Town of Goffstown
New Hampshire

Hazard Mitigation Plan
Update 2015

Town of Goffstown, New Hampshire

Hazard Mitigation Plan Update 2015

Prepared for the Town of Goffstown, NH and the
NH Homeland Security & Emergency Management (NHHSEM) and the
Federal Emergency Management Administration (FEMA)
by the
Goffstown Hazard Mitigation Committee with
assistance from the Southern New Hampshire Planning Commission

March, 2015

___, 2015 Public Hearing Date
___, 2015 Adoption Date
Final Plan

Acknowledgements

The Board of Selectmen of the Town of Goffstown wish to thank the following individuals for serving on the Town's Hazard Mitigation Committee and for their assistance in the development of this Plan:

Goffstown New Hampshire Hazard Mitigation Committee

Chief Richard O'Brien, Committee Chair, Goffstown Fire Department

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Carl Quiram, Director, Goffstown Department of Public Works

Parker Moore, State Hazard Mitigation Planner, NH Homeland Security & Emergency Management

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Special thanks also to:

- The New Hampshire Homeland Security and Emergency Management (NH HSEM), which developed the *New Hampshire Multi-Hazard Mitigation Plan (2013)*;
- The Bedford, Hooksett Hazard Mitigation Committees and the Town of Campton, NH and their respective Hazard Mitigation Plans.

All the above publications served as models for this plan.

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Table of Contents

Acknowledgements ii
Executive Summary 1

I. INTRODUCTION 7

The Hazard Mitigation Planning Process 7
Jurisdiction 8
Authority 8
Scope of the Plan & Federal and State Participation 8
What Is Hazard Mitigation? 9
Why Develop a Hazard Mitigation Plan? 9
Benefits of Hazard Mitigation 9
Public and Stakeholder Involvement 10
Incorporation of Existing Plans, Studies, Reports and Technical Information 17
Existing Goffstown Emergency Operations Plan 18
State of NH Legislation Related to Master Plans 18
Hazard Mitigation Planning Process & Methodology 19
Plan Development Steps 19
Town of Goffstown's Hazard Mitigation Goals 20
Narrative Description of the Planning Process 21
Plan Adoption 26
Plan Monitoring 26
Community Profile 27

II. HAZARD IDENTIFICATION & POTENTIAL RISK ASSESSMENT 35

Natural Hazards and Their Consequences 35
Hazard Identification 41
Hazard Threat Analysis 43
Risk Assessment 45
Past and Potential Hazards 46
Goffstown National Flood Insurance Program (NFIP) Status 46
Potential Losses 49
Description of the Hazards 52
- Flooding 52
- 100-year Floodplain Events 53
- Fluvial Erosion Hazards 57
- Hurricanes 60
- Debris-Impacted Infrastructure 63
- Erosion and Mudslides 65
- Rapid Snow Pack Melt 67
- River Ice Jams 68

Dam Breach or Failure....70
Tornadoes....73
Downbursts....75
Lightning....77
Wildfires....78
Heavy Snow Storms....83
Ice Storms....88
Hailstorms....90
Earthquakes....92
Landslides....95
Drought....96
Extreme Heat....98
Extreme Cold....101
Radon....102
Civil Disorder....104
Prison Break / Disturbance....104
Terrorism....104
Critical Infrastructure Failure....105
Areas at Risk....111

III. EXISTING MITIGATION STRATEGIES & PROPOSED IMPROVEMENTS… 115

Review of Existing Programs....115
Description of Existing Programs....116
Existing Protection Matrix and Proposal Input....125
Existing Protection Matrix – Summary Chart....126
Potential Mitigation Strategies and Actions....133

IV. NEWLY IDENTIFIED MITIGATION STRATEGIES & CRITICAL EVALUATION.140

Summary of Evaluation Method....142
Preliminary Prioritization……..……... 143

V. PRIORITIZED IMPLEMENTATION SCHEDULE & FUNDING SOURCES.....145

Implementation Strategy for Priority Mitigation Actions ……....145
Cost of Implementation....155

VI. ADMINISTRATIVE PROCEDURES REGARDING ADOPTION OF THE PLAN….159

Adoption....159
Monitoring & Updates....159

List of Maps

Location Map of Goffstown, NH 27
Past and Potential Hazards Map 47
Fluvial Erosion Hazards Map 61
Wildfire Hazards Map..... 82
Critical Facilities Map..... 109
Areas at Risk Map…….……....113

Appendices

Appendix A – Dams, Hazardous Materials, and Commercial Impact Areas
Appendix B- Resources, Bibliography, Websites
Appendix C- New Hampshire Dam Classification Schedule
Appendix D- Technical and Financial Assistance for Hazard Mitigation
Appendix E- STAPLEE Criteria
Appendix F- GHMC Meeting Agendas, Minutes and Attendance Sheets
Appendix G- Documentation of Public Hearing and Plan Adoption
Appendix H- 2004 Prioritized Implementation Schedule and Funding Sources
Appendix I - Fluvial Erosion Hazard Assessment Maps 1-12
Appendix J– NH DES Environmental Fact Sheet: Fluvial Erosion Hazards
Appendix K - Description of Fluvial Geomorphology Data
Appendix L – List of Culverts – Piscataquog River Watershed Stream Crossing Vulnerability Assessment Project
Appendix M – Town of Goffstown Flood Hazard (FH) District

Goffstown New Hampshire Hazard Mitigation Plan
Update 2015
Executive Summary

This Plan was created through a grant from the New Hampshire Homeland Security and Emergency Management (NHHSEM). The Plan is an update to the original Goffstown Hazard Mitigation Plan, approved by the U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA), Region 1 on July 1, 2009.

Approval Dates for 2015 Update

Town of Goffstown Public Hearing:	_____ **Date**
Town of Goffstown Board of Selectmen Adoption:	_____ **Date**
NHHSEM Plan Approval:	_____ **Date**
FEMA Plan Approval:	_____ **Date**

The following organizations have contributed invaluable assistance and support to this Plan:

- New Hampshire Homeland Security & Emergency Management (HSEM)
- Federal Emergency Management Agency (FEMA)
- NH Office of Energy and Planning (NH OEP)
- NH Department of Environmental Services (NH DES), Geologic Survey
- NH Department of Environmental Services, Dam Safety

The ***Goffstown Hazard Mitigation Plan Update 2015*** serves as a means to reduce future losses from natural and/or man-made hazard events before they occur. The 2015 Plan was developed by the Goffstown Hazard Mitigation Committee and affected stakeholders with assistance provided by the Southern New Hampshire Planning Commission. The Plan contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts. In an effort to produce an accurate and current planning document, the Goffstown Hazard Mitigation Committee used the 2009 Plan as a foundation building upon that Plan to provide more timely information.

A "natural hazard" is defined as a source of harm or difficulty created by a meteorological, environmental, or geological event. "Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards (44CRF 201.2). Hazard mitigation activities may be implemented prior to, during, or after an event. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusion, comprehensive, long-term plan that is developed before a disaster occurs."[1] This 2015 Updated Plan addresses the following natural and human-caused hazards:

[1] Source: Local Mitigation Plan Review Guide, FEMA, October 1, 2011.

Natural Hazards

- Flooding (100-year events)
- Fluvial Erosion Hazards
- Hurricanes
- Erosion and Mudslides
- Rapid Snow Pack Melt
- River Ice Jams
- Dam Breach or Failure
- Tornadoes
- Downbursts
- Lightning
- Wildfires
- Severe Winter Weather (heavy snow)
- Ice Storms
- Hailstorms
- Earthquakes
- Landslides
- Debris-Impact Infrastructure
- Extreme Heat
- Extreme Cold
- Drought
- Radon

Human-Caused Hazards

- Critical Infrastructure Failure
- Civil Disorder
- Prison Break/Disturbance
- Terrorism

The Plan also provides a list of "**Critical Infrastructure**" and "**Key Resources"** categorized as follows: Necessary for Emergency Response Facilities (ERF); Not Necessary for Emergency Response Facilities (NERF); Facilities and Populations to Protect (FPP); and Potential Resources (PR).

In addition, this Plan addresses the Town of Goffstown's involvement in the National Flood Insurance Program (NFIP).

Highlights of these resources include:

Critical Infrastructure:

- Emergency Operations Center
- Town Hall
- Post Office
- Fire Service Facilities
- Law Enforcement Facilities
- Public Works Garage
- Evacuation Routes
- Bridges
- Emergency Shelters – primary Goffstown High School & Mountain View Middle School
- Telephone Facilities
- Wireless Communication Facilities
- Emergency Fuel Facilities
- Hydropower Plants

Key Resources:

- Isolated Homes
- Dams
- Major Highways
- Electrical Power Substations
- Hazardous Material Facilities
- Recreation Areas
- Problem Culverts
- Hydro Power Plants
- Historic/Unique Resources
- Commercial/Economic Impact Areas
- Water and Wastewater Treatment Facilities
- Churches
- Correctional Facilities
- Nursing Homes
- Elderly Housing
- Schools/Day Care Center
- Socio-Economic Impact Area

The Town of Goffstown also has a number of existing programs, land use regulations and building codes in place that are designed to help mitigate and adequately cope with the impact of natural hazards within the community. The Goffstown Hazard Mitigation Committee has identified the following **existing hazard mitigation programs**:

1. Best Management Practices (BMPs)
2. Life Safety Codes, State Adopted Fire Standards
3. Town Adopted Building Codes
4. Flood Hazard District
5. River Stewardship Program
6. Steep Slopes and Class VI Road Regulations
7. Road Design Standards
8. Wetlands Conservation District
9. Manufactured Homes and Manufactured Home Parks (Zoning Ordinance)
10. Open Space Development Program
11. Public Education
12. Elevation Certificates
13. Conservation and Open Space District
14. Town Radio System – Conventional VHF Radio
15. Town Public Safety Radio System
16. Flood Gauge
17. Flood Warning System
18. Fluvial Erosion Hazards and River Geomorphic Assessment Program
19. Piscataquog River Watershed Stream Crossing Vulnerability Assessment Project

Developing mitigation strategies and action items addressing every hazard impacting the community is at times difficult to achieve. In addition, confronted with today's economic constraints, the Town of Goffstown like many other cities and towns in New Hampshire is not likely to have the financial resources and ability to pay for certain mitigation action items, such as buying power lines or moving flood prone buildings. In recognizing this financial reality, the Goffstown Hazard Mitigation Committee prepared the following comprehensive list of **mitigation strategies** for the 2015 Update Plan. The Committee believes these strategies will help to diminish the impact of hazards within the community and at the same time allow the town to maintain a list of preparedness action items for future reference and use:

1. Improve the town's Flood Warning System and incorporate Code Red warnings.
2. Update existing plans for Dam Breach and Failure (such as Gregg Falls Dam)
3. Obtain generators and establish emergency back-up power for Emergency Shelters.
4. Develop another emergency shelter in addition to the Middle and High School.
5. Work with U.S. Army Corp of Engineers to establish a new or relocate existing flood gauge at the New Boston/Goffstown line.

6. Upgrade/improve critical bridges crossings (Henry Bridge and Main Street)
7. Write a Debris Management Plan for the Town.
8. Improve/upgrade town's existing Public Safety Radio on Mt. Uncanoonuc and for use by the DPW.
9. Improve storm water capacity and prioritize upgrades to town's culverts and stream crossings using the new Culvert Vulnerability and Assessment data and findings.
10. Develop enforcement guidelines and provisions for town staff in the Flood Hazard Overlay District.
11. Examine existing wetland buffers to determine effectiveness at protecting wetlands and water resources within the town.
12. Improve public awareness and education on debris management after storm events around private property.
13. Improve public awareness and education on wildfire hazards.
14. Install generators and backup power for fuel pumps/sanitation services.
15. Encourage installation of utilities and wires underground for all new development and critical infrastructure.
16. Develop a Floodplain Management Plan for the Town.
17. Increase salt storage capacity.
18. Develop a Storm Water Runoff Plan for the Town and incorporate into relevant town plans, such as Master Plan and MS-4 plans for EPA.
19. Conduct a study and analysis of landslide hazards in the community and incorporate into relevant town plans.
20. Develop Extreme Heat outreach education, planning and protective measures for the public. Target vulnerable populations.
21. Update town's Timber Management Plan for Mt. Uncanoonuc.
22. Work with the PRLAC to develop a voluntary river stewardship program for river maintenance and to control debris and sediment.
23. Develop site and building standards to minimize erosion risks within the town.
24. Encourage the Conservation Commission and Town to pursue purchase of flood-prone properties in town.
25. Develop strategies to stabilize slope failure at vulnerable locations around town.
26. Acquire more snow and ice equipment to increase ability to clear snow.
27. Acquire View Works Software program for cataloguing drainage infrastructure for planning purposes.
28. Examine Manufactured Homes and Home Parks Zoning Ordinance to determine applicability for hazards and safety.
29. Participate in Community Rating System through NFIP for reduced insurance rates to citizens.
30. Establish a Storm Water Utility Fee.
31. Educate property owners within flood zones on participation in National Flood Insurance Program.
32. Provide Urban Wildland Interface Education to the public and local developers.

33. Create a town-wide hazard Public Warning system.

The overall goal and mission of this 2015 Plan Update is to make the Town of Goffstown less vulnerable to the effects of hazards through the effective administration of hazard mitigation planning, natural hazard assessments, and a coordinated approach to mitigation policy and planning activities. It is the vision of the Goffstown Hazard Mitigation Committee to reduce the impacts of natural hazards and other potential disasters through implementing mitigation measures, public education and specific deliberated capital expenditures within the community which are supported by the public and the Board of Selectmen. Thus, homes and businesses in Goffstown will be made safer and the community's ISO rating may be improved.

SECTION I
INTRODUCTION

"*Plans are worthless. Planning is essential.*" —Dwight D. Eisenhower

The Hazard Mitigation Planning Process

The Town of Goffstown Hazard Mitigation Plan 2015 Update was prepared in accordance with the Disaster Mitigation Act of 2000 (DMA), Section 322 Mitigation Planning, signed into law by President Clinton on October 30, 2000. This updated hazard mitigation plan was prepared by the Goffstown Hazard Mitigation Committee for the Town of Goffstown under contract with the New Hampshire Homeland Security and Emergency Management (HSEM) operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-97 Edition) and with the assistance and professional services of the Southern New Hampshire Planning Commission. The Plan was funded by HSEM through grants from FEMA (Federal Emergency Management Agency); matching funds for Committee members' time were also part of the funding formula.

The primary purpose of the Disaster Mitigation Act of 2000 (DMA) is to: "…establish a national disaster hazard mitigation program – to reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and to provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster."[2]

It is HSEM's goal to have all New Hampshire communities complete a local hazard mitigation plan as a means to reduce future losses from natural or human-caused events before they occur. HSEM outlined a process whereby communities throughout the state may be eligible for grants and other assistance upon completion of this hazard mitigation plan.

The Goffstown Hazard Mitigation Plan Update 2015 is a planning tool to use to reduce future losses from natural and human-caused hazards as required by the Disaster Mitigation Act of 2000; this Plan does not constitute a section of the Town's Master Plan; however mitigation action items contained in this Plan may be incorporated into future Master Plan updates.

The DMA places a new emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a

[2] Disaster Mitigation Act (DMA) of 2000, Section 101, b1 and b2.

condition to receiving Hazard Mitigation Grant Program (HMGP) project grants. Local governments must review yearly and update this Plan every five years to continue program eligibility.

Jurisdiction

This 2015 Updated Plan addresses one jurisdiction – the Town of Goffstown, NH.

Authority

The Goffstown Hazard Mitigation Committee prepared the Goffstown Hazard Mitigation Plan Update 2015 with the assistance of the Southern New Hampshire Planning Commission (SNHPC) under contract with the New Hampshire Homeland Security and Emergency Management (NHHSEM). After a public hearing held in the Goffstown Town Hall on _____, 2015, the Goffstown Board of Selectmen formally adopted this Plan on _____, 2015. Documentation of the Board of Selectmen's adoption of the Plan is provided in Appendix H.

Scope of the Plan & Federal and State Participation

A community's hazard mitigation plan often identifies a large number of natural hazards and is somewhat broad in scope and outline. The scope and effects of this Plan were assessed based on the impact of hazards and wildfires on: Critical Infrastructure and Key Resources within the community such as the town's public infrastructure (public water, sewer, roads, streets, drainage, etc.), existing residential buildings and other structures within the town; future development; administrative technical and physical capacity of emergency response services; and response coordination between federal, state and local entities.

In seeking approval as a Hazard Mitigation Plan, the planning effort included participation of Homeland Security and Emergency Management staff, floodplain management staff at the NH Office of Energy and Planning (OEP), and the NH Department of Environmental Resources (NH DES), Geologic Survey staff as well as routine notification of upcoming meetings to these key public agencies and officials. In addition, as required under Code of Federal Regulations (CFR), Title 44, Part 201.6(c)(2)(ii) and 201.6(c)(3)(ii), the Plan must address the Community's participation in the National Flood Insurance Program (NFIP), its continued compliance with the program and as part of vulnerability assessment, the Plan must address the NFIP insured structures that have been repetitively damaged due to floods.

What Is Hazard Mitigation?

Hazard mitigation is the practice of reducing risks to people and property from natural hazards. FEMA's Local Mitigation Planning Handbook states that "Hazard mitigation reduces disaster damages and is defined as sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards."[3] It includes both structural interventions, such as flood control devices, and nonstructural measures, such as avoiding construction in the most flood-prone areas. Mitigation includes not only avoiding the development of vulnerable sections of the community, but also making existing development in hazard-prone areas safer. For example, a community could identify areas that are susceptible to damage from natural disasters and take steps to make these areas less vulnerable. It could also steer growth to less risky areas. Keeping buildings and people out of harm's way is the essence of mitigation.

Mitigation should not be seen as an impediment to growth and development. On the contrary, incorporating mitigation into development decisions can result in a safer, more resilient community, one that is more attractive to new families and businesses.

Why Develop a Hazard Mitigation Plan?

The full cost of the damage resulting from natural hazards—personal suffering, loss of lives, disruption of the economy, and loss of tax base—is difficult to measure. New Hampshire is subject to many types of natural disasters: floods, hurricanes, nor'easters, winter storms, earthquakes, tornadoes, and wildfires, all of which can have significant economic and social impacts. Some, such as hurricanes, are seasonal and often strike in predictable locations. Others, such as floods, can occur any time of the year and almost anywhere in the state.

Benefits of Hazard Mitigation

Hazard mitigation offers many benefits for a community. It can:

- **Save lives and property.** A community can save lives and reduce property damage from natural hazards through identifying risks and taking action, such as elevating structures in the floodplain.
- **Reduce vulnerability to future hazards.** By having a mitigation plan in place, a community is prepared to take steps that will permanently reduce the risk of future losses. This opportunity is often lost when communities are built without regard to natural hazards, or when they are rebuilt after a disaster "just like they were before." While it is natural to want to return things to the way they were, it

[3] Local Mitigation Planning Handbook, FEMA, March 2013.

is important to remember that, in many cases, the disaster would not have been as severe if a mitigation plan had been implemented.

- **Facilitate post-disaster funding.** By identifying and ranking recovery projects before the next disaster, a community will be in a better position to obtain post-disaster funding because much of the background work necessary for applying for federal funding will already be done.
- **Speed recovery.** By developing a mitigation strategy, a community can identify post-disaster mitigation opportunities in advance of a disaster and be ready to respond quickly after a disaster.

Public and Stakeholder Involvement

Public and stakeholder involvement was stressed prior to work on the Plan and during all the meetings of the Goffstown Hazard Mitigation Committee. A List of Stakeholders consisting of various public officials and various organizations was developed and used in notifying the public and local and state officials and surrounding communities of the Plan (see Table A, pages 14, 15 and 16). Community officials were urged to contact as many people as they could to participate in the planning process, including not only residents, but also town planners and emergency management directors as well as residents from surrounding communities. This was stressed throughout the planning process as the Town of Goffstown understands that natural hazards do not recognize corporate boundaries.

Section 201.6(b) requires that there be an open public involvement process in the formation of a hazard mitigation plan. This process shall provide an opportunity for the public to comment on the Plan during its formation as well as an opportunity for any neighboring communities, businesses, and others to review any existing plans, studies, reports and technical information and incorporation of those in the Plan, to assist in the development of a comprehensive approach to reducing losses from natural disasters.

To seek public involvement and participation in the 2015 Plan Update, SNHPC released the following Press Release to the local media early on in the planning process. In addition, SNHPC prepared an article about the Hazard Mitigation Plans in its quarterly newsletter which is distributed electronically to every community and public official in the SNHPC Region, including local board members, volunteers and the general public (see following copy of the article). During the development of the Plan, SNHPC also posted meeting announcements and minutes on the SNHPC website and worked with the City Police staff to post agendas and public notices of all the Goffstown Hazard Mitigation Committee meetings on the bulletin board at the Town Office Building.

The SNHPC also organized and facilitated a region-wide hazard mitigation and fluvial erosion hazard workshop held on February 23, 2014 at the New Boston Public Library

and invited public officials, emergency management directors and town planners and the public from surrounding communities to participate and become involved in the development of this and other hazard mitigation plans in the Piscataquog Watershed (see workshop flyer and agenda in Appendix A).

In addition, SNHPC made phone calls to the organizations and individuals identified on the Stakeholders Contact List; also inviting local Emergency Management Directors and Town Planners from neighboring towns as well as various state officials to participate in the Plan. A list of these individuals and their contact information is provided in the following Stakeholders Contact List for this Plan (see Table A, pages 14, 15 & 16). As a result of this public outreach many interested citizens and stakeholders had the opportunity to become aware of the hazard mitigation planning taking place in Goffstown.

FOR IMMEDIATE RELEASE – January 1, 2014

CONTACT:
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Southern New Hampshire Planning Commission
(603) 669-4664 – Phone
dpreece@snhpc.org

TOWN OF GOFFSTOWN HAZARDS MITIGATION PLAN

The Southern New Hampshire Planning Commission (SNHPC) is assisting the Town of Goffstown in updating the community's existing 2009 Hazards Mitigation Plan and is inviting the public and surrounding municipalities as well as other local, town, state and federal officials and environmental organizations to participate in the planning process.

The first Goffstown Hazard Mitigation Committee Meeting will take place on January 14, 2014 at 3:00 PM in the Goffstown Police Department located at 326 Mast Rd.

As the primary contacts for the plan, please contact David Preece (DPreece@snhpc.org) and/or Jillian Harris (JHarris@snhpc.org) with the SNHPC for any questions or information about the plan at (603)-669-4664. Thank you!

END

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Vol. 40, No 1 Southern New Hampshire Planning Commission September 2014

In This Issue

Hazard Mitigation Plans Prepare Towns for Emergencies

Developing Peak Hour Travel Demand Models

CEDS Program

MTA / CART System Connection Study

Corridor Management Plan for Londonderry Apple Way

Windham Master Plan Survey

48th Annual Meeting and Ramond E. Closson Award

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Hazard Mitigation Plans Prepare Towns for Emergencies

The Southern New Hampshire Planning Commission (SNHPC) is currently updating Hazard Mitigation Plans for the towns of Bedford, Derry, Goffstown, Hooksett, and Raymond. Londonderry will start the process by the end of the year.

These Hazard Mitigation Plans need to be updated every five years for towns to get Federal Emergency Management Agency (FEMA) funding during emergencies. The Disaster Mitigation Act of 2000 requires local governments to develop natural hazard mitigation plans and submit the plan to FEMA for review. In New Hampshire, the Department of Safety, Homeland Security and Emergency Management reviews the plans before they are submitted to FEMA.

The Hazard Mitigation Plan establishes eligibility for funding programs by FEMA, which now falls under the Department of Homeland Security (DHS). This provides the opportunity to reduce the risk to individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds. Towns develop mitigation measures which help prevent damage from happening in the first place. Just like preventative medication, carefully written and established mitigation measures can keep towns protected and healthy during and after a hazardous weather event. Examples of a mitigation measure would be higher regulatory standards for floodplain development,

JoAnn Duffy, Goffstown
Barbara Griffin, Goffstown
David Pierce, Alt., Goffstown
Michel N. Jolin, Hooksett
Richard G. Marshall, Hooksett
Jacqueline Roy, Hooksett
Sharon M. Carson, Londonderry
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Harold "Bo" Strong, New Boston
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upgrading problem culverts, and writing Wildfire Prevention and Drought Plans. Public education and outreach is another example of a mitigation measure.

The FEMA Hazard Mitigation Assistance (HMA) programs provide funds for projects that reduce the risk to individuals and property from natural hazards. These programs enable mitigation measures to be implemented before, during, and after disaster recovery. The programs include:

- Hazard Mitigation Grant Program (HMGP) provides funding for long-term hazard mitigation measures following major disaster declarations.
- Pre-Disaster Mitigation (PDM) provides funding on an annual basis for hazard mitigation planning and the implementation of mitigation projects.
- Flood Mitigation Assistance (FMA) provides funding on an annual basis so measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program (NFIP).

For more information on Hazard Mitigation Plans, please contact Karen Mattor, Senior Planner, at kmattor@snhpc.org.

Developing Peak Hour Travel Demand Models

Peak hour travel demand models are broadly used in vehicle emissions and air quality analysis, congestion management programs, identification of highway system problems, transit analysis, and analysis of intelligent transportation systems. The current Southern New Hampshire Planning Commission (SNHPC) regional travel demand model predicts annual average daily traffic volume; which is basically a 24 hour volume. The peak hour travel demand models would predict morning and afternoon peak hour volume on the regional roadways. The SNHPC staff have started developing the regional peak hour travel demand model.

There are four standard approaches when developing a peak hour travel demand model. They are 1) after trip assignment, 2) between mode choice and trip assignment, 3)

Table A: Stakeholders Contact List

	Contact	Title	Organization	Email
State	Parker Moore	Mitigation Planner	NH HESM	Parker.Moore@dos.nh.gov
	Danielle Morse	Field Representative	NH HESM	danielle.morse@dos.nh.gov
	Jennifer Gilbert	Floodplain Planner	NH OEP	jennifer.gilbrt@nh.gov
	Nancy Ballargeon	Administrator	NH DES Dam Bureau	damsafety@des.nh.gov
	Shane Csiki	Fluvial Coordinator	NH DES Geologic Survey	Shane.Csiki@des.nh.gov
Local (Goffstown)	Collis Adams	Chairman, Board of Selectmen Select Board	Town of Goffstown	cadams@goffstownnh.gov
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	Brian Rose	Town Planning and Zoning Administrator	Town of Goffstown	brose@goffstownnh.gov
	Robert Browne	Police Chief	Town of Goffstown	police@goffstownpolice.com
	Richard O'Brien	Fire Chief & Emergency Management Director	Town of Goffstown	robrien@goffstownnh.gov
	Mark Tessier	Health Officer	Town of Goffstown	mtessier@goffstownnh.gov
	Brian Balke	Superintendent of Schools	SAU19-Goffstown and New Boston	bbalke@goffstown.k12.nh.us
	Rick Wilhelmi	Parks and Recreation Director	Town of Goffstown	rwilhelmi@goffstownnh.gov

	Mike Hillhouse	Interim Public Works Director	Town of Goffstown	mhillhouse@goffstownnh.gov
	Meghan Theriault	Town Engineer	Town of Goffstown	mtheriault@goffstownnh.gov
	Mark Tessier	Building Inspector	Town of Goffstown	mtessier@goffstownnh.gov
	Bill Connor	Selectman	Town of Goffstown	bconnor@goffstownnh.gov
	Carl Quiram	Former Public Works Director	Town of Goffstown	cquiram@goffstownnh.gov
	Michael Sullivan	Selectboard	Town of Goffstown	msullivan@goffstownnh.gov
Special Interest	Allen Gamans	Administrator	Goffstown Village Water District	gvwp@comcast.net
	Christine Daniels	Chair	Grasmere Water District	497-8346
	Kevin Corriveau	Gregg Falls Dam Operator	Gregg Falls Hydroelectric Association, Algonquin Power Corp. Inc.	497-4290
	Thomas Caldwell	Editor	The Goffstown News	tcaldwell@unionleader.com
	Chris Wells	Executive Director	Piscataquog Land Conservancy	cwells@plcnh.org
Surrounding Towns	Scott Wiggin	Fire Chief	Town of Bedford	swigging@bedfordnh.org
	John Bryfonski	Police Chief	Town of Bedford	jbryfonski@bedfordnh.org
	Rick Sawyer	Town Planner	Town of Bedford	rsawyer@bedfordnh.org

	John Wiggin	Emergency Management Director	Town of Dunbarton	www.dunbarton.nh.gov
	Jo Ann Duffy	Town Planner	Town of Hooksett	Jduffy@hooksett.org
	Michael Williams	Emergency Management Director	Town of Hooksett	mwilliams@hooksettfire.org
	Nicola Strong	Planning Coordinator	Town of New Boston	planning@new-boston.nh.us
	Dan MacDonald	Emergency Management Director	Town of New Boston	emergencymanagement@newbostonnh.gov
	Naomi Bolton	Town Planner	Town of Weare	nbolton@weare.nh.gov
	John Velleca	Former Emergency Management Director	Town of Weare	www.weare.nh.gov
	Pam Goucher	Assistant Planning Director	City of Manchester	pgoucher@manchesternh.gov
	Captain Chuck Hunn	Emergency Management Director	City of Manchester	chunn@manchestermo.gov
	Stephanie Alexander	Senior Planner	Central NH Regional Planning Commission	salexander@cnhrpc.org
Experts	Richard Ludders	Chair	Piscataquog River Management Advisory Committee	ludds@comcast.net
	Colin Lawson	Culvert Specialist	Trout Unlimited	Clawson@tu.org

It is often very difficult to attract individual citizens to participate in town government and those that do generally hold full-time jobs and work as volunteers in a variety of town positions. In addition, Goffstown is a fairly large suburban community located in the Greater Manchester Region (with a 2010 population of 17,761) and the percent of interested citizens involved in local planning activities in Goffstown is extremely small and limited. The Town of Goffstown also has a relatively high number of young people compared to other towns in the region (the town's median age is 39 years old) and many of these individuals have full time jobs and generally lack interest in politics which greatly limits public participation and involvement in local planning work.

While much effort was made to promote public involvement and include public officials from surrounding towns to participate in the development of this Plan and attend the meetings of the Goffstown Hazard Mitigation Committee, no general community members or individuals took the opportunity to participate; therefore no comments from the general public are included in this Plan at this time. Another concentrated public outreach effort will be initiated again by the SNHPC prior to the release of the final draft of this Plan and scheduling the final public hearing on its adoption.

Incorporation of Existing Plans, Studies, Reports and Technical Information

Overall, the planning process in developing this Plan included a complete review of the Town of Goffstown's existing 2009 Hazard Mitigation Plan for updates, development changes and accomplishments. In addition, as noted in the Appendices and in the footnotes located throughout the Plan, many other documents and references were used to create this hazard mitigation plan.

Two studies of particular importance include: (1) the Fluvial Erosion Hazard Assessment of the Piscataquog River which was conducted by the NH DES, Geological Survey in 2013 and 2014; and (2) the Piscataquog River Watershed Stream Crossing Vulnerability Assessment which was prepared by Trout Unlimited and the SNHPC in 2014. In addition, some but not all, of the following plans and documents were used as references are noted below:

The Goffstown Hazard Mitigation Plan of 2009……Compare & Contrast
The Goffstown Master Plan……..Future Development
The SNHPC Regional Comprehensive Plan……..……Future Development
Goffstown Annual Town Report, 2014……...Structure Value Data
Area Hazard Mitigation Plans (Weare, New Boston, Bedford, etc.)..... Mitigation Ideas
Goffstown Zoning Ordinance…….Floodplain Regulations
Census 2010 and OEP Data……..Population Data
NH DRA Summary of Inventory of Valuation MS-1 2014 Report….Structure Evaluation

SNHPC Community Asset Profiles – Socio-Economic Data……...Population Trends
American Community Survey (ACS 2008-2014)……...Population Trends
NH Office of Energy and Planning……..Flood Loss
NH Dept. of Revenue property tax valuation by property type……Property Information

Other technical manuals, federal and state laws as well as research data were combined with these elements to produce this integrated hazard mitigation plan. It is highly recommended that the reader also refer to the Appendices and the Plan's footnotes.

Existing Goffstown Emergency Operations Plan

It is important to note that adoption of this Plan, the Goffstown Hazard Mitigation Committee and the Town of Goffstown plan to incorporate this Plan into the Town of Goffstown's Emergency Operations Plan as part of the Hazard Analysis section and as a Functional Annex of the Plan.

The Town of Goffstown last updated the *Goffstown Emergency Operations Plan* in July 2014. This plan describes the *preparedness* activities to improve the Town's ability to respond to an incident; the *response* activities, including rescue operations, evacuation, emergency medical care, and emergency personnel training; and *recovery* activities that begin after the disaster. *Mitigation* activities help to reduce or eliminate the damages from future disaster events, and can occur before, during and after a disaster. The *Goffstown Emergency Operations Plan* states in part:

> *The Town of Goffstown is exposed to many hazards, all of which have a potential to disrupt the community, cause damage, and create casualties… Mitigation actions eliminate or reduce the probability of some disaster occurrences and also include long-term activities that lessen the undesirable effects of unavoidable hazards or reduce the degree of hazard risk. Some mitigation examples include flood plain management and public education programs. Mitigation seeks to prevent disasters and to reduce the vulnerability of people to disasters that may strike. Hazard mitigation should follow all disasters.*

State of New Hampshire Legislation Related to Master Plans

It is also important to note that during 2002, the State of New Hampshire adopted new legislation related to master plans requiring municipalities to "provide more definitive guidance in planning and managing future growth." This new legislation allows a natural hazards section to be considered during the master planning process and to be incorporated into the master plan. It is the desire of the Goffstown Town Planner that upon adoption, the ***Goffstown Hazard Mitigation Plan Update 2015*** could possibly serve as a new section of the town's existing or future *Goffstown Master Plan* as directed by the Planning Board. The new legislation, *RSA 674:2 (e) Master Plan; Purpose and Description,* reads:

(d) A natural hazards section which documents the physical characteristics, severity, frequency, and extent of any potential natural hazards to the community. It should identify those elements of the built environment at risk from natural hazards as well as extent of current and future vulnerability that may result from current zoning and development policies.

The State of New Hampshire has also adopted legislation related to fluvial erosion hazard ordinances. RSA 674:56.II. (a) and (b) authorizes municipalities to adopt fluvial erosion hazard ordinances either as an amendment to an existing zoning ordinance or as a separate ordinance.

Hazard Mitigation Planning Process & Methodology

The planning process in developing this plan consisting of 12 specific steps or work tasks as outlined in FEMA's *Local Mitigation Planning Handbook*, March 2013. Some of these tasks were accomplished independently while other areas were interdependent and thus addressed concurrently. The ultimate sequence of the planning process such as the number of meetings held, meeting preparation, attendance and other community needs generally resulted in significant cross-talk and inter-departmental communications regarding all types of natural and human-caused hazards among all Town Departments, state and federal agencies, and in particular the Goffstown Hazard Mitigation Committee members and stakeholders involved in developing the Plan.

Utilizing a "building block" approach, the base, or foundation, for the mitigation plan 2015 update was the prior 2009 plan. Each development step in the table that was completed had its starting point with the last hazard mitigation plan completed by the community. Ultimately, the "building blocks" leading to the town's hazard mitigation goals and the development of the prioritized mitigation "action items" placed into the action plan were all designed to lessen or diminish the impact of natural hazards on the town.

Plan Development Steps

The following is a summary of the steps conducted to complete the updated 2015 Plan:

Step 1: **Formation of Planning Team (e.g. Hazard Mitigation Committee); Orientation and Goal Identification**
Step 2: **Formulate Hazards List; Hazards Description and Threat Matrix**
Step 3: **Profile, List and Map Historic and Potential Hazards, Wildfire, Natural and Human-Caused**
Step 4: **Profile, List and Map Critical Infrastructure and Key Resources**
Step 5: **Assess Community's Participation in National Flood Insurance Program**

Step 6: Gather Town History, Past and Future Development Trends, Town Statistics
Step 7: List Existing Mitigation Strategies & Brainstorm to Identify Potential Mitigation Strategies
Step 8: Examine Mitigation Strategies from the Prior Plan
Step 9: Evaluate and Categorize Potential Mitigation Action Items
Step 10: Prioritize Mitigation Action Items to Determine Action Plan
Step 11: Review of Plan Contents for Submission to HSEM/FEMA
Step 12: Adopt and Monitor the Plan

Town of Goffstown's Hazard Mitigation Goals

The Goffstown Hazard Mitigation Committee developed, reviewed and adopted the following Hazard Mitigation Goals for this Plan and the Town of Goffstown.

1. To improve upon the protection of the general population, citizens and guests of the Town of Goffstown from all natural and man-made hazards.

2. To reduce the potential impact of natural and man-made disasters on the Town of Goffstown's Critical Support Services and Critical Facilities.

3. To reduce the potential impact of natural and man-made disasters on the Town of Goffstown's infrastructure.

4. To improve the Town of Goffstown's Emergency Preparedness, Disaster Response and Recovery Capability.

5. To reduce the potential impact of natural and man-made disasters on private property.

6. To reduce the potential impact of natural and man-made disasters on the Town of Goffstown's economy.

7. To reduce the potential impact of natural and man-made disasters on the Town of Goffstown's natural environment.

8. To reduce the Town of Goffstown's liability with respect to natural and man-made hazards generally.

9. To reduce the potential impact of natural and man-made disasters on the Town of Goffstown's specific historic treasures.

10. To address the challenges posed by climate change as they pertain to increasing risks in the Town of Goffstown's infrastructure and natural environment as

resources allow. The Town of Goffstown recognizes the need to implement updated engineering designs and standards that adequately prepares public infrastructure for increasing stormwater runoff. With this goal, the town seeks to adapt to events featuring heavy precipitation causing severe flood damage to public and private property. The Department of Public Works will seek to adopt guidelines that are properly vetted and endorsed by national and state standards.

11. To continue participation in the National Flood Insurance Program (NFIP).

"... [M]itigation works. The Seattle-Tacoma area did not suffer significant losses [following the February 28, 2001, earthquake] because 20 to 30 years ago local leaders invested in its future by passing building codes and issuing municipal bonds that implemented solid protective measures." –Joe Allbaugh, Director of FEMA, Congressional Testimony, May 16, 2001

Narrative Description of the Planning Process

The 2015 Updated Plan was prepared with substantial local, state and federal coordination and assistance. Completion of this new hazard mitigation plan required significant planning preparation. In January 2014, the Goffstown Hazard Mitigation Committee was formed to begin updating the Plan. The Committee followed the process set forth in the Local Mitigation Planning Handbook (2013) and the 12 steps outlined on pages 19 and 20 of this Plan.

The Committee consisted of representatives from various local and state agencies, including the Planning Department, Fire Department, Police Department and Public Works Department. All meetings of the Goffstown Hazard Mitigation Committee were geared to accommodate brainstorming, open discussion and an increased awareness of potential hazardous conditions within the Town.

A total of seven public meetings were held, beginning in January 2014 and ending in September 2014. All of the meetings were properly posted in two public places as required by NH state open meeting laws. The public was invited to attend meetings and provide input through such opportunities as viewing the SNHPC website, meeting agendas and minutes, public meeting notices, as well as press release and public media blasts and newsletter articles prepared by the SNHPC. All meetings were held at either the Goffstown Fire Station, the Goffstown Police Station or at the Goffstown Town Hall. Copies of all the meeting agendas, minutes and attendance sheets for this 2015 Updated Plan are provided in Appendix G.

The planning process included a complete review of the 2009 Goffstown Hazard Mitigation Plan. Each section of the 2009 Plan was reviewed and updated according to new information and the events of the past five years. Use the 2009 Plan as a base, each element of the old plan was examined and revised to reflect changes that had taken place in development and in the priorities of the community. In addition, referring to the 2009 Plan, the Goffstown Hazard Mitigation Committee was able to reassess strategies from the past and to improve upon mitigation strategies for the future.

The following narrative explains how the 2009 Goffstown Hazard Mitigation Plan was used during each step of the planning process to make revisions that resulted in this Plan

Meeting 1, January 14, 2014

Prior to the meeting, Richard O'Brien (Fire Chief) organized the Goffstown Hazard Mitigation Committee and the first full meeting of the Committee was held (see list of Committee members on the Acknowledgement page of this Plan). Meeting attendance included Richard O'Brien (Fire Chief); Robert Browne (Police Chief), Keith Chauvette (Police Lieutenant), Pierre Pouliot (Police Lieutenant), Brian Rose (Planning & Zoning Administrator), Armando Cantano (Operations Officer, Goffstown CERT), Carl Quiram (Director of Public Works), Danielle Morse (Field Representative HSEM), Jillian Harris, (SNHPC) and Daniel Snyder (SNHPC).

To introduce the Committee to the planning process, Jillian Harris reviewed the evolution of the Town's Hazard Mitigation Plans, grant funding, the 12 Step Planning Process (as outlined on pages 19 and 20), past and potential hazard events in Goffstown, the town's critical infrastructure and key resources, and the updates to flood hazard areas and repetitive loss properties. Mrs. Harris also explained the need to sign-in, track volunteer time (handout) and to provide public notice to encourage community involvement. In addition, she provided the Committee with a list of "stakeholders" to invite to take part in the planning process; the Committee suggested additional names to be added to the Stakeholders Contact List (see Table A, pages 14, 15 & 16).

Meeting 2, February 11, 2014

Attendance at the February 11, 2014 meeting, included: Richard O'Brien (Fire Chief); Robert Browne (Police Captain); Robert Browne (Police Captain); Armando Catano, Operations Officer, Goffstown CERT; Pierre Pouliout, Lieutenant, Goffstown Police Department; Jillian Harris and Daniel Synder, SNHPC staff.

The Committee continued their efforts identifying and formulating the hazards list, describing the hazards and developing a hazard vulnerability assessment (see Table C).

The list of past and potential hazards identified in the town's prior 2009 plan were reviewed and eventually mapped. This data was integrated into a new Hazard Vulnerability Assessment Tool (see Table C) for the 2015 Plan which includes a rating of each hazard:

The Committee next reviewed the definitions and maps of Critical Infrastructure and Key Resources in the town from the 2009 Plan and recommended that shelters and wireless towers be added to the data. Goffstown's participation in the NFIP was also assessed as well as the NH OEP's most current FEMA report on repetitive loss properties (see pages 41 and 42). The Committee found that there are 32 repetitive loss properties in Goffstown and most are single-family residential dwellings and 8 of these properties are considered "mitigated" by NFIP.

According to the 12-step process, the Committee also reviewed the prior 2009 Plan and the state's Hazard Mitigation Goals for inclusion in this 2015 Plan. The Committee adopted these and added an additional goal regarding climate change and NFIP participation. The Committee also gathered information on the town's history, past and future development trends and town statistics and began to review the list of existing mitigation strategies from the 2009 Plan. The Committee concluded that the steep slopes and Class VI Roads protection action item had been completed and could be removed from the matrix. In addition, the Committee stressed the importance for the flood gauge to be more precise, along with the need for an additional gauge to be positioned at the Goffstown/New Boston town line.

Meeting 3, March 25, 2014

Attendance at the March 25, 2014 meeting, included: Richard O'Brien (Fire Chief); Robert Browne (Police Chief); Pierre Pouliout, Lieutenant, Goffstown Police Department; Keith Chauvette (Lieutenant, Police Department); Brian Rose (Town Planner); Carl Quiram (Director of Public Works); and Jillian Harris and Daniel Synder, SNHPC staff.

At this meeting, the Committee was updated on the status of the NH DES Geologic Survey's fluvial erosion hazard assessment study of the Piscataquog Watershed as well as the need to notify the local Eagle Creek dam operators along the Piscataquog River. The Committee also continued to assess the town's participation and compliance in the National Flood Insurance Program. A number of actions of town compliance were identified and discussed. Committee members also began to review FEMA's report of Recommended Hazard Mitigation Strategies for consideration at the next meeting.

Meeting 4, June 24, 2014

Attendance at the June 24, 2014 meeting, included: Richard O'Brien (Fire Chief); Robert Browne (Police Captain); Keith Chauvette (Lieutenant, Police Department); Danielle

Morse (Field Representative/NH HSEM); Parker Moore (Hazard Mitigation Planner, NH HSEM); and Karen Mattor and Jack Munn, SNHPC staff.

At the meeting, the Committee continued going through the existing protection matrix and assessed whether existing programs are working or not. The Committee assigned an effectiveness rating to each of the existing programs: poor – needs improvement or does not meet hazards mitigation plan goal; satisfactory – meets goals; and excellent – exceeds goals.

The Committee also went through the summary of new strategies in the prior 2009 Plan to determine which actions were completed and which actions need to be deleted or used in the Updated Plan.

Meeting 5, July 15, 2014

Attendance at the July 15, 2014 meeting, included: Richard O'Brien (Fire Chief); Robert Browne (Police Captain); Keith Chauvette (Lieutenant, Police Department); Brian Rose (Town Planner); Carl Quiram, Danielle Morse (Field Representative/NH HSEM); and Karen Mattor SNHPC staff.

The Committee continued to examine the mitigation strategies from the 2009 plan and evaluate potential mitigation action items for the new 2015 updated plan. The Committee also completed their assessment of hazards within the community considering the probability of the hazard occurring within the community based upon the Committee's knowledge and experience and it they believed the hazard to be "likely" – e.g. having a less than 1 percent probability of occurring within the next 100 years; whether the hazard is "possible" – e.g. having between a 1 and 10 percent probability of occurring within the next year, or at least one chance in the next 100 years; whether the hazard is "likely" to occur – e.g. having between 10 and 100 percent probability of occurring within the next year, or at least one chance in the next 10 years; and finally whether the hazard is "highly likely" to occur – e.g. near 100 percent probability of occurring in the next year.

Each hazard was than determined to be either "unlikely"; "possible"; "likely" or "high likely" to occur within the community. This assessment of probability was then given a score of between 1 to 3 with a score of 1 equal to a low probability and a score of 3 equal to a high probability. In addition, similar scores between 1 and 3 were assigned to each hazard considering their severity and impacts to human, property and business utilizing the hazard vulnerability assessment tool contained in the New Hampshire 2013 Updated Multi-Hazard Mitigation Plan.

The Committee also continued to use FEMA's Mitigation Ideas Handbook (January 2013) to brainstorm and identify potential new mitigation strategies and action items for the town.

Meeting 6, August 19, 2014

Attendance at the August 19, 2014 meeting, included: Richard O'Brien (Fire Chief); Keith Chauvette (Lieutenant, Police Department); Brian Rose (Town Planner); and Karen Mattor SNHPC staff.

The focus at this meeting was a review of the proposed Fluvial Erosion Hazard assessment amendment to the 2015 Plan. In addition, the Committee reviewed the STAPLEE process, a systematic method used to gauge the quality of each of the action items. The Social (S), Technical (T), Administrative (A), Political (P), Legal (L), Economic (E) and Environmental (E) impacts for each action item was discussed. This process was assigned as homework for the Committee. Individual Committee scores were submitted by email to SNHPC and then compiled into the final 2015 Plan Update document (see final STAPLEE scores presented in Appendix E).

Meeting 7, September 23, 2014

Attendance at the September 23, 2014 meeting, included: Richard O'Brien (Fire Chief); Robert Browne (Police Captain); Keith Chauvette (Lieutenant, Police Department); Brian Rose (Town Planner); Parker Moore (Hazard Mitigation Planner, NH HSEM); and Karen Mattor and Amy Kizak, SNHPC staff.

At this meeting, Amy Kizak presented and the Committee reviewed all the final maps prepared for the plan. No changes to the maps were made by the Committee. These maps include and are shown as Past and Future Hazards, Fluvial Erosion and Wildfire Hazards in the Plan.

Next on the agenda, the results of the STAPLEE prioritization were presented to the Committee and the Committee endorsed the final scores as shown in Appendix E with more specific timelines noted as per State and FEMA requirements.

The DRAFT 2015 Plan document was also reviewed and discussed and Committee members were asked to provide their final edits and comments by email to SNHPC staff. The Committee endorsed the DRAFT Updated 2015 Plan and agreed that the plan will be monitored by the Town Emergency Management Director annually in January of each year to ensure that the mitigation actions are implemented and/or updated as necessary. The Committee also agreed to work towards another major update to the plan in five years, 2020.

Plan Adoption

Section VI of this Plan outlines the final adoption and plan monitoring requirements that will be conducted by the Town of Goffstown. This final draft of the 2015 Updated Plan will be posted on both the SNHPC and Town of Goffstown websites two weeks prior to scheduling the public hearing with the Goffstown Board of Selectmen. In addition, SNHPC will prepare and release another press release of the final draft plan prior to the scheduled public hearing, including notifying all the contacts and surrounding communities, adjacent regional planning commissions, state and town officials and emergency management directors of the final draft of the 2015 Updated Plan (see Table A, pages 14, 15 and 16).

In providing the public, town officials and town boards and commissions (e.g. such as the Conservation Commission and Planning Board) with information about the 2015 Updated Plan, SNHPC previously presented and reviewed the contents of the plan at the Goffstown Board of Selectmen on February 23, 2015. To continue to provide outreach to the public, the SNHPC is scheduled to present and review the draft 2015 Update Plan with the Piscataquog Local River Advisory Committee on March 16, 2015.

Pending NH HSEM final review and approval of this Plan, SNHPC will submit the Plan to FEMA for "Approval Pending Adoption" and work with the Town Administrator and Town Emergency Management Director to schedule the public hearing with the Goffstown Board of Selectmen prior to final plan adoption. This public hearing shall be held two weeks before the plan is voted on by the Board of Selectmen and the public hearing shall be properly posted and advertised by the Town in accordance with New Hampshire state law. The Board of Selectmen understands that final FEMA approval will not be granted until the Plan has been adopted by Town of Goffstown.

Plan Monitoring

As outlined in the Plan Adoption Certification in Appendix H, the Town of Goffstown shall review the 2015 Updated Plan on an annual basis to be certain the goals and objectives of the Plan are being met, and the policies are being implemented. This annual update shall begin in January of each year as directed by the Fire Chief and Emergency Management Director by reconvening the Town's Hazard Mitigation Committee. The Committee will track the progress being made in implementing the hazard mitigation strategies and actions and how effective the Plan is in addressing its intended purpose. This will be accomplished by tracking the action items and projects recommended by the Plan in the town's CIP and through various grant applications. Section VI of the Plan identifies how this annual evaluation process will be carried out by the Committee, including the adoption and monitoring requirements. In addition to this annual review, the Town of Goffstown shall conduct a major update to this Plan. The next scheduled major update will be in the year 2020.

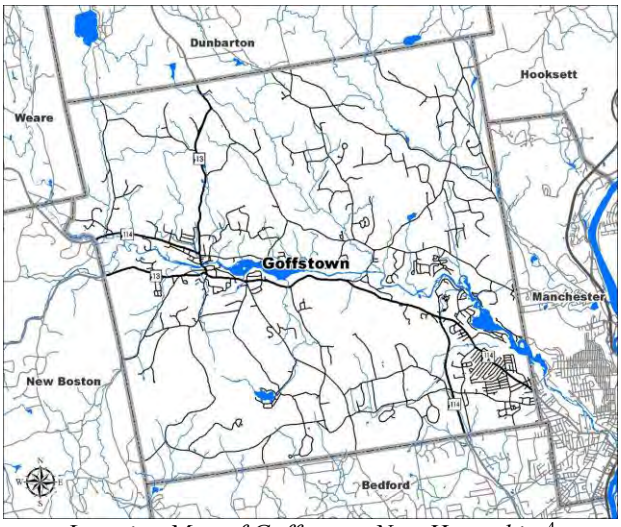
Community Profile

A. Introduction

The Town of Goffstown is located in the south-central portion of the State of New Hampshire in Hillsborough County. Goffstown is bordered by the Town of Dunbarton to the north, the towns of Hooksett and Manchester to the east, Bedford to the south, and New Boston and Weare to the west.

Goffstown encompasses a total of 24,960 acres or approximately 37.5 square miles, and is located about 20 miles southwest of the City of Concord, and 40 miles east of the City of Keene. According to the 2010 U.S. Census, the population of Goffstown was 17,651 as of 2010 and is projected to grow to 20,435 by 2050. In 2010 Goffstown had 6,341 housing units and which increased 9.37 percent since 2000 (SNHPC).

Primary highway access is provided by New Hampshire Route 114, which connects Goffstown with Bedford to the south and Weare to the west. Route 114A connects Goffstown to the City of Manchester to the east.



Location Map of Goffstown, New Hampshire[4]

The principal watercourse in the Town of Goffstown is the Piscataquog River. The river flows through the center of Goffstown and West Manchester and empties into the Merrimack River approximately 10 miles downstream of the Goffstown town limits.

Goffstown sits at the top of a bedrock plateau that varies in elevation from 300 to 600 feet. The Uncanoonuc Mountains rise to a peak elevation of approximately 1,300 feet.

[4] Map courtesy Complex Systems Research Center.

Average temperature for the area varies from 25 degrees Fahrenheit in winter to 67 degrees Fahrenheit in summer. Total annual precipitation is about 43 inches. The humidity is moderate. Average seasonal snowfall is about 72 inches.

A five-member Board of Selectmen governs Goffstown. The Town maintains a Town Manager and Assistant Town Manager; a full time Fire and Police Chief and staff; and full-time public works, planning, building, health and recreation departments to name a few.

B. Past and Current Development Trends

Past development trends within the Town of Goffstown since the last plan has been primarily residential and housing growth. One of the main impacts related to the amount of land used is the construction of new houses in the Agricultural zone, which comprises most of the town's area. This housing growth has been driven by the economic and population growth in the area. In some cases, parts of several residential developments approved in the past are now being built, and in other cases, new developments are being approved and built.

According to the 2010 U.S. Census, the total housing units in Goffstown is 6,341 with 76.9 percent owner occupied and 18.8 percent renter occupied, leaving 4.3 percent vacant. As of 2009, 70 percent are single-family homes, 25.6 percent are multi-family homes and 4.2 percent are manufactured housing. The dwelling units increased 20.55 percent between 2000 and 2010 with a 1.89 percent annual growth rate. The population of Goffstown has also increased by 20.72 percent between 1990 and 2010, from 14,621 in 1990 to 17,761 in 2010, which is a 1.04 percent annual growth rate. (SNHPC, 2014)

There has not been a lot of new development in Goffstown since the previous Plan with an average of 20 new single-family houses built every year between 2009 and 2011 (see following data). There have also been two multi-family housing units and less than five commercial properties built in the last five years. Thus, there are no real visible changes to hazard vulnerability given this limited development trend.

The Town of Goffstown's existing Zoning Ordinance, Floodplain Development Ordinance, Subdivision and Site Plan Review Regulations all work to minimize the impacts if not eliminate any development in the hazard areas. Extensive acreage of vacant developable land still exists outside of the Special Flood Hazard Areas and areas of steep slopes. These non-hazard related areas remain the preferred location of development in Goffstown, both by the town and developers. However, most of the dense development in Goffstown is located along Route 114 which runs adjacent to the Piscataquog River. This area is the most vulnerable to natural hazards and will require monitoring by the Town.

Building Permits - Single Family Houses	
	Number of Permits Issued
2009	20
2010	15
2011	14
2012	28
2013	22
2014	21

Source: Town of Goffstown

C. Future Development Trends

The following is an excerpt from Moving Southern New Hampshire Forward 2015-2035 Regional Comprehensive Plan, Land Use Chapter prepared by the Southern Regional Plan Commission which provides an overview of the future growth and development trends for the Town of Goffstown, NH:

The Town of Goffstown is broken up into eight possible planning districts. These districts are: Parker Station; Pattee Hill; Northeast; Grasmere Village; Goffstown Village; Uncanoonuc Mountains; Bypass Area; and Pinardville Village. While these districts are the ones identified within the Master Plan, it should be noted that these eight districts are just a sample and are not necessarily the end result. Other districts could still emerge, or the districts that are outlined within the Master Plan could be altered. In any case, each district area would ideally share comparable characteristics or a common history.

The Parker Station area contains mostly conservation subdivisions. These are smaller clustered lots, developed as open space subdivisions. They are high priority areas for preserving natural resources and creating functional open spaces.

Pattee Hill shares conservation subdivision area with suburban residential, which are two-acre lots that are developed as open space subdivisions. These areas have private water and sewer, as well as public recreation facilities.

The Northeast area features a suburban residential area along with conservation open space, which consists of large lots that encourage open space uses. There is a low density of development, and these areas are high priority for conservation easement or public ownership.

Grasmere Village mainly features village residential, which is an area of a village design context. These are small lots with public water and sewer service, and single-family or attached single-family homes that are integrated into the neighborhood. In addition to this, Grasmere Village also contains a small area of village commercial mixed-use. This consists of a village

design with small lots, public water and sewer service with village scaled single-family, single-family attached and apartment uses that are mixed with village scaled service and retail uses.

Goffstown Village has some village residential uses, as well as some village commercial mixed-use and also a small residential mixed-use area, which is single-family, attached single-family and multi-family homes in small projects mixed with retail or office uses, serviced by public water and sewer.

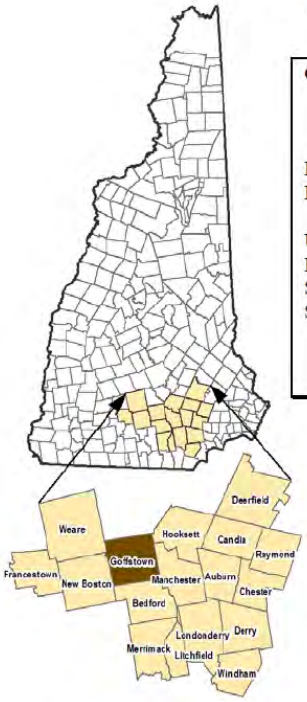
The Uncanoonuc Mountain area is simply a mixture of conservation open space alongside conservation subdivisions. The Bypass Area features a combination of conservation subdivision area with a village residential mixed-use area, which is an area of village design having small lots served by public water and sewer service. The area features single-family, and single-family attached, and apartment areas that are mixed with village scaled service and retail uses.

Pinardville Village contains a healthy mix of village residential, commercial mixed-use, and also a campus mixed-use area that is comprised of institutional and college uses with compatible commercial and residential areas.

D. Town Statistics (see following Economic Assets Profile)

TOWN OF GOFFSTOWN
NEW HAMPSHIRE

Economic Assets Profile



Contact:	Susan Desruisseaux Town Administrator 16 Main Street, Town Office Goffstown, NH 03045		
Phone:	(603) 497-8990 Fax: (603) 497-8993		
E-mail:	sued@goffstownnh.gov		
U.S. Congress	District 1	Carol Shea-Porter	
Executive Council	District 4	Christopher Pappas	
State Senate	District 20	Lou D'Allesandro	
State Representatives	Hillsborough Country District 6, 39		
	John Burt	John Hikel	Calvin Pratt
	Ruth Gage	Richard Meaney	Mark Warden

Town of Goffstown
www.goffstown.com

Hillsborough County
www.hillsboroughcountynh.org/

Capital Regional Development Council
www.crdc-nh.com

Access Greater Manchester
www.AccessGreaterManchester.com

Regional Planning Commission
www.snhpc.org

County	Hillsborough
Date of Incorporation	1761
Labor Market	Manchester NH Metro-NECTA (New England City and Town Area)
Tourism Region	Merrimack Valley
Planning Commission	Southern NH Planning
Regional Economic Development	METRO CENTER NH Capital Regional Development Council
Zoning Ordinance	1961/11
Master Plan	2009

Source: NH Employment Security ELMIB

Type of Government			Selectmen
Budget: Municipal Appropriations (2011)			$ 19,991,907
Budget: School Appropriations (2011)			$ 36,388,170
Capital Improvement Plan			Yes
Development Plans Reviewed by			Planning Board
Boards and Commissions			
Elected:	Selectmen Planning Budget Library School Zoning	Appointed:	Conservation Cemetery Historic Economic Development Parks and Recreation
Public Library: Goffstown Public			

Source: NH Employment Security ELMIB

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Goffstown's Key Economic Assets and Strengths

- **Quality of life/tourism from physical attributes (rivers, lakes, mountains)**
- **Employment in county offices, district court, and women's prison**
- **Main street organization and the Industrial Development Corp.**
- **Rails-Trails Program**
- **Saint Anselm College**
- **Workforce housing, ERZ tax credits, and Community Revitalization tax credits**

Source: Municipal SWOT Analysis, February 2010

Goffstown at a Glance

Geography

Total Area (sq mile)	37.6
Total Land	37.1
Total Water	0.5

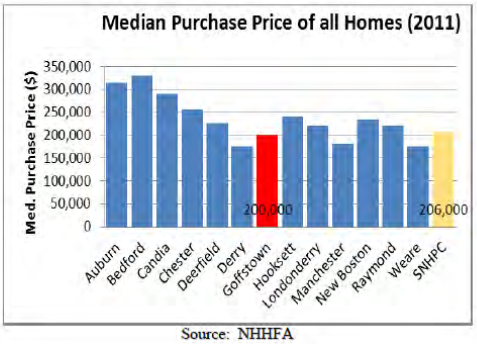
Source: NH Employment Security ELMIB

Population

Total 2010 (Census)	17,651
Male	8,344
Female	9,307
Median Age	39.0 years
People per sq. mile	476

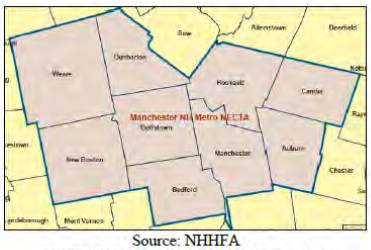
Source: U.S. Census Bureau

Housing

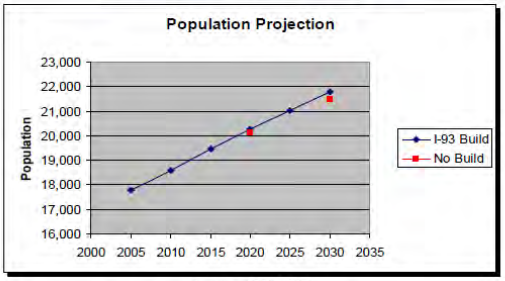


Source: NHHFA

Manchester, NH Metro NECTA



Source: NHHFA
NECTA: New England City and Town Area



Source: NH OEP
* I-93 Build refers to proposed widening. No Build is without widening.

	2010	Percent
Total Housing Units	6,341	
Owner Occupied	4,874	76.9%
Renter Occupied	1,194	18.8%
Vacant	273	4.3%
	2009	
Single-Family	4,425	70.1%
Multi-family	1,617	25.6%
Manufactured	266	4.2%

Source: NH OEP, 2009 NHHFA

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Education

High School Graduate or higher		89.1%
Bachelor's degree or higher		26.4%
	# Facilities	# Students
Elementary	2	642
Middle/Junior High	1	957
High School	1	1,219
Private/Parochial	1	179
School District	SAU 19	
Nearest Community/Technical	Manchester	
Nearest Colleges/Universities	Saint Anselm College Hesser College Southern NH University UNH - Manchester	

Source: NH Department of Education

Tax Rates

2010	(per $1,000 of value)
Town Tax	$ 8.95
Local Education Tax	$10.57
State Education Tax	$ 2.30
County Tax	$ 1.09
Total Tax Rate	$22.91
Town Valuation	$1,411,324,700
2009	
Local Assessed Value by Property Type	
Residential Land and Buildings	88.1%
Commercial Land and Buildings	11.7%
Public Utilities, Current Use, and Other	0.2%

Source: NH Department of Revenue Administration

Employment

Annual Average	**1999**	**2008**	**2009**
Civilian Labor Force	9,083	10,274	10,231
Employed	8,860	9,959	9,712
Unemployed	223	315	519
Unemployment Rate	2.5%	3.1%	5.1%

Source: NH Employment Security ELMIB

Income

2009 (ACS)		
Median Household Income		$75,868
Median 4-Person Family Income		$85,472
Per Capita Income		$ 27,748
Median Earnings (Full time, Year-Round Workers)		
Male		$54,126
Female		$40,039
Families Below the Poverty Level		3.5%
Consumer Price Index (July 2011)		% Change
CPI		Over the Year
Not Seasonally Adjusted	225.9	3.6%
Seasonally Adjusted	225.0	3.2%

Source: 2009 ACS, NH Employment Security ELMIB

Largest Employers

Employers	*Employees*
St Anselm College	500-999
Hillsborough County Nursing Home	250-499
Goffstown High School	100-249
Hannaford Brothers Supermarket	100-249
Shaw's Supermarket	100-249
Mountain View Middle School	100-249
Northeastern Sheet Metal Inc	100-249
YMCA	100-249
Hillsborough County Sheriff's Office	100-249
Goffstown Truck Center, Inc.	50-99
Maple Avenue Elementary	50-99
Goffstown Police Dept	50-99
Goffstown Fire Dept	50-99
R & W Cleaning Svc	50-99
Bel-Air Nursing Home	50-99
McClellan Automation	50-99
Kids Block	20-49
Women's Prison	20-49
Sully's Superette	20-49
Villa Augustina School	20-49
Goffstown Public Works	20-49
Landscape Support Svc	20-49
McDonald's	20-49
Accurate Brazing Co	20-49
New Hampshire Stamping Co	20-49
Educare Day Care & Learning	20-49
Louis P Cote Inc	20-49

Source: NHetwork, NH Employment Security ELMIB, infoUSA

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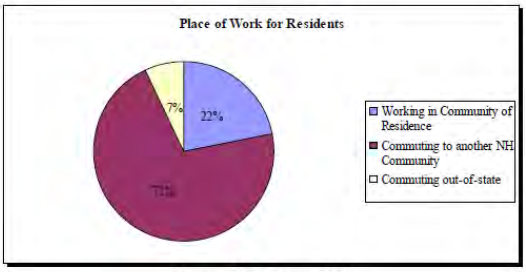
Commuting

Workers 16 years and over (2009 ACS)	
Drove alone, car/truck/van	78.9%
Carpooled, car/truck/van	7.2%
Public transportation	0.1%
Walked	5.5%
Other Means	0.3%
Worked at Home	8.0%
Mean Travel Time to Work	23.0 minutes
Percent of Working Residents (2000 Census)	
Working in Community of Residence	22%
Commuting to another NH Community	71%
Commuting out-of-state	7%

Source: 2009 ACS, 2000 Census



Source: U.S. Census 2000

Transportation

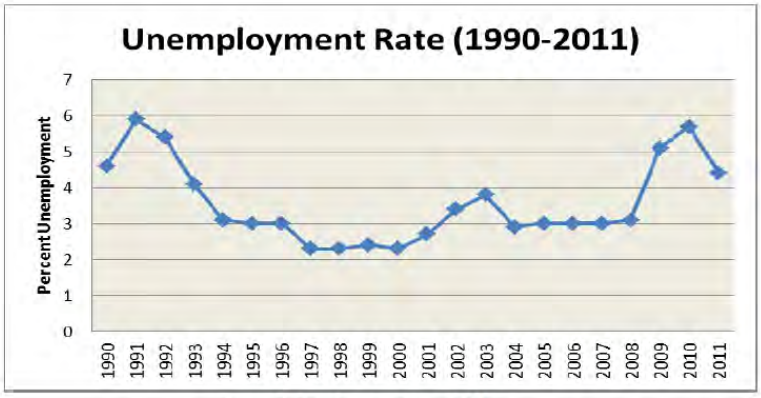
Road Access	U.S. Routes	
	State Routes	13, 114
Nearest Interstate, Exit		I-293 Exit 4 (8 miles)
Railroad		No
Public Transportation		No
Nearest Airport with Scheduled Service		Manchester-Boston Regional
Driving Distance to Selected Cities:		
Manchester, NH		8 miles
Concord, NH		16 miles
Portsmouth, NH		52 miles
Boston, MA		61 miles
Portland, ME		107 miles
Montreal, Quebec		250 miles
New York City, NY		258 miles

Source: NH Employment Security ELMIB

Employment and Wages

2010 Industry	Annual Average Employment	Average Weekly Wage
Total, All Industries	3,535	$626
Goods-Producing	368	$927
Service-Providing	2,008	$514

Source: NH Employment Security ELMIB



Source: NH Employment Security ELMIB

Sources for graphics: Heading and Seal: Town Website - State of NH and County Map: ELMIB - SNHPC Region: SNHPC

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SECTION II
HAZARD IDENTIFICATION & POTENTIAL RISK ASSESSMENT

Natural Hazards and Their Consequences

During the past two decades, the United States has suffered a record number of natural disasters. In 1992, Hurricane Andrew caused an estimated $25 billion in damage. The 1993 Midwest floods resulted in some $12-$16 billion in damage. The 1994 Northridge earthquake caused $20 billion in damage, and the 2002 summer flooding in central Texas topped $1 billion in damage. In 2005, Hurricane Katrina inflicted unprecedented financial and human costs. Flooding 80 percent of the City of New Orleans, damage surpassed $75 billion, making it the costliest hurricane in United States history. Katrina was also the deadliest U.S. hurricane since the 1928 Okeechobee Hurricane, with at least 1,383 lives lost.

Photo of four homes lost in Tennessee due to a mile-wide tornado during November 2002. Portions of the Midwest and South assessed the damage from more than 70 tornadoes that touched down. The death toll stands at 35 throughout five states. President George W. Bush declared a major disaster for Tennessee, opening the way for the use of federal disaster funds to help meet the recovery needs of families and businesses devastated by the tornadoes. Mossy Grove, Tennessee, was among the hardest hit areas as 12 people were killed and the rural town was destroyed. (FEMA photo courtesy of Jason Pack)

In New England, more than 100 natural disasters during the past quarter century have been sufficiently catastrophic to be declared "disaster areas" by the president, making them eligible for federal disaster relief. That is about four major disasters per year. Nine out of ten of these disasters were the result of flooding.

The October 2005 floods in southwestern New Hampshire caused catastrophic damage. At least five bridges were washed out, up to 18 families were left homeless, more than 1,000 people were displaced by evacuations and there were seven deaths. Rainfall amounts of approximately 9 inches in southwestern New Hampshire from October 7-12 made for swollen rivers, streams and brooks. While events of this magnitude are not commonplace, damage could be averted or reduced with the implementation of foresighted hazard mitigation efforts.

Chatel Avenue, Goffstown, New Hampshire
May 2006

More flooding events in New Hampshire took place over Mother's Day weekend 2006 and in April of 2007. Like the October 2005 floods, these floods were due to record breaking amounts of rainfall. During the Mother's Day flood, 8.8 inches was recorded in Concord, from May 13-16. It is estimated that 25 homes in the state were destroyed, 235 severely damaged, and another nearly 4,750 damaged. Over 600 roads were closed statewide. Additionally, over 200 schools closed for at least two days following the onset of flooding. Three dams were breached, another four required controlled breaches, and two other dams failed. Additional damages to businesses are estimated to be greater than four million dollars and 115 businesses were damaged. Damages to state and local infrastructure were over $14 million.

Henry Bridge Road, Goffstown, New Hampshire
May 2006

The April 2007 flood was a combination of heavy rainfall and rapid snowmelt. Up to 7 inches of rain fell April 16 - 18 from a storm that stalled off the coast of New England. The peak discharges during the April 2007 flood were the highest ever recorded at five long-term (more than 10 years of record) stream gauge sites on the New Hampshire-Salmon Falls River at Milton, Cocheco River near Rochester, Oyster River near Durham, Contoocook River at Peterborough, and, South Branch Piscataquog River near Goffstown. In addition, peak discharges equaled or exceeded a 100-year recurrence interval at 10 stream gauges and a 50-year recurrence interval at 16 stream gauges. The most severe flooding occurred in Rockingham, Strafford, Merrimack, and Hillsborough Counties.[5]

Since the April 2009 Goffstown Hazard Mitigation Plan, the following Presidentially Declared Disasters (DR) and Emergency Declarations (EM) have occurred in Hillsborough County and affected the Town of Goffstown. Three were winter storms and two were hurricane and flooding events.

1. On May 12, 2010, there was a Presidentially Declared Disaster for a severe winter storm in Hillsborough and Rockingham Counties. There was $3,057,473 in FEMA money distributed in the form of Public Assistance.
2. On September 3, 2011, a Presidentially Declared Disaster was announced for Tropical Storm Irene for the Counties of Belknap, Carroll, Coos, Grafton, Merrimack, Stratford, and Sullivan in the amount of $11,101,752 in Public Assistance and Individual Assistance Funds. The storm took place between

[5] Flynn, R.H., 2008, Flood of April 2007 in New Hampshire: U.S. Geological Survey Scientific Investigations Report 2008.

August 26, 2011 and September 6, 2011, and the Major Disaster Declaration was declared on September 3rd.

3. On December 7, 2011, it was announced that the October Nor'easter for Hillsborough and Rockingham Counties received $4,411, 457 in FEMA funds was distributed in the form of Public Assistance.
4. On October 30, 2012, there was an Emergency Declaration declared for Hurricane Sandy in the Counties of Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan Counties. The incident period was October 26, 2012 to October 31, 2012 and the Emergency Declaration was declared on October 30th.
5. Between February 8 and 10, 2013, there was a Presidentially Declared Disaster for a severe snow and blizzard in the Counties of Belknap, Carroll, Cheshire, Hillsborough, Merrimack, Strafford, and Rockingham.

Between August 26 and September 6, 2011, Hurricane Irene was a storm which had heavy rains and caused substantial damage in New England. On October 29, 2012 Hurricane Sandy, like Hurricane Irene, caused a Presidential Disaster Area to be declared. Hurricane Sandy created a strong storm surge and heavy rains across New England, New York City, and New Jersey.

Floods, tornadoes, winter storms, hurricanes, earthquakes, and wildfires - natural disasters - are part of the world around us. Their occurrence is inevitable. These events can wreak havoc on the natural environment by uprooting trees, eroding riverbanks and shorelines, carving new inlets, and blackening forests. Yet the natural environment is amazingly resilient, often recuperating in a matter of days or weeks.

When these events strike the man-made environment, however, the result is often more devastating. Disasters occur when a natural hazard crosses paths with elements of the man-made environment, including buildings, roads, pipelines, or crops. When hurricanes tear roofs off houses, it is a disaster. When tornadoes ravage a town, it is a disaster. When floods invade low-lying homes, it is a disaster. If only undeveloped wetlands and floodplains are flooded, rather than homes and businesses, few take notice. The natural environment takes care of itself. The fabricated environment, in contrast, often needs some emergency assistance.

A complete summary of all the Federal Presidentially Declared Disasters (DR) and Emergency Declarations (EM) since 1953 are outlined in the following tables as provided by the New Hampshire Updated 2013 Multi-Hazard Mitigation Plan.

Table B: Presidentially Declared Disasters (DR) and Emergency Declarations (EM) since 1953

State of New Hampshire Presidentially Declared Disasters (DR) and Emergency Declarations(EM) 1982-2013					
Date Declared	**Event**	**FEMA DR**	**Program**	**Amount**	**Counties Declared**
August 27, 1986	Severe storms/flooding	FEMA-771-DR	PA	$1,005,000	Cheshire & Hillsborough
April 16, 1987	Severe storms/flooding	FEMA-789-DR	PA/IA	$4,888,889	Carroll, Cheshire, Grafton, Hillsborough, Merrimack, Rockingham, and Sullivan
August 29, 1990	Severe Storms/Winds	FEMA-876-DR	PA	$2,297,777	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, and Sullivan
September 9, 1991	Hurricane	FEMA-917-DR	PA	$2,293,449	Statewide
November 13, 1991	Coastal Storm/Flooding	FEMA-923-DR	PA/IA	$1,500,000	Rockingham
March 16, 1993	Heavy Snow	FEMA-3101-EM	PA	$832,396	Statewide
January 3, 1996	Storms/Floods	FEMA-1077-DR	PA	$2,220,384	Carroll, Cheshire, Coos, Grafton, Merrimack, and Sullivan
October 29, 1996	Severe Storms/Flooding	FEMA-1144-DR	PA	$2,341,273	Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan
January 15, 1998	Ice Storm	FEMA-1199-DR	PA/IA	$12,446,202	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Strafford, and Sullivan
July 2, 1998	Severe Storms	FEMA-1231-DR	PA/IA	$3,420,120	Belknap, Carroll, Grafton, Merrimack, Rockingham, and Sullivan
October 18, 1999	Hurricane/Tropical Storm Floyd	FEMA-1305-DR	PA	$750,133	Belknap, Cheshire, and Grafton
March 2001	Snow Emergency	FEMA-3166-EM	PA	$4,500,000	Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, and Strafford
February 17-18, 2003	Snow Emergency	FEMA-3177-EM	PA	$3,000,000	Cheshire, Hillsborough, Merrimack, Rockingham, and Strafford
September 12, 2003	Severe storms and flooding	FEMA-1489-DR	PA	$1,300,000	Cheshire and Sullivan
March 11, 2003	Snow Emergency	FEMA-3177-EM	PA	$3,000,000	Cheshire, Hillsborough, Merrimack, Rockingham, and Strafford
January 15, 2004	Snow Emergency	FEMA-3193-EM	PA	$3,200,000	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, and Sullivan

State of New Hampshire Presidentially Declared Disasters (DR) and Emergency Declarations(EM) 1982-2013 Cont.					
Date Declared	**Event**	**FEMA DR**	**Program**	**Amount**	**Counties Declared**
March 30, 2005	Snow Emergency	FEMA-3207-EM	PA	$4,654,738	Belknap, Carroll, Cheshire, Grafton, Hillsborough, Merrimack, Rockingham, Strafford and Sullivan
March 30, 2005	Snow Emergency	FEMA-3208-EM	PA	$1,417,129	Carroll, Cheshire, Coos, Grafton and Sullivan
April 28, 2005	Snow Emergency	FEMA-3211-EM	PA	$2,677,536	Carroll, Cheshire, Hillsborough, Rockingham and Sullivan
October, 26, 2005	Severe Storm and Flooding	FEMA-1610-DR	PA/IA	$14,996,626 +	Belknap, Cheshire, Hillsborough, Merrimack and Sullivan. Grafton
May 31, 2006	Severe Storm and Flooding	FEMA-1643-DR	PA/IA	$17,691,586 +	Belknap, Carroll, Hillsborough, Merrimack, Rockingham, Strafford and Grafton
April 15 - 23, 2007	Severe Storm and Flooding	FEMA-1695-DR	PA/IA	$27,000,000 +	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan.
August 11, 2008	Severe Storms, Tornado, and Flooding	FEMA-1782-DR	PA	$1,691,240	Belknap, Carroll, Merrimack, Rockingham, and Strafford
September 5, 2008	Severe Storms and Flooding	FEMA-1787-DR	PA	$4,967,595	Belknap, Coos, and Grafton
October 3, 2008	Severe Storms and Flooding	FEMA-1799-DR	PA	$1,050,147	Hillsborough and Merrimack
December 11, 2008	Severe Winter Storm	FEMA-3297-EM	DFA/PA	$900,000	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan
January 2, 2009	Severe Winter Storm	FEMA-1812-DR	DFA/PA	$19,789,657	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan
March 29, 2010	Severe Winter Storm	FEMA-1892-DR	PA	$9,103,138	Merrimack, Rockingham, Strafford, and Sullivan
May 12, 2010	Severe Winter Storm	FEMA-1913-DR	PA	$3,057,473	Hillsborough and Rockingham
July 22, 2011	Severe Storms and Flooding	FEMA-4006-DR	PA	$1,664,140	Coos and Grafton

State of New Hampshire Presidentially Declared Disasters (DR) and Emergency Declarations(EM) 1982-2012 Cont.					
Date Declared	**Event**	**FEMA DR**	**Program**	**Amount**	**Counties Declared**
September 3, 2011	Tropical Storm Irene	FEMA-4026-DR	PA/IA	$11,101,752	Belknap, Carroll, Coos, Grafton, Merrimack, Stratford, and Sullivan
December 7, 2011	October Nor'Easter	FEMA-4049-DR	PA	$4,411,457	Hillsborough and Rockingham
June 18, 2012	Severe Storms and Flooding	FEMA-4065-DR	PA	$unknown	Cheshire
October 30, 2012	Hurricane Sandy	DR-4095 EM-3360	PA DFA	$unknown	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan.
February 08-10-2013	Severe Snow and Blizzard	DR-4105	PA	$Unknown	Belknap, Carroll, Cheshire, Hillsborough, Merrimack, Strafford, Rockingham
35 Declarations Totaling $ 175,166,810.00					
Program Key: PA: Public Assistance **IA**: Individual Assistance **DFA**: Direct Federal Assistance					

Hazard Identification

The first step in hazard mitigation is to identify the hazards in Goffstown which have the greatest probability of occurring within the community. In conducting this assessment, the Goffstown Hazard Mitigation Committee identified 25 natural hazards and human-caused hazards which have the potential to occur in the Town of Goffstown. Based on past history and potential future probability, the Goffstown Hazard Mitigation Committee categorized the hazards as being either **highly likely**, **likely**, **possible** or **unlikely** to occur in Goffstown based upon the following criteria:

Unlikely: Less than 1 percent probability in occurring in the next 100 years;
Possible: Between 1 and 10 percent probability of occurring in the next year, or at least one change in the next 100 years;
Likely: Between 10 and 100 percent probability of occurring in the next year, or at least one chance in the next 10 years; and
Highly Likely Near 100 percent probability of occurring in the next year.

This rating is shown at the end of the descriptions of each hazard in this section.

Hazards identified as **Highly Likely** to occur in Goffstown include:

1. Flooding (100-year events)
2. Severe winter weather (heavy snow storms)
3. Hurricanes
4. Debris Impacted Infrastructure

Hazards identified as **Likely** to occur in Goffstown include:

1. Severe winter weather (ice storms)
2. Rapid snow pack melt
3. Extreme Temperatures (cold)
4. Downbursts
5. Extreme Temperatures (heat)
6. Hailstorms
7. Fluvial erosion
8. River Ice Jams
9. Wildfires
10. Erosion & Mudslides
11. Radon

Hazards identified as **Possible** to occur in Goffstown include:

1. Critical Infrastructure Failure
2. Earthquakes
3. Tornadoes
4. Lighting
5. Landslides
6. Drought
7. Dam Breach or Failures
8. Civil Disorder
9. Prison Break/Disturbance
10. Terrorism

The Goffstown Hazard Mitigation Committee determined that none of the 25 identified natural and human-caused hazards are **Unlikely** to occur in Goffstown.

The Town of Goffstown is susceptible to a variety of natural hazards including flooding, severe winter storms (heavy snow storms), hurricanes, debris impacted infrastructure, and other hazards. The most significant natural disaster threat to Goffstown is Flooding (100-year events) due to heavy rain and rapid snow melt. The second and third **Highly Likely** hazards are Severe Winter Weather (heavy snow storms) and Hurricanes.

All the major floods in Goffstown have resulted from rainfall alone or a combination of snowmelt and ice jams. A record flood occurred in March 1936 and inundated much of the community. A slightly smaller but still damaging flood occurred in 1938, accompanied by hurricane force winds. Discharges were not recorded for these unusual flood events, but based on records from other streams in the region, the return period for a flood like that which occurred in 1936 is approximately 100 years. In 2006 and 2007 Goffstown also experienced 100-year flood events that caused damage to structures in

the floodplain. The flooding of 2007 in some areas was the highest level recorded during the period of record (1941-1978) for one river gauge in Goffstown.[6]

More recent hurricane events include Tropical Storm Irene in 2011 and Hurricane Sandy in 2012. The Town of Goffstown Emergency Response Team website announced a flood watch during Hurricane Irene on August 26, 2011. On October 29, 2012 during Hurricane Sandy, the website announced a high wind warning for Hillsborough County. Not only are hurricanes and flooding major hazards in Goffstown, but also there have been severe winter storms, such as the severe winter storm in 2010, the October Nor'easter in 2011, and a severe snow and blizzard event in February 2013.

In light of recent events (Hurricanes Irene & Sandy), it should be noted that hurricanes can cause significant damage in Goffstown as a result of both wind strength and flash flooding creating road closures and damage. The Goffstown Hazard Mitigation Committee indicated hurricanes are "highly likely to affect Goffstown" although the likelihood of high category hurricanes occurring in New England is rare in general.

Hazard Threat Analysis

Utilizing the hazard identification assessment conducted above, the Goffstown Hazard Mitigation Committee next conducted a hazard threat analysis to determine which hazards have the greatest risk and threat to the community in terms of their severity and impacts. This was accomplished by the Committee using the Hazard Vulnerability Assessment Tool as presented in the New Hampshire Updated 2013 Multi-Hazard Mitigation Plan. The results of this analysis are presented in the following Table C, Hazard Vulnerability Analysis.

Based upon the Committee's limited objective appraisal of the each hazard's occurrence within the community, a score of 3 is assigned to a hazard where there is a high probability or great likelihood it will occur within the next 25 years. A score of 2 is assigned to a hazard with a moderate likelihood of occurring in the next 25 years and a score of 1 is assigned to a hazard where the Committee believed there is no likelihood the hazard would impact the community in the next 25 years.

A score for severity is also assigned based on an estimate of a hazard's impact on human, property and business within the community. A high severity score of 3 is assigned where the community's total population, property, commerce, infrastructure and services are uniformly exposed to the effects of a hazard of potentially great magnitude.

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[6] Flynn, Robert H. Flood of April 2007 in New Hampshire. USGS. http://pubs.usgs.gov/sir/2008/5120/pdf/SIR2008-5120.pdf

A moderate severity score of 2 is applied when it is determined that the total population, property, commerce, infrastructure and services of the community are exposed to the effects of a hazard of moderate influence; or the total population, property, commerce, infrastructure and services of the community are exposed to the effects of a hazard, but not all to the same degree; or an important segment of the population, property, commerce, infrastructure and services of the community are exposed to the effects of a hazard. In a worst case scenario, there could be disaster of moderate to major, though not catastrophic, proportions.

A score of 1 is assigned for a hazard of low severity when there is less likelihood that the hazard will impact human, property, and business. The overall relative threat is shown in the last column of Table C by multiplying the total scores of the probability and the severity ratings into an overall score. This score than helps the town weigh the hazards against one another to determine which hazard is most detrimental to the community.

Table C: Hazard Vulnerability Assessment

0-N/A 1-Low 2-Moderate 3-High	**Human Impact** Probability of death or injury	**Property Impact** Physical losses and damages	**Business Impact** Interruption of Service	**Probability** Likelihood this will occur in 25 years	**Severity** Avg. of humans/property business	**Relative Threat** Severity-x-Probability 0-1 = Low 2-3 = Moderate >4 = High
Event						
Flooding (100-YR)	2	3	2	3	2	6
Fluvial Erosion	1	2	1	2	1	2
Hurricanes	1	2	2	3	2	6
Debris Impacted Infrastructure	1	2	2	3	2	6
Erosion/Mudslides	1	1	1	2	1	2
Rapid Snow Pack Melt	1	2	2	2	2	4
River Ice Jambs	1	1	1	2	1	2
Tornadoes	2	2	2	1	2	2
Downbursts	1	2	2	2	1	2
Lighting	1	1	1	1	1	1
Wildfires	1	2	2	2	1	2
Heavy Snowstorms	1	2	3	3	2	6
Ice Storms	1	2	2	2	2	4

Hailstorms	1	1	1	2	1	2
Earthquakes	1	2	2	1	2	2
Landslides	1	1	1	1	1	1
Drought	1	1	1	1	1	1
Extreme Heat	1	1	1	2	1	2
Extreme Cold	1	2	2	2	2	4
Radon	1	1	1	2	1	2
Civil Disorder	1	1	1	1	1	1
Prison Break	1	1	1	1	1	1
Dam Breach/Failure	3	3	3	1	3	3
Terrorism	1	1	1	1	1	1
Critical Infrastructure Failure	1	2	2	1	2	2

Source: New Hampshire 2013 All Hazards Mitigation Plan

From the results of this analysis and as shown in the last column in Table C, the hazards identified which have the highest overall threat to the community are flooding (100-Year Event); hurricanes; debris-impacted infrastructure; heavy snowstorms; rapid snow pack melt; ice storms; and extreme cold weather events.

Risk Assessment

The next step in hazard mitigation planning is to identify the location of past hazard events and if possible, identify what facilities or areas were impacted. To accomplish this the Goffstown Hazard Mitigation Committee utilized the hazard descriptions information presented in this section of the Plan as well as the probability and severity rankings documented in Table C, the Hazard Vulnerability Assessment Tool, to identify potential threats and prioritize the threat potential within the community. The Committee then used a base map that included the 100-year floodplain, political boundaries, water bodies, the road network and aerial photos to locate all of the past hazard events on the base map. This step in the planning process serves as a stepping stone for predicting where future hazards could potentially occur.

These criteria were combined using GIS analysis and weighted equally to determine risk levels through the Town of Goffstown. Once the analysis and mapping was complete in GIS, a matrix was created showing varying risk levels: low, medium and high. Each risk level was assigned a color and was mapped over a base-map of the Town (see following Map #2).

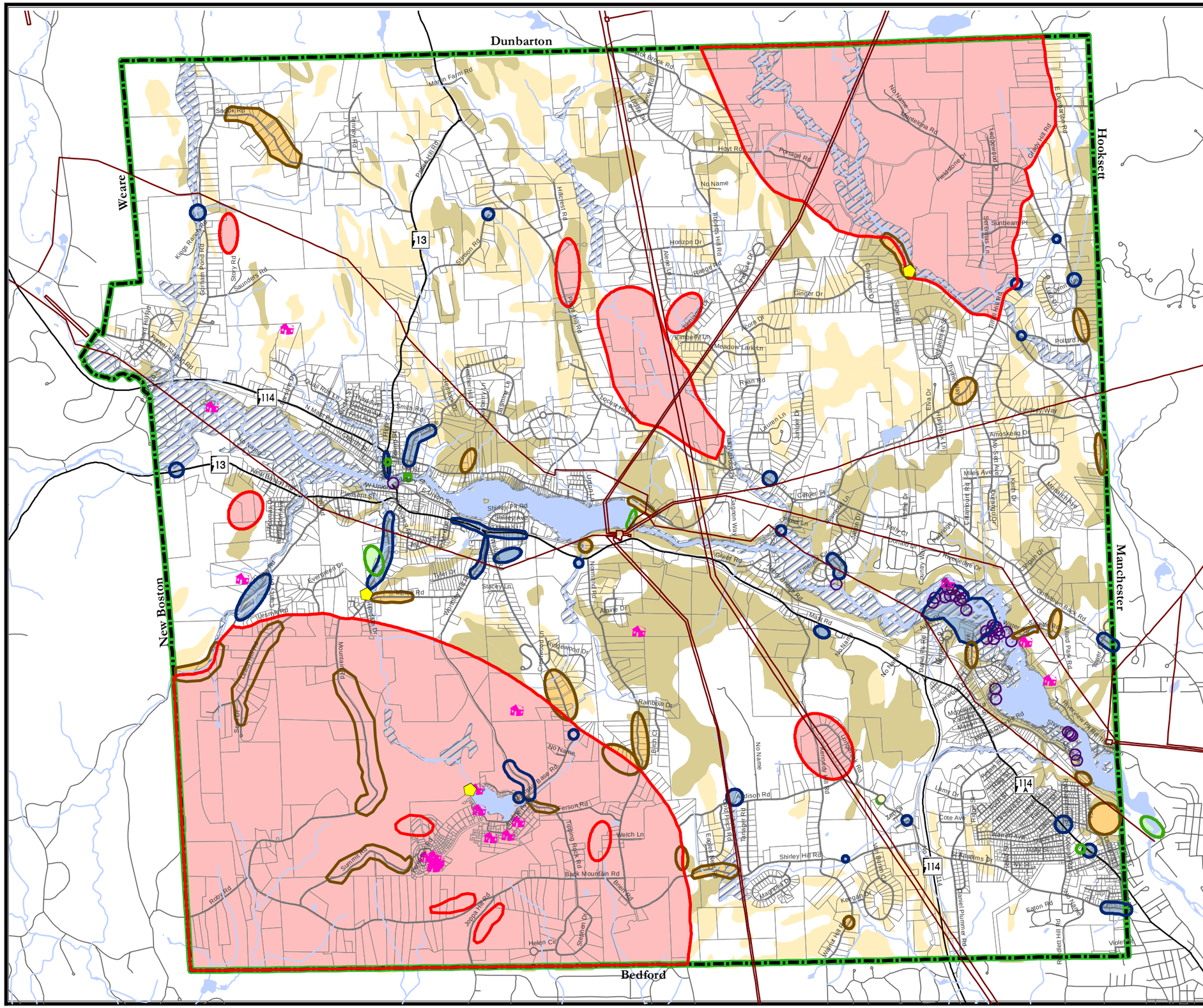
Past and Potential Hazards

The past hazard events with the highest overall risk and threat to the community, include flooding (100-year flood events), hurricanes, debris-impacted infrastructure, heavy snowstorms, rapid snow pack melt, ice storms, and dam breach or failure. These hazards were also identified in a Committee brainstorming session. Additionally, the State of New Hampshire Hazard Mitigation plan was consulted and other supporting information was derived from the resources listed in the Appendices. For each hazard, the Committee reviewed background information; areas at risk; and the potential for the hazard to occur in the town as well as the potential risk, threat and damage each hazard could have to structures, infrastructure or human life. An overall map showing the location of Past and Potential Hazards in Goffstown is provided (see Map #2).

Goffstown National Flood Insurance Program (NFIP) Status

The Town of Goffstown has been participating in the National Flood Insurance Program since June 15, 1979. The floodplain areas of Goffstown are located primarily along the Piscataquog River (which runs through the middle of the town), Bog Brook, Gorham Brook, Black Brook, Glen Lake, and several other brooks and lakes. The floodplain areas in Goffstown include Zones A and A1-30 with regulatory floodways.

FEMA first issued the Town of Goffstown, a Flood Hazard Boundary Map (FHBM) on September 20, 1974 and an initial Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map on June 15, 1979. These early FEMA maps were revised and replaced by new Flood Insurance Rate Maps and a new D FIRM, all bearing the effective date of September 25, 2009. The revised maps are now used for flood insurance purposes and are on file with the Goffstown Planning and Building Departments. In addition to these FEMA maps, the Town of Goffstown continues to implement and enforce their Flood Hazard District Ordinance (Section 13.2), which regulates all new construction and substantial improvements within the Special Flood Hazard Areas (SFHAs).



Map # 2

Past and Potential Hazards Goffstown, NH

Hazard Zones

- Dam Breach/Failures
- Isolated Homes

Past and Potential Hazards

- Debris Impacted Infrastr.
- Erosion
- Flooding
- Wildfire
- Repetitive Loss Areas

Steep Slopes - 15% Minimum Slope

- with a maximum of 25% gradient
- with a maximum of 35% gradient

Special Flood Hazard Areas

- 100 Year Floodplain
- 500 Year Floodplain

Base Legend

- Political Boundary
- Parcels
- Utility Lines
- Lakes
- Streams

Roads

- Interstate
- US and State Routes
- Local Roads

0 0.25 0.5 1 1.5 2 Miles

Data Sources:
Granit Digital Data (1:24,000)
NH Department of Transportation
Individual Community Parcel Data

The town of Goffstown and the SNHPC make no representations or guaranties to the accuracy of the features and designations of this map.

Map produced by SNHPC September 2014.

This map is designed as part of the Towns Hazard Mitigation Plan and is for planning purposes only. It is not to be used for legal boundary determinations or for regulatory purposes.

N W E S

SNHPC

According to NH Office of Energy and Planning's (NH OEP) last CAV Report supplied to FEMA dated May 14, 2009 and NH OEP's most current Biennial Report to FEMA as of December 31, 2014, there are a total of 149 flood insurance policies in force in Goffstown with insurance coverage totaling $35,225,700. A total of 119 paid losses in the amount of $3,009,142 have been paid out to date. Since 1978, there have been a total of 16 substantial damage claims. Among the 149 policies in force, the majority of the policies are for single-family homes (e.g. 129) of which 88 are located within zones A01-30 and AE zones. There are also a total of 3 policies for 2-4 family home structures; 6 policies for all other residences; and 11 policies for non-residential structures within the community. A total of 32 repetitive loss properties or buildings were identified by NH OEP with a total of 69 lossesin the CAV Report supplied to FEMA on May 14, 2009. Of these properties there were a total of 30 single-family homes, one 2-4 family dwelling, and one non-residential property.

In the last CAV Report prepared for Goffstown on May 14, 2009, it was noted that Goffstown at that time was ranked 10# in the state in the highest number of policies and ranked 3# in the state in the highest number of paid losses, totaling 117 at a cost of $2.8 million. The CAV Report also noted that there were no programmatic issues or problems identified or potential violations with the community's floodplain management program, maps or flood insurance study, or program administration or enforcement. A minor problem was noted with respect to the town's floodplain management regulations at the time as the town's regulations did not properly cite and reference the date of the revised 2009 flood insurance maps. This minor problem was adequately addressed by the town and is reflected in the town's Flood Hazard District Regulations (see most current copy of these regulations in Appendix M).

In addition, the Town of Goffstown has implemented the following actions related to continued compliance with the National Flood Insurance Program (NFIP):

- Participate in NFIP training offered by the State and/or FEMA (or in other training) that addresses flood hazard planning and management.
- Establish mutual aid agreements with neighboring communities to share a building inspector to address administering the NFIP following a major storm event.
- Revise/adopt floodplain ordinance regulations to improve floodplain management in the community.
- Pursue applying and joining NFIP's Community Rating System (CRS).
- Prepare, distribute or make available NFIP, insurance and building codes explanatory pamphlets as well as maps.
- Identify and become knowledgeable of non-compliant structures in the community.

- Identify cause of submit-to-rate structures and analyze how to prevent non-compliant structures in the future.
- Inspect foundations at time of completion before framing to determine if lowest floor is at or above Base Flood Elevation (BFE), if they are in the floodplain.
- Require the use of elevation certificates.
- Enhance local officials, builders, developers, local citizens and other stakeholders' knowledge of how to read and interpret the FIRM.
- Work with elected officials, the state and FEMA to correct existing compliance issues and prevent any future NFIP compliance issues through continuous communications, training and education.

Potential Losses

In order to determine estimated losses due to natural and man-made hazards in Goffstown, each hazard area was analyzed with results shown below. The estimates were calculated using FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses,* August 2001. While the tables in that publication were helpful, a modified variant was utilized based on the information and data available.

For instance, an abbreviated inventory of assets was conducted instead of a detailed inventory, since building specific data is not yet available in a format that can be queried to locate property specific information in a given hazard zone. Therefore, the losses are calculated using available historical and current data to create an estimate for each hazard. Also, data that would provide estimates of future buildings, infrastructure and critical facilities in the identified hazard areas is not yet available. Some of the historical, background and risk related information considered in the estimation process is described in the subsection entitled "Past Hazards, Potential Hazards and Critical Facilities."

Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure. The value of all structures, including exempt structures such as schools and churches, is $797,832,300.[7]

Flooding **$1,885,234 to $3,556,903**

The Town of Goffstown has approximately 232 residential structures located in the floodplain with an average residential sale price in 2013 of $214,186.[8] The estimated

[7] NH Department of Revenue. 2013 Equalization Reports. http://www.nh.gov/revenue/munc_prop/documents/tables_by_county_2007.xls

[8] Southern New Hampshire Planning Commission, *Real Estate Sales Tracking in the Southern New Hampshire Planning Commission Region,* Annual Report, 2004.

population within these structures is 663.[9] The town has 32 residential repetitive loss properties and 1 commercial repetitive loss property since 1978 with losses total approximately $1,367,584.[10] Repetitive loss *areas* are mapped on the Past and Potential Hazards Map (see Map #2). The land uses within these areas are Residential 1, Residential 2, Agricultural, Commercial, and Village Commercial.

Two scenarios were considered with a low estimate assuming damage to 25 percent of the structures with a one-foot flood depth and a high estimate assuming damage to 50 percent of the structures with a four-foot flood depth. These estimates also assume the residential structures are one- or two-story homes with basements. Standard values for percent damage, functional downtime and displacement time were used from FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses* and its "Worksheet 4-Estimate Losses" to determine the actual estimates.

The low estimate was $1,042,385 in structural damages, $781,789 in contents loss, and $61,060 in structure use and function loss. The total low estimate loss was $1,885,234. The high estimate was $1,945,786 in structural damages, $1,459,339 in contents loss, and $151,778 in structure use and function loss. The total high estimate loss was $3,556,903.

Infrastructure damage could also be extensive, including roads, bridges, utilities, towers, etc. If a devastating flood were to occur, the damage to properties located within the floodplain could exceed this estimated amount. It is clear that Goffstown could benefit greatly from any flood mitigation measures that would help reduce typical losses that occur during a major flood event.

Fluvial Erosion Hazards **$231,872 to $432,827**

The Town of Goffstown has approximately 12 structures located in identified fluvial erosion hazard areas as shown on fluvial erosion maps on Map #3 at the end of Section II and in Appendix I. There are two scenarios which can be considered in estimating future potential damage to structures related to fluvial erosion hazards – low estimates of $231,872 and a high estimate of $432,827.

Hurricane **$7.9 Million to 40 Million**

A major hurricane can cause significant damage to a community. Hurricane Andrew in 1992 caused billions of dollars in damage in the State of Florida. Most of the damage is caused by high water and high winds. Since Goffstown is inland from the coast, less damage would be expected to occur here than in coastal areas. Assuming an assessed structural valuation of approximately $797,832,300 damaging 1 percent to 5 percent of

[9] NFIP Website data
[10] Data provided by FEMA

this community-wide assessed valuation could result in losses of approximately $7.8 million to $40 million. This would not include other damages expected to occur on public property within the community.

Debris Impacted Infrastructure; River Ice Jams **$10,000 to $5,000,000**

Much of the damage from these two hazards could be expected to occur not only on structures, but also on public property, such as roads and bridges. Dollar estimates from this type of hazard can range widely depending on the nature and severity of the hazard. A small to medium sized event could be expected to produce a loss between $10,000 and $5,000,000.

Erosion and Mudslide **$10,000 to $5,000,000**

Erosion and Mudslide hazard events usually affect infrastructure such as roads and bridges, but they can also affect individual structures and businesses. Since this hazard has already occurred in several parts of town, damages from this hazard could be expected to range from a few thousand dollars to a few million dollars, depending on the severity of the event.

Rapid Snow Pack Melt **$659,340 - $2,428,074**

Both Mill Street and Gregg Falls have been identified as being susceptible to rapid snow pack melt in Goffstown. Since the estimated loss for this hazard is similar to flooding, the cost estimate is the same as that for flooding. See dam and breach failure below for this estimated potential loss.

Dam and Breach Failure **$40,000,000 to $60,000,000+**

Goffstown has one Class H "High Hazard" Dam, two Class S "Significant Hazard" Dams, four Class L "Low Hazard" Dams and 16 Class NM "Non-menace" Dams. Dam and/or breach failure could have catastrophic results in Goffstown, including loss of human life. Assuming all 340 structures in the Inundation Zone for Greg Falls Dam (as recorded and located in Goffstown Emergency Plan) were destroyed, along with major losses to utilities and public properties, the total damage could exceed $60,000,000. There are no flood protection measures existing at this time which affect flooding along the South Branch Piscataquog River in the Town of Goffstown. The Everett Dam, a flood control structure built to impound the 500-year discharge, is located on the Main Branch Piscataquog River in the Town of Weare.

Tornadoes **$100,000 to $10,000,000**

The Fujita Scale is used to determine the intensity of tornadoes. Most tornadoes are in the F0 to F2 Class. Building to modern wind standards provides significant property protection from these hazard events. New Hampshire is located within Zone 2 for Design Wind Speed for Community Shelters, which is 160 mph, and is also noted as being within a hurricane susceptible region. While it is difficult to assess the monetary impact a tornado may have on a community, the range of damage shown above

indicates an approximate amount that could be expected. Tornados rarely occur in this part of the country, so damage from this hazard would not be highly likely.

Nor'easters, Ice Storms, Heavy Snow Storms **$10,000 to $5,000,000**
Nor'easters and ice storms typically vary greatly depending on the amount of snow and ice that accumulates during the storm. The ice storm of 1998 caused much damage to power lines and structures in northern New England. These types of storms in Goffstown could be expected to cause damage ranging from a few thousand dollars to several million, depending on the severity of the storm.

Wildfire **$242,000 to $4.3 million**
A wildland fire can strike at any time in any place. Wildland fires may be expected to occur during years of drought. Damage from a small-to-medium-size fire that destroys from one to 20 homes could be expected to range from $242,000 to $4.3 million. Damages to other items such as utilities, etc. are not included in this estimate.

Earthquakes **$7.9 to 39 million**
Assuming a moderate earthquake in Goffstown where structures are not built to a high seismic design level, and presuming mostly wood frame construction, it could be estimated that about 1 percent to 5 percent of the assessed structural valuation could be lost, including damage to homes and homes that are totally destroyed.

Downbursts, Lightning, Hailstorms, Landslides, Radon, Drought, Extreme Heat
No major hazards have occurred related to these hazards so no potential loss estimates have been prepared for these hazards for this Plan.

Please note that all of the above figures are only estimates. The amount of damage from any hazard will vary from these figures depending on the extent and nature of the hazard that occurs.

Description of the Hazards

Flooding

The Goffstown Hazard Mitigation Committee reviewed the following flood hazards which have the highest probability and potential of occurring in Goffstown: 100-Year Floodplain Events. The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Flooding Events	
Probability	3
Severity	2
Overall Risk	6

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of 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.

100-year Floodplain Events

Flood hazard areas identified on the FEMA Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a one percent chance of being equaled or exceeded in any given year.

The one percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30.

Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded).[11]

Similar to many other New Hampshire communities, the Town of Goffstown developed along the waterways and flood safety is a great concern along these watercourses and can be greatly enhanced by flood hazard mitigation planning. While much of Goffstown's floodplain is undeveloped or in agricultural use, there is some development in the SFHA.

Areas of concern include portions of the town center, the neighborhoods of Water Road, Danis Park Road and Dumont Park. In addition, the neighborhoods of Channel Lane and Arrowhead Drive. These areas lie within the special flood hazard areas and flooding hazards are of continuing concern for residents and businesses.

High Severity- Potential to cause a lot of damage
Moderate Severity- Potential to cause minor damage.
Low Severity- Will not cause much damage.

[11] FEMA. NFIP Policy Index. http://www.fema.gov/floodplain-management/flood-zones. 03-26-14.

Known flooding in Goffstown has occurred in the following areas:

Area	Type of Damage and Description	Severity	2014 Update
1. Harry Brook at Henry Bridge Road	Flooding, bridge heavily damaged, road below washed out. There have been several close encounters since 2006.	High	Bridge replaced after 2006 flood
2. Pollard Road(Black Brook)	Flooding, bridge heavily damaged.	Low	Bridge replaced after 2006 flood. New bridge has increased capacity for water flow.
3. Addison Road at Winding Brook Road	Historic granite box culvert washed out in 2006/2007.	Moderate	Reinforced road with cap and installed bypass pipe in 2006/2007
4. Shirley Hill Road (Mystic Brook)	Prone to flooding in large events (Same brook as Addison)	High	Culverts replaced
5. Rt. 114 by Villa Augustina	2006/2007 flooding and recent ponding. Beaver dam let go behind Villa Augustina.	High	Replaced culverts
6. Rt. 114 from Park Lane to Barnard Lane	Same area as Villa Augustina, prone to flooding	High	Improvements made to rail trail, culverts cleaned out
7. Mt. Base - close to Wallace Brook	2006/2007 washouts	Moderate	Culverts replaced
8. Mt. Base by Mcfarland Road	Prone to flooding/washouts	Moderate	Remains prone to flooding currently
9. Mt. Road from Merrill Road to Knoll Crest Road	Dam breach in 2009 caused flooding	Moderate	Dam has been removed and hazard is no longer a threat. Road is low.
10. Bog Road between Lesnyk Lane and Pleasant Street	Prone to flooding	High	Repaired damaged bridge. This hazard area is part of a proposed study for the Uncanoonuc Lake Dam
11. Stinson Road near Paige Hill Road	Prone to flooding	Moderate	Repaired shoulder, still needs ditching and beaver dam mitigation. Work planned for 2014.
12. Gorham Pond Road by Stone Bridge Country Club	Undersized pipe	Moderate	Upsized pipe

Area	Type of Damage and Description	Severity	2014 Update
13. New Boston Road/Route 13 at Town Line	Flat, wet area, no drainage	High	Will improve ditch lines in 2014/2015
14. Montelona Road by Mercier Court	Undersized culvert	Low	Upsized culvert/upgraded to box culvert
15. East Dunbarton Road near Jenny Lane (Brook crossing)	Floods in large events	Low	Reconstruction project planned for Summer 2014
16. Tirrell Hill Road between Black Brook Road and Sunbeam	Wetland area, prone to flooding	Low	Bridgework planned for 2014/2015
17. Main Street	Undersized culvert, water runs under buildings and businesses, buildings prone to damage. Town Hall affected from debris.	Severe	Still needs mitigation. Private property affected and mitigation will require public/private cooperation.
18. Mast Road and Roy Street	Jacque's Flowers property parking lot floods	Moderate	Mitigation will require pipe upgrades and connection work
19. Mast Road at College Road	Intersection prone to flooding	Moderate	Mitigation will require pipe upgrades and connection work. High priority mitigation project.
20. Center Street at Juniper Driver	Downstream abutter infilled outflow pipes, private property floods	Low	Easement proposed for mitigation, coordination in progress currently
21. Worthley Hill Road from Tyler Drive to Wallace Road	Undersized pipe	Moderate	Need to upsize pipe and identify funding source.
22. Police Station (Mast Road)	Low-lying area prone to flooding, DOT culvert issue from 2007	High	Need to upgrade culvert (DOT responsibility)
23. High School (Wallace Road)	Prone to flooding from undersized culverts/pipes and impermeable surfaces. Water has nowhere to go.	Severe	Engineer hired, drainage study and project currently being scoped
24. Addison Road by Tanager Road	Narrow valley, may be prone to flooding again	Low	Upgraded pipe

Area	Type of Damage and Description	Severity	2014 Update
25. Danis Park Road	Neighborhood lies within a flood zone and major flooding is continuously an issue in large events. Evacuation has been necessary in the past and will continue to be a necessary response to flooding in this area.	High	Although no new development is allowed in this area per floodplain management regulations for the Town, this will continue to remain an issue as long as there is development here. Mitigation would require acquiring property from private property owners and placing the land into conservation.
26. Goffstown back road at Manchester TL	Flooding an issue due to new subdivision and runoff impacting roads	High	Drainage extension needed to channel water
27. St. Anselm College on Manchester Town Line	Problem area originates in Manchester and floods into Goffstown	Moderate	St. Anselm is working with the City of Manchester to mitigate.
28. County Farm/Behind Piggery	Culvert collapsed on rail trail	Low	Stabilized culvert – complete
29. Maple Avenue by Elm	Undersized pipe, prone to flooding	High	Re-occurring flooding, pipe needs to be upsized
30. Worthley at Mt. Base Road	Prone to washouts, capacity and beaver issues.	Moderate	Upsize culvert. Pond is owned by private land trust and cooperation is needed to mitigate.

All Special Flood Hazard Areas (SFHAs) in the Town of Goffstown are potentially at risk if a 100-year floodplain event occurs.

I***t is highly likely for flooding to occur and cause damage in the floodplain in Goffstown.***

Fluvial Erosion Hazards

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Fluvial Events	
Probability	**2**
Severity	**1**
Overall Risk	**2**

Floods are well known for posing inundation risks to properties and infrastructure in floodplains adjacent to rivers, but there is a less-appreciated danger associated with sudden channel scouring and riverbank collapse, bridge abutment failure and culvert washouts, or even wholesale changes in the courses of rivers. These phenomena all fall under the general heading of 'fluvial erosion hazards,' where the term 'fluvial' is used by earth scientists to indicate action by flowing water and by rivers in particular. Fluvial erosion, a natural process, is the wearing away of river beds and banks by the action of running water, and is most active during flood events.

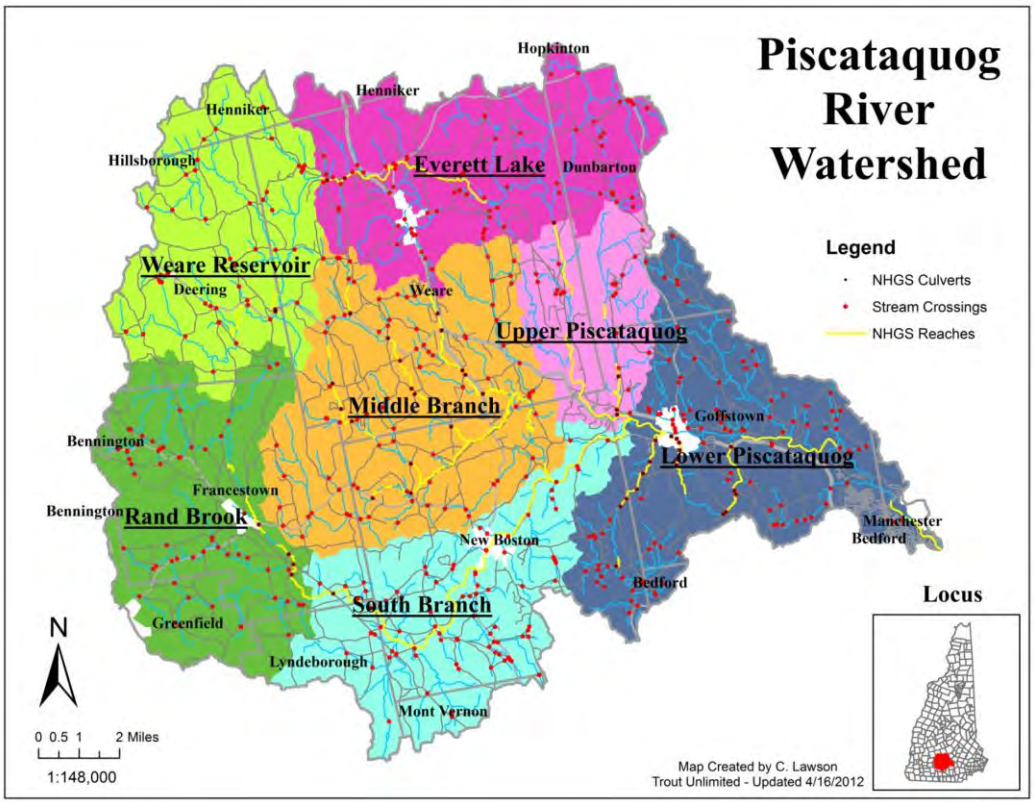
The most dramatic kind of erosion event, known as an 'avulsion,' occurs when a river cuts through one of its banks and erodes an entirely new path, usually abandoning its old path in the process. Such an event occurred on the Suncook River in the Town of Epsom during the Mother's Day Flood of 2006 when Huckins Mill Dam and Bear Island were bypassed by a new channel that cut through an area of wetlands and a working gravel pit. Avulsions are relatively rare, but the effects on property owners and natural ecosystems can be significant and long-lasting.[12]

The New Hampshire Department of Environmental Services (DES) coordinated an assessment for the collection of scientific information in 2013-2014 that identified areas of the Piscataquog River Watershed prone to river and stream erosion that can impact public health and safety. The assessment evaluates the present condition of the watershed to identify areas most prone to flood and erosion-related hazards. The final report was made available to the public in the summer of 2014 and is available from NH DES, Geologic Survey.

The Fluvial Erosion Hazard (FEH) assessment for the Piscataquog River Watershed provides geomorphic data and maps identifying hazard areas. The benefits of this assessment include: the targeting of resources to minimize future flood impacts; enhancing public safety by protecting public and private property, improving infrastructure and minimizing loss of lives; the reduction of economic losses; and aiding

[12] NHDES. Fluvial Erosion Hazards and River Geomorphic Assessment Program. Environmental Fact Sheet. CO-GEO-10. 2013.

municipalities in the development of pre-disaster mitigation plans. The following figure shows the overall Piscataquog River Watershed and its subwatersheds, the stream reaches, culverts and stream crossings which was studied by the NH DES, Geologic Survey as part of the fluvial erosion hazard assessment.



The Fluvial Erosion Hazard Zones in Goffstown, NH are shown on FEH Maps 1-12 in Appendix I. An overall map of the FEH zones in Goffstown is provided in the following Map #3. In the Town of Goffstown, there is one Extreme FEH zone, five Very High FEH zones and four High FEH zones. There are no Moderate or Very Low FEHs identified in the assessment. A description of the FEH zones in Goffstown is provided in the following table. When viewing the maps the severity ranking colors are as follows: Extreme (Dark Red); Very High (Red on map); and High (Orange on map).

According to the NH Geological Survey, the fluvial erosion hazard zone, or meander belt is provided for the river reaches. For each river reach, a suite of river geomorphology (condition) data was collected that provided an understanding of the river channel's sensitivity to future change (inclusive of bed and bank erosion) as a result of high flow events. The sensitivity for a reach can be in one of six categories, based on its condition, ranging from Very Low to Extreme. Sensitivity is defined as the potential of a river to respond to flood events, through bank erosion and lateral migration (across the floodplain). Rivers, as a result of the combination of their geologic

context and extent of historical development, will vary in their likelihood to experience flood-event driven rapid changes. Past activities, such as channel straightening, can increase the potential for change in a flood. Reaches already experiencing erosion are prone to such rapid changes, given the exposed bank materials available for the power of water to erode into. The occurrences of such features are incorporated into the sensitivity rankings, where generally, the greater number of features present that can cause changes, the higher the sensitivity to change.

Broadly, assignment of an "Extreme" category means a reach that is experiencing considerable erosion of its beds and banks, and typically has flood chutes and meander cutoffs that maximize the potential for changing flow paths and further erosion during a large flood. Conversely, a rating of "Very Low" is typically found in a bedrock gorge, where the flow path will not change on time scales of concern to people.

Fluvial Erosion Hazard Zones Piscataquog River Watershed Goffstown, NH

	River	Description of Location	Severity	Length
1	S. Branch Piscataquog	New Boston Road (Route 13) at New Boston/Goffstown border. Extending from New Boston east to north up to juncture of merger of north and south branches of the Piscataquog River. Right before the two islands.	Extreme	6,063 feet
2	Gorham Brook I	N. Branch Piscataquog River at Route 114 north to before Saunders Road	High	2,821 feet
3	Gorham Brook II	East of Weare/Goffstown border, starting a little south of Kings Ranch Road north over 2,000 feet.	High	2,138 feet
4	Bog Brook I	Slightly south of Bog Brook start off Piscataquog River down to New Boston Road (Route 13)	Very High	2,052 feet
5	Bog Brook II	New Boston Road (Route 13) south to New Boston/Goffstown border (and extends into New Boston)	High	11,178 feet
6	Whittle Brook I	Slightly south of the start of Whittle Brook off Piscataquog River down to intersection of Mountain Road and Hampton Court.	Very High	3,189 feet
7	Whittle Brook II	Starts south of Whittle Brook I continuing until almost the end of Whittle Brook	Very High	6,309 feet
8	Dan Little Brook I	Route 114 to slightly south of Alpine Drive and after a stream fork	Very High	4,041 feet
9	Dan Little Brook II	Starting after stream fork, west of Rainbow Drive, and ending at	Very High	6,699 feet

		Uncanoonuc Lake		
10	Piscataquog River	Starting at end of Glen Lake and ending at Henry Bridge Road	High	5,172 feet

On the following Map #3 and the FEH Maps 1-12 in Appendix I, "Extreme" rating is depicted in maroon red; "Very High" is depicted in red; "High" as orange; "Moderate" as yellow; and, "Very Low" in Green. Only within these designation zones is fluvial erosion a potential risk for the community.

It is likely for fluvial erosion to happen in the Town of Goffstown.

Hurricanes

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

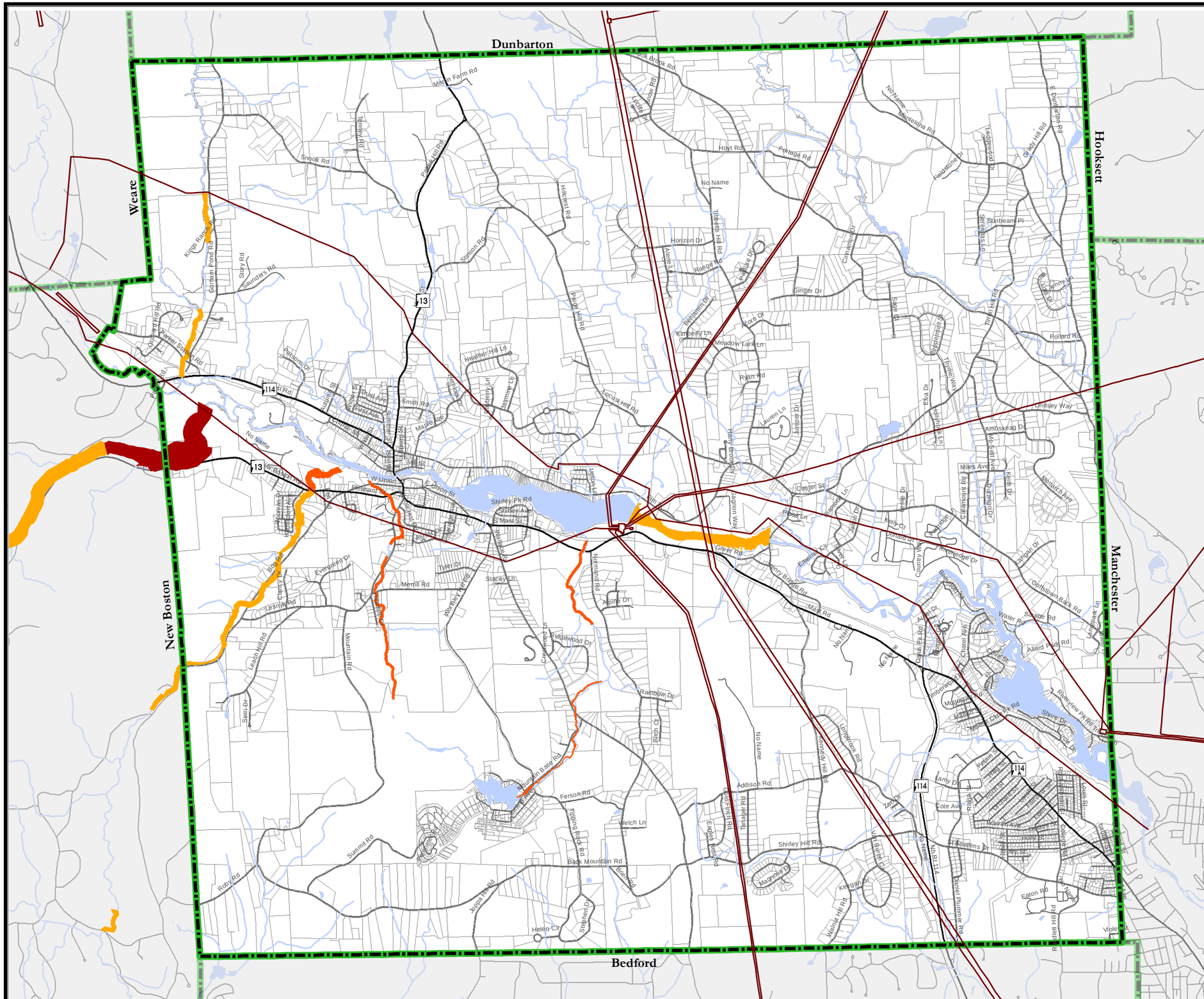
Hurricanes	
Probability	**1**
Severity	**2**
Overall Risk	**2**

Since 1938, twelve hurricanes and tropical storms have reached New Hampshire; (2013 State of New Hampshire Natural Hazards Mitigation Plan p. 69-70). The 1938 hurricane was a more notable event, causing damage to Goffstown and other towns in southern New Hampshire. Hurricanes Carol and Edna caused some damage in August and September of 1954. In addition, New Hampshire saw some localized flooding and wind damage in September 1985 – Gloria; August 1991 – Bob; and September 1999 – Floyd. In all of these cases, trees and power lines came down, but there was not a lot of structural damage.

The most recent Hurricanes to reach New Hampshire were Hurricane Irene in August 2011 and Hurricane Sandy in October 2012, which was downgraded to a post-tropical cyclone by the time it reached New Hampshire, with most areas reporting winds of 40 to 70 mph (64 to 110 km/h).[13] Goffstown experienced downed trees and power lines in these events, but no significant flooding issues.

During these events trees and power lines came down, and there was minimal structural damage. Hurricane Bob was a Presidentially Declared Disaster for the State of New Hampshire and caused about $2.3 million in damages statewide. Most recently,

[13] NOAA. National Climatic Data Center. Storm Events Database. http://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=416281. 01-22-14.



Map # 3

Fluvial Erosion Hazard Zones Goffstown, NH

Fluvial Erosion Hazard Zones *

- Extreme
- Very High
- High
- Moderate
- Very Low
- Political Boundary
- Parcels
- Utility Lines
- Lakes
- Streams
- Interstate
- US and State Routes
- Local Roads

* A full description of FEH zones can be found in the Goffstown Hazard Mitigation Plan.

0 0.5 1 2 Miles

Data Sources:
Granit Digital Data (1:24,000)
NH Department of Transportation
Individual Community Parcel Data

The town of Goffstown and the SNHPC make no representations or guaranties to the accuracy of the features and designations of this map.

Map produced by SNHPC September 2014.

This map is designed as part of the Towns Hazard Mitigation Plan and is for planning purposes only. It is not to be used for legal boundary determinations or for regulatory purposes.

N W E S

SNHPC

Hurricane Sandy was also a Presidentially Declared Disaster for the State. (FEMA, "Federally Declared Disasters by Calendar Year"). Irene's heavy rains caused flooding at a mitigated area and caused wind damage – one house was hit by a tree. Hurricane Sandy was not noted as particularly significant, although it did cause road closures, downed wires, and brush had to be cleared.

Severe hurricanes reaching south-central New Hampshire in the late summer and early fall are the most dangerous of the coastal storms that pass through New England from the south. During a hurricane wind speeds may reach 250 miles per hour in a Category 5 hurricane, as measured on the Saffir-Simpson Hurricane Scale. Tropical depressions are considered to be of hurricane force when winds reach 74 miles per hour. Substantial damage may result from winds of this force, especially considering the duration of the event, which may last for many hours.

Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129 mph	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156 mph	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 mph or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Oceanic and Atmospheric Administration (NOAA)

Potential effects of a hurricane include flooding; runoff not handled adequately, and disrupted travel. Past hurricanes to impact the Town of Goffstown were:

- September 1985 – Gloria
- August 1991 – Bob
- September 1999 – Floyd
- August 2011 – Irene
- October 2012 - Sandy

During these events trees and power lines came down, and there was minimal structural damage. On the Goffstown Community Emergency Response Town website it was announced that there was a flood watch for eastern and Central Hillsborough County during Hurricane Irene on August 26, 2011. Hurricane Bob was a Presidentially Declared Disaster for the State of New Hampshire and caused about $2.3 million in damages statewide. Most recently, Hurricane Sandy was also a Presidentially Declared Disaster for the State. (FEMA, "Federally Declared Disasters by Calendar Year").

Based upon this information, all areas of Goffstown are potentially at risk if a hurricane reaches Hillsborough County, NH.

It is highly likely for hurricanes to occur and cause damage in Goffstown.

Debris-Impacted Infrastructure

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Debris Impacted Infrastructure	
Probability	**3**
Severity	**2**
Overall Risk	**6**

If flooding occurs in the Town of Goffstown, there is the potential for debris-impacted infrastructure to cause harm. Bridges, culverts and related roadways were identified as most vulnerable to debris-impacted infrastructure and included on the Critical Facilities and Areas at Risk GIS maps. The Town has a dam alert system for Greggs Falls Dam. In case of dam failure, residents have a 10-minute warning.

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Debris carried by floodwaters can compromises the effectiveness of bridges, dams, culverts, diverting structures, etc. The debris may compound a flooding

hazard by obstructing normal floodwater flow. Debris impacted infrastructure could also be comprised of downed trees, limbs, or power lines onto roadways. Roadways are typically considered unsafe to travel until the debris has been removed from the roadway and power has been restored.

Debris impacted infrastructure is considered more of a technological hazard than a natural hazard. Impaction of infrastructure can occur on a large scale when trees or old vehicles block a dam or bridge, or on a smaller scale can be simply leaves, sticks, and litter blocking a culvert.

A publication from the U.S. Federal Highway Administration (FwHA) entitled Debris Control Structures Evaluation and Countermeasures Hydraulic Engineering Circular No. 9 Third Edition provides many criteria for determining both the production and estimation of largest size delivered to a site, particularly a bridge. A river reach must be observed to ascertain the Potential, and each Potential is then assigned to that particular reach. The following Table measures the High to Low scale potential magnitude for flowing debris delivery to a downstream site.

Potential for River/Brook Debris Delivery to the (Bridge/Culvert/Dam) Site

Potential for Debris Delivery	Direct Evidence	Indirect Evidence
High	1. Multiple cases of floating debris accumulation at bridges. 2. Chronic floating debris accumulation at one or more sites 3. Floating debris accumulation at sites where potential for accumulation would be low if floating debris were not abundant 4. Abundant floating debris stored in the channel. 5. Past need for debris removal in the channel system or at bridges.	1. Widespread bank erosion in the upstream channel system. 2. History of changes in the upstream channel system, including degradation, lateral migration, widening, channelization, in-stream gravel mining, widespread drainage, or dams 3. Prospects of changes in the channel system. 4. Hydraulic and geomorphic factors indicating stream instability 5. Widespread timber harvesting in the basin 6. History or prospect of marked changes in basin land use 7. In-stream gravel mining
Low	1. Negligible floating debris delivered in major events, especially at sites with a high potential for trapping floating debris or at typical debris-accumulation sites. 2. All of the floating debris accumulates in forested channel upstream 3. Floating debris in the channel is stationary during floods because of low flow velocity.	1. The inability of woody vegetation to grow along the channel system and on steep slopes leading down to the stream channels. 2. The channel system is stable and is unlikely to experience any significant change.

Source: U.S. Federal Highway Administration

Known locations of debris-impacted infrastructure include:

- ***Hadley Falls***
- ***Greggs Falls Dam***
- ***Karanikas Moat/Dam (Private)***
- ***Church St. Box culvert***
- ***Manchester trestle bridge***
- ***Mill Street (Hadley Dam)***
- ***Ravines behind County Prison, debris clogs culverts***

Potential location(s) of debris-impacted infrastructure include:

- ***Addison Road***

In the past, the Mast Road/Roy Street area was a known location of debris-impacted infrastructure, but it has been repaired and is no longer considered a hazard area. However, all SFHAs in Goffstown are potentially at risk if a debris-impacted infrastructure event occurs**.**

It is highly likely for debris-impacted infrastructure to occur and cause damage in Goffstown.

Erosion and Mudslides

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Erosion and Mudslides	
Probability	**2**
Severity	**1**
Overall Risk	**2**

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Watercourses which are particularly prone to flash-flooding conditions are most vulnerable to erosion and scouring. These types of rivers are primarily found at higher elevations. Bank erosion can occur on the streams in Goffstown and along the Piscataquog River. Certain roadways with a very steep slope are also particularly vulnerable.

Diverse stream bank shapes have different types of resistance to erosion. An undercut bank, a bank that rises vertically or overhangs the stream, generally provides good cover for macroinvertebrates and fish and is resistant to erosion. However, if seriously further undercut, it might be vulnerable to collapse. The steeply sloping bank sloping

at more than a 30 degree angle is very vulnerable to erosion. The gradually sloping bank has a slope of 30 degrees or less and it is highly resistant to erosion but does not provide much streamside cover. Not only is there loss of property due to erosion, but habitat and ecosystems are affected. (Source: USGS)

Stream bank and fluvial erosion may eventually result in mudslides. As mentioned earlier in this report, development in Goffstown is concentrated along the South Branch of the Piscataquog River. Land in Goffstown which has at least 15 percent slope, a vertical rise of 15 feet over a horizontal run of 100 feet, is scattered throughout the Town, usually occurring around the hills and along the South Branch. Areas of steep slopes and highly erodible soils in Goffstown are shown on the Past and Potential Hazards GIS Map #2.

According to the Goffstown Hazard Mitigation Committee, areas prone to existing erosion problems in Goffstown are shown in the following the table. Based upon input provided by the Public Works Department, areas identified with a rating of "high" reflect erosion/mudslide events which occurred in association with a major flooding event where damage occurred. Areas assigned a "moderate" rating reflect events which occurred with moderate damage as a result of some flooding; and a "minor" rating reflects events which occurred with minor damage unrelated to a flood that was in most cases readily contained or repaired by the Public Works Department.

Area	2015 Update	Rating
Shirley Hill Road	Contained	HIGH
Sarette Road (private)	Not repaired	LOW
Worthley Hill Road	Needs repair work	HIGH
Mountain Road	Contained	MODERATE
Walnut Hill Road	Repaired	LOW
Bog Road	Contained	HIGH
Leach Hill and Serri Drive	Repaired	MODERATE
Summit Road	Contained	HIGH
Merrill Road	Repaired	MODERATE
Normand Road from Rainbow Drive to Wallace Road	Needs Repair	HIGH
Wallace Road below Mt. Base Road	Contained	MODERATE
Wallace Road between Addison Road and Shirley Hill Road	Contained	MODERATE
Wallace Road just below Normand Road	Contained	MODERATE
Shirley Hill Road from Eagle's Nest Road to Tanager Road	Repaired headwalls; however, likely to flood	LOW
Landfill (between Louis Street and the Town Line)	Mitigated	LOW

Area	2015 Update	Rating
East Dunbarton Road between Pollard Road and Lisa Drive	Repaired	LOW
East Dunbarton Road by the Town Line (Manchester)	Repaired	LOW
Chatel Avenue	Repaired	LOW
Tirrell Hill Road by Thyme Way and Mo-Sett Avenue	Contained	LOW
Elm Street from Big Jane's Lane to Glen Lake Boat Launch	Repaired	LOW
Snook Road	Repaired	LOW
Rail Bed through Town	Contained	MODERATE
Black Brook Road below Cinnamon Drive	Needs Repair	MODERATE
Rail Trail by Normand Road	Repaired	LOW
Silver Lane by Jason Drive	Repaired	LOW
Elm Street near Lakeview (private property)	Needs repair work	MODERATE

Based upon this information all areas of steep slopes and erosion prone soils, as mapped in this Plan, are potentially at risk of potential erosion and mudslide events.

It is likely for erosion and mudslides to occur and cause damage in Goffstown.

Rapid Snow Pack Melt

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Rapid Snow Pack Melt	
Probability	2
Severity	2
Overall Risk	4

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Rapid snow pack melt is another category of flooding. The solid snow cover from a winter season can be melted prior to a ground thaw in a few warm or rainy days, resulting in flash-flood like conditions.

The National Operational Hydrologic Remote Sensing Center (NOHRSC) provides an interface for Interactive Snow Information in the form of Modeled Snow Water Equivalent from National Oceanic and Atmospheric Administration (NOAA) forecasts.

Historic and current snow water equivalent (how much water there would be if the current snow melted) can be mapped and identified. The online map can be zoomed in to the Hillsborough County level, and the daily prediction of snow water equivalent legend is posted for emergency managers to measure the magnitude of snow water equivalent (snow pack melt).

An accompanying tool on this HOHRSC website, the Change in Modeled Snow Water Equivalent (SWE), indicates how much the snow water equivalent changed over the previous 24-hour period. Emergency responders can use this Interactive Snow Information Map tool to identify increases or decreases in the number of inches of SWE, either through snowfall or snowmelt. Using both the Modeled Snow Water Equivalent and the Change in Modeled Snow Water Equivalent together as predictive tools, responders can monitor snow melt and identify problem areas in Town for resolution.

Rapid snow pack melt can cause flooding or ponding throughout the community. Specific damaged locations include undersized or unmaintained culverts, roads, driveways, slopes yards or fields, or swollen streams. The location of some of these areas can be seen on the GIS maps' depiction of steep slopes. Structures and improvements located on, along, or at the base of steep slopes or the SFHAs are most vulnerable to rapid snow pack melt. Problems have been known to exist at both the Mill Street and Greggs Falls dams. The Mill Street area may have been caused by debris-impacted infrastructure. These areas can be seen on the Past and Potential Hazards Map's depiction of steep slopes and the 100-year flood areas.

Heavy snowstorms in 2007 caused higher than average flooding in Goffstown. This hazard is a concern whenever there may be heavy snow in the winter followed by a sudden onset of consistently warm temperatures. On February 26, 2010 there was a flood warning in effect for Goffstown, NH as rivers neared flood stage. The Piscataquog River's water level was frequently checked.

Based upon this information all areas at the base of steep slopes (as mapped in this Plan, see Map #2) and other areas at locations of critical drainage infrastructure scattered throughout the Town, are potentially at risk in the case of rapid snow pack melt.

It is likely for rapid snow pack melt to occur and cause damage.

River Ice Jams

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

River Ice Jams	
Probability	2
Severity	1
Overall Risk	2

An ice jam is an accumulation of ice in a river that restricts water flow and may cause back water that floods low-lying areas upstream from the jam. The U.S. Army Corp of Engineers (ACOE) maintains the Ice Jam Database, Bulletins & Surveys website which locates where ice jams are presently occurring and where they have occurred in the past. Reports can be generated in various formats so emergency responders can identify the locations of prior ice jams and begin to mitigate the effects of future events.

An examination of the U.S. Army Engineer Research and Development Center Ice Jam Database revealed 18 listed for Goffstown since it started to keep records in 1780. Goffstown ranks the 11th town in NH that has had the most ice jams. About 70 percent of the information on NH Ice Jams in the database comes from the USGS Water Resource Data. Forty-seven percent of New Hampshire ice jams have occurred in March and April when the rivers begin to break up, an indicator that these ice jams are largely break-up ice events. The 47 percent of jams that occur in January and February could be either free up or break up ice jams (U.S. Army Corp of Engineers, Hanover, NH 2000). The most common ice jam damages are bridge, commercial and residential damage, road and railroad flooding, evacuations, and agricultural damage.

Many floods in Goffstown have been due to snowmelt and heavy rains in conjunction with ice jams. Minor flooding can occur any time, as heavy thunderstorms can result in rapid runoff and flooding in the downstream portions of the small streams. Bridges, culverts, water and sewer infrastructure, roads and water-based industrial sites may be especially vulnerable to this type of hazard. There is the potential for river ice jams to occur in Goffstown and create hazardous conditions. According to the U.S. Army Corp of Engineers, historically most of the ice jams have occurred on the S. Branch of the Piscataquog River. The table below describes two most recent ones, in 2005 and 2011.

Town of Goffstown Ice Jams since 2005

Date	Location	Description
March 7, 2011	S. Branch Piscataquog River	Annual Maximum peak stage of 11.54 feet due to ice jam. Average daily discharge estimated at 1,280 cfs.
January 23, 2005	Piscataquog River	Very cold air temperatures caused frazil accumulations in the river (freeze-up type of ice jam), affecting gage readings. No flood was occurring at the time. Peak stage of 6.7 feet and dropped to 5 feet.

Source: U.S. Army Engineer Research and Development Center, 2014.

In the past, ice jams have occurred at the following locations:

- Black Brook near Pollard, Piscataquog River;
- Tirrell Hill Road, Piscataquog River – bridge replaced in 2013 and no longer has a center span, which may relieve this area of possible ice jam hazards;
- Mill Street and Greggs Falls dam, Piscataquog River; and
- Rt. 13 at the New Boston town line, Piscataquog River - (impacts private property) in 2013 (not listed in Ice Jam Database).

Based upon this information, all Special Flood Hazard Areas in the Town of Goffstown are potentially at risk if an ice jam occurs.

It is likely for a river ice jam to occur and cause damage in Goffstown.

Dam Breach or Failure

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Dam Breach or Failure	
Probability	**1**
Severity	**3**
Overall Risk	**3**

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. The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Dam breach is considered a Technological Hazard, a secondary hazard caused by flooding conditions. Dam breaches are a potential danger to people and property within the dam breach inundation area(s). All class S (Significant Hazard) and H (High Hazard) dams have the potential to cause damage if they breach or fail.

The State of New Hampshire, Dam Bureau categorizes every dam into one of four classifications, which are differentiated by the degree of potential damages that a failure of the dam is expected to cause:

Non-Menace structure means a dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property, provided the dam is:

- Less than six feet in height if it has a storage capacity greater than 50 acre-feet; or

- Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.

Low Hazard structure means a dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:

- No possible loss of life.
- Low economic loss to structures or property.
- Structural damage to a town or city road or private road accessing property other than
- the dam owner's that could render the road impassable or otherwise interrupt public
- safety services.
- The release of liquid industrial, agricultural, or commercial wastes, septage, or
- contaminated sediment if the storage capacity is less than two-acre-feet and is located
- more than 250 feet from a water body or water course.
- Reversible environmental losses to environmentally-sensitive sites.

Significant Hazard structure means a dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:

- No probable loss of lives.
- Major economic loss to structures or property.
- Structural damage to a Class I or Class II road that could render the road impassable
  or otherwise interrupt public safety services.

Major environmental or public health losses, including one or more of the following:

- Damage to a public water system, as defined by RSA 485:1-a, XV, which will take longer than 48 hours to repair.
- The release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more.
- Damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.

High Hazard means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as a result of:

- Water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure, which is occupied under normal conditions.
- Water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to dam failure is greater than one foot.
- Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services.
- The release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 147-A:2 VII.
- Any other circumstance that would more likely than not cause one or more death

There are no flood protection measures existing at this time which affect flooding along the South Branch Piscataquog River in the Town of Goffstown. The Everett Dam, a flood control structure built to impound the 500-year discharge, is located on the Main Branch Piscataquog River in the Town of Weare. Provided below is a list of the dams in Goffstown with the hazard class ratings.

Dams in Goffstown with Hazard Class

HAZCL	STATUS	NAME	RIVER	HEIGHT	IMPND
H	ACTIVE	GREGG FALLS DAM	PISCATAQUOG RIVER	60	118.8
H	ACTIVE	HADLEY FALLS DAM	PISCATAQUOG RIVER	20	20
L	active/ multiple	UNCANOONUC LAKE DIKE	WHITTLE BROOK	8	24
S	active/ multiple	UNCANOONUC LAKE DAM	DAN LITTLE BROOK	9	24
L	ACTIVE	GOFFSTOWN LOWER RESERVOIR DAM	WHITTLE BROOK	30	2
L	ACTIVE	GOFFSTOWN UPPER RESERVOIR DAM	WHITTLE BROOK	31	4
	BREACHED	WHITTLE BROOK	WHITTLE BROOK	10	0.5
	RUINS	PIERCE BROOK DAM	PIERCE BROOK	10	
	RUINS	UNNAMED STREAM DAM	UNNAMED BROOK		
NM	ACTIVE	FRIBORG DAM	BOG BROOK	12	0.14
NM	ACTIVE	BOG BROOK	BOG BROOK	13.5	0.1
	EXEMPT	BARTLETTS CORNER DAM	NATURAL SWALE		
NM	ACTIVE	BLACK BROOK	BLACK BROOK	11.5	0.5
	EXEMPT	BARNARD PLAYGROUND DAM	NATURAL SWALE	4	0.25
	BREACHED	VILLA AUGUSTINA SCHOOL DAM	DAN LITTLE BROOK		
NM	ACTIVE	FIRE POND	SMALL BROOK	8	1.5
L	ACTIVE	PRESTON ICE POND DAM	DAN LITTLE BROOK	8	10
NM	ACTIVE	ABOVE WATER SUPPLY RESERVOIR	UNNAMED STREAM		

	EXEMPT	HECKER FARM POND DAM	FORSYTH BROOK	3	0.25
NM	ACTIVE	RECREATION POND	NATURAL SWALE	8	0.75
NM	ACTIVE	HYAIRE DAM	DAN LITTLE BROOK	6	1.5
	EXEMPT	CLARK POND DAM	TR HARRY BROOK	2	0.7
NM	ACTIVE	RETENTION POND	UNNAMED STREAM	7.5	0.29
NM	ACTIVE	RODNEY STARK DAM	UNNAMED BROOK	7.5	0.4
NM	ACTIVE	WALLACE ROAD ASSOCIATES	UNNAMED BROOK	11	0.1
	EXEMPT	PARIS RECREATION POND DAM	UNNAMED STREAM	3	0.1
NM	ACTIVE	PARIS FARM POND	TR HARRY BROOK	8	1.25
NM	ACTIVE	RILEY DETENTION POND	RUNOFF	6	0
	EXEMPT	SAINT ANSELM DETENTION POND	RUNOFF	9	0.2
	EXEMPT	VAN BEUREN EST DET POND	RUNOFF	3.9	2.36
NM	ACTIVE	STONEBRIDGE CNTRY CLUB DET POND	RUNOFF	10	0.22
	EXEMPT	COTE AVE DETENTION POND DAM	RUNOFF	6	0.3
	EXEMPT	COTE AVE SEDIMENTATION BASIN	RUNOFF	8	0.01
	EXEMPT	CATAMOUNT RIDGE DET POND DAM	RUNOFF	5.4	0.13
NM	ACTIVE	LEACH HILL DAM	TRIB TO BOG BROOK	14	0.72

Source: NH Dam Bureau, 2014

The following dams have had a breach or failure in the past in Goffstown:

- **Black Brook Kordas Dam**
- **Kordas Dam at Blackbrook Road-** failed in 2006
- **Backside of Mt. Base Pond –** Water precinct repaired this dam and it is also currently part of the Uncanoonuc Lake Dam study in 2014
- **Mountain Road just below Merrill Road –** Dam no longer exists in this location and is therefore no longer a hazard for dam breach or failure

Based upon this information all immediate areas below and surrounding existing dams in Goffstown would be impacted by a dam breach or failure.

It is possible for a dam breach or failure to occur and cause damage in Goffstown.

Tornadoes

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Tornadoes	
Probability	**1**
Severity	**2**
Overall Risk	**2**

All areas of Goffstown are potentially at risk for property damage and loss of life due to tornadoes. Since 1951, there are 18 known tornadoes that have occurred in Hillsborough County (State of New Hampshire Multi-Hazard Mitigation Plan, 2013). Another data source, NOAA Storm Prediction Center (SPC) historical tornado data shows that since 1950 there have been 20 known tornadoes that have occurred in Hillsborough County ranging from 1-3 on the Fujita scale. None of these are known to have had any effect in Goffstown. What usually occurs in Goffstown would be better classified as a "downburst" (see below).

On average New Hampshire has 1.5 - 2 tornadoes per year (National Climatic Data Center.) Most of the tornadoes in New Hampshire are small and cause only localized damage. Tornadoes are measured using the Enhanced Fujita Tornado Damage Scale, as seen in the following table.

Enhanced Fujita Tornado Damage Scale

FUJITA SCALE			DERIVED EF SCALE		**OPERATIONAL EF SCALE**	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**
0	40-72	45-78	0	65-85	**0**	**65-85**
1	73-112	79-117	1	86-109	**1**	**86-110**
2	113-157	118-161	2	110-137	**2**	**111-135**
3	158-207	162-209	3	138-167	**3**	**136-165**
4	208-260	210-261	4	168-199	**4**	**166-200**
5	261-318	262-317	5	200-234	**5**	**Over 200**

Source: NOAA

Based upon this information, all areas of Goffstown are potentially at risk for property damage and loss of life due to tornadoes.

It is possible for tornadoes to occur and cause damage in Goffstown.

Maple Avenue, Goffstown Wind Storm 2014

Downbursts

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Downbursts	
Probability	2
Severity	1
Overall Risk	2

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. Depending on the size and location of these events, the destruction to property may be devastating. Downbursts fall into two categories. Microbursts cover an area less than 2.5 miles in diameter, and macrobursts cover an area at least 2.5 miles in diameter.

The State of New Hampshire Multi-Hazard Mitigation Plan has downbursts in the same category as tornadoes. The plan defines downbursts the following way: "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. Depending on the size and location of these events, the destruction to property can be devastating. Microburst covers an area less than 2.5 miles in diameter; and Macroburst covers an area at least 2.5 miles in diameter."[14]

Downbursts have occurred in nearby towns. On August 18, 1991, five people were killed and 11 injured in Stratham by a downburst causing almost $2.5 million in

[14] State of New Hampshire Multi-Hazard Mitigation Plan, Update 2013, page 60.

damage. On July 6, 1999, one person was killed when a microburst struck central New Hampshire. In 2011 there was a microburst in Bow, only 20 miles away. City Auto in Bow had 15 campers damaged and estimated $200,000 in damage (New Hampshire Multi-Hazard Mitigation Plan, 2013). There were microbursts in Lake Winnisquam, Tilton and City of Franklin, Webster Lake in 2012. In these cases several large trees came down landing on vehicles and homes. In September 2014 there was a microburst in Hollis, NH which had winds estimated at up to 110 mph, which splintered and uprooted trees. The winds were in a more straight-line pattern as opposed to the circular pattern you find with a tornado. The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Downbursts often accompany thunderstorms, which are quite common during Central NH's hot weather months. Microbursts and macrobursts (wet) have been known to occur here in the region.

Downbursts of both sizes are capable of producing strong wind shear, or large changes in wind speed and direction over a short distance. Downbursts typically originate from thunderstorm clouds, with air moving in a downward motion until it hits the ground level and then spreads outward in all directions. In fact, the wind pattern of a downburst is the opposite of a tornado's wind pattern. The National Oceanic and Atmospheric Administration (NOAA) National Weather Service and the National Weather Service Jetstream Online School for Weather have provided descriptions of downbursts. Downbursts can follow the Enhanced Fujita Scale for the tornado-like high winds they spawn. Downbursts are categorized into macrobursts and microbursts, and although there are wet and dry microbursts, NH only experiences wet microbursts. The Enhanced Fujita Scale shown on the table below measures the magnitude of wind speed for downbursts.

Characteristics of Downbursts: Macrobursts and Microbursts

Characteristics	Microburst (wet)	Macroburst (wet)
Wind Span	<2.5 miles	>2.5 miles
Time	2 to f minutes	5 to 20 minutes
Wind Speed	Up to EF 4 (166 mph)	Up to EF 3 (136 mph)
Example of Damages	Trees flattened; hazardous conditions for planes; building damage.	Not as strong as a microburst, but winds last longer.

The Town of Goffstown has experienced high concentrated winds. On July 6, 1999, a downburst consisting of winds of over 80 mph blew over a tree, which caused **two fatalities** in Goffstown and caused problems with communication towers. There was also a lot of damage to trees near power lines because of the high winds. Known locations of past downburst activity include:

- Center and Elm Street
- Blueberry Farm on Parker Road (2004)
- Mountain Road and Bog Road (2014)

Based upon this information all locations in Goffstown are potentially at risk for property damage and loss of life due to downbursts.

It is likely for downbursts to occur and cause damage in Goffstown.

Lightning

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Lightning	
Probability	**1**
Severity	**1**
Overall Risk	**1**

During the development of a thunderstorm, the rapidly rising air within the cloud, combined with the movement of the precipitation, causes electrical charges to build up. Generally, positive charges build up near the top of the cloud, while negative charges build up near the bottom and ground beneath the cloud becomes positively charged. Lightning is a giant spark of electricity that occurs between the positive and negative charges within the atmosphere or between the atmosphere and the ground. The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Severe storms such as thunderstorms are usually responsible for the lightning south NH region receives. Lightning fires are unpredictable and they are most dangerous when strikes occur in rural areas with limited fire suppression access. Lightning can be measured to determine how likely it may be for starting fires. Using a Level system of 1 to 6 corresponding with storm development and the number of lightning strikes, the Lightning Activity level (LAL) measures the magnitude of lightning strikes as displayed in the below table.

Lightning Activity Level (LAL)

Level	LAL Cloud and Storm Development	Cloud to Ground Strikes per 5 Minutes	Cloud to Ground Strikes per 15 Minutes
LAL 1	No thunderstorms	n/a	n/a
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five minute period.	1 to 5	1 to 8
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10	6 to 10	9 to 15

	cloud to ground strikes in a 5 minute period.		
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a 5 minute period.	11 to 15	16 to 25
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.	>15	>25
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.	6 to 10	9 to 15

Source: National Weather Service

In the United States, an average of 54 people are killed by light annually and while none have occurred in NH there were deaths in Florida, New Jersey, Texas, Alabama, Louisiana and Pennsylvania in 2012. The main activities were fishing, soccer and other outdoor activities. NH seems to have less lightning than the rest of the country with NH and Maine having less than 2 cloud-to-ground lightning strikes per square mile per year on average. However, in 2012 there were three lightning strikes in NH causing damage in Portsmouth causing damage at Sarah Long Bridge, Laconia at a residence with three people injured when the lightning struck the ground nearby and Goffstown. The lightning strike in Goffstown occurred at the Goffstown Babe Ruth League on August 4, 2012 that caused $200,000 in equipment and building damages. (NH Multi-Hazard Mitigation Plan, 2013). Other prone areas include: Saint Anselm College, Winter Hill/Paige Hill Area and the Department of Public Works Main Building. Power lines and terrain may contribute to this hazard.

All areas of Goffstown, especially the smaller hills, are potentially at risk for property damage and loss of life due to lightning.

It is possible for lightning to occur and cause damage in Goffstown.

Wildfires

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Wildfires	
Probability	**2**
Severity	**1**
Overall Risk	**2**

Wildfire is defined as any unwanted and unplanned fire burning in forest, shrub or grass and is frequently referred to as forest fire, shrub fire or grass fire, depending on

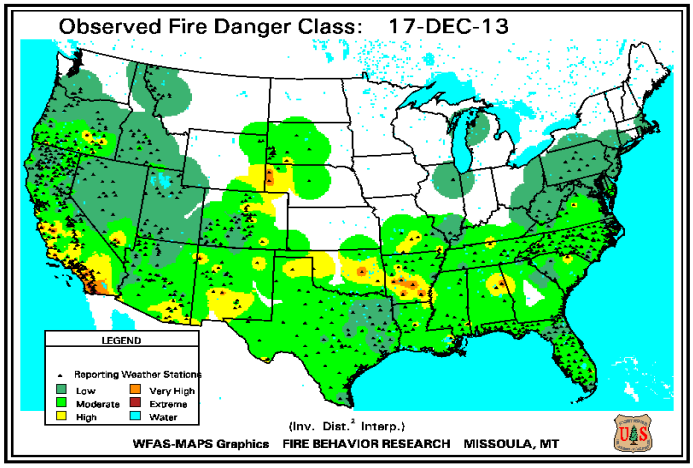
location. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. The threat of wildfires is greatest where vegetation patterns have been altered by past land-use practices, fire suppression and fire exclusion. Historically, large NH wildfires run in roughly 50-year cycles. The increased incidence of large wildfire activity in the late 1940's and early 1950's is thought to be associated with debris from the Hurricane of 1938. Significant woody 'fuel' was deposited in the forests during that event. The Ice Storm of 1998 left a significant amount of woody debris in the forests of the region as may fuel future wildfires and, more recently, the Ice Storm of 2008 has left a significant amount of woody debris in the forests of the region as may fuel future wildfires

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. The Table below shows the National Wildfire Coordinating Group (NWCG) Size Fire Classification.

National Wildfire Coordinating Group (NWCG) Size Fire Classification	
Class A	1/4 acre or less
Class B	More than 1/4 acre, but less than 10 acres
Class C	10 acres or more, but less than 100 acres
Class D	100 acres or more, but less than 300 acres
Class E	300 acres or more, but less than 1,000 acres
Class F	1,000 acres or more, but less than 5,000 acres
Class G	5,000 acres or more

The National Fire Danger Rating System (NFDRS) on WFAS is another fire rating system that considers current and future predicted weather, fuel types, and fuel moisture reported by reporting stations. Values in between the stations are estimated and a map is generated for the Observed Fire Danger Classification in a particular area. See the map below as an example.

Fire Danger Classification Map (Daily)



Source: National Fire Danger Rating System (NFDRS)

The National Weather Service (NWS) has an online National Fire Weather mapping tool that displays selections of different criteria such as Fire Weather Watches, Large Fires, and NWS Fire Weather Zones. In the future, this online map will identify the location of Fire Weather Watches, Red Flag Warnings, or Hazardous Weather outlooks across the state of NH and northeast. This map will measure the magnitude of weather conditions contributing to the development of wildfires which might damage Goffstown.

New Hampshire has 350-400 wildfires during an average year and 95 percent of these fires are caused by humans and 5 percent are caused by lightning (NH Hazard Mitigation Plan, 2013). The vast number of these fires occur in the most populated areas like Hillsborough and Rockingham Counties. These fires are suppressed quickly with an average fire size of less than one acre. The primary cause of wildfires in NH continues to be escaped debris burns, with miscellaneous causes (power lines, fireworks, etc.) and campfires being the top three. Average acres burned per year in NH are between 200-250 acres and months of April and May experience the highest number of fire starts with the period of October and November following with the highest number. These time periods are because the predominant forest type is hardwood trees and in spring it is before they green up and the late fall the leaves have dropped. It normally only occurs with an extended period of hot, dry weather conditions. The total number of fire starts have decreased between 2006 and 2011. (NH Hazard Mitigation Plan, 2013).

While there has not been any significant wildfire event or damage to property in the community, the Goffstown Fire Department strongly encourages landowners to clean up downed trees to prevent wildfires. More stringent measures may be necessary to ensure public safety in the future. According to the Goffstown Hazard Mitigation Committee, there are several areas within the community that are susceptible to wildfires. These areas have been identified on both the Past and Potential Hazards Map #2 and the following Wildfire Hazards Map #4 and include:

- All new developments (when trees are cut down, soil dries leaving dead grass)
- OHRVs spark cause fires
- Debris left from ice storms in 2008
- Mountains - high fuel load areas
- Joppa Hill (both sides of the road)
- Tirrell Hill area

Known locations and events of past wildfires that occurred between 2004 and 2014 in Goffstown include:

- North Summit
- South Summit

- Joppa Hill/Back Mt. Area
- Paige Hill
- Locust Hill
- Tibbetts/Benjamin Dr
- Shirley Hill Rd at Back Mt
- Cushing Rd – this area has been forested recently in 2014
- Longbrook
- Gorham Pond Rd

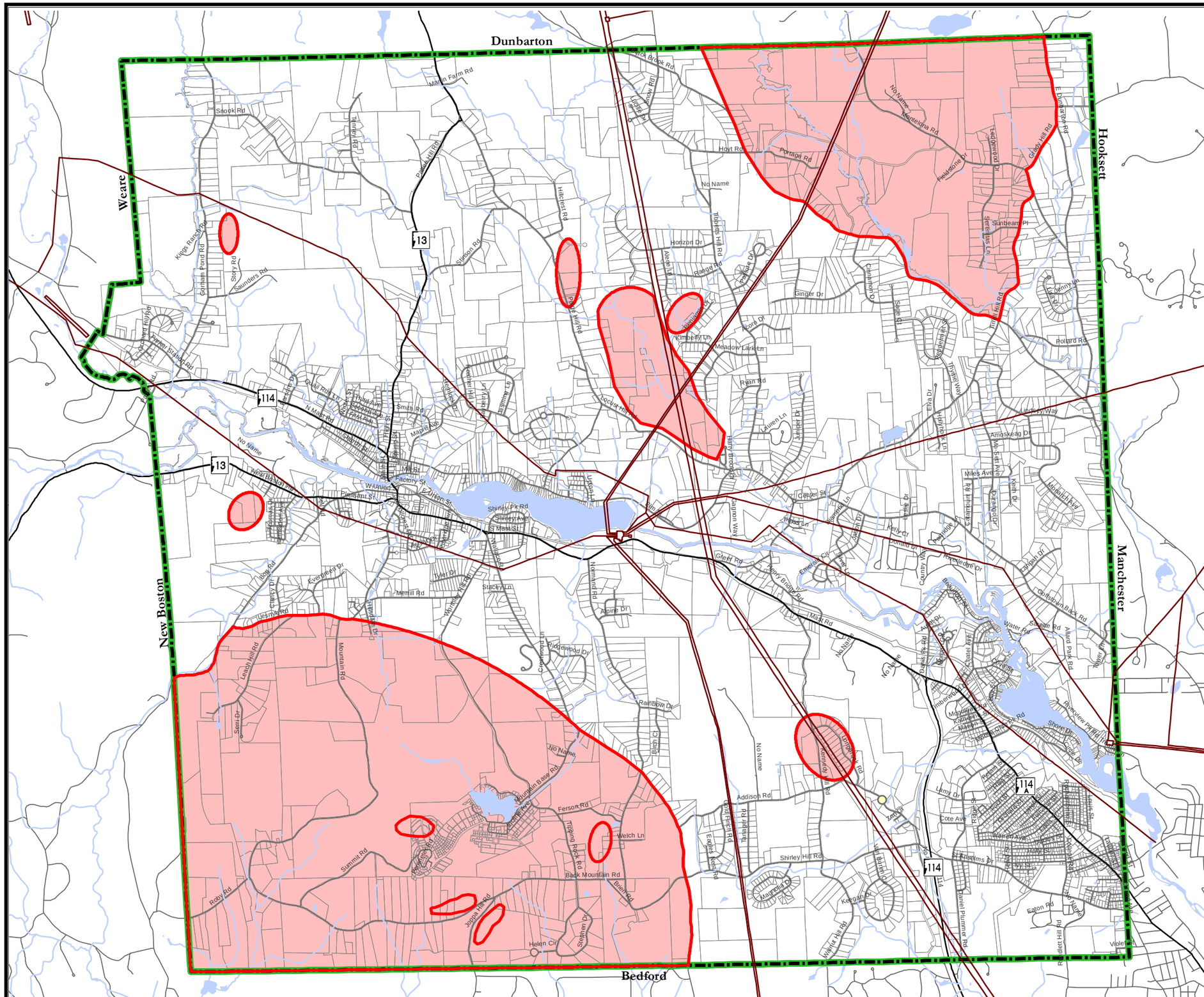
The Goffstown Hazard Mitigation Committee also identified a number of areas of concern for potential future wildfires particularly at isolated homes in the following areas:

- Top of Wallace road (one house)
- Perimeter Road (six homes around the communication towers)
- Incline Avenue
- Perimeter Road
- Crescent Lane
- Forest Street
- Brassard Avenue
- End of Alpine Drive

Much of Goffstown is heavily forested and is therefore exposed to wildfires. The proximity of many populated areas to forested lands exposes these areas and their populations to the potential impact of wildfires.[15] In addition, there are conservation lands in Goffstown which have exposure to wildfires. This includes the 235 acres of Conservation Land located on the northeast slope of the South Uncanoonuc Mountain, between the summit of the mountain and the Mountain Base Point, about 2.5 miles southeast of downtown Goffstown. The property contains portions of the summit of the South Uncanoonuc Mountain, frontage on Mountain Base Pond, and many acres of woodland that are found on the slope in between. A Timber Cruise and Forest Management Plan was prepared for the Goffstown Conservation Commission in 1999 for this area by Foreco: Forest Resource Consultants. While there is nothing about wildfires in this plan, it does give an overview of the type and nature of the forests and watersheds in this area and where access roads into the conservation lands are located so the Fire Department can quickly get to potential fires.
Based upon this information, there are many areas in Goffstown that are potentially at risk for property damage and loss of life due to wildfires.

It is likely for wildfires to occur and cause damage in Goffstown.

[15] State of New Hampshire Natural Hazards Mitigation Plan, page 34.



Map # 4

Wildfire Hazards Goffstown, NH

Past and Potential Hazards

- Wildfire

Base Legend

- Political Boundary
- Parcels
- Utility Lines
- Lakes
- Streams

Roads

- Interstate
- US and State Routes
- Local Roads

0 0.25 0.5 1 1.5 2 Miles

Data Sources:
Granit Digital Data (1:24,000)
NH Department of Transportation
Individual Community Parcel Data

The town of Goffstown and the SNHPC make no representations or guaranties to the accuracy of the features and designations of this map.

Map produced by SNHPC February 2015.

This map is designed as part of the Towns Hazard Mitigation Plan and is for planning purposes only. It is not to be used for legal boundary determinations or for regulatory purposes.

N W E S

SNHPC

Heavy Snow Storms

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Heavy Snow Storms	
Probability	**3**
Severity	**2**
Overall Risk	**6**

According to the 2013 NH Updated Multi-Hazard Mitigation Plan, severe winter weather in NH may include snow storms, blizzards, nor'easters and ice storms. Generally speaking, NH will experience at least one of these hazards during any winter season.

Church Street, Goffstown, NH Winter Storm 2010

A ***heavy snowstorm*** is generally considered to be one that deposits four or more inches of snow (or 10 cm) in a twelve-hour period. A ***blizzard*** is a violent snowstorm with winds blowing at a minimum speed of 35 miles (56 kilometers) per hour and visibility of less than one-quarter mile (400 meters) for three hours.

A ***Nor'easter*** is a large weather system traveling from south to north, passing along the coast. As the storm's intensity increases, the resulting counterclockwise winds which impact the coast and inland areas in a Northeasterly direction. Winds from a Nor'easter can meet or exceed hurricane force winds.

The National Climactic Data Center (NCDC) produces the Regional Snowfall Index (RSI) for the Northeast to categorize significant snowstorms. The RSI ranks snowstorm effects on a scale from 1 to 5. The RSI is based on the spatial extent of the storm, the amount of snowfall, and the population. The Regional Snowfall Index is displayed

below in the table. This is a measurement of the magnitude of a snowstorm in the Northeast, which includes New Hampshire.

Regional Snowfall Index (RSKI) for the Northeast

Storm Category	RSI Value	Snow Description
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18 +	Extreme

Source: National Climactic Data Center (NCDC), 2014

The National Oceanic and Atmospheric Administration's (NOAA's) National Operational Hydrologic Remote Sensing Center (NOHRSC) hosts an Interactive Snow Information site that produces daily Modeled Snow Depth Maps displaying inches of snow depth. These Maps measure the magnitude of snow depth during a chosen day for New Hampshire counties, although individual communities like Goffstown will recognize their municipal location.

Historical Events

During the years from 1955 through 1985, a number of winter storms have attained historic statute in New England. The blizzards of February 1958 and January 1966, the triple snowstorms of the 1960/1961 winter, the great New England Blizzard of February 1978, and the "President's Day Storm" of February 1979 are the most notable events of this period. The blizzard of February 8-10, 2013 was referred to as "Nemo" and this storm exceeded previous snow fall amounts (State of New Hampshire Multi-Hazard Mitigation Plan, 2013). There was also a notable October Nor'easter in 2011 in Hillsborough an Rockingham Counties which caused $4,411,457 in damages. There were wide spread power outages due to heavy snow and debris. (NH Multi-Hazard Mitigation Plan, 2013) The following table from the NH Updated 2013 Multi-Hazard Mitigation Plan provides a complete history of snowfall events (including ice storms) in New Hampshire between 1929 and 2013.

Hazards from heavy snows and nor'easters can include icing which cause downed trees and power lines to go down. According to FEMA, there were major winter storms with a Major Disaster Declaration for the following snowstorms: December 2008; February-March 2010; October 2011 and February 2013. The October 2011 storm around Halloween was referred to as "Snowtober".

According to FEMA, towns in Central NH were struck by this shocking, early severe snowstorm on October 29-30, 2011. In Hillsborough County, damages were at the equivalent of $5.11 per capita (400,721 people in 2010). The blizzard of 2013 (February) caused heavy snow fall. According to FEMA, on February 8-9, 2013 a Nor'easter, known as Winter Storm NEMO, struck the state of New Hampshire. This storm was a

powerful winter storm that developed from the combination of two areas of low pressure merging above the New England Region. The storm brought almost three feet of snow to New England with wind gusts up to 75 mph. A State of Emergency was declared and all motorists were asked to limit travel past 7:00 p.m. that evening.

State of NH Severe Winter Storm Events			
Date	Location	Event	Impacts
Dec 17-20, 1929	State wide	Ice Storm	Unprecedented disruption and damage to telephone, telegraph and power system.
Feb 14-17, 1958	State Wide	Heavy Snow	Only information available states that New England experienced 10-20" of snowfall.
Dec 12, 1960	State wide	Heavy Snow and Wind	Between 13-17" of snowfall across New England and winds between 36-51MPH
Jan 19-20, 1961	State wide	Heavy Snow	24" of Snowfall.
Feb 3-4, 1961	State wide	Heavy Snow and Wind	Only information available states that 8-40" of snow fell across the New England area along with gale force hurricane winds.
Jan 27-31, 1966	State wide	Severe Winter Storm	Large amount of snowfall resulting in disruption of power and transportation services.
Feb 6-7, 1978	State Wide	Heavy Snow and Wind	Snowfall amounts ranged 17-50" in the New England Area along with hurricane force winds.
Jan 8-25,1979	State wide	Ice Storm	Major disruptions to power and transportation.
Feb 14-15,1986	State wide	Ice Storm	Fiercest ice storm in 30 years in the higher elevations in the Monadnock region. It covered a swath about 10 miles wide from the Massachusetts border to New London, New Hampshire.
March 3-6,1991	Southern NH	Ice Storm	Numerous outages from ice-laden power lines .
March 16, 1993	State wide	Heavy Snow	$832,396 worth of damages DR 3101 Numerous power outages.
Jan 15, 1998	State wide	Ice Storm	Severe ice storm that spread throughout New England, causing major damage to private and public utilities.
March 2001	Statewide	Snow	$4,500,000 in damages DR 3166 Numerous outages.
February 17-18 2003 March 11, 2003	Cheshire, Hillsborough, Merrimack, Rockingham and Strafford	Snow Emergency	$3,000,000 in damages EM 3177 Numerous power outages.
January 15, 2004	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack and Sullivan	Snow Emergency	$3,200,000 in damages , EM-3193 Numerous power outages.
March 30, 2005	Belknap, Carroll, Cheshire, Grafton, Hillsboro, Merrimack, Rockingham, Strafford and	Snow Emergency	$4,654,738 in damages, EM 3207 numerous power outages.

	Sullivan		
April 28, 2005	Carroll, Cheshire, Hillsborough, Rockingham and Sullivan	Snow Emergency	$2,677,536 in damages. EM 3211 Numerous power outages.
Dec 12, 2008	State wide	Ice Storm	DR-1199 Severe ice storm that spread throughout New England, causing major damage to private and public utilities six injuries and one fatality and $17+ million in damages to Public Service of NH.
February 2010	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan	Severe Winter Storm	$19,789,657 in damages, DR 1812 extreme winds and power outages along with massive amount of debris.
March 29, 2010	Merrimack, Rockingham, Strafford, and Sullivan	Severe Winter Storm	$9,103,138 in damages, DR 1892. Extreme winds and power outages.
December 7, 2011	Hillsborough and Rockingham	October Nor'Easter	$4,411,457 in damages, DR 4065 Wide spread power outages due to heavy snow and debris.
February 8-10, 2013	Belknap, Carroll, Cheshire, Hillsborough Merrimack, Strafford, Rockingham	February Blizzard 'Nemo'	Exceeded previous snow fall amounts, received snow assistance along with Category B declaration DR 4105.

Based upon this information all areas of Goffstown are potentially at risk for property damage and loss of life due to heavy snows, blizzards and Nor'easters. According to the Goffstown Hazard Mitigation Committee, the primary areas in Goffstown with the greatest risk from heavy snows are:

- Any high elevations in town (receive double the amount of snow as low-lying regions)
- All of Back Mountain
- Around Uncanoonuc Mountain
- "East Parts" – high elevations of town

Most recently, the Town of Goffstown was impacted by several heavy snow storms occurring during the 2014 and 2015 winters.

It is highly likely for heavy snow storms to occur and cause damage in Goffstown.

Jason Street, Goffstown during the Winter Storm 2010

Ice Storms

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Ice Storms	
Probability	**2**
Severity	**2**
Overall Risk	**4**

Ice Storms occur when a when a mass of warm moist air collides with a mass of cold arctic air, the less dense warm air will rise and the moisture may precipitate out in the form of rain. When this rain falls through the colder more dense air and comes in contact with cold surfaces, the latent heat of fusion is removed by connective and/or evaporative cooling. Ice forms on these cold surfaces and may continue to form until the ice is quite deep, as much as several inches.

This condition may strain branches of trees, power lines and even transmission towers to the breaking point, and often creates treacherous conditions for highway travel and aviation. Notwithstanding the unique beauty of such events, the weight of formed ice (especially with a following wind) may cause power and phone lines to snap and the towers that support them to fail under the load of ice and/or bending or broken tree limbs. Debris impacted roads make emergency access, repair and cleanup extremely difficult. An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines, resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of a ¼" or greater. The Sperry–Piltz Ice

Accumulation Index, or SPIA Index, predicts the projected footprint, total ice accumulation, and resulting potential damage from approaching ice storms. It is a tool to be used for risk management and/or winter weather preparedness.

The Town of Goffstown, as well as the rest of New Hampshire and much of the Northeast, experienced an intense ice storm from December 11-12, 2008. A major disaster declaration was declared for 10 counties in New Hampshire, including Hillsborough County which includes Goffstown. The damage was widespread and approximately 400,000 residents of New Hampshire lost power from the storm. Restoring power to a majority of the State took approximately 14 days and in some extreme cases it took 17 days. The 2008 ice storm is believed to be the worst ice storm ever recorded in New Hampshire.

The 13 communication towers that form the tower "farm" on top of Uncanoonuc Mountain in Goffstown have also been affected by wind and ice. Public Service of New Hampshire (now Eversource) has a program to cut trees to avoid damage to power and transmission lines from fallen trees and branches.

SPIA Index

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

ICE DAMAGE INDEX	DAMAGE AND IMPACT DESCRIPTIONS
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
4	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

Based upon this information, all areas of Goffstown are potentially at risk for property damage and loss of life due to ice storms.

It is likely for ice storms to occur and cause damage in Goffstown.

Hailstorms

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Hailstorms	
Probability	**2**
Severity	**1**
Overall Risk	**2**

Hailstones are balls of ice that grow as they are held up by winds, known as updrafts, which blow upwards in thunderstorms. The updrafts carry droplets of super cooled water (at a below freezing temperature) but not yet ice. The super cooled water droplets hit the balls of ice and freeze instantly, making the hailstones grow. The faster the updraft, the bigger the stone can grow. Most hailstones are smaller in diameter than a dime, but, stones weighing more than a pound have been recorded. These irregular balls of ice can be as large as baseballs, sometimes even bigger. Hail damage events can be severe to persons, property, livestock and agriculture. While crops are the major victims, hail is also a hazard to vehicles and windows. The Hail Size Description Chart developed by the National Oceanic and Atmospheric Administration (NOAA) and enhanced by other National Weather Service local sites depicts the potential size of hail during a hurricane or severe storm event. Some examples from the Hail Size Description chart include "1/2 inch=Pea Size" and "2 inches=Hen Egg Size." The table below shows the Hail Sizes by NOAA.

Hail Size Description

Hailstone Diameter in Inches	Size Description
<1/4	Bb
1/4	Pea Size
1/2	Mothball Size
3/4	Penny Size
7/8	Nickel Size
Severe Criteria 1	Quarter Size
1 1/4	Half Dollar Size
1 1/2	Walnut or Ping Pong Ball Size
1 3/4	Golf Ball Size
2	Hen Egg Size
2 1/2	Tennis Ball Size
2 3/4	Baseball Size
3	Teacup Size
3 4/5	Softball Size
4	Grapefruit Size
4 3/4	CD/DVD

Sources: National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS)

Hailstorms in Hillsborough County from 2009-2014

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag
Totals:							
BROOKLINE	HILLSBOROUGH CO.	NH	06/27/2009	16:33	EST-5	Hail	1.00 in.
PINE HILL	HILLSBOROUGH CO.	NH	07/07/2009	13:25	EST-5	Hail	1.25 in.
HUDSON	HILLSBOROUGH CO.	NH	07/07/2009	13:35	EST-5	Hail	1.25 in.
RUSSELL	HILLSBOROUGH CO.	NH	07/19/2010	17:50	EST-5	Hail	1.00 in.
NEW BOSTON	HILLSBOROUGH CO.	NH	09/13/2010	16:37	EST-5	Hail	0.75 in.
SOUTH WEARE	HILLSBOROUGH CO.	NH	09/13/2010	16:37	EST-5	Hail	0.75 in.
BEDFORD	HILLSBOROUGH CO.	NH	09/13/2010	17:16	EST-5	Hail	0.75 in.
AMHERST	HILLSBOROUGH CO.	NH	05/07/2011	11:35	EST-5	Hail	0.75 in.
PINE HILL	HILLSBOROUGH CO.	NH	05/07/2011	12:30	EST-5	Hail	0.75 in.
PINE HILL	HILLSBOROUGH CO.	NH	05/07/2011	12:48	EST-5	Hail	0.75 in.
HUDSON	HILLSBOROUGH CO.	NH	05/07/2011	15:20	EST-5	Hail	0.75 in.
HILLSBOROUGH	HILLSBOROUGH CO.	NH	05/16/2012	19:20	EST-5	Hail	0.75 in.
ANTRIM	HILLSBOROUGH CO.	NH	05/29/2012	18:06	EST-5	Hail	1.75 in.
GOFFSTOWN	HILLSBOROUGH CO.	NH	07/24/2012	12:54	EST-5	Hail	0.75 in.
WEARE	HILLSBOROUGH CO.	NH	08/04/2012	13:40	EST-5	Hail	0.88 in.
HANCOCK	HILLSBOROUGH CO.	NH	05/21/2013	18:40	EST-5	Hail	0.88 in.
MANCHESTER	HILLSBOROUGH CO.	NH	06/24/2013	17:07	EST-5	Hail	0.88 in.
HUDSON	HILLSBOROUGH CO.	NH	07/29/2013	15:40	EST-5	Hail	1.50 in.
WEARE	HILLSBOROUGH CO.	NH	05/25/2014	16:35	EST-5	Hail	1.00 in.
NEW BOSTON	HILLSBOROUGH CO.	NH	05/25/2014	17:05	EST-5	Hail	0.88 in.
AMHERST	HILLSBOROUGH CO.	NH	05/25/2014	17:25	EST-5	Hail	1.00 in.
BROOKLINE	HILLSBOROUGH CO.	NH	05/25/2014	17:30	EST-5	Hail	0.75 in.
BROOKLINE	HILLSBOROUGH CO.	NH	05/25/2014	17:50	EST-5	Hail	1.00 in.
MANCHESTER	HILLSBOROUGH CO.	NH	07/28/2014	16:23	EST-5	Hail	0.75 in.

Source: NOAA Climatic Data Center, 2014

Based upon this information all areas of Goffstown are potentially at risk for a hailstorm to occur. According to the Goffstown Hazard Mitigation Committee, an area of high risk is located within the eastern portion of the town.

It is likely for a hailstorm to occur and inflict damage in Goffstown.

Earthquakes

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Earthquakes	
Probability	**1**
Severity	**2**
Overall Risk	**2**

An earthquake is defined as a series of vibrations induced in the Earth's crust by the abrupt rupture and rebound of rocks in which elastic strain has been slowly accumulating. New Hampshire is considered to lie in an area of moderate seismic hazard with respect to other areas within the US. New Hampshire has had and will continue to experience large damaging earthquakes; however, the intervals between such events are greater in New Hampshire than in high hazard areas.

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric 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 widely determined by the use of two scales, the more commonly used Richter Scale (measures strength or magnitude) and the Mercalli Scale (measures intensity or severity). The following chart shows the two scales relative to one another. The Richter Scale measures earthquakes starting at 1 as the lowest with each successive unit being about 10 times stronger and more severe than the previous one.[16]

Potential Future Hazards

As reported in the NH 2013 All Hazards Mitigation Plan, during a damaging earthquake (Magnitude of 5 or greater), it can be expected that there is wide spread damage due to the historically built environment. There are a large number of un-reinforced masonry structures still in use and much of our infrastructure, including bridges and many of our gas and waterlines, are very vulnerable to seismic forces, not only the older and historic structures should be a concern, many of our newer structures are not built to any seismic building codes and therefore are vulnerable.

[16] Modified Mercalli Scale/Richter Scale Chart: MO DNR, http://www.dnr.mo.gov/geology/geosrv/geores/richt_mercalli_relation.htm

Damages from earthquakes generally fall into two categories: Structural and Nonstructural.

- **Structural Damage** is any damage to the load-bearing components of a building or other structure.
- **Nonstructural Damage** is any portion not connected to the superstructure. This includes anything added after the frame is complete; such as lighting fixtures, bookcases, utilities, etc.

Impact

Magnitude and location from a damaging earthquake are the key factors for the possible impact as well as a cascade of disasters that may occur:

- Total or partial collapse of buildings, especially un-reinforced masonry structures and those not built to seismic codes
- Damage to roads and bridges from ground settlement and structural damage
- Mass Casualties
- Loss of electric power
- Loss of telecommunications systems
- Fires from gas line ruptures and chimney failures
- Total or partial loss of portable and firefighting water systems from pipe ruptures
- Hazardous materials incidences
- Loss of critical capabilities from structural and nonstructural damages
- Lack of mutual aid support
- Damage to gas lines and chimneys result in fires that are difficult to extinguish due to the roads and bridges
- Structural and nonstructural damage cause many injuries; but because of damage to health care facilities and emergency response facilities, there is slow or nonexistent response
- Responders are slowed in their response because of hazardous material incidents and flooding due to dam failures.

Historical Earthquake Events

According to the NH 2013 All Hazard Mitigation Plan, one of the earliest written accounts of earthquake activity in North America (from 1638), describes an event which most probably had its epicenter in or near the Ossipee Range of Central New Hampshire. The following table identifies the earthquakes that have been directly tied to New Hampshire, or were felt in New Hampshire.

Modified Mercalli Scale		Richter Magnitude Scale
I	Detected only by sensitive instruments	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibration like passing truck	2.5
IV	Felt indoors by many, outdoors by few, at night some may awaken; dishes, windows, doors disturbed; autos rock noticeably	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos	4.5
VIII	Panel walls thrown out of frames; fall of walls, monuments, chimneys; sand and mud ejected; drivers of autos disturbed	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up in air	7
		7.5
		8

Epicenter Location	*Date*	*Magnitude*
Ossipee, NH	December 20, 1940	5.5
Ossipee, NH	December 24, 1940	5.5
Dover, NH-Foxcroft, ME	December 28, 1947	4.5
Kingston, RI	June 10, 1951	4.6
Portland, ME	April 26, 1957	4.7
Middlebury, VT	April 10, 1962	4.2
Quebec Border, NH	June 15, 1973	4.8
West of Laconia, NH	January 19, 1982	4.5
Ontario-Quebec Border	June 23, 2010	5.0
Boscawen, NH	September 26, 2010	3.1
Virginia	August 23, 2011	5.8
Concord, NH	September 18, 2012	1.2
Southern Maine	October 16, 2012	4.0

Source: New Hampshire Multi-Hazard Plan, 2013

The most significant historic earthquakes in New Hampshire occurred December 20th and 24th, 1940 (epicenter just west of Whittier Mountain, Ossipee, NH, 5.5 Richter scale magnitude). Between 1728 and 1989, there were 270 earthquakes in New Hampshire. This averages to approximately one quake per year. In the fall of 2012, a minor earthquake originating from the epicenter in Maine (4.0 magnitude on the Richter scale)

was felt as far away as Boston. No property damage was recorded. The frequency of small earthquakes has been increasing in the past several decades. It is well documented that there are fault lines running throughout New Hampshire, but high magnitude earthquakes have not been frequent in New Hampshire history. New Hampshire is on the low attenuation of seismic waves in the eastern United States.

Attenuation is a term in physics that means the slow loss of intensity of flow through any kind of medium. Seismic waves can cover an area 4 to 40 times greater in the east than they do in the west because of the cold hard rock geology of New Hampshire. The importance of this to emergency planning and response is that damages can be expected to be spread over a much greater area, and an earthquake's location does not have to be close to a particular point to cause damage."[17]

The Town of Goffstown felt the seismic activity originating from the October 2012 Maine earthquake. The Goffstown Hazard Mitigation Committee recalled roughly three earthquakes in 20 years that were generally low, 2.0 - 2.5 on the Richter Scale.

Based upon this information all areas of Goffstown are potentially at risk for property damage and loss of life due to earthquakes.

It is possible for earthquakes to occur and cause damage in Goffstown.

Landslides

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Landslides & Mudslides	
Probability	**1**
Severity	**1**
Overall Risk	**1**

A landslide is the sliding of a mass of soil, detritus or rock on or from a steep slope. More specifically, a landslide is the downward movement of slope forming materials reacting under the force of gravity including: mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides and earth flows. Landslides may be formed when a layer of soil atop a slope becomes saturated by significant precipitation and slides along a more cohesive layer of soil or rock. According to the New Hampshire 2013 All Hazards Mitigation Plan, seismicity may play a role in the mass movement of

[17] State of New Hampshire Multi-Hazard Mitigation Plan Update 2013, page 50.

landforms, such as was reported in Newcastle, NH ad Berlin, MA during the Cape Ann event of 1755.

Historical Events

Although the vulnerability to landslide activity is generally modest statewide, parts of New Hampshire have considerable terrain that is susceptible to landslide action. Steep slopes adjacent to roadways and mountainous areas, consisting of relatively "old" geologic formations that have been worn by the forces of nature for eons are susceptible to landslides. Formations of sedimentary deposits and along the banks of the Connecticut and Merrimack Rivers also create potential landslide conditions.

Landslides are a possibility on steep slopes in Goffstown where certain topological and saturated soil conditions are met. Development in close proximity to areas of steep slopes (greater than 15 percent) could present a risk to landslides. Most potential landslides in Goffstown however will be in conjunction with another hazard event, such as flooding or severe rain or potential seismic activity.

All areas of steep slopes in Goffstown as shown as part of the Past and Potential Hazards Map are at risk for landslides.

According to the Goffstown Hazard Mitigation Committee, an area of particular concern for landslides is the rail bed in Pinardville, between Moose Club Park to the Town line.

Based upon this information it is possible for landslides to occur and cause damage in Goffstown.

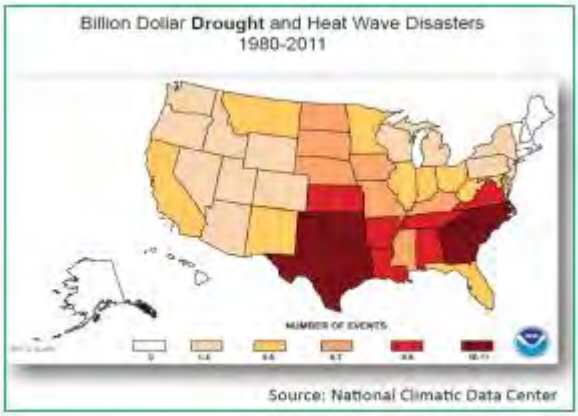
Drought

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Drought	
Probability	**1**
Severity	**1**
Overall Risk	**1**

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects the growing season or living conditions of plants and animals. 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 drought 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 groundwater levels or increasing stream flow. Low stream flow also correlates with low groundwater levels because groundwater discharge to streams and rivers maintains stream flow during extended dry periods. Low stream flow and low groundwater levels commonly cause diminished water supply.

New Hampshire has been under several drought warnings, including drought emergencies in the past. While a drought is not as devastating as some other hazards, low water levels can have a negative effect on existing and future home sites, since many sites depend on groundwater for water needs. Additionally, the dry conditions of a drought may lead to an increase wild fire risk.

New Hampshire breaks the State into five Drought Management Areas, including three along the southern portion of the State, and the Town of Goffstown is located in the Southern Interior Area (i.e. consisting of Hillsborough, Merrimack and Belknap counties). Federal agencies have coordinated to develop the National Drought Monitor which classifies the duration and severity of the drought using precipitation, stream flow, and soil moisture data coupled with information provided on a weekly basis from local officials. The NH Drought Management, part of DES, utilizes these maps to help determine which areas are the hardest hit. NH DES also maintains a "Situation Summary" where precipitation, stream flow, groundwater level, lake level and fire danger data from all over the state can be accessed to assess if areas in NH are being impacted by drought. (NH Hazard Mitigation Plan, 2013)

There are five magnitudes of drought identified in the NH State Drought Management Plan ranging from Exceptional to Extreme, Severe, Moderate and Abnormally Dry. In regard to recurrence intervals, there have been 1 year recurrence intervals for the

Moderate level drought; 2 Year recurrence interval for the Severe level drought; 9 years for the Extreme level; and greater than 25 years for the Exceptional level in the Southern Interior Area. Between the years of 1950-2010 the following years have had an Extreme drought in the Southern Interior Area, which includes the Town of Goffstown: 1957, 1963, 1965, 1966, 1970 (no data in the 1970s-1990s), 2001 and 2010. (NH Hazard Mitigation Plan, 2013)

NEW HAMPSHIRE DROUGHT HISTORY

Dates	Area Affected	Recurrence Interval Yrs	Remarks
1929-1936	Statewide	10 to > 25	Regional
1939-1944	Statewide	10 to > 25	Severe in southeast and moderate elsewhere
1947-1950	Statewide	10 to 25	Moderate
1960-1969	Statewide	> 25	Regional longest recorded continuous spell of less than normal precipitation
2001-2002	Statewide	Not yet determined	Third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942

NH DES;
http://des.nh.gov/organization/divisions/water/dam/drought/documents/hist

Based upon this information, all areas of Goffstown could be affected by a drought, with particular risk noted at any pastureland in high elevations, Back Mountain, and former farms.

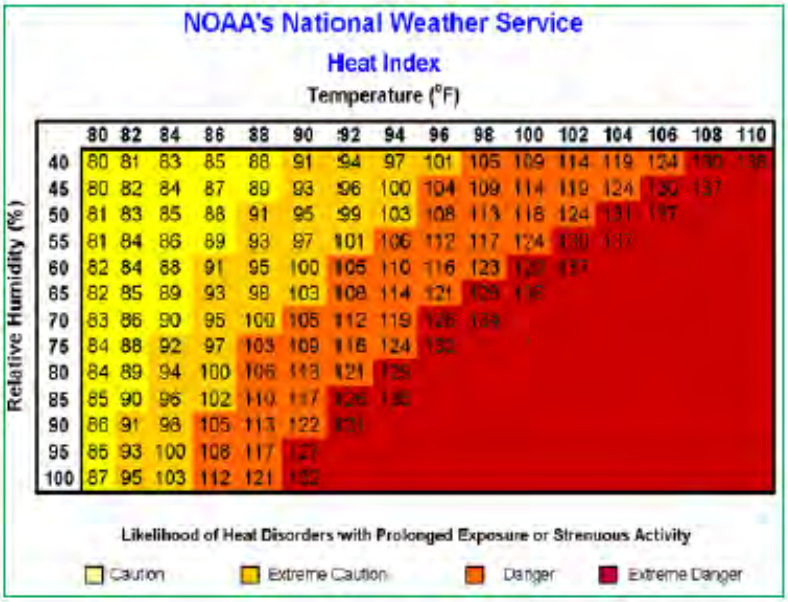
It is possible for drought to occur and cause damage in Goffstown.

Extreme Heat

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Extreme Heat	
Probability	**2**
Severity	**1**
Overall Risk	**2**

A Heat Wave is defined as a "Prolonged period of excessive heat, often combined with excessive humidity."[18] Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature. Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children and those who are sick or overweight are more likely to succumb to extreme heat. Conditions that can induce heat-related illnesses include stagnant atmospheric conditions, and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat a night, which can produce higher nighttime temperatures known as the "urban heat island effect."[19] NOAA's National Weather Service has prepared the following Heat Index identifying likelihood of heat disorders under prolonged exposure or strenuous activity.



While the State of New Hampshire's Updated 2013 Multi-Hazard Mitigation Plan does not specifically address extreme heat as a natural hazard, it has been confirmed by scientific climate data that global warming is currently causing changes throughout the state and the Southern NH region specifically with regard to temperatures, precipitation, and the number and intensity of severe weather events. Since 1970, average annual temperatures in the Southern New Hampshire Region, which includes the Town of Goffstown have warmed 1.1 to 2.6 degree F, with the greatest warming occurring in winter (1.6 to 3.4 degrees F).[20]

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[18] Town of Campton, NH Hazard Mitigation Plan Update, 2014, pg. 118.
[19] NOAA, Index/Heat Disorders: http://www.srh.noaa.gov/ssd/html/heatww.htm
[20] Climate Change in Southern New Hampshire. Climate Solutions of New England, 2014.

Under a high greenhouse gas emissions scenario, it is projected that summer temperatures in Southern New Hampshire are likely to experience the most dramatic change, increasing up to 11 degree F warmer with the number of extreme heat days likely to increase dramatically raising concerns about sustained heat on human heath, infrastructure, and the electricity grid.[21] Climate scientist Dr. Cameron Wake at UNH has depicted potential future summers in the Southern NH region, including the Town of Goffstown where four-fifths of the summer is a heat wave (around 90 degree F or higher) punctuated by more bearable cooler days.[22] By 2100, Dr. Wake has projected that the Southern NH region and the Town of Goffstown will likely experience between 20 and 54 days per year above 90 degree F depending on either the low or high greenhouse gas emissions scenario. Factoring in the urban heat island effect caused by the City of Manchester and surrounding urban areas, the Town of Goffstown could see over 70 days per year above 90 degree F by 2100 under the high emissions scenario.[23]

A good resource for the Town of Goffstown to consider in preparing for these extreme heat waves is the Excessive Heat Emergency Response Plan prepared by the State of NH Department of Health and Human Services (2011). This plan includes criteria for establishing "cooling rooms" including the health effects of extreme heat events.

While there have been no extended periods of extreme heat in Goffstown, the State of New Hampshire Natural Hazards Mitigation Plan notes the hottest summer of record as 1999. There were 13 days above 90 degrees, 5 days over 95 degrees and 2 days over 97 degrees.

Based upon this information, all areas of the Town of Goffstown could be affected by extreme heat. Particular areas and populations at a greater risk are:

- Elderly populations and day care centers, identified in the "Areas at Risk" listing at the end of this section;
- Power system may become overburdened;
- Communications negatively affected by power burden;
- Possible railroad derailment due to unstable rails and extreme expansion.
- Farms would suffer.

It is likely for extreme heat to occur and cause damage in Goffstown.

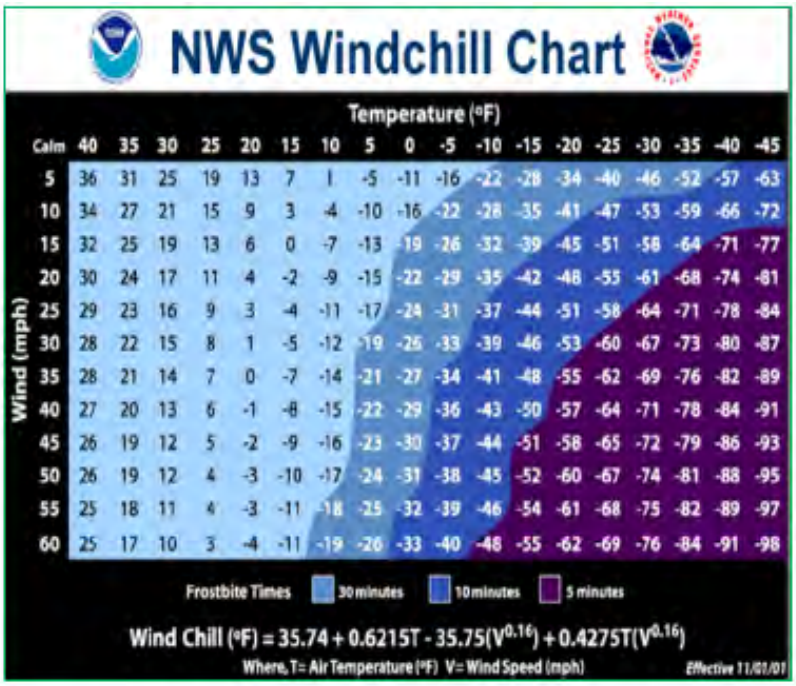
[21] Ibid.
[22] Ibid.
[23] Ibid.

Extreme Cold

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Extreme Cold	
Probability	**2**
Severity	**2**
Overall Risk	**4**

What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly: these weather related conditions may lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people without shelter or who are stranded, or who live in a home that is poorly insulated or without heat.[24] The following National Weather Service Chart shows wind chill as a result of wind and temperature.[25]



[24] CDC: http://www.bt.cdc.gov/disasters/winter/guide.asp f

[25] National Weather Service: http://www.nws.noaa.gov/om/windchill/

While the State of New Hampshire's current 2013 Multi-Hazard Mitigation Plan does not specifically address extreme cold as a natural hazard, there are many meteorologists, climatologists, public officials and community residents across the state and in the Town of Goffstown that would identify the past two winters of 2014 and 2015 as some of the coldest winters they remember in NH and New England

Based upon this information, all areas of Goffstown could be affected by extreme cold. Particular areas and populations at a greater risk are:

- Elderly populations and day care centers, identified in the "Areas at Risk" listing at the end of this section;
- Heating systems could become overburdened and heating fuels could be depleted;
- Pets and farm animals could suffer from outdoor exposure and windchills.

It is likely for extreme cold to occur and cause damage in Goffstown.

Radon

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Radon	
Probability	**2**
Severity	**1**
Overall Risk	**2**

Radon is a radioactive gas with carcinogenic properties that occurs naturally. It has been identified as a problem in many New Hampshire communities. Typically radon is found in metamorphic rocks in southeastern New Hampshire and may enter homes in a dissolved state through the drinking water from drilled wells. The NH Office of Community and Public Health Bureau of Radiological Health, reports nearly one third of New Hampshire homes have radon levels at or above the United States Environmental Protection Agencies "action level" of four picocuries per liter for at least a portion of the year.[26]

There is a website on the NH Department of Environmental Services website, http://des.nh.gov/organization/divisions/air/pehb/ehs/radon/ with information for NH towns and citizens regarding Radon. In 2011, the NH Legislature cut the NH Radon Program; this is the last year of available data. As of 2011, average Radon Levels

[26] 2013 NH All Hazard Mitigation Plan

in Hillsborough County were 5.3 pCl/L which compares to the national average of 1.3 pCl/L. (NH Multi-Hazard Mitigation Plan, 2013). The Town of Goffstown is located in Hillsborough County and thus it can be assumed that the county levels would likely also apply to Goffstown.

Based upon this information all areas of Goffstown are considered at risk for radon. According to the Goffstown Hazard Mitigation Committee the following known areas of Goffstown contain high radon levels:

- Heather Hill
- East Goffstown
- Rainbow Drive
- Merrill Road
- Maple Avenue

It is likely for radon to occur and cause damage in Goffstown

Civil Disorder

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Civil Disorder	
Probability	**1**
Severity	**1**
Overall Risk	**1**

"Civil disorder, also known as civil unrest, is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people"[27] Examples of civil disorder include: riot, illegal parades and sit-ins. Events that are of particular concern are the Town's annual Pumpkin Regatta, campaign protesters, political and other events at St. Anselm College.

Based upon this information all areas of Goffstown are at risk in the event of a civil disorder. As of 2014, the Goffstown Police Department has reported an increase in crime and drug use within the community.

It is possible for civil disorder to occur in Goffstown.

[27] Schurink, W.J. (1990) *Victimization: Nature and Trends.* Human Sciences Research Council. p 416

Prison Break / Disturbance

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Prison Break/Disturbance	
Probability	**1**
Severity	**1**
Overall Risk	**1**

The New Hampshire State Prison for Women is located in the center of Goffstown. This presents a safety concern for the town if a prison break or disturbance were to occur. The prison was opened in 1989 and in 2007 housed 134 inmates. In the summer of 2006 there was an escape attempt which did not cause a disturbance in the community.

Based upon this information all areas of Goffstown are at risk in the event of a prison break. It is projected that by Fall 2016, the women's prison will move to Concord; however, the facilities may serve as overflow for the Valley Street prison.

It is possible for prison break/disturbance to occur in Goffstown.

Terrorism

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Terrorism	
Probability	**1**
Severity	**1**
Overall Risk	**1**

Terrorism is defined in the Code of Federal Regulations as "*the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives*." High-risk targets for acts of terrorism include: military and civilian government facilities, commercial airports, large cities and high-profile landmarks, large public gatherings, water and food supplies, utilities and corporate centers.

The New Hampshire Critical Infrastructure Protection Program (CIPP) is managed by the NH Information and Analysis Center. NH developed specific sector criteria for 19 sectors, 18 of which are included in the National Infrastructure Protection Plan. Assets

are identified in each sector including state, local and private sector facilities and the adopted database utilized is the Automated Critical Asset Management System (ACAMS). Between 2010 and 2012 in NH there were 46 actual cases of conventional terrorism, which involved suspicious packages and improvised device or material. (NH Multi-Hazard Mitigation Plan, 2013) The Town of Goffstown Police, Fire and Public Works Departments perform soft target checks on the dams, the substation, the tower site, schools, the reservoir and area wells. The town has also performed drills to prepare for this type of emergency.

Based upon this information, all areas of Goffstown are at risk in the event of a terrorist attack.

It is possible for terrorism to occur in Goffstown.

Critical Infrastructure Failure

The following table shows the overall threat level of this hazard to the community based on the scoring provided in Table C.

Critical Infrastructure Failure	
Probability	**1**
Severity	**2**
Overall Risk	**3**

Based on previous world events, it is presumed that critical infrastructure, facilities and services as well as large public gatherings are at a high risk. According to the 2013 NH All Hazard Mitigation Plan, the overall management for NH's Critical Infrastructure Protection Program (CIPP) is the responsibility of the NH Information and Analysis Center. NH developed specific sector criteria for 19 sectors; NH has the Special Events Sector that is in addition to the 18 original sectors of the National Infrastructure Protection Plan. Assets have been identified within each sector, as applicable based on state criteria, and include state, local and private sector facilities.

The adopted database utilized to categorize NH assets is the Automated Critical Asset Management System (ACAMS). The overarching goal of the CIPP is to build a safer, more secure, and more resilient state by preventing, deterring, neutralizing, or mitigating the effects of a terrorist attack or natural disaster, and to strengthen preparedness, response, and recovery in the event of an emergency.

Critical Infrastructure Protection is Important to NH:

- Attacks on critical infrastructure could significantly disrupt the functioning of government and business alike and will produce a cascading effect far beyond the targeted sector and physical location of the incident.
- Direct terrorist attacks and natural manmade, or technological hazards could produce catastrophic losses in terms of human casualties, property destruction, and economic effects, as well as profound damage to public morale and confidence.
- Attacks using components of the nation's critical infrastructure as weapons of mass destruction could have even more devastating physical and psychological consequences.

According to the Goffstown Hazard Mitigation Committee, there are four critical roads in the Town of Goffstown; Mast Road (Route 114), Elm Street, Main Street, and Henry Bridge Road. In the event that a hazard may shut down any one of these roads, it would affect the rest of the town and the transportation of emergency personnel, supplies and evacuation routes in and out of town. These roads are included on the Critical Facilities Inventory Map at the end of this section (see Map#5). In addition, Gregg Falls Dam is the largest dam and an important critical facility in the Town of Goffstown.

Gregg Falls Dam

According to the information supplied by the owner to the US EPA, there are 258 existing houses, 2 state roads, and 32 town roads at risk from a failure of Gregg Falls Dam within the Goffstown community.

Based upon this information all areas of Goffstown are at risk in the event of a critical infrastructure failure.

It is possible for critical infrastructure failure to occur in Goffstown.

Critical Facilities – "Critical Infrastructure"

Geographic Information Systems (GIS) generated maps were prepared to illustrate Past Hazards and Potential Hazards, Areas at Risk and Critical Facilities as identified by the Goffstown Hazard Mitigation Committee. Reductions of these maps are included in this section. A summary listing of "Critical Facilities" and "Areas at Risk" are also provided below. "Critical Facilities" involve emergency equipment or areas *needed* to respond at the time of a natural disaster. Applicable hazard areas for each Critical Facility are keyed in parenthesis. Each of the following "Critical Facilities" identified in Goffstown are shown as symbols on Map #5, Critical Facilities, Goffstown, NH.

Emergency Operations Center

- Goffstown Police Station – 326 Mast Rd (S, T)

Emergency Fuel Facilities

- Goffstown Public Works/Transfer Station- 404 Elm Street (T)

Town Hall

- Goffstown Town Hall (back-up power available) – 16 Main Street (T)

Law Enforcement Facilities

- Goffstown Police Station–326 Mast Road (S, T, F)
- Sherriff's Office – 329 Mast Road (S, T, F)

Fire Service Facilities (back-up power available)

- Goffstown Fire Station (#18) 18 Church Street (T)
- East Goffstown Fire Station (#17) – 289 Tirrell Hill Road (T)
- Pinardville Station (#19)– 656 Mast Road (T)

Public Works Campus

- Goffstown Public Works Department– 404 Elm Street (T)

Shelters

- Goffstown Fire Station– 18 Church Street (T)
- High School – 27 Wallace Road (T)
- Mountain View Middle School– 41 Lauren Lane (S, T)
- Maple Avenue Elementary School- 16 Maple Ave. (T)

Key

(F) Located within the Special Flood Hazard Area and/or prone to flooding and damage due to 100-year floodplain events, ice jams, debris impacted infrastructure, hurricanes or rapid snow pack melt.

(S) Located on or adjacent to a Steep Slope and susceptible to damage in the event of erosion, mudslides or landslides.

(X) Located in or near a known past or potential wildfire location

(T) Susceptible to Town wide hazard risks such as wind damage from hurricanes, tornados, nor'easters, downbursts, lightning, heavy snow or ice storms or hailstorms.

(FEH) Located within Fluvial Erosion Hazard Zone.

- Town Hall- upstairs (T)
- Goffstown Fire Station- 2nd floor, 656 Mast Road (T)
- Goffstown Community Church (T)
- Bartlett Elementary School– 689 Mast Road (T)
- St. Anselm College – 100 Saint Anselm Drive (T)
- Rosary Hall, Villa Augustina – 208 Mast Road (T)
- Community Center, Medvil Cooperative -Donald Drive (T)

Dams- See Appendix A (F, T)

Evacuation Routes/Major Highways

- Mast Road/NH Route 114 A (T)
- Elm Street/Center Street/Goffstown Back Road (F, S, T)
- Wallace Road (S, T)
- Route 13 North (S, T)
- Route 13 West (F, S, T)

Bridges (17)

- By Parker Station Road and Gorham Pond Road (F, T)
- Off North Mast Road (F, T)
- Off North Mast Road by New Boston Town Line (F, T)
- 2 Off Bog Road (F, T)
- 2 Off Pleasant Street (at west F, T and at east F, S, T)
- By Main Street and Depot Street (F, T)
- 2 Off Mountain Road (F, T)
- By Merrill Road and Hillsdale Drive (F, S, T)
- By Locust Hill Road and Elm Street (F, T)
- 2 Off Henry Bridge Road (at north F, S, T and at south F, T)
- Off Tirrell Hill Road (F, S, T)
- By Pollard Road and Black Brook Road (F, S, T)
- Off Dunbarton Road (F, T)

Ambulance

- Pinardville Ambulance– 656 Mast Rd. (T)
- Village Ambulance– 18 Church St. (T)

Hazardous Materials Facilities (See Appendix A)

Wireless Communication Facilities

- Lookout Tower – Near the Goffstown-Bedford Town line (T)
- Water tank – South of Mast Road adjacent to Kennedy Hill Road (County-Owned)

- Yacum Hill (S,T)
- Summit Road (T)
- Perimeter Road (T)
- Water Tower at St. Anselm College (T)

Radio Towers (6)

- Perimeter Rd. Tower Farm (S, T)
- Off Lance Lane (T)
- KBR Towers – Between Goffstown Back Rd. and Sarette Rd. (T)
- Police Dept. Tower – 326 Mast Rd. (T)
- Yacum Hill (S, T)
- Water Tower at St. Anselm College (T)
- Fire Stations #17, #18, #19 (T)
- Stone Bridge Country Club, Gorham Pond Road (T)

Power Generators

- Hydroelectric Plant, Glen Lake Dam (T)

Bridges

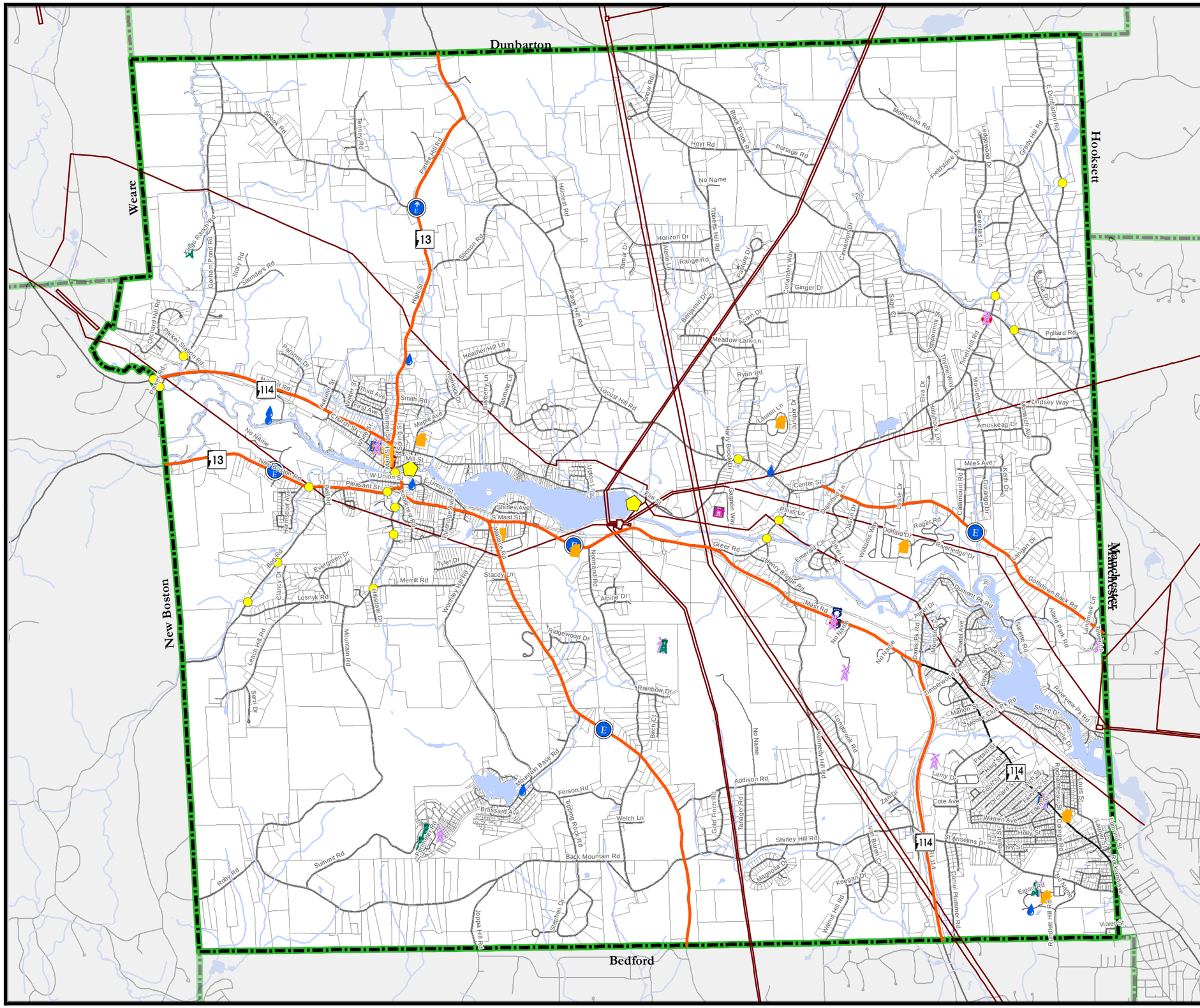
- Parker Station Road and Gorham Pond Road (FEH)
- Bog Road (FEH)
- Bog Road (FEH)
- Pleasant Street (west) (FEH)
- Pleasant Street (east) (FEH)
- Mountain Road (FEH)
- Mountain Road (FEH)
- Merrill Road and Hillsdale Drive (FEH)
- Henry Bridge Road (South) (FEH)
- Glen Lake Dam (FEH)

Water Facilities

- Goffstown Village Precinct – office 11 E. Union Street (T)
  Uncanoonuc Mountain Reservoir (F, S, T);
  N Mast wells (T);
  Pattee Hill water tank (T)
- St. Anselm College, 100 St. Anselm Drive (T)
- Grasmere Water Precinct – Juniper Drive (T)

Hydro Dams

- Gregg Falls (F, S, T)
- Mill Street- Hadley Falls (F, T)



Map # 5

Critical Facilities Goffstown, NH

Critical Facilities

- Bridge
- Water Facilities
- Hydro Dams
- Evacuation Route West
- Evacuation Route North
- Evacuation Route
- Public Works Campus
- Law Enforcement Facilities
- Wireless Communication Facilities
- Fire Service Facilities (back-up power available)
- Emergency Fuel Facilties
- Town Hall
- Emergency Operations Center
- Ambulance
- Radio Tower
- Shelter
- Evacuation Routes

Base Legend

- Political Boundary
- Parcels
- Utility Lines
- Lakes
- Streams

Roads

- Interstate
- US and State Routes
- Local Roads

0 0.5 1 2 Miles

Data Sources:
Granit Digital Data (1:24,000)
NH Department of Transportation
Individual Community Parcel Data

The town of Goffstown and the SNHPC make no representations or guaranties to the accuracy of the features and designations of this map.

Map produced by SNHPC September 2014.

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Areas at Risk

"Areas at Risk" involve emergency equipment or areas *not needed* to respond at the time of a natural disaster. Applicable hazard areas for each Area at Risk are keyed in parenthesis. Each of the identified "Areas at Risk" are shown as map symbols on the following Map #6, Areas at Risk, Goffstown, NH.

Sewer Pumping Station

- Riverview Park (F, T)
- Moose Club Park (F, T)
- Elm Street (T)

Electrical Power Substations

- 2 Between Mast Road and Glen Lake (S, T)
- At the beginning of Riverview Park Road by the Goffstown/ Manchester town line (S, T)
- Elm Street (F, T)
- Power sub-station on Mast Rd. between Roosevelt St. and Bartlett School (T)

Correctional Facilities

- Women's Prison – 317 Mast Road (T)

Problem Intersections

- Daniel Plummer Road and Mast Road (T)
- St. Anselm Drive and Route 114 (T)
- College Road and Mast Rd (T)
- Elm Street and Main Street (T)
- Wallace and South Mast Rd (T)

Schools

- Bartlett Elementary School - 689 Mast Road (T)
- Goffstown High School – 27 Wallace Road (T)
- Maple Avenue Elementary School – 16 Maple Avenue (T)
- Mountain View Middle School (Backup Power) – 41 Lauren Lane (S, T)
- In His Steps - 67 Henry Bridge Road (T)
- Formerly Villa Augustina School - 208 S. Mast Road (T)
- St. Anselm College – 100 St. Anselm Drive (T)
- Namaste Montessori School - 535 Mast Road (T)
- Montessori School – 36 North Mast Road (T)

Sewer

- Sewer Interceptor Pipe (carries Town's sewage to Manchester) (T,S)

Daycare Centers

- Merri Loo Community Preschool – 86 Center St (T)
- Main Street Kid's Connection – 10 Main Street (T)
- New Morning School, Inc. – 215 Wallace Road (T)
- YMCA School's Out Program 116 Goffstown Back Rd (T)
- Baby Boomers - 26 Lynchville Park Road (T)

- Betsy's Daycare – 16 Rosemont Street (T)
- Carol Enman Daycare – 32 Libby Street (T)
- Children's Country Cottage 28 First Avenue (F, T)
- Colette's Daycare – 16 Upton Lane (T)
- Deb's Daycare – 926 Black Mountain Road (T)
- Loving Lambs & Kinderkids – 15 Katherine Street & 526 Mast Rd (T)
- Eager Beaver Daycare – 722 Mast Road (T)
- Educare Daycare – 381 Goffstown Back Road (S, T)
- Kids Learning Village – 276 Goffstown Back Rd (S, T)

Churches

- St. Matthews Episcopal Church – 5 N. Mast Rd (F, T)
- St. Anselm Abby –100 St. Anselm Drive (T)
- Hillside United Methodist Church – 82 Center Street (S, T)
- St. Lawrence Catholic Church – 51 Main Street (T)
- Goffstown Congregational Church – 8 Main Street (F, T)
- Goffstown Christian Fellowship – 67 Henry Bridge Road (T)
- Goffstown Harvest Christian – 542 Mast Road (T)
- Jehovah's Witnesses – 97 Daniel Plummer Road (T)

Nursing Homes

- Bel-Air Nursing Home – 29 Center St. (T)
- Hillsborough County Nursing Home – 400 Mast Rd. (T)

Elderly Housing

- Edward J. Roy Apartments – 27 College Rd. (T)
- Placid Woods – 24 Mountain Rd. (T)
- Meetinghouse at Goffstown – 12 Reed Street (F, T)
- The Inn at Parker Station – 46 Parker Station Road (T)
- Medvil Cooperative – 158 Goffstown Back Road (T)
- Villager– 50 N Mast Rd. (F, T)
- Bel-Air – 29 Center Street(T) (Nursing home too)
- Medford Farms (Office)(Associated with Medvil Coop, formerly Village at Glen Falls) – 158 Goffstown Back Road (T)

Recreational Areas

- Maple Avenue Playground– 16 Maple Ave (T)
- Greater Manchester Family YMCA – 116 Goffstown Back Road (T)
- Goffstown Village Common – Intersection of High & Elm Streets (T)
- Glen Lake Boat Launch –Elm St (F, S, T)
- Lion's Park – 50 West Union Street (F, S, T)
- Allard Park – Sarette Rd (F, S)

- Recreation Center – Adjacent to Shirley Ave, north of Mast Rd & south of Glen Lake (T)
- Little League Field / Villa Field– South Mast Street (S, T)
- Barnard Park – Barnard Ln off Mast Rd between Pineridge St and Wallace Rd (S, T)
- Roy Memorial Park – Rosemont Street off Mast Road near Rockland Ave (T)
- Football field at Hillsborough County Fields (T)
- Sarette Fields – Louis St and Laurier St (T)

Commercial Economic Impact Areas (See Appendix A)

- Businesses employing over 25 employees

Socio-Economic Impact Areas

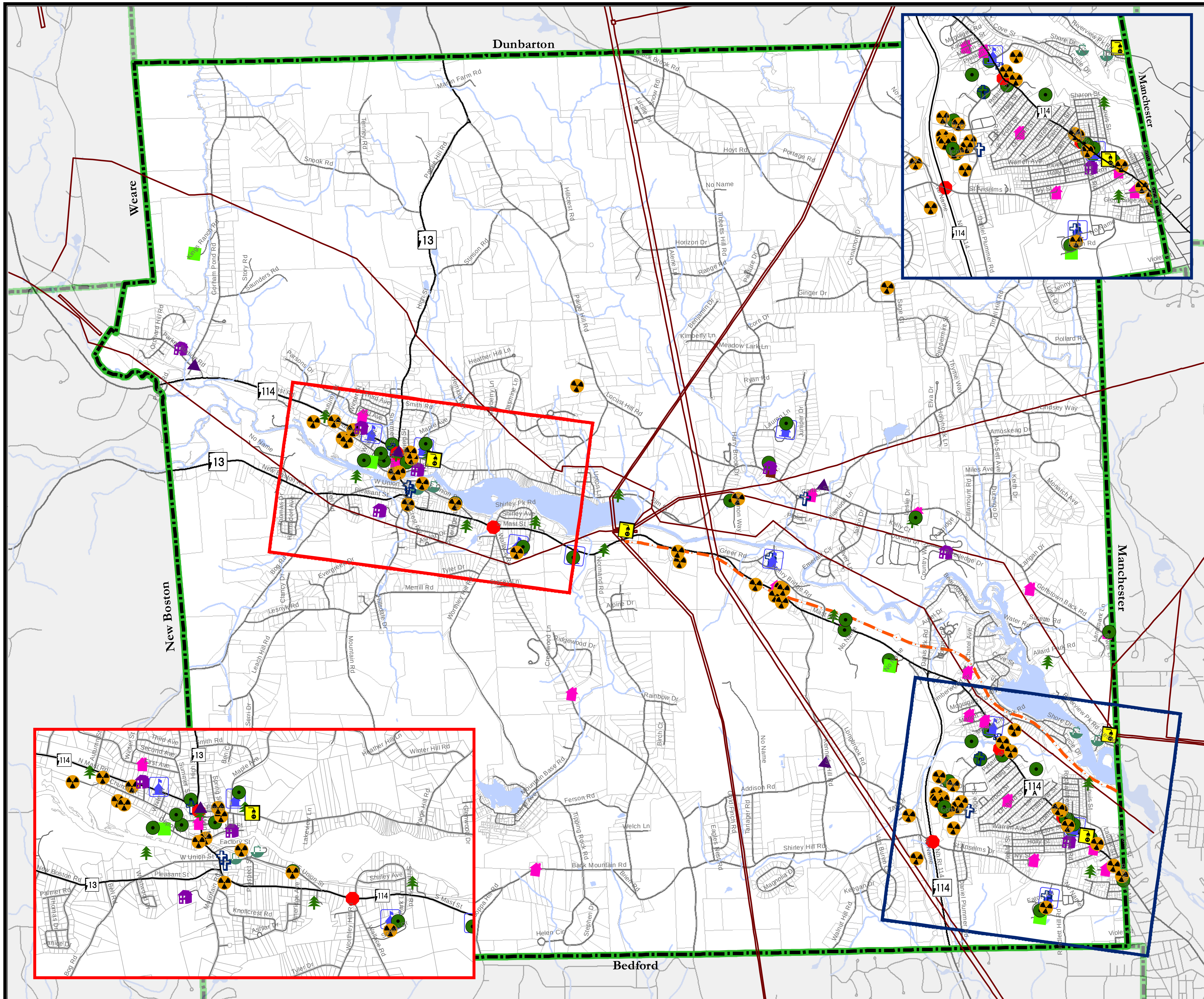
- Stonebridge Country Club (S, T)
- NorthEast Sheet Metal (F, T)
- St. Anselm College (T)
- County Buildings / Nursing Home (T)

Unique or Historic Resources
(National Register of Historic Places)

- Kennedy Hill Farm – Kennedy Hill Rd (T)
- Parker's Store (Goffstown Historical Society) – West Goffstown on Rt. 114 (F, S, T)
- Grasmere Town Hall and Schoolhouse #9 – 87 Center St (S, T)
- Goffstown Public Library – 2 High Street (T)
- Historic Districts – Main Street and Grasmere Center (T,F)

Map # 6

Areas at Risk Goffstown, NH



Areas At Risk

- Churches
- Commercial Economic Impact Areas
- Correctional Facilities
- Daycare Centers
- Elderly Housing
- Electrical Power Substations
- Hazardous Material Facilities
- Nursing Homes
- Problem Intersections
- Recreational Areas
- Schools
- Sewer Pumping Station
- Socio-Economic Impact Areas
- Unique or Historic Resources

Base Legend

- Political Boundary
- Parcels
- Utility Lines
- Lakes
- Streams

Roads

- Interstate
- US and State Routes
- Local Roads

0 0.45 0.9 1.8 Miles

Data Sources:
Southern New Hampshire Planning Commission
Granit Digital Data (1:24,000)
NH Department of Transportation

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SECTION III
EXISTING MITIGATION STRATEGIES & PROPOSED IMPROVEMENTS

Identification of Existing Programs

The Goffstown Hazard Mitigation Committee identified the following existing regulations and programs in the community which currently provide various policies, resources and strategies which help to mitigate the impacts of the hazards identified in this Plan. These regulations and programs are identified below and more thoroughly described in the follow description of existing programs.

A. Flooding

- Flood Development Ordinance
- Wetlands Conservation District
- Town Adopted Building Codes
- Best Management Practices
- Warning System
- Town Radio System
- National Flood Insurance Program (NFIP)

B. Fluvial Erosion

- Stream restoration
- Stream bank stabilization
- Stream buffers
- Stream setbacks
- Fluvial Erosion Hazard Overlay
- River Corridor Protection
- Infrastructure Management – bridges, culverts, and roads
- Stormwater Management
- Pre-Disaster Mitigation Planning

B. Wind

- Town Adopted Building Codes
- Warning System
- Electrical Back-Up Generators

C. Wildfire

- Water Protection Regulations (State)

- Town Adopted Building Codes
- Warning System
- Town Radio System

D. Ice & Snow Events

- Town Adopted Buildings Codes
- DPW Operations
- Warning System
- Electrical Back-Up Generators

E. Earthquake

- Town Adopted Building Codes
- Warning System
- Forestry and Conservation District
- Electrical Back-Up Generators

Description and Review of Existing Programs

In identifying and developing a comprehensive range of specific mitigation actions and projects which could be undertaken by the Town to reduce the effects of hazards, with respect to new and existing buildings and infrastructure, the following existing programs and regulations were reviewed and discussed by the Goffstown Hazard Mitigation Committee. Identified improvements or changes to these programs are summarized in the following section on recommended improvements and existing protection matrix.

Floodplain Development Ordinance – Flood Hazard Overlay District

Last amended on March 11, 2014 (see copy of Town's Flood Hazard Overlay District regulations in Appendix M of this Plan). These regulations apply to all lands designated as special flood hazard areas (SFHAs) by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for the Town of Goffstown, NH" along with the most current D FIRM maps dated September 25, 2009. The Building Inspector is required to review all building permit applications and issue permits for new construction or substantial improvements to determine whether proposed building sites are in compliance with the regulations and will be reasonably safe from flooding. Since the completion of the last CAV Report evaluating the town's floodplain development regulations on May 14, 2009, and the Office of Energy and Planning's most recent Biennial Report supplied to FEMA dated December 31, 2014, there have been no programmatic issues or violations that have been reported with respect to implementation and enforcement of the community's floodplain management program, the FEMA flood maps or flood insurance

studies. In review of this information and the town's flood hazard overlay district, the Goffstown Hazard Mitigation Committee identified a need for the addition of enforcement provisions and administrative procedures to the ordinance. Currently there are no guidelines or provisions within the flood hazard overlay district regulations for how town staff is to enforce the regulations.

National Flood Insurance Program (NFIP)

The Town of Goffstown joined the NFIP on June 15, 1979. The National Flood Insurance Program (NFIP) is aimed at reducing the impact of flooding on private and public structures. This is achieved by providing affordable insurance for property owners and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socio-economic impact of disasters by promoting the purchase and retention of Risk Insurance in general, and National Flood Insurance in particular. To date, there have been no reported issues or violations of the NFIP in Goffstown. Goffstown's status in the NFIP and the number of flood insurance claims and losses is reported in Section II on pages 44 through 47 of this Plan. In reviewing the NFIP, the Goffstown Hazard Mitigation Committee identified a need to request that the September 25, 2009 FEMA flood maps and D-FIRM be provided to the town in feet.

Wetlands and Surface Water Conservation District

Enacted to regulate the uses of lands subject to standing water or extended periods of high water table. Areas of town that contain marshes, ponds, bogs, lakes, streams and rivers, as well as soils defined as poorly or very poorly drained by the National Cooperative Soil Survey conducted by the U.S. Department of Agriculture Soil Conservation Service. Includes wetlands that are 2000 square feet or larger, and that are of any size if contiguous to surface waters, as well as all land within 50 feet of those wetlands that are included within the Wetlands Conservation District. The town's wetlands conservation district regulations have been effective to date in protecting the town's wetlands, surface waters and high water table, and no issues or violations have occurred since adoption of the town's prior 2009 Plan. While no specific improvements or changes are recommended to these regulations at this time, the Goffstown Hazard Mitigation Committee identified a need to evaluate the town's existing 100 foot buffer requirements and how the regulations comply overall with state statutes.

Groundwater Resource Conservation District

To protect, preserve and maintain existing and potential groundwater supply and groundwater recharge areas within known aquifers from adverse

development, land use practices or depletion. This is to be accomplished by regulating land uses, which would contribute polluted water and pollutants to designated aquifers identified as being needed for present and future public and private water supply. Those areas designated as having high and medium potential to yield groundwater as shown on the Town of Goffstown Groundwater Conservation District map on file with the Planning Board. The town's groundwater resource conservation district regulations have been effective to date in protecting the known aquifers and groundwater resources and no issues or violations have occurred since adoption of the town's prior 2009 Plan. Thus, no improvements or changes are recommended to these regulations at this time.

Forestry and Conservation District

To protect large areas of undeveloped land which have been identified as having unique value for the conservation of land and wildlife habitat; the preservation of the rural character of the town; the maintenance of natural resources, including aquifers which provide water to private wells; the maintenance of recreational opportunities and scenic beauty; the encouragement of the continuation of large contiguous tracts of forest land in private ownership; the encouragement of forestry and timber harvesting; the development of linkages of open space corridors; or, to protect large areas of undeveloped land which are undevelopable or marginally developable because of poor road access, steep slopes, shallow depth to bedrock, or severe limitations for septic systems. The town's forestry and conservation district regulations have been effective to date in protecting conservation land, wildlife habitat and the town's rural character and no issues or violations have occurred since adoption of the town's prior 2009 Plan. Thus, no improvements or changes are recommended to these regulations at this time.

Open Space Development District

The purpose of the town's Open Space Development District is to: maintain rural character of the town through preservation of natural resources and open space; preserve agriculture and farming within the community; encourage use of land in accordance with its character including viewsheds, permanent protection of open space, agricultural lands, and other natural resources; encourage less sprawling form of development; providing adequate setbacks and buffers to minimize adverse impacts on neighboring properties; and promoting a natural system of storm water management to minimize erosion and encourage aquifer protection. The town's open space development standards have been effective to date in promoting compact development and protecting open space within the community and no issues or violations have occurred since adoption of the town's prior 2009 Plan. Thus, no improvements or changes are recommended to these regulations at this time.

Best Management Practices (BMPs)
The State has established Best Management Practices for roads, erosion and sediment control. These BMPs are methods, measures or practices to prevent or reduce water pollution, including, but not limited to, structural and nonstructural controls, operation and maintenance procedures, and other requirements and scheduling and distribution of activities. Usually, BMPs are applied as a system of practices rather than a single practice. BMPs are selected based on site-specific conditions that reflect natural background conditions. The Town of Goffstown relies upon the state's BMPs in the review of erosion and sedimentation plans, grading and excavation plans and general site plans under the Planning Board's jurisdiction. To date these BMPs have been effective protecting and maintaining the town's water resources and overall environmental quality within the community and no issues or violations have occurred since adoption of the town's prior 2009 Plan. However, some improvements could be made by including Low Impact Development (LID) standards in the town's development regulations. This could be an improvement and potential mitigation strategy in this Plan.

Life Safety Codes and State Adopted Fire Standards
Sets forth minimum fire and building codes and standards in the design and construction of buildings and structures to mitigate and prevent fire related hazards and incidences. These standards are administrated primarily by the Fire Department working in close relationship with the Building Inspections Department. The Goffstown Hazard Mitigation Committee recognized that the Town of Goffstown has limited staff to administer and enforce these regulations based upon the size and development of the town. Adding additional staff could be an improvement and potential mitigation strategy in this Plan.

Town Adopted Building Codes
The Town of Goffstown's building codes regulate construction and building within the town by setting forth minimum standards based upon occupancy. The Town of Goffstown has adopted the International Building Code and the National Electric Code which is recommended for all municipalities statewide. The Building Codes apply town-wide and address both residential and non-residential building. The Goffstown Hazard Mitigation Committee has identified a need for the Town's Building Codes to address EPA's new MS-4 municipal stormwater regulations.

River Stewardship (River Protection Program)
There are several organizations which work to protect the Piscataquog River and the surrounding watershed from degradation and increased flooding. The Piscataquog Local River Advisory Committee (PRLAC) works under state laws to review development proposals and wetland permits including developing and

updating a management plan for the river. There are also the Friends of Glen Lake and Namesake Lake which are volunteer organizations which work to protect these lakes from development and water quality issues. The Goffstown Hazard Mitigation Committee reviewed the PRLAC's river management and watershed conservation plan and recommended that these plans be reviewed and incorporated as part of the town's master plan. The Committee also identified a need for the town to develop a floodplain management plan for the Town of Goffstown which includes debris and sedimentation control.

Road Design Standards

Both the Town of Goffstown and the New Hampshire Department of Transportation (NH DOT) develop and implement necessary road construction and design standards for all public and new private roads. While both sets of road design standards are adequate, the Goffstown Hazard Mitigation Committee identified a need to update the town's road specifications standards with respect to the NFPA Fire Standards and more clearly distinguish what standards apply to public and private roads. More importantly, the Committee recommended that the town's road and drainage standards need to be updated with respect to utilizing the new Cornell Rainfall intensity standards for New England in all hydrology and hydraulic storm capacity modeling and drainage work in the town.

Manufactured Homes and Manufactured Housing Parks

The town's zoning regulations currently govern manufactured housing parks and manufactured housing units in such parks within the community. Since the prior 2009 Plan, there have been no issues or violations that have occurred within the community with respect to these regulations. In addition, these regulations have been updated after the 2006 Mother's Day Flood to reflect state statutes. Thus, no improvements or changes are identified at this time with respect to these regulations as part of this Plan.

Public Education

Various departments and boards and commissions in the Town of Goffstown are active in public education and developing public education materials, brochures and public access media information for the public, including the dissemination of natural hazard and emergency safety and preparedness. The Goffstown Hazard Mitigation Committee noted that the town's emergency notification system and website has been upgraded since the 2009 Plan. Thus, no changes or additions were identified as part of this 2015 Plan Update.

Elevation Certificates

Elevation certificates are required for all new and substantially improved construction under the NFIP and the town's Flood Hazard District in all FEMA

designated Special Flood Hazard zones. These certificates are reviewed and approved by the Town Building Inspector as part of the building permit process. The Goffstown Hazard Mitigation Committee reviewed and discussed these certificates with the Building Inspector and no specific improvements are changes were identified or recommended, except to request that FEMA submit new flood insurance maps and the D-FIRM for Goffstown in feet as opposed to meters. This will make it much easier for the town to administer this program.

Town Radio System-Conventional VHF Radio

The town's conventional VHF radio system is a voter receiver repeater system that currently acts as a back up to the Police Department's trunked radio system and provides a communication system for the Fire Department. In reviewing the effectiveness of the system with both the Police and Fire Departments, the Goffstown Hazard Mitigation Committee determined the system is functional and performs adequately; however in some locations within the town there are frequency problems which need to be addressed.

Town Radio System – Trunked Radio System

Since late 2009, the Police Department has moved to a digital narrow banded radio system compliant with FCC. The existing radio system is a trunked system using five frequencies dependent on phone lines between the Police Department and mountain top. As with any system, there continues to exist some spots where communication is not ideal within the community due to topography, limitations of phone lines, and intermodulation. However, the system has improved over time. The Goffstown Hazard Mitigation Committee has reviewed the effectiveness of this system and has determined that future system expansion could address these dead spots.

The Fire Department also uses conventional radio equipment to alert emergency personnel in their homes over a radio pager. The pagers are not compatible with trunking technology. The Department also uses conventional radio technology for primary radio communications. It is recognized that improvements are needed in this area as firefighter safety and alerting are fundamental to operation. The Department of Public Works uses conventional radio equipment.

Flood Gauge

The flood gauge on the Piscataquog River is owned and maintained by the U.S. Army Corps of Engineers . It is located at Henry Bridge to measure the level of the river during various flow events. According to the Goffstown Hazard Mitigation Committee, the effectiveness of this gauge is poor and a new gauge is needed at the New Boston/Goffstown line, to measure the level of high water on the river before the water reaches Goffstown. The Committee noted that there is an Early Warning and Advance Notice system listing the number of residents

and businesses located downstream from Greggs Falls Dam. However, this radio system is old and no longer effective. The Committee recommends that the NH DES Dam Bureau be contacted about this old and out of date radio system. In addition, the Goffstown Hazard Mitigation Committee recommends that the U.S. Army Corps of Engineers add a new gauge on the Piscataquog River between Henry Bridge Road and Danis Park, as well as a new gauge on the river at the New Boston Town Line.

Flood Warning System

There is an old and out of date flood warning system currently in place in Goffstown which consists of a radio receiver alerting residences to a potential dam break or failure. There are roughly five homes in Goffstown which contain this receiver which would receive alerts from the dam owner and the U.S. Army Corps of Engineers. The Goffstown Hazard Mitigation Committee identified that this flood warning system needs to be improved. In addition, the Committee suggested that the U.S. Army Corps of Engineers install a siren system for all areas below the dam as well as a new flood warning system town wide.

Electrical Back-Up Generators

The following facilities currently have electrical back-up generators: the Police Department, Highway Department, Fire Department/Town Hall, and Middle School. The Goffstown Hazard Mitigation Committee has recognized the need for additional generators at the town's emergency shelters, fuel pumps and sanitation.

Hazardous Materials Regulations

New Hampshire regulations regarding Hazardous Materials, etc., are enforced in the Town of Goffstown. These regulations are enforced by both the Fire Department and the Public Works Department through the building permit and land development review process. No improvements or changes are identified or needed to these regulations at this time.

Zoning Regulation of Trailers

The Town of Goffstown's Zoning Ordinance provides regulations governing Temporary Trailers and Mobile Homes. Specifically, the zoning ordinance requires that no person or organization shall locate, park, keep or maintain nor allow to be located, parked, kept, or maintained upon his or its property a temporary trailer or mobile home not on a permanent foundation except in strict compliance with the ordinance. Since the prior 2009 Plan, there have been no issues or violations which have occurred within the community with respect to these regulations. Thus, no improvements or changes are identified to these regulations as part of this Plan.

Shoreland Protection Act
The Act, adopted during 1994 and updated in 2008, establishes minimum standards for the future subdivision, use, and development of all shore lands within 250 feet of the state's public waters. When repairs, improvements, or expansions are proposed to existing development, the law requires these alterations be consistent with the intent of the Act. The Department of Environmental Services (DES) is responsible for enforcing the standards within the protected shoreland, unless a community adopts an ordinance or shoreland provisions that are equal to or more stringent than the Act. To date there have been no identified issues or violations reported since the prior 2009 Plan, therefore at this time no changes or improvements to the state's regulations or the town's enforcement of these regulations are proposed as part of this Plan.

Fluvial Erosion Hazards and River Geomorphic Assessment Program
This program is now a division in the NH DES Geologic Survey and the goal of the program is to identify and inventory fluvial erosion hazards in the State. Shane Csiki is the Fluvial Geomorphology Specialist at the NH Geological Survey at DES. This program began in New Hampshire in 2008 and protocols have been established based on the State of Vermont's program in the inventory and assessment of these hazards. Assessments of watersheds throughout NH have been conducted by NH DES and a major assessment study was conducted for the Piscataquog River and Watershed 2013-2014. This assessment identified and evaluated fluvial erosion hazards within the watershed and collected inventory data on all the major culverts, bridges and stream crossings within the watershed. The Environmental Fact Sheet describing the State's Fluvial Erosion Hazard program can be found in Appendix J.

In addition, the overall findings and inventory assessment performed by the NH DES Geologic Survey for the Piscataquog River and Watershed within the Town of Goffstown is included in this Plan (see Description of Fluvial Erosion Hazards, pages 55-58 and Appendix K, Description of Fluvial Geomorphology Data). This assessment and inventory is a major addition to this Updated 2015 Hazard Mitigation Plan for the Town of Goffstown. The Goffstown Hazard Mitigation Committee has reviewed the findings of the 2013/2014 assessment study on the Piscataquog River and Watershed in Goffstown and has determined that while this natural hazard is likely to occur within the community, it has a moderate level of severity and impact to human health, property and business and a low overall threat to the community. As such there are no specific mitigation strategies or improvements proposed in this Plan to address this hazard at this time.

Piscataquog River Watershed Stream Crossing Vulnerability Assessment Project

In addition to the fluvial erosion assessment conducted on the Piscataquog River Watershed in Goffstown, another major study and inventory was conducted within the watershed and included in this 2015 Updated Plan. The purpose of the Piscatauog River Watershed Stream Crossing Vulnerability Assessment Project was to develop a user-friendly geographic information system (GIS-based) hydrologic and hydraulic model to identify high water flows during server storm events and to assess the capacity of all the existing stream crossings, culverts, bridges and infrastructure within the Piscataquog River watershed to handle these flows. The primary goal was to evaluate and provide a rating for all the stream crossings, with respect to their vulnerability to high water flows during severe storm events. A secondary goal was to develop the modeling tools, organized in a user-friendly format, so they can be offered to communities throughout New Hampshire that would be interested in running similar analyses.

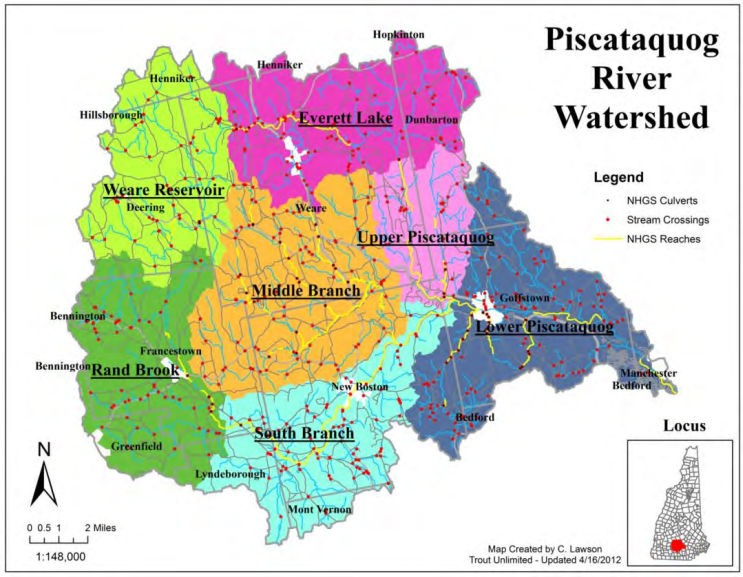
Trout Unlimited (TU), the Southern NH Planning Commission (SNHPC), and other state and federal partners collaborated to develop this GIS-based hydraulic capacity (HC) modeling tool and vulnerability assessment as to whether a particular stream crossing will pass the projected instream water flows during the 2, 10, 25, 50 and 100 year return interval storms. The project builds upon field data collected on aquatic connectivity and geomorphic conditions of the Piscataquog River during the summer of 2012 (TU 2012). These two projects were managed by TU and the NH Department of Environmental Services Geological Survey (NHGS) respectively.

The Piscataquog River watershed is 217.8 square miles (138,880 acres) in size and includes the following 11 communities: the towns of Deering, Dunbarton, Francestown, Greenfield, Goffstown, Henniker, New Boston, Mont Vernon, Lyndeborough, Weare, and the southwestern edge of the City of Manchester. An estimated 400 stream crossings surveyed in 2012 were evaluated for stormwater vulnerability. The majority of the identified stream crossings are drainage pipes or box culverts installed to carry water under a public right of way or a private road. Hydrologic information was processed and summarized in GIS; this GIS output and the 2012 field data were entered as into to an Excel spreadsheet model where the hydraulic modeling was performed. Model results for this analysis have been mapped showing the hydraulic capacity (HC) rating of each stream crossing to determine existing problem areas. This information can then be used to proactively develop a long-term strategy to reduce community risk associated with undersized and vulnerable road crossings. The results from this data analysis provides municipalities and state agencies with valuable

information necessary for implementing new conservation initiatives and detailed safety and hydraulic capacity investigations of hazardous culverts, stream crossings and infrastructure vulnerable to severe storms and hazards.

By using this updated stream crossing information, municipal road agents and public works staff and local officials can identify and prioritize restoration efforts or replacement of inadequate crossings, thus reducing the chance of inundation in flood prone areas and culvert wash-outs during the extreme storm events. In the end, this proactive approach to addressing infrastructure needs at the community level will help, in both the short and long term, to reduce emergency repair costs associated with potential storm damage. Restoring connectivity to these problem sites will also serve to protect critical community water quality resources as well as improve a diversity of aquatic habitat frequently associated with stream fragmentation. A key mitigation strategy in protecting a community's infrastructure resiliency is to be prepared; and a big part of that preparedness is to understand the vulnerability of road crossings in each community under a variety of storm scenarios.

This user-friendly strategic planning tool is available to all NH communities interested in performing this type of analysis. With the appropriate field data collected, access to a person with GIS skills, and the ability to run an Excel model, towns and regional planning commissions will be able to complete a detailed assessment of the current vulnerability of all the road and stream crossings across their political boundaries. A list and rating of all the Town of Goffstown's culverts and stream crossings is provided in Appendix L. The number and location of these crossings is also shown in the map below and on the maps contained in Appendix L.



The Goffstown Hazard Mitigation Committee evaluated the findings and results of this vulnerability assessment and identified that many of the town's culverts and stream crossings are projected to fail during the 25, 50 and 100-year storm events. The Goffstown Hazard Mitigation Committee concluded that this part of the town's critical infrastructure should be improved. As a result, the Committee suggested that culvert and stream crossing improvements be considered a potential mitigation strategy and action item in the 2015 Updated Plan.

Existing Protection Matrix

Based upon this evaluation of the town's existing mitigation protection programs and strategies, the Goffstown Hazard Mitigation Committee developed the following Existing Protection Matrix. This matrix provides an overall summary of how well the town's existing mitigation programs are working, what can be improved, and what changes should be considered as mitigation measures and action items as part of this 2015 Updated Plan.

This matrix includes the type of existing protection (Column 1), a description of the existing protection (Column 2), the area of town affected (Column 3), an overall rating of the effectiveness and/or enforcement of the strategy within the community (Column 4), identified improvements or changes that need to be considered as mitigation measures and action items as part of this 2015 Plan Update (Column 5).

The Goffstown Hazard Mitigation Committee utilized the following rating criteria in determining the overall effectiveness and/or enforcement of the town's existing mitigation programs within the community:

Poor: The policy, plan, regulation or program does not work as well as it should and often falls short of meeting its goals.

Fair: The policy, plan, regulation or program does not work as well as it should and sometimes falls short of meeting its goals.

Good: The policy, plan, regulation or program works very well and is achieving its goals.

Excellent: The policy, plan, regulation or program works and often exceeds its goals.

Existing Protection Matrix and Proposed Improvements to Existing Programs, Policies and Regulations Identified by the Goffstown Hazard Mitigation Committee

TYPE OF EXISTING PROTECTION	**DESCRIPTION**	**AREA OF TOWN COVERED**	**EFFECTIVENESS** *(Rating definitions can be found below this table)*	**IMPROVEMENTS OR CHANGES NEEDED 2015 Update**
Floodplain Development Ordinance – Flood Hazard District	Reduces hazards of floods and increased risk of flood damage by setting forth regulations for building in flood hazard zones	Regulations apply to all lands designated as special flood hazard areas by FEMA	Good Planning and Building Departments Planning Board	There is a need to include enforcement provisions identifying the administrative procedures and guidelines for town staff to follow in enforcing these regulations.
NFIP	FEMA and state floodplain program	Floodway and 100 and 500-year flood zones	Good Planning and Building Departments	It is recommended that FEMA provide the September 25, 2009 flood insurance maps and D-FIRM to the town in "feet" as opposed to meters.
Wetlands and Surface Water Conservation District	Sets zoning guidelines for protecting the town's wetlands and surface waters	Impacts all lands within delineated wetlands; 100 foot buffers and wetlands larger than 2,000 SF	Good Planning and Building Departments Conservation Commission Zoning Board of Adjustment	No specific needs or improvements are identified at this time except the Town should consider evaluating the 100 foot buffer requirements as well as the overall compliance of the regulations with state statutes.

TYPE OF EXISTING PROTECTION	DESCRIPTION	AREA OF TOWN COVERED	EFFECTIVENESS *(Rating definitions can be found below this table)*	IMPROVEMENTS OR CHANGES NEEDED **2015 Update**
Groundwater Resource Conservation District	Sets zoning guidelines for protecting existing and potential groundwater supply and existing aquifers	Designated water supply areas and aquifers	Good Planning and Building Departments Planning Board Zoning Board of Adjustment	None identified or recommended at this time.
Forestry and Conservation District	Sets zoning guidelines for protecting conservation and open space lands	Designated conservation and open space lands	Good Planning and Building Departments Planning Board	None identified or recommended at this time.
Open Space Development District	Sets zoning standards for cluster and open space development	Only allowed within R-1; R-2 and Agricultural and Conservation zoning districts having a parent lot of 10 acres of more	Good Planning and Building Departments Planning Board	None identified or recommended at this time.
Best Management Practices (BMPs)	NH State guidelines for Roads & Soil and Erosion	All	Good State/DPW (town)	The only identified need is to incorporate Low Impact Development BMPs into the town's land use and development regulations. Planning and DPW Departments will seek grant funds for this work.

TYPE OF EXISTING PROTECTION	DESCRIPTION	AREA OF TOWN COVERED	EFFECTIVENESS *(Rating definitions can be found below this table)*	IMPROVEMENTS OR CHANGES NEEDED **2015 Update**
Life Safety Codes State Adopted Fire Standards	Sets minimum design and construction standards to mitigate fire effects	All	Good Fire Department	There is a need for additional town staff is to provide and maintain 100% enforcement capacity.
Town Adopted Building Codes	Regulates construction to set a min standard of protection to occupants	All: commercial some 1- & 2-family structures	Good Building Inspector	It is recommended that EPA's MS4 stormwater management requirements be incorporated and addressed into the town's building codes.
River Stewardship (Preventative Program)	Piscataquog River Local Advisory Committee (PRLAC) seeks to protect the river and prevent water quality degradation and development which could lead to floods	Covers the river and all tributaries in the watershed	Good Piscataquog River Local Advisory Committee (PRLAC), Friends of Glen Lake and Namesake Lake	It is recommended that the PRLAC's river management and watershed conservation plan be made a part of the town's Master Plan. There is also a need to develop a floodplain management plan for the town that also addresses debris and sediment control.

TYPE OF EXISTING PROTECTION	DESCRIPTION	AREA OF TOWN COVERED	EFFECTIVENESS *(Rating definitions can be found below this table)*	IMPROVEMENTS OR CHANGES NEEDED **2015 Update**
Road Design Standards	NH DOT Standards	Town maintained roads & new private roads	Good Planning Board Public Works Department	It is recommended that the town's road specifications be updated to reflect NFPA Fire Standards. The new rainfall intensity data from Cornell should also be used by the town in all hydrology and hydraulic capacity modeling and drainage work. Planning and PWD departments plan to seek grant funds for these improvements.
Manufactured Homes and Manufactured Home Parks (Zoning Ordinance)	Regulations to provide safe and affordable housing	Manufactured Home Parks and Subdivisions	Good Planning Board State Fire Marshall Town Fire & Police	The town's zoning regulations were updated after the 2006 Mother's Day Flood. No additional updates or changes are identified or needed at this time.
Public Education	Dissemination of various information related to public safety	All	Good Town Offices Fire Department Police Department	The emergency notification system and website has been upgraded by the town and state, but additional improvements are needed particularly for Code Red incidences and hazard events.

TYPE OF EXISTING PROTECTION	DESCRIPTION	AREA OF TOWN COVERED	EFFECTIVENESS *(Rating definitions can be found below this table)*	IMPROVEMENTS OR CHANGES NEEDED **2015 Update**
Elevation Certificates	Required for all new and substantially improved construction in the Special Flood Hazard Areas	Floodplain	Good Building Inspections	The issuance of these certificates can be improved if FEMA's flood insurance maps prepared for the Town are updated to be in "feet" as opposed to meters.
Town Radio System-Conventional VHF Radio	Backup to Trunked Radio system as well as for Fire Department Communications	Entire Town	Good Fire Department	The Town's radio system is functional, but in some locations frequency is a problem and improvements are needed to address these issues.
Town Radio System-Trunked Radio System	5 frequencies, depending on microwave transmission	Entire Town	Poor Police Department	The Town's existing radio system is old and should be updated and improved. System upgrades are needed at such locations as the DPW and at the town's public schools. Police and Fire are currently using the system, but the DPW is not. The radio system also has poor reception in many parts of the town.

TYPE OF EXISTING PROTECTION	DESCRIPTION	AREA OF TOWN COVERED	EFFECTIVENESS *(Rating definitions can be found below this table)*	IMPROVEMENTS OR CHANGES NEEDED **2015 Update**
Flood Gauge	Measures the level of the Piscataquog River	Henry Bridge/ Piscataquog River	Poor U.S. Army Corps of Engineers	A new flood gauge is needed at New Boston/Goffstown town line to measure water levels before flood waters reach the town. The existing gauge is currently located between the dam and Henry Bridge. There is an Early Warning and Advance Notice system for property owners living downstream from the dam. However, it is an old radio system and it is not designed for effective public notification in advance of floods. The NH Dam Bureau should be made aware of the need for improvements to this system. It is recommended the U.S. Army Corps of Engineers install a new flood gauge between Henry Bridge and Danis Park, as well as at the New Boston Town Line.

TYPE OF EXISTING PROTECTION	DESCRIPTION	AREA OF TOWN COVERED	EFFECTIVENESS *(Rating definitions can be found below this table)*	IMPROVEMENTS OR CHANGES NEEDED **2015 Update**
Flood warning system	Radio receiver in house alerts to dam break (plectron)	Five houses in town	Poor U.S. Army Corps of Engineers NH DES Dam Bureau Police Dispatch	The existing flood warning system is old and should be updated and improved such that it is available town wide. It is recommended that the town also have a siren system that can be used during town wide emergencies and natural disasters.
Fluvial Erosion Hazards (FEH) and River Geomorphic Assessment Program	Performs assessments of Fluvial Erosion areas in the state of NH. An assessment was completed of the Piscataquog Watershed in 2013-2014.	Ten sections of the rivers in town.	Excellent NH DES Geologic Survey	No improvements or changes are needed as this is a new program currently being developed and implemented by the NH DES Geologic Survey.
Piscataquog River Watershed Stream Crossing Vulnerability Assessment Project	Evaluated all the stream crossings and culverts in town and assessed their condition and vulnerability to severe storm events	List of culverts can be found in the Appendix.	Excellent Planning Board DPW	The Town of Goffstown should utilize the findings and result of this assessment to begin to prioritize the town's culverts and stream crossings for future replacement or restoration.

Potential Mitigation Strategies and Actions Identified by the Goffstown Hazard Mitigation Committee

Utilizing the information derived from the assessment of existing mitigation programs, policies and regulations contained in the Existing Protection Matrix, the Goffstown Hazard Mitigation Committee next reviewed and evaluated the mitigation strategies and action items contained with the Town's prior 2009 Plan. This step is necessary in the hazard mitigation planning process as it provides the Committee with a comprehensive identification and analysis of all the potential mitigation strategies and actions for consideration in this Updated 2015 Plan.

1. Implement a new Wireless mesh network in town for increased communication and response in emergency situations
2. Coordination and communication needed between the town and Eversource (formerly PSNH)/Utilities during hazard situations
3. Additional Carbon Monoxide monitoring equipment needed
4. Seek Grant Resources for improvement of BMPs
5. Seek grant resources for Signal Coverage upgrades to Town Radio System
6. Seek Grant resources for Town Radio Purchases
7. Prioritize and upgrade critical crossings
8. Upgrade the Goffstown Emergency Management Response Unit with additional safety and traffic control equipment
9. Consider adopting the IBC National Maintenance Code for Manufactured Homes
10. Seek Grant resources for Automated backup power for Fuel Pumps/Sanitation
11. Consider applying to the CRS program through NFIP for reduced insurance rates to citizens
12. Purchase a proximity meter for DPW/Safety personnel to determine live and dead power lines for the clearing of downed trees/limbs after ice and wind storms
13. Conservation Commission should have a Timber Management Plan for land owned on Mt. Uncanoonuc
14. Additional training needed for DPW and safety personnel in relation to mitigation of downed trees, limbs and power lines after ice and wind storms
15. Consider regulating the distance of trees to power lines to decrease downed limbs/trees during ice and wind storms
16. Continue to pursue a river stewardship program for river maintenance and to control debris and sediment and develop a floodplain management plan

17. Seek approval from Army Corp of Engineers and funding for a Flood warning system
18. Conservation Commission should pursue the purchase of flood prone properties in town
19. Sewer water infrastructure needed in Danis Park and Lynchville Park
20. Flood mitigation inspection program needed for enforcement of floodplain management zoning ordinances
21. Increased salt storage capacity is needed
22. Purchase remote camera system for safety personnel in the event of building collapse
23. Public education on clearing needed to mitigate large amounts of tree, limb, brush debris after ice and wind storms
24. Urban Wildland Interface Education needed for town and increased development
25. Seek Grant resources for the creation of a Town wide warning system
26. Purchase portable traffic lights for power outages

The following table identifies the existing mitigation strategies, measures and actions as set forth in the Town of Goffstown's 2009 Hazard Mitigation Plan and identifies what the status of these strategies and measures are in terms of implementation. Strategies and action items from the 2009 plan identified as "Completed" in this table were not considered by the Committee for inclusion in this Updated 2015 Plan. Strategies and action items identified as "Deferred" are included in this Updated 2015 Plan.

2009 Mitigation Measure Update						
ACTION #	**MITIGATION ACTION**	**PRIORITY POINTS**	**WHO (LEADERSHIP)**	**STATUS**	**HOW (FUNDING)**	**2015 UPDATE**
1	Consider implementing a wireless mesh network in town for increased communication and response in emergency situations.	39	Emergency Management Director	Completed	Grants	Completed
2	Coordination and communication needed between the town and PSNH/Utilities during hazard situations	36	DPW, Utilities	Completed	Town/Utilities	Completed
3	Additional Carbon Monoxide monitoring equipment needed	36	Fire, Police, Emergency Management	Completed	Grants/Town Budget	Completed
4	Seek Grant Resources for improvements of BMPs	36	DPW	Completed	Grants	Completed
5	Seek grant resources for signal coverage upgrades to Town Radio System	35	Fire, Police, DPW	Deferred	Grants	Included as an action item in the 2015 Plan
6	Seek grant resources for Town Radio Purchases	34	Fire, Police, DPW	Completed	Grants	Completed
7	Prioritize and upgrade critical crossings	34	DPW	Deferred	Town Budget/Grants/State/CIP	Two bridges (Henry Bridge and Main Bridge) remain to be upgraded and improved. Included as an action item in the 2015 Plan

2009 Mitigation Measure Update						
ACTION #	**MITIGATION ACTION**	**PRIORITY POINTS**	**WHO (LEADERSHIP)**	**STATUS**	**HOW (FUNDING)**	**2015 UPDATE**
8	Upgrade the Goffstown Emergency Management Response Unit with additional safety and traffic control equipment	34	Police, Fire, Emergency Management	Completed	Town Budget/Grants	Completed
9	Consider adopting the IBC National Maintenance Code for Manufacturing Homes	34	Planning Board	Deleted	Town	No longer under consideration by the Town.
10	Seek Grant Resources for Automated backup power for Fuel Pumps/Sanitation	33	DPW	Deferred	DPW	Included as an action item in this 2015 Plan
11	Consider applying to the Community Rating Systems (CRS) program through NFIP for reduced insurance rates to citizens.	33	NFIP Coordinator	Deferred	Town	Included as an action item in this 2015 Plan
12	Purchase a proximity meter for DPW/Safety personnel to determine live and dead power lines for the clearing of downed trees/limbs after ice and wind storms.	33	DPW	Deleted	Grant	No longer under consideration by the DPW
13	Conservation Commission should have a Timber Management Plan for land owned on Mt. Uncanoonuc	33	Conservation Commission	Deferred	Grants	This plan was completed in 1999, but needs to be updated. It is included as an action item in the 2015 Plan.

2009 Mitigation Measure Update						
ACTION #	**MITIGATION ACTION**	**PRIORITY POINTS**	**WHO (LEADERSHIP)**	**STATUS**	**HOW (FUNDING)**	**2015 UPDATE**
14	Additional training needed for DPW and safety personnel in relation to mitigation of downed trees, limbs and power lines after ice and wind storms.	33	DPW, Police, Fire, Emergency Management	Completed	Town Budget/Grants	Completed
15	Consider regulating the distance of trees to power lines to decrease downed limbs/trees during ice and wind storms.	32	Planning Board	Deleted	Town	PSNH (Eversource) currently addresses this through its tree management program
16	Continue to pursue a river stewardship program for river maintenance and to control debris and sediment and develop a floodplain management plan.	32	State, Building Department, Piscataquog River Local Advisory Council	Deferred.	State, Grants	Included as an action item in this 2015 Plan. The town can work with the PRLAC to develop this program.
17	Seek approval from Army Corp of Engineers and funding for a Flood warning system.	32	Fire, Police, DPW	Deferred	Grants	Included as an action item in this 2015 Plan.
18	Conservation Commission should pursue the purchase of flood prone properties in town.	31	Conservation Commission	Deferred	Grants	Included as an action item in this 2015 Plan.

2009 Mitigation Measure Update						
ACTION #	**MITIGATION ACTION**	**PRIORITY POINTS**	**WHO (LEADERSHIP)**	**STATUS**	**HOW (FUNDING)**	**2015 UPDATE**
19	Sewer and water infrastructure needed in Danis Park and Lynchville Park.	31	DPW	Deleted	Town Budget/Grants	Goffstown Village Water Precinct is responsible for these improvements.
20	Flood mitigation inspection program needed for enforcement of floodplain management zoning ordinances.	31	Building Department	Deferred	Town Budget	Included as an action item in this 2015 Plan.
21	Increased salt storage capacity is needed.	31	DPW	Deferred	Town Budget	Included as an action item in this 2015 Plan.
22	Purchase remote camera system for safety personnel in the event of building collapse.	31	Police, Fire, Emergency Management	Deferred	Grants	Included as an action item in this 2015 Plan.
23	Public education on clearing needed to mitigate large amounts of tree, limb, brush debris after ice and wind storms.	30	Fire, DPW	Deferred	Town Budget/Grants	Included as an action item in this 2015 Plan.
24	Urban Wildland Interface Education needed for town and increased development.	30	Fire, Emergency Management	Deferred	Town Budget/Grants	Included as an action item in this 2015 Plan.
25	Seek grant resources for the creation of a Town Wide warning system.	30	Fire, Police, Emergency Management	Deferred	Grants	Included as an action item in this 2015 Plan.

2009 Mitigation Measure Update						
ACTION #	**MITIGATION ACTION**	**PRIORITY POINTS**	**WHO (LEADERSHIP)**	**STATUS**	**HOW (FUNDING)**	**2015 UPDATE**
26.	Purchase portable traffic lights for power outages.	29	Fire, Police, Emergency Management	Deferred	Grants	Included as an action item in this 2015 Plan.
27.	Additional snow removal equipment for DPW needed.	29	DPW	Deferred	Grants	Included as an action item in this 2015 Plan.

SECTION IV

NEWLY IDENTIFIED MITIGATION STRATEGIES AND CRITICAL EVALUATION

Utilizing the information presented in Section III of this Plan and FEMA's Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013) as a guide, the Goffstown Hazard Mitigation Committee identified the following mitigation strategies and actions for consideration in the 2015 Updated Plan.

These mitigation strategies and actions are identified to help the Town of Goffstown prepare for the hazards facing the Goffstown community today and in the future. In developing this list of newly identified strategies, the Goffstown Hazard Mitigation Committee reviewed the updated hazard data, information and threats to the community in Section I of the plan; the identified gaps and needs in the existing mitigation programs, policies and regulations as outlined in the Existing Protection Matrix; as well as the previous mitigation strategies and measures as set forth in the town's prior 2009 Plan.

One-third of the 33 identified new mitigation strategies are designed to address the issue of flooding within the community. Most of the other mitigation strategies and actions are identified to address and improve the town's communication and flood warning systems and emergency shelters. Still other strategies recommend investing in new equipment needed to mitigate severe winter weather and hurricanes as well as provide for continuous hazard mitigation planning to improve floodplain management and storm water capacity and to upgrade critical infrastructure within the town. The complete list of the new identified strategies is provided below.

1. Improve the existing Flood Warning System and incorporate Code Red warnings.
2. Update existing plans and information on dam breaches and failures in the community (such as Greg Fall Dam).
3. Attain and establish emergency back-up power through generators at the town's Emergency Shelters.
4. Develop another emergency shelter in addition to the Middle and High School.
5. Work with US Army Corp of Engineers to establish a new or relocate existing flood gauge at the New Boston/Goffstown line.
6. Upgrade and improve critical bridges crossing the Piscataquog River (Henry Bridge and Main Street).
7. Write a Debris Management Plan for the Town.
8. Improve and upgrade the town's existing Public Safety Radio on Mt. Uncanoonuc for Department of Public Works use.

9. Improve storm water capacity and prioritize upgrades to town's existing culverts and stream crossings utilizing new Culvert Vulnerability and Assessment data and findings.
10. Develop enforcement guidelines and provisions for town staff for inclusion in the Flood Hazard Overlay zoning district.
11. Examine existing requirements for wetland buffers to determine effectiveness at protecting wetlands and water resources.
12. Develop and implement public education on debris management after storms around private property.
13. Improve public awareness and education on wildfire hazards in the community.
14. Obtain generators for backup power for the town's fuel pumps/sanitation services.
15. Encourage installation of utilities and wires underground for all new development and critical infrastructure.
16. Develop a Floodplain Management Plan for the Town.
17. Increase the town's salt storage capacity.
18. Develop a Storm Water Runoff Plan for the Town.
19. Conduct a study and analysis of landslide hazards within the community.
20. Develop Extreme Heat outreach education, planning and protective measures for the public. Target vulnerable populations.
21. Update the town's Timber Management Plan for Mt. Uncanoonuc.
22. Work with the PRLAC to develop a voluntary river stewardship program for river maintenance and to control debris and sediment.
23. Develop site and building standards to minimize erosion risks within the town.
24. Encourage the Conservation Commission and the Town to pursue purchases of flood prone properties in the town.
25. Develop strategies to stabilize slope failure at vulnerable locations around town.
26. Acquire more snow and ice equipment to increase ability to clear snow.
27. Acquire View Works Software Program for cataloguing drainage infrastructure for planning purposes.
28. Examine Manufactured Homes and Home Parks Zoning Ordinance to determine applicability for hazards and safety.
29. Participate in Community Rating System through NFIP for reduced insurance rates to citizens.
30. Establish a Storm Water Utility Fee.
31. Educate property owners within flood zones on participation in the National Flood Insurance Program.
32. Provide Urban Wildland Interface Education to the public and local developers.
33. Create a town-wide Public Warning System for natural hazards and emergencies.

Summary of Evaluation Method

The next step in the hazard mitigation planning process required the Goffstown Hazard Mitigation Committee to evaluate and prioritize each of the recommended new mitigation strategies and actions for inclusion in this Plan. The initial selection of the mitigation actions in the town's 2009 plan was based on filling in perceived gaps in hazard protection within the Town.

The methodology in selecting the final mitigation strategies and prioritizing these actions has not changed since the last plan was adopted. It was decided by the Committee that no changes were needed to the methodology since the process worked well last time and some of the same mitigation measures were used again. Any mitigation actions that were deferred from the Goffstown Hazard Mitigation Plan Update 2009 or that require continued implementation were included in the 2015 critical evaluation process. In addition, the Goffstown Hazard Mitigation Committee reviewed each section of the FEMA guidance document *Mitigation Ideas*[28] and considered a comprehensive range of mitigation strategies and projects for each of the identified hazards that the Town of Goffstown is susceptible to.

The Goffstown Hazard Mitigation Plan Committee began the process by first selecting those mitigation actions that were determined to be most important to the town. Mitigation strategies continuing from the 2009 Plan, the newly identified mitigation actions, and those strategies as recommended in Column 6 of the Existing Protection Matrix were then compiled and reviewed by each member of the Committee using the STAPLEE process for prioritization (see Appendix E). Using the following fourteen (14) criteria[29], rating scores were assigned by Committee members to each criterion based on (1) for Poor; (2) for Average; and (3) for Good. Total scores can range from a minimum of 14 to a maximum of 42.

- ***Social*:** *(1)* Is the proposed action socially acceptable to the community? (2) Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- ***Technical:*** *(3)* Is the proposed action technically feasible and will it work? (4) Is it a long term solution?
- ***Administrative:*** *(5)* Can the community implement the action? Is there someone to coordinate and lead the effort? (6) Are there funding sources already allocated or available for this project?
- ***Political:*** *(7)* Is the action politically acceptable? (8) Does the project help to achieve other community objectives?

[28] FEMA. *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*. January 2013.
[29] These are derived from the STAPLEE method criteria. Explanation of STAPLEE is provided in Appendix G

- ***Legal:*** *(9)* Is the community authorized to implement the proposed action? (10) Is there a clear legal basis of precedent for this project or is there chance of legal challenge?
- ***Economic:*** *(11)* What are the costs and benefits of this action? Does the cost seem reasonable for the size of the problem and the likely benefits? (12) Does the project reduce potential future damages from disasters?
- ***Environmental:*** *(13)* How will the action impact the environment, i.e. land, water, animals, plants? (14) Will the action need and meet environmental regulatory approvals

Preliminary Prioritization

The Goffstown Hazard Mitigation Plan Committee assigned the following scores to each of the 33 mitigation strategies in considering their effectiveness relative to the critical STAPLEE evaluation factors listed above.

ACTION #	MITIGATION ACTION	PRIORITY POINTS
1	Improve existing Flood Warning System with Code Red warnings	34
2	Update existing plans for dam breach and failure (such as Greg Fall Dam)	31.5
3	Attain generators for back-up power for emergency shelters	31.5
4	Develop another emergency shelter in addition to Middle and High School	31
5	Work with US Army Corp of Engineers to establish a new or relocate existing flood gauge at the New Boston/Goffstown line.	31
6	Upgrade/improve critical bridges crossing the Piscataquog River (Henry Bridge and Main Street)	34
7	Write a Debris Management Plan for the Town	30
8	Improve/upgrade town's existing Public Safety Radio system on Mt. Uncanoonuc and for DPW	30
9	Improve storm water capacity and prioritize upgrades to town's existing culverts and stream crossings using new Culvert Vulnerability and Assessment data and findings	29.5
10	Develop enforcement guidelines and provisions for town staff in town's Flood Hazard Overlay zoning district	29.5
11	Examine existing wetland buffer requirements to determine effectiveness at protecting wetlands and water resources	29.5
12	Develop and implement public education on debris management after storms around private property	29
13	Improve public awareness and education on wildfire hazards in the community	29
14	Obtain generators for backup power for town fuel pumps/sanitation services	29
15	Encourage installation of utilities and wires underground for all new development and critical infrastructure	28.5
16	Develop a Floodplain Management Plan for the Town	28.5

ACTION #	MITIGATION ACTION	PRIORITY POINTS
17	Increase the town's salt storage capacity	28.5
18	Develop a Storm Water Runoff Plan for the Town	28
19	Conduct a study and analysis of landslide hazards in the community	28
20	Develop Extreme Heat outreach education, planning and protection measures for the public. Target vulnerable population.	28
21	Update the town's Timber Management Plan for Mt. Uncanoonuc	28
22	Work with PRLAC to develop a voluntary river stewardship program for river maintenance and to control debris and sediment.	28
23	Develop site and building standards to minimize erosion risks within the town	27.5
24	Encourage the Conservation Commission and Town to pursue purchases of flood prone properties in town.	27.5
25	Develop strategies to stabilize slope failure at vulnerable locations around town	27
26	Acquire more snow and ice equipment to increase ability to clear snow	26.5
27	Acquire View Works Software program for cataloguing drainage infrastructure for planning purposes	26
28	Examine Manufactured Homes and Home Parks Zoning Ordinance to determine applicability for hazards and safety	26
29	Participate in Community Rating System through NFIP for reduced insurance rates to citizens	25
30	Establish a Storm Water Utility Fee	24
31	Educate property owners within flood zones on participation in the National Flood Insurance Program.	24
32	Provide Urban Wildland Interface Education to the public and local developers	22
33	Create town-wide Public Warning system for natural hazards and emergencies	22

SECTION V

PRIORITIZED IMPLEMENTATION SCHEDULE AND FUNDING SOURCES

Implementation Strategy for Priority Mitigation Actions

Utilizing the STAPLEE Scores as identified in the previous section and table, the Goffstown Hazard Mitigation Committee created the following prioritized schedule for implementation of the priority mitigation strategies and actions in this Updated 2015 Plan.

To successfully implement the prioritized mitigation actions as set forth in this Plan, the Town of Goffstown will consider local funding sources and research additional funding sources. Grants will be particularly researched on a project-by-project basis to search out the best-suited grant match. As feasible, the prioritized Mitigation Measures and Actions as set forth in this Plan will be incorporated into the Town's Master Plan when updates are made, including the town's Capital Improvement Program (CIP), as feasible. This will be addressed by the Town by the Emergency Management Director as part of each annual update and review of the plan monitoring and implementation.

In the following table identifying the prioritized strategies and actions for this Plan, under the column identified as "Timeframe" the reference to Short Term refers to a time period of 1-2 years; Medium Term refers to a time period 3-4 years; and Long Term is generally considered to be up to 5 years or ongoing.

2015 Prioritization Schedule

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
High	34	Existing system is out of date and does not adequately warn the general public in event of a hazard	Improve the town's existing Flood Warning System and incorporate Code Red warnings	Flooding	Emergency Management Director	<$10,000	FEMA Hazard Mitigation Assistance Grants, Town Budget	Short Term
High	31.5	Existing plans are old and out of date and need to be updated and improved	Update existing plans for dam breach and failures (such as Gregg Falls Dam) and incorporate into Town Plans, such as Master Plan and Emergency Operations Plan	Flooding	Emergency Management Director	<10,000	Dam Owner Responsibility No cost to Town	Short Term
High	31.5	There is no emergency backup power for the town's emergency shelters	Attain generators to establish emergency back-up power supply for town's emergency shelters	All Natural Hazards	Emergency Management Director	<$10,000	FEMA Hazard Mitigation Assistance Grants, Town Budget	Short Term
High	31	Based on the current size of the community, the town needs another emergency shelter	Develop another emergency shelter in addition to the Middle and High School	All Natural Hazards	Emergency Management Director	<$10,000	FEMA Hazard Mitigation Assistance Grants, FEMA EMPG, Town Budget	Short Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
High	31	Location of existing gauge does not provide adequate notice of rising flood waters	Work with U.S. Army Corp of Engineers to establish a new or relocated existing flood gauge at the Boston/Goffstown line.	Flooding	Emergency Management Director	<$10,000	No cost to Town to consult and seek help of U.S. Army Corp of Engineers	Short Term
High	34	Henry and Main Street Bridges have been scheduled by Town for upgrade prior to 2009 Plan	Upgrade/improve critical bridge crossing the Piscataquog River (Henry Bridge and Main Street)	Flooding	DPW	>$100,000	CIP; Town Budget; State Bridge and Highway Funds	Short Term
High	30	The Town has no comprehensive plan for addressing debris-impacted infrastructure	Write a Debris Management Plan for the Town	Flooding, Fluvial Erosion, Debris-Impacted Infrastructure	DPW	<$10,000	CIP; Town Budget	Short Term
High	30	Frequency issues and radio dead zones	Improve/upgrade town's existing Public Safety Radio on Mt. Uncanoonuc and for DPW	All Natural Hazards	Police, Fire, DPW, Emergency Management Director	<$10,000	Town Budget, CIP	Short Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
Medium	29.5	Many of the town's existing culverts and stream crossings fail to pass 25, 50 and 100-year storms and severe storm events	Improve storm water capacity and prioritize upgrades to town's culverts and stream crossings using new Culvert Vulnerability and Assessment data and findings	Flooding Fluvial Erosion, Hurricanes, Rapid Snow Pack Melt, Debris Impacted Infrastructure	DPW, Emergency Management Director, Planning, Police & Fire	<$10,000	Town Budget, CIP NH DES Aquatic Mitigation Funds	Medium Term
Medium	29.5	There are no procedures for how town staff should enforce this ordinance	Develop enforcement guidelines and provisions for town staff in Flood Hazard Overlay District	Floodplain Management, Flooding	Building Inspections and Planning Departments	<$10,000	Town Budget, Department Budgets	Medium Term
Medium	29.5	The effectiveness of town's existing 100-foot buffer requirement needs to be verified	Examine existing requirements for wetland buffers to determine effectiveness at protecting wetlands and water resources	Flooding, Erosion and Mudslides	Planning Board Conservation Commission, Building Inspection, Zoning Board of Adjustment	<$10,000	Town Budget, Conservation Commission or Planning Department Budget, Grants	Medium Term
Medium	29	There is limited to no public awareness or understanding of the impacts of debris impacted infrastructure	Improve public awareness and education on debris management after storm events around private property	Flooding, Erosion and Mudslides, Debris-Impacted Infrastructure	DPW Planning Board	<$10,000	Town budget, NH DES Grants	Medium Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
Medium	29	Improve public awareness and proximity of new development with respect to wildfire areas	Improve public awareness and education on wildfire hazards	Wildfires	Fire and Planning Departments	<$10,000	Town Budget/Grants	Medium Term
Medium	29	Town fuel station shuts down during power failures and emergencies	Obtain generators for backup power for fuel pumps and sanitation services	All Natural Hazards	Emergency Management Director, DPW	<$10,000	FEMA Hazard Mitigation Assistance Grants, Town Budget	Medium Term
Medium	28.5	Overhead wires and utilities are subject to storm damage and pose public safety issues	Encourage installation of utilities and wires underground for all new development and critical infrastructure	All Natural Hazards	Planning Department Planning Board DPW	>$100,000	Town Budget, Developer Cost with New Development	Medium Term
Medium	28.5	Town has never had a comprehensive floodplain management plan to guide and direct improvements to floodplain areas	Develop a Floodplain Management Plan for the Town	Flooding, Fluvial Erosion Hazards, Hurricanes, Rapid Snow Pack Melt, River Ice Jams, Dam Breach or Failure	Planning Board, Planning Department, DPW	<$10,000	Town Budget; CIP; Grants	Medium Term
Medium	28.5	Cost of salt is often difficult to budget for during severe winter months	Increase salt storage capacity	Severe Winter Hazards	DPW	<$10,000	CIP; Town Budget	Medium Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
Medium	28	A plan is needed to help town address EPA's MS 4 requirements for storm water	Develop a Storm Water Runoff Plan for the Town. Incorporate into relevant town plans, such as Master Plan and MS-4 plans for EPA	Flooding, Erosion and Mudslides Landslides Downbursts, Severe Winter Weather, Debris-Impacted Infrastructure	DPW Planning Board	<$10,000	Town Budget; CIP; EPA and NH DES Grants	Medium Term
Medium	28	There is very little information and data on areas in town prone to landslides and mudslides	Conduct a study and analysis of landslide hazards in the community. Incorporate into relevant town plans, such as Master Plan and Emergency Management Plan	Landslides Erosion and Mudslides Rapid Snow Pack Melt, Downbursts, Earthquakes	Planning Board, Emergency Management Director, DPW Building Inspections	<$10,000	Town Budget, NH DES Grants	Medium Term
Medium	28	Little preparation or public education has been implemented in the town to protect public health and safety during these hazards	Develop Extreme Heat outreach education, planning and protection measures for the public. Target vulnerable population	Extreme Heat, Drought Civil Disorder	Emergency Management Director; Health Director, Fire & Police	<$10,000	Town Budget; CIP; NH DES Grants	Medium Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
Medium	28	This large conservation area is vulnerable to wildfires and drought conditions	Update town's Timber Management Plan for Mt. Uncanoonuc	Wildfires Drought, Extreme Heat	Conservation Commission, Goffstown Village Precinct	<$10,000	Town Budget; CIP and Village Water Precinct Budget	Medium Term
Medium	28	Many rivers and streams are impacted by litter/trash and other various types of debris which block flow of water during storms	Work with PRLAC to develop a voluntary river stewardship program for river maintenance and to control debris and sediment	Debris-Impacted Infrastructure Flooding Hurricanes River Ice Jams Fluvial Erosion	DPW Piscataquog River Local Advisory Council (PRLAC) Emergency Management Director	<$10,000	Town Budget; Volunteers; Federal and NH DES Grants	Medium Term
Medium	27.5	The Town has very limited Low Impact Development (LID) BMPs to guide land development and minimize erosion risks and	Develop site and building standards to minimize erosion risks within the town	Debris-Impacted Infrastructure Flooding Hurricanes River Ice Jams Fluvial Erosion	Planning Board, Planning Department, DPW, Building Department	<$10,000	Town Budget; CIP; Federal and NH DES Grants	Medium Term
Medium	27.5	Purchasing flood prone land will help to reduce flood damage and repetitive insurance claims	Encourage Conservation Commission and Town to pursue purchase of flood prone properties	Flooding	Selectboard Town Administrator Conservation Commission DPW & EMD	>$100,000	FEMA Hazard Mitigation Assistance Grants; NH DES Grants	Medium Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
Medium	27	Goffstown has many areas with steep slopes and erodible soils	Develop strategies to stabilize slope failure at vulnerable locations around town	Debris-Impacted Infrastructure Flooding Fluvial Erosion Landslides Earthquakes	DPW, Planning Department Building Inspections	<$10,000	Town Budget; CIP	Medium Term
Medium	26.5	The DPW continually needs to repair and replace snow removal equipment	Acquire more snow and ice equipment to increase ability to clear snow	Severe Winter Weather	DPW	<$10,000	Town Budget; CIP	Medium Term
Medium	26	The DPW lacks planning and budgetary tools in prioritizing critical infrastructure needs	Acquire View Works Software program for cataloguing drainage infrastructure for planning purposes.	All Natural Hazards	DPW	<$10,000	Town Budget; CIP	Medium Term
Medium	26	The Manufactured Homes and Mobile Home Parks in Goffstown are vulnerable to natural hazards	Examine Manufactured Homes and Mobile Home Parks Zoning Ordinance to determine applicability for hazards and safety	All Natural Hazards	Planning Department, Building Department	<$10,000	Town Budget; CIP	Medium Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
Medium	25	The last CAV Report for Goffstown was prepared on May 14, 2009. Participation in this rating system is important to FEMA	Participate in Community Rating System through NFIP for reduced insurance rates to citizens.	Flooding	Planning and Building Inspections Department	<$10,000	Town Budget	Medium Term
Low	24	Federal EPA stormwater management requirements are increasing and passing costs for compliance to municipalities with limited funding	Establish a Storm Water Utility Fee	Flooding; Erosion and Mudslides Landslides Debris-Impacted Infrastructure	DPW Planning Board	<$10,000	Town Budget; Federal and State grants	Long Term
Low	24	Participation in NFIP and FEMA requires ongoing education and communication	Educate property owners within flood zones on participating in the National Flood Insurance Program.	Flooding	Planning Department, Building Department	<$10,000	Town Budget; FEMA Grants	Long Term

Rank/ID	STAPLEE Score	Problem Statement	Mitigation Action	Hazard Addressed	Responsible Party	Anticipated Cost	Potential Funding Source	Timeframe
Low	22	Local developers and property owners are often unaware of this interface and the need for wildfire buffers	Provide Urban Wildland Interface Education to the public and local developers	Wildfires Extreme Heat Drought Lighting	Conservation Commission	<$10,000	Town Budget	Long Term
Low	22	The Town of Goffstown does not have a town-wide public hazard warning system or siren	Create town-wide hazard Public Warning system	All Hazards	Emergency Management Director	<$10,000	Town Budget; CIP	Long Term

Cost of Implementation

The following table compares rough estimated costs of implementing each of the prioritized mitigation actions. The actual final project budgets may exceed or be lower than the estimated range. Nonetheless, these figures are assumed to represent a generic project of its type. These estimates are to serve as a comparative tool for project selection and planning purposes. Costs were derived from personal knowledge of the Goffstown Hazard Mitigation Committee, past project costs in the Town of Goffstown and within the Southern New Hampshire region, and Internet searches for project costs from either town requests for proposals or manufacturers' specifications.

		Cost Range			
		< $10,000	**$10,000-$50,000**	**$50,000-$100,000**	**>$100,000**
1	Improve the Flood Warning System and incorporate Code Red warnings	X			
2	Update existing plans for dam breaches and failures (such as Greggs Falls Dam)	X			
3	Attain generators to establish emergency back-up power at town's emergency shelters	X			
4	Develop another emergency shelter in addition to the Middle and High School	X			
5	Work with U.S. Army Corp of Engineers to establish a new or relocated existing flood gauge at the New Boston/Goffstown line	X			
6	Upgrade/improve critical bridge crossing the Piscataquog River (Henry Bridge and Main Street)				X

		Cost Range			
		< $10,000	**$10,000-$50,000**	**$50,000-$100,000**	**>$100,000**
7	Write a Debris Management Plan for the Town	X			
8	Improve/upgrade town's existing Public Safety Radio on Mt. Uncanoonuc and for DPW	X			
9	Improve storm water capacity and prioritize upgrades to town's culverts and stream crossings using new Culvert Vulnerability Assessment data and findings	X			
10	Develop enforcement guidelines and provisions for town staff in Flood Hazard Overlay District	X			
11	Examine existing requirements for wetland buffers to determine effectiveness at protecting wetlands and water resources	X			
12	Improve public awareness and education on debris management after storms around private property	X			
13	Improve public awareness and education on wildfire hazards	X			
14	Obtain generators for backup power for fuel pumps/sanitation	X			
15	Encourage installation of utilities and wires underground for all new development and critical infrastructure				X

		Cost Range			
		< $10,000	**$10,000-$50,000**	**$50,000-$100,000**	**>$100,000**
16	Develop a Floodplain Management Plan for the Town	X			
17	Increase salt storage capacity	X			
18	Develop a Storm Water Runoff Plan for the Town	X			
19	Conduct a study and analysis of landslide hazards in the community	X			
20	Develop Extreme Heat outreach education, planning and protection measures for the public. Target vulnerable population	X			
21	Update town's Timber Management Plan for Mt. Uncanoonuc	X			
22	Work with PRLAC to develop a voluntary river stewardship program for river maintenance and to control debris and sediment	X			
23	Develop site and building standards to minimize erosion risks within the town	X			
24	Encourage the Conservation Commission and Town to pursue purchase of flood prone properties in town				X

		Cost Range			
		< $10,000	**$10,000-$50,000**	**$50,000-$100,000**	**>$100,000**
25	Develop strategies to stabilize slope failure at vulnerable locations around town	X			
26	Acquire more snow and ice equipment to increase ability to clear snow	X			
27	Acquire View Works Software program for cataloguing drainage infrastructure for planning purposes	X			
28	Examine Manufactured Homes and Home Parks Zoning Ordinance to determine applicability for hazards and safety	X			
29	Participate in Community Rating System through NFIP for reduced insurance rates to citizens.	X			
30	Establish a Storm Water Utility Fee	X			
31	Educate property owners within flood zones on participation in the National Flood Insurance Program	X			
32	Provide Urban Wildland Interface Education to the public and local developers	X			
33	Create town-wide hazard Public Warning system	X			

SECTION VI

ADMINISTRATIVE PROCEDURES REGARDING ADOPTION AND MONITORING OF THE PLAN

Adoption

Upon notification that FEMA has granted "Approval Pending Adoption" of this Plan, the Goffstown Board of Selectmen will hold a public hearing to formally adopt the ***Goffstown Hazard Mitigation Plan Update 2015*** as an official statement of Town policy and as an Annex to the Goffstown Emergency Operations Plan. This public hearing shall be held two weeks before the plan is voted on by the Board of Selectmen and the public hearing shall be properly posted and advertised by the Town in accordance with New Hampshire state law. Documentation that the plan has been formally adopted by the Board of Selectmen is included in this *Plan* (see Appendix G).

Adoption of the ***Goffstown Hazard Mitigation Plan Update 2015*** demonstrates the Town's commitment to hazard mitigation. It also qualifies the community for federal, state and local funding and prepares the public for what the community can be expected to do both before and after a natural hazard disaster occurs.

Monitoring and Updates

The ***Goffstown Hazard Mitigation Plan Update 2015*** shall be reviewed and updated annually to track progress in implementing the mitigation strategies and actions as well as updating the goals and objectives of the *Plan*. The Goffstown Emergency Management Director shall be responsible for initiating this review every January of each year in coordination with the Board of Selectmen. Further, the Goffstown Emergency Management Director and the Board of Selectmen shall seek to incorporate the Priority Mitigation Actions identified in Section V of the *Plan* into other planning mechanisms, including the Town Master Plan and Capital Improvement Program (CIP).

The public will continue to be invited and encouraged to be involved during the monitoring and update process and to attend all review meetings. All meetings involving implementation or updates of the plan shall be open to the public as required by RSA 91-A and notice of the meeting will be posted at least 24 hours in advance in a minimum of two locations such as the Town Hall and Library. In addition, the all review meetings will be publicized by the Town on the local access television station or in the local newspaper. To gain additional public involvement, draft copies of the amended Hazard Mitigation Plan will be made available at two public locations for review and comment – the Town Hall and

Public Library. The document shall be left for a minimum of two weeks at each location and then all comments will be considered by the Goffstown Hazard Mitigation Committee in drafting final revisions.

Changes shall be made to the *Plan* to accommodate any actions that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, shall 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 ***Goffstown Hazard Mitigation Plan***, a public hearing to receive comment on the *Plan* maintenance and updating shall be held during the annual review period, and the final product will be adopted by the Board of Selectmen.

APPENDIX A

Active Dams in Goffstown

Hazardous Material Facilities in the Town of Goffstown

Commercial Economic Impact Areas in Goffstown

Active Dams in Goffstown[30]

Above Water Supply Reservoir
Class: NM "Non-menace"
Owner: Goffstown Village Water Precinct
Owner Address: 183 N. Mast St., PO Box 689, Goffstown, NH 03045
Dam Location/Parcel ID: Off Mountain Rd / 1-83

Black Brook Kordas Dam
Class: NM "Non-menace"
Owner: Mr. William Kordas
Owner Address: 275 Black Brook Road Goffstown, NH 03045
Dam Location/Parcel ID: Black Brook Rd / 9-62A

Bog Brook
Class: NM "Non-menace"
Owner: Mr. Robert Batdorp
Owner Address: 605 Back Mountain Road, Goffstown, NH 03045
Dam Location/Parcel ID: 11 Summit Rd. / 1-49

Fire Pond
Class: NM "Non-menace"
Owner: Healthsource New Hampshire
Owner Address: 211 Pattee Hill Road Goffstown, NH 03045
Dam Location/Parcel ID: Rt. 13 / 7-83

Friborg Dam
Class: NM "Non-menace"
Owner: Mr. Robert Friborg
Owner Address: 598 Back Mountain Road, Goffstown, NH 03045
Dam Location/Parcel ID: Roby Rd. / 1-16

Gregg Falls Dam
Class: H "High Hazard"
Owner: NH Water Resources Council
Owner Address: P.O. Box 95 29 Hazen Drive, Concord, NH 03302-0095
Dam Location/Parcel ID: Off Henry Bridge Rd / 5-15

Hadley Falls
Class: S "Significant Hazard"
Owner: NH Water Resources Council
Owner Address: P.O. Box 95 29 Hazen Drive, Concord, NH 03302-0095
Dam Location/Parcel ID: Rt. 13 / 34-171

Hyaire Dam
Class: NM "Non-menace"
Owner: Hyaire LLC, Mr. Gossett Mcrae
Owner Address: P.O. Box 182 Goffstown, NH 03045
Dam Location/Parcel ID: 558 Mast Rd / 3-37

Lower Goffstown Reservoir
Class: L "Low Hazard"
Owner: Goffstown Village Precinct/ Mr. Lee Minnich
Owner Address: 183 N. Mast St., PO Box 689, Goffstown, NH 03045
Dam Location/Parcel ID: Back Mountain Rd / 1-38

Paris Farm Pond
Class: NM "Non-menace"
Owner: Mr. Arthur Butt
Owner Address: 27 Tibbetts Hill Road Goffstown, NH 03045
Dam Location/Parcel ID: Off Tibbetts Hill Rd / 5-35-18

[30] See Appendix C for NH Dam Classification Schedule

Retention Pond
Class: NM "Non-menace"
Owner: Banyan Group
Owner Address: P.O. Box 173 Merrimack, NH 03054
Dam Location/Parcel ID: 46 Danis Park Rd / 23-17

Riley Detention Pond
Class: NM "Non-menace"
Owner: Evergreen Management/Timberwood Condominiums
Owner Address: 71 Market Street Manchester, NH 0313
Dam Location/Parcel ID: 484 Mast Rd / 21-26

Rodney Stark Dam
Class: NM "Non-menace"
Owner: Mr. Rodney L. Stark
Owner Address: 51 Elm Street Goffstown, NH 03045
Dam Location/Parcel ID: 34 Smith Rd / 7-111A-4-9

Uncanoonuc Lake Dam
Class: S "Significant Hazard"
Owner: Goffstown Conservation Commission
Owner Address: 16 Main Street Goffstown, NH 03045
Dam Location/Parcel ID: Railroad Ave / 42-2

Uncanoonuc Lake Dike
Class: L "Low Hazard"
Owner: Goffstown Village Precinct/Mr. Lee Minnich
Owner Address: 183 N. Mast St., PO Box 689, Goffstown, NH 03045
Dam Location/Parcel ID: 61 McFarland Rd / 42-70

Upper Goffstown Reservoir
Class: L "Low Hazard"
Owner: Goffstown Village Precinct/Mr. Lee Minnich
Owner Address: 183 N. Mast St., PO Box 689, Goffstown, NH 03045
Dam Location/Parcel ID: Back Mountain Rd / 1-38

Wallace Road Associates (Earthen Dam)
Class: NM "Non-menace"
Owner: Wallace Road Associates
Owner Address: 678 Mast Road Manchester, NH 03102
Dam Location/Parcel ID: 7A Apple Tree Dr / 5-83

Barnard Playground Dam
Class: NM "Non-menace"
Owner: Town of Goffstown
Owner Address: Town Offices Goffstown, NH 03045
Dam Location/Parcel ID: Barnard Ln / 30-81

Preston Ice Pond Dam
Class: L "Low Hazard"
Owner: PJN Labonte Enterprises, LLC, Nathan Labonte
Owner Address: 80 Colonel Drive Bedford, NH 03110
Dam Location/Parcel ID: Rt. 114 / 3-37

Recreation Pond
Class: NM "Non-menace"
Owner: Mr. Gerald Upton
Owner Address: Goffstown, NH 03045
Dam Location/Parcel ID: Back Mountain Rd / 4-16-1

Van Beuren Est. Detention Pond
Class: NM "Non-menace"
Owner: RBR Development, Mr. Robert Roy
Owner Address: Roosevelt Road
Weare, NH 03281
Dam Location/Parcel ID: Walnut Hill Rd / 3-59-2

StoneBridge Country Club
Class: NM "Non-menace"
Owner: Mr. Ronald Merino
Owner Address: 16 Warren Drive
New Boston, NH 03070
Dam Location/Parcel ID: Gorham Pond Rd / 7-45

Leach Hill Dam
Class: NM "Non-menace"
Owner: Darla Boehme
Owner Address: 151 Leach Hill Road
Goffstown, NH 03045
Dam Location/Parcel ID: Leach Hill Rd / 1-29

Hazardous Material Facilities in the Town of Goffstown

Active Facilities Generating Hazardous Waste – 40. Applicable hazard area for each location is keyed in parenthesis.

Key

(F) Located within the Special Flood Hazard Area and/or prone to flooding and damage due to 100-year floodplain events, ice jams, debris impacted infrastructure, hurricanes or rapid snow pack melt.

(S) Located on or adjacent to a Steep Slope and susceptible to damage in the event of erosion, mudslides or landslides.

(X) Located in or near a known past or potential wildfire location

(T) Susceptible to Town wide hazard risks such as wind damage from hurricanes, tornados, nor'easters, downbursts, lightning, heavy snow or ice storms or hailstorms.

• Accurate Brazing Co. (T)	**36 Cote Ave.**
• Active Contracting (T)	**242 Mast Rd.**
• Advance Auto Parts (T)	**553 Mast Rd.**
• Aubin Hardware (T)	**762 Mast Rd.**
• Associated Home Utilities (T)	**242 Mast Rd.**
• Twisted Fender Auto Body (T)	**22 Elm St** .
• Upreach Therapeutic Riding Center (S, T)	**153 Paige Hill Rd.**
• Condominium Landscape Maint. (T)	**4 Cote Ave. Unit 11**
• Cote LP Inc. (S, T)	**42 Cote Ave.**
• Cumberland Farms #2831 (T)	**Rt. 114 & Rockland Ave.**
• Daily Press Cleaners (T)	**571 Mast Rd.**
• Department of Public Works (T)	**404 Elm St.**
• Direct Gas (T)	**27 Main St.**
• Duval Towing Service (S, T)	**237 Mast Rd.**
• Gulf (T)	**2 S. Mast Rd.**
• Fleet Medic Ltd. (S, T)	**4 Cote Ave.**
• Goffstown Animal Hospital (T)	**3 Roosevelt St.**
• Goffstown Area High School (T)	**27 Wallace Rd.**
• Ace Hardware (T)	**5 Depot St.**
• Goffstown Mobil (T)	**81 N. Mast Rd.**
• Goffstown Truck Center Inc. (T)	**62 E. Union St.**
• Gregg Falls Hydroelectric Associates (T)	**55 Mast Rd.**
• Happy House Amusement Inc. (F, S, T)	**70 Depot St.**
• Hebert Towing Inc. (T)	**516 Shirley Hill Rd.**
• Hudson Automotive (T)	**54 Cote Ave.**
• KRG Motor Sport (S, T)	**239 Mast Rd.**
• Mikes Mast Rd. Auto Inc. (F, T)	**208 Mast Road**

- New Hampshire Stamping Co. Inc. (T) **9 Lance Lane (Also 30 Lamy Dr?)**
- NH State of DOT District 5 (S, T) **PTRL 507 93 Church St.**
- NH Steel Fabricators Inc. (T) **17 Lamy Dr.**
- Pinard Lube & Wash Inc. (T) **665 Mast Rd.**
- **Philip Mansour DMD PLLC** **17A Tatro Dr.**
- Pit Stop Towing & Auto Repair (T) **118 Daniel Plummer Rd.**
- Prest J. Transport (T) **3 Winding Brook Rd.**
- Samsco Division of Capital Controls Inc. (S, T) **18 Cote Ave.**
- Shell Station (S, T) **South Mast St.**
- Saint Anselm College (T) **100 Saint Anselm Dr.**
- Stanley Steamer Carpet Clean (T) **36 Cote Ave.**
- Village Animal Clinic (T) **15 Elm St.**
- Vittos Cleaners (T) **659 Mast Rd.**
- Welch Auto Body (T) **684 Mast Rd.**

Commercial Economic Impact Areas in Goffstown

Businesses employing over 25 employees on site. Applicable hazard area for each location is keyed in parenthesis. See key above.

• Accurate Brazing (T)	**36 Cote Avenue**
• Bartlett Elementary School (T)	**689 Mast Road**
• Bel-Air Nursing Home (T)	**29 Center Street**
• Bob Nadeau's House of Subs (T)	**776 Mast Road**
• Burger King (T)	**690 Mast Road**
• Dunkin Donuts (T)	**570 Mast Road**
• Educare Day Care Center (S,T)	**379 Goffstown Back Road**
• Goffstown Fire Department (T)	**18 Church Street**
• Goffstown High School (T)	**27 Wallace Road**
• Goffstown Plaza (S, T)	**533 Mast Road**
• Goffstown Police Department (S, T)	**326 Mast Road**
• Goffstown Public Works (T)	**404 Elm St.**
• Goffstown Superintendent (T)	**11 School Street**
• Goffstown Truck Center Inc. (T)	**62 East Union Street**
• Granite State Plumbing & Heating (T)	**546 Mast Road**
• Hannaford Supermarket (T)	**605 Mast Road**
• Hillsborough County Bouchard Building (T)	**329 Mast Road**
• Hillsborough County Nursing Home (T)	**400 Mast Road**
• Jutras Signs (T)	**711 Mast Road #11**
• Maple Avenue Elementary (T)	**16 Maple Avenue**
• McDonalds (F,T)	**569 Mast Road**
• Mountain View Middle School (S, T)	**41 Lauren Lane**
• NH Steel Fabricators Inc. (T)	**17 Lamy Drive**
• New England School of Dance (T)	**679 Mast Road**
• Northeastern Sheet Metal (F, T)	**31 Depot Street**
• R & W Cleaning Service Inc. (T)	**28 Daniel Plumber**
• Samsco Inc & HEA Associates	**18 Cote Avenue**
• Sanel's Auto Parts (T)	**679 Mast Road**
• Sully's Superette (F,T)	**10 N. Mast Road**
• St. Anselm College (T)	**100 St. Anselm Drive**
• US Post Office (T)	**13 Church Street**
• US Post Office (T)	**24 Lamy Drive**
• Villa Augustine School (T)	**208 South Mast Street**
• YMCA (T)	**116 Goffstown Back Road**

APPENDIX B
Resources, Bibliography, Websites

I. AGENCIES

New Hampshire Homeland Security and Emergency Management		271-2231
Federal Emergency Management Agency		617-956-7506
NH Regional Planning Commissions:		
	Central NH Regional Planning Commission	226-6020
	Lakes Region Planning Commission	279-8171
	Nashua Regional Planning Commission	424-2240
	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:		
	New Hampshire Office of State Planning	271-2155
NH Department of Cultural Affairs		271-2392
	Division of Historical Resources	271-3483
NH Department of Environmental Services		271-4974
	Air Resources	271-1370
	Waste Management	271-2900
	Water Resources	271-3434
	Bureau of Dams	271-3406
NH Fish and Game Department		271-3511
NH Department of Resources and Economic Development		271-3556
	Natural Heritage Inventory	271-2214
	Division of Forests and Lands	271-2214
	Division of Parks and Recreation	271-3556
NH Department of Transportation		271-3734
U.S. Department of Commerce		
	National Oceanic and Atmospheric Administration	301-713-4000
	National Weather Service; Gray, Maine	207-688-3216
U.S. Department of the Interior		
	U.S. Fish and Wildlife Service	223-2541
	U.S. Geological Survey	226-7800
U.S. Department of Agriculture		
	Natural Resource Conservation Service	223-6023

II. PUBLICATIONS

1. *Community-Based Hazard Mitigation Planning: Lowering the Risks and Costs of Disasters*; New England Training Workshop, 27 August 1998; sponsored by the Federal Emergency Management Agency/Region I, Massachusetts Department of Environmental Management, Massachusetts Emergency Management Agency, and the Massachusetts Chapter of the American Planning Association.

2. *Community Flood Mitigation Planning Guidebook*; Wisconsin Department of Natural Resources.

3. *Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives*; the Office of Management and Budget; June 1998

4. *Flood Hazard Mitigation Planning: A Community Guide*; The Commonwealth of Massachusetts, Department of Environmental Management, Flood Hazard Management Program; June 1997

5. *Flood Insurance Study (FIS): Hillsborough County, New Hampshire*; Federal Emergency Management Agency. FEMA, 1978

6. *Flood of April 2007 in New Hampshire;* R.H. Flynn 2008. U.S. Geological Survey Scientific Investigations Report 2008–5120, 53 p.

7. *Hazard Mitigation Plan*; Charlestown, Rhode Island; January 1997.

8. *Hazard Mitigation Planning for New Hampshire Communities*; Southwest Regional Planning Commission. July 1999.

9. *Local Multi-Hazard Mitigation Planning Guidance;* Federal Emergency Management Agency; 2008.

10. *Montpelier Flood Hazard Mitigation Plan*; City of Montpelier Department of Planning and Development; May 1998.

11. *National Mitigation Strategy: Partnerships for Building Safer Communities*; Federal Emergency Management Agency; December 6, 1995.

12. *Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments*; Federal Emergency Management Agency, September 1990.

13. *Protecting Business Operations: Second Report on Costs and Benefits of Natural Hazard Mitigation*; Federal Emergency Management Agency; August 1998.

14. *Real Estate Sales Tracking in the SNHPC Region*; Southern New Hampshire Planning Commission. Annual Report. 2004.

15. *Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials*; Federal Emergency Management Agency; February 1987.

16. *State of New Hampshire 2007 Natural Hazard Mitigation Plan*; New Hampshire Homeland Security and Emergency Management (NH HSEM). Concord, NH: NH Homeland Security and Emergency Management, October 2007.

17. *State of New Hampshire 2004 Natural Hazard Mitigation Plan*; New Hampshire Homeland Security and Emergency Management (NH HSEM). Concord, NH: NH Homeland Security and Emergency Management, October 2004.

18. *State of New Hampshire 1999 Natural Hazard Mitigation Plan*; New Hampshire Homeland Security and Emergency Management (NH HSEM). Concord, NH: NH Homeland Security and Emergency Management, October 1999.

19. *Texas Community Officials Primer on Floodplain Planning Strategies and Tools*; Texas Natural Resource Conservation Commission; June 1994.

20. *The Local Mitigation Strategy: A Guidebook for Florida Cities and Counties*; Florida Depart. of Community Affairs; April 1998.

21. *Town of Goffstown Master Plan 2006*; Goffstown, NH.

22. *Town of Goffstown Zoning Ordinance 2008*; Goffstown, NH.

23. *Piscataquog River Watershed Stream Crossing Vulnerability Assessment* Project; Trout Unlimited, Concord, NH & SNHPC; August 2014.

24. *Fluvial Erosion Hazard and River Geomorphic Assessment Program's Assessment of the Piscataquog River;* New Hampshire Geological Survey, DES, July 2014.

25. *State of New Hampshire Multi-Hazard Mitigation Plan;* New Hampshire Homeland Security and Emergency Management (NH HSEM), Update 2013.

26. *State of New Hampshire Multi-Hazard Mitigation Plan;* New Hampshire Homeland Security and Emergency Management (NH HSEM), Update 2015.

III. WEBSITES

Sponsor	*Internet Address*	*Summary of Contents*
Natural Hazards 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 – Earth Observing System Data and Information System	https://earthdata.nasa.gov/data/near-real-time-data/data/hazards-and-disasters	Searchable database of sites that encompass a wide range of natural disasters.
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
The Flood Observatory	http://floodobservatory.colorado.edu/	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	https://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	http://www.met.fsu.edu/explores/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/otd/	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	https://www.llnl.gov/	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.
USDA Forest Service	http://www.fs.fed.us/	Information on forest fires and land management.

APPENDIX C

NEW HAMPSHIRE DAM CLASSIFICATION SCHEDULE

Non Menace (NM) structure means a dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property, provided the dam is:

- Less than six feet in height if it has a storage capacity greater than 50 acre-feet; or
- Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.

Low Hazard (L) structure means a dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:

- No possible loss of life.
- Low economic loss to structures or property.
- Structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services.
- The release of liquid industrial, agricultural, or commercial wastes, septage, Or contaminated sediment if the storage capacity is less than two-acre-feet and is located more than 250 feet from a water body or water course.
- Reversible environmental losses to environmentally-sensitive sites.

Significant Hazard (S) structure means a dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:

- No probable loss of lives.
- Major economic loss to structures or property.
- Structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services.
- Major environmental or public health losses, including one or more of the following:
- Damage to a public water system, as defined by RSA 485:1-a, XV, which will take longer than 48 hours to repair.
- The release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is two acre-feet or more.
- Damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.

High Hazard (H) means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as a result of:

- Water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure, which is occupied under normal conditions.
- Water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to dam failure is greater than one foot.
- Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services.
- The release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 471-A:2 VI.
- Any other circumstance that would more likely than not cause one or more deaths.

APPENDIX D
Technical and Financial Assistance for Hazard Mitigation

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.

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
Programs to prepare the Nation to address the consequences of natural and man-made disasters and emergencies.				
Department of Homeland Security	*Border and Transportation Security Directorate*	State Homeland Security Grant Program www.ojp.usdoj.gov	This core assistance program provides funds to build capabilities at the state and local levels and to implement the goals and objectives included in state homeland security strategies and initiatives in the State Preparedness Report.	State governments
	Emergency Preparedness and Response Directorate	Emergency Management Performance Grants www.fema.gov http://www.fema.gov/government/grant/index.shtm	To assist State and local governments in enhancing and sustaining all-hazards emergency management capabilities.	States with pass through to local emergency management organizations
	Emergency Preparedness and Response Directorate	Assistance to Firefighters Grant Program https://www.fema.gov/fire-prevention-safety-grants	The primary goal of the Assistance to Firefighters Grants (AFG) is to meet the firefighting and emergency response needs of fire departments and nonaffiliated emergency medical services organizations.	Local, State, and Regional Fire Departments and agencies.

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
	Emergency Preparedness and Response Directorate	Citizen Corps http://www.ready.gov/citizen-corps	To bring community and government leaders together to coordinate community involvement in emergency preparedness, planning, mitigation, response and recovery.	States with a pass through to local governments
Department of Homeland Security	*Emergency Preparedness and Response Directorate*	Emergency Management Institute Training Assistance http://training.fema.gov/	To defray travel and per diem expenses of State, local and tribal emergency management personnel who attend training courses conducted by the Emergency Management Institute, at the Emmitsburg, Maryland facility; Bluemont, Virginia facility; and selected off-site locations. Its purpose is to improve emergency management practices among State, local and tribal government managers, in response to emergencies and disasters. Programs embody the Comprehensive Emergency Management System by unifying the elements of management common to all emergencies: planning, preparedness, mitigation, response, and recovery.	State, local, and tribal emergency managers

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
	Emergency Preparedness and Response Directorate	Interoperable Emergency Communications Grant Program http://www.dhs.gov/interoperable-emergency-communications-grant-program	To provide governance, planning, training and exercise, and equipment funding to States, Territories, and local and tribal governments to carry out initiatives to improve interoperable emergency communications, including communications in collective response to natural disasters, acts of terrorism, and other man-made disasters.	States and Territories
	Emergency Preparedness and Response Directorate	Chemical Stockpile Emergency Preparedness Program https://www.fema.gov/technological-hazards/chemical-stockpile-emergency-preparedness-program	A cooperative agreement to enhance emergency preparedness capabilities of the States and local communities at each of the eight chemical agent stockpile storage facilities. The purpose of the program is to assist States and local communities in efforts to improve their capacity to plan for and respond to accidents associated with the storage of chemical warfare materials.	State and local governments and the general public in the vicinity of the eight chemical agent stockpile storage facilities.
Department of Health and Human Services		Public Health and Social Services Emergency Fund www.hhs.gov	To continue to prepare our nation's public health system and hospitals for possible mass casualty events, and to accelerate research into new treatments and diagnostic tools to cope with possible bioterrorism incidents.	Individuals, families, Federal, State, and local government agencies and emergency health care providers
	Health Resources and Services Administration	Medicare Rural Hospital Flexibility Program http://www.hrsa.gov/ruralhealth/	To help States work with rural communities and hospitals to develop and implement a rural health plan, designate critical access hospitals (CAHs), develop integrated networks of care, improve emergency medical services and improve quality, service and organizational performance.	States with at least one hospital in a non-metropolitan region

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
	Health Resources and Services Administration	EMS for Children www.hrsa.gov	To support demonstration projects for the expansion and improvement of emergency medical services for children who need treatment for trauma or critical care. It is expected that maximum distribution of projects among the States will be made and that priority will be given to projects targeted toward populations with special needs, including Native Americans, minorities, and the disabled.	State governments and schools of medicine
Department of Health and Human Services	*National Institute of Health*	Superfund Hazardous Substance Research and Training Program http://www.niehs.nih.gov/	To establish and support an innovative program of basic research and training consisting of multi-project, interdisciplinary efforts that may include each of the following: (1) Methods and technologies to detect hazardous substances in the environment; (2) advance techniques for the detection, assessment, and evaluation of the effects of hazardous substances on humans; (3) methods to assess the risks to human health presented by hazardous substances; and (4) and basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances.	Any public or private entity involved in the detection, assessment, evaluation, and treatment of hazardous substances; and State and local governments
	Centers for Disease Control	Immunization Research, Demonstration, Public Information and Education www.cdc.gov	To assist States, political subdivisions of States, and other public and private nonprofit entities to conduct research, demonstrations, projects, and provide public information on vaccine-preventable diseases and conditions.	States and nonprofits organizations

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
	Centers for Disease Control	National Toxic Substance Incidence Program http://www.atsdr.cdc.gov/ntsip/	To assist State health departments in developing a State-based surveillance system for monitoring hazardous substance emergency events. This surveillance system will allow the State health department to better understand the public health impact of hazardous substance emergencies by developing, implementing, and evaluating a State-based surveillance system.	State, local, territorial, and tribal public health departments
Department of Education		Readiness and Emergency Management for Schools http://rems.ed.gov/	This grant program supports efforts by LEAs to improve and strengthen their school emergency management plans, including training school personnel and students in emergency management procedures; communicating with parents about emergency plans and procedures; and coordinating with local law enforcement, public safety, public health, and mental health agencies.	School Districts
Department of Transportation	*Pipeline and Hazardous Materials Safety Administration*	Hazardous Materials Emergency Preparedness Training and Planning Grants http://www.phmsa.dot.gov/	Increase state, local, territorial, and Native American tribal effectiveness to safely and efficiently handle HazMat accidents and incidents; enhance implementation of the Emergency Planning and Community Right-to-Know Act of 1986; and encourage a comprehensive approach to emergency planning and training by incorporating response to transportation standards.	States, local, territorial, tribal governments.
Programs to coordinate Federal response efforts and to assists states, localities, and tribes in responding to disasters and emergencies.				
Department of Homeland Security	*Emergency Preparedness and Response Directorate*	Urban Search and Rescue www.fema.gov	To expand the capabilities of existing Urban Search and Rescue Task Forces.	28 existing US&R Task Forces

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
Programs to provide assistance to States, localities, tribes, and the public to alleviate suffering and hardship resulting from Presidentially declared disasters and emergencies caused by all types of hazards.				
Department of Homeland Security	*Emergency Preparedness and Response Directorate*	Individual Assistance https://www.fema.gov/individual-assistance-program-tools	To provide assistance to individuals and families who have been affected by natural or man-made Presidentially declared disasters. Funding provided from the Disaster Relief Fund.	Individuals and Families
	Emergency Preparedness and Response Directorate	Public Assistance https://www.fema.gov/public-assistance-local-state-tribal-and-non-profit	To provide assistance to states, localities, tribes, and certain non-profit organizations affected by natural or man-made Presidentially declared disasters. Funding provided from the Disaster Relief Fund	State, local and tribal governments; private non-profit organizations
Department of Homeland Security	*Emergency Preparedness and Response Directorate*	Fire Management Assistance Grant Program https://www.fema.gov/fire-management-assistance-grant-program	Provide funds to States, local, and tribal governments for the mitigation, management, and control of wildland fires posing serious threats to improved property.	State, local and tribal governments
Small Business Administration	*Office of Disaster Assistance*	Disaster Loan Program https://www.sba.gov/content/disaster-loan-program	To offer financial assistance to those who are trying to rebuild their homes and businesses in the aftermath of a disaster.	Individuals, families, private sector
Department of Justice	*Office for Victims of Crime*	Antiterrorism and Emergency Assistance Program http://www.ovc.gov/AEAP/	To provide assistance programs for victims of mass violence and terrorism occurring within and outside the United States and a compensation program for victims of international terrorism.	Public and private nonprofit victim assistance agencies
Programs to reduce or eliminate future risk to lives and property from disasters.				
Department of Homeland Security	*Emergency Preparedness and Response Directorate*	Hazard Mitigation Grant Program https://www.fema.gov/hazard-mitigation-grant-program	To provide assistance to states, localities, and tribes to fund projects that will reduce the loss of lives and property in future disasters. Funding is provides from the Disaster Relief Fund and administered by the states according to their own priorities.	State, local, and tribal governments

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
	Emergency Preparedness and Response Directorate	Pre-Disaster Mitigation Program https://www.fema.gov/pre-disaster-mitigation-grant-program	This program provides funding for mitigation activities before disaster strikes. In recent years it has provided assistance for mitigation planning. In FY03, Congress passes a competitive pre-disaster mitigation grant program that will include project funding.	State, local, and tribal governments
	Emergency Preparedness and Response Directorate	Flood Mitigation Assistance Program (FMA) https://www.fema.gov/flood-mitigation-assistance-program	The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance program.	State, local and tribal governments
	Emergency Preparedness and Response Directorate	Map Modernization https://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/map-modernization	This funding provides assistance to develop digital flood maps, support flood-mapping activities and expand the Cooperating Technical Partners Program to communities and regional entities.	State, local and tribal governments
Programs to interdict potentially hazardous events from occurring				

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
Department of Health and Human Services	*Centers for Disease Control*	Immunization Grants www.cdc.gov	To assist States and communities in establishing and maintaining preventive health service programs to immunize individuals against vaccine-preventable diseases.	States
Other				
Department of Housing and Urban Development	*NH Office of Energy and Planning*	Community Development Block Grant (CDBG) Program http://www.hud.gov/offices/cpd/communitydevelopment/programs/	HUD provides flexible grants to help cities, counties, and States recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations.	State, local and tribal governments

Mitigation Programs of Other NH State Agencies

The following agencies of the state of New Hampshire are directly or indirectly involved in activities that include Hazard Mitigation Planning and/or program implementation:

- *NH Department of Transportation Bureau of Repair and Maintenance*
- *NH OSP/NFIP Program*
- *NH OSP Coastal Program*
- *NH DRED Division of Forests and Lands*
- *NH DES Water Resources Division – Dam Safety Program*
- *NH DES Wetlands Program*
- *NH DES Shoreline Protection*
- *NH Geologic Survey*

APPENDIX E

STAPLEE Criteria

STAPLEE is an acronym for a general set of criteria common to public administration officials and planners. It stands for the Social, Technical, Administrative, Political, Legal, Economic, and Environmental criteria for making planning decisions. Questions to ask about suggested actions include:

- ***Social*:** Is the proposed action 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 action work? Will it create more problems than it solves?

- ***Administrative:*** Can the community implement the action? Is there someone to coordinate and lead the effort?

- ***Political:*** Is the action politically acceptable? Is there public support both to implement and to maintain the project?

- ***Legal:*** Is the community authorized to implement the proposed action? Is there a clear legal basis of precedent for this study?

- ***Economic:*** What are the costs and benefits of this action? Does the cost seem reasonable for the size of the problem and the likely benefits?

- ***Environmental:*** How will the action impact the environment? Will the action need environmental regulatory approvals?

Hazard Mitigation Actions Evaluation - Actions Identified by the Hazard Mitigation Committee

SCORING:

1- Poor 2- Average 3- Good

NOTE scoring shown is from Respondent 1

	S		T		A		P		L		E		E				
	Social		Technical		Administrative		Political		Legal		Economic		Environmental				
Project	Socially Acceptable (by community)	Effect on segment of population	Technically Feasible/ Potentially Successful	Is it a long-term solution?	Administratively Feasible- Staffing and Maintenance	Is there funding allocated for this project?	Politically Acceptable- has support	Does it help achieve other community objectives?	Conforms to State & local law	Potential to be legally challenged	Economically Beneficial- Benefits outweigh Costs	Does the project reduce future disaster damages?	Environmental impacts on land, water, animal, plants	Conforms to State, Local, & Federal Regs.	**Total from Respondent 1**	**Total from Respondent 2**	**Priority Points Average**
1. Improve the Flood Warning System.	3	3	2	3	3	1	3	3	2	2	3	3	2	2	35	33	**34**
2. Update Flood Plan for Dam failure (such as Gregg Fall Dam).	3	3	3	3	2	1	2	3	2	2	3	3	2	2	34	29	**31.5**
3. Write an Emergency back-up plan for emergency shelters.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	35	**31.5**
4. Develop more emergency shelters in addition to the Middle and High Schools.	2	2	2	2	2	1	2	2	2	2	2	2	2	2	27	35	**31**
5. Work with Army Corp of Engeineers to get a flood guage at the New Boston/Goffstown line.	3	2	2	2	2	1	2	2	2	2	3	2	2	2	29	33	**31**
6. Upgrade critical crossing bridges (Henry Bridge and Main Street.)	2	3	2	2	2	1	1	2	2	2	3	3	2	2	29	33	**31**
7. Write Debris Management Plan	2	3	2	3	2	1	1	2	2	2	2	3	3	2	30	30	**30**
8. Improve Town Radio System so DPW and summit is included.	2	3	2	2	2	1	1	2	2	2	2	2	2	2	27	33	**30**
9. Perform Culvert Assessment to improve storm water capacity and prioritize upgrades using Culvert Assessment Program.	2	3	2	3	3	1	1	2	2	2	2	3	3	2	31	28	**29.5**
10. Develop a planning regulation for new developments in floodplain, to restrict such development.	2	2	2	3	2	2	2	2	2	2	2	3	3	2	31	28	**29.5**
11. Examine Wetland buffers to determine effectiveness.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	31	**29.5**
12. Public education on cleaning needed to mitigate large tree debris after ice and wind storms.	2	3	2	2	1	1	2	2	2	2	3	3	3	2	30	28	**29**
13. Improve public awareness and education on wildfires.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	30	**29**
14. Seek grant resources for automated backup power for Fuel Pumps/Sanitation.	2	1	2	2	2	1	1	2	2	2	2	2	2	2	25	33	**29**
15. Encourage putting wires underground for new develoment and critical infrastructure.	3	3	2	3	2	1	1	3	2	2	3	3	2	2	32	25	**28.5**
16. Develop a floodplain management plan.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	29	**28.5**
17. Increased salt storage needed.	1	3	2	2	2	1	1	2	2	2	2	2	2	2	26	31	**28.5**
18. Develop a Storm Water Runoff Plan	2	2	2	2	2	1	1	2	2	2	2	3	3	2	28	28	**28**
19. Determine where the landslide hazards are.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	28	**28**
20. Develop Extreme Heat measures.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	28	**28**
21. Timber Management Plan for Mt. Uncanoonuc.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	28	**28**
22. Develop a river stewardship program for river maintenance and to control debris and sediment.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	28	**28**
23. Develop site and building standards to minimize erosion risks.	2	2	2	2	2	1	2	2	2	2	2	2	2	2	27	28	**27.5**
24. Conservation Commission should pursue purchase of flood prone properties in town.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	27	**27.5**
25. Develop strategies to stablize slope failure.	2	1	2	2	1	1	2	2	2	2	2	2	3	2	26	28	**27**
26. Acquire more snow and ice equipment to increase ability to clear snow.	3	3	2	2	1	1	1	2	2	2	2	1	2	2	26	27	**26.5**
27. Develop View Works for drainage infrastructure.	2	2	2	2	1	1	1	2	2	2	2	2	2	2	25	27	**26**
28. Determine enforcement of Manufactured Homes and Home Parks Zoning Ordinance	1	1	1	2	1	1	1	2	2	2	2	2	2	2	22	30	**26**
29. Participate in Credit Rating System through NFIP for reduced insurance rates to citizens.	1	2	1	2	1	1	1	2	2	2	2	2	1	2	22	28	**25**
30. Establish a Storm Water Utility Fee	1	2	2	2	2	1	1	2	2	2	2	2	2	2	25	23	**24**
31. Educate homeowners on building structures such as elevating structures.	1	1	1	2	1	1	1	2	2	2	1	2	1	2	20	28	**24**
32. Urban Wildland Interface Education needed for town and increased development.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	28	16	**22**
33. Seek grant resources for creation of Town wide warning system.	3	3	3	3	3	1	1	3	3	2	3	3	2	2	35	9	**22**

APPENDIX F

GHMC Meeting Agendas, Minutes and Attendance Sheets

Goffstown Hazard Mitigation Committee Meeting

Meeting Number 1
January 14, 2014
3:00 pm

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

AGENDA

1. **Call to Order**

2. **Overview of the Hazard Mitigation Planning Process**
   a. Purpose and benefits of Hazard Mitigation Plans
   b. Scope of work to be completed

3. **Identify/Update Past and Potential Hazards**
   a. Identify past hazard events in Goffstown
   b. Map past hazard events and other areas of concern

4. **Identify/Update Critical Facilities**
   a. Definition of Critical Facilities, Areas at Risk, Commercial Economic Impact Areas and Hazardous Waste Sites
   b. Review Critical Facilities in current plan and identify those that are not listed or those that have changed

5. **Review Repetitive Loss Properties**
   a. Review Flood Hazard Areas for any change in the past 5 years
   b. Review Repetitive Loss Properties by type and estimate numbers located in identified flood hazard areas.

6. **Agree on Next Committee Meeting Date, Time, Location**

7. **Adjournment**

Town of Goffstown, New Hampshire

Hazard Mitigation Committee Meeting #1

January 14, 2014
3:00 PM

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
ARMANDO CATANIA	GOFFSTOWN CERT OPS. OFFICER	ACAT189@COMCAST.NET 603-222-9074
ROB BROWNE	GOFFSTOWN PD CAPTAIN	rbrowne@goffstownnh.gov
Daniel Snyder	SNHPC	intern1@snhpc.org
RICHARD O'BRIEN	GOFFSTOWN FD / DEP. EMD	robrien@goffstownnh.gov 603-497-3619
Jillian Harris	SNHPC	
Keith Chauvette	Goffstown P.D. Lieutenant	Kchauvette@goffstownnh.gov.
PIERRE POULIOT	GOFFSTOWN PD LT.	ppouliot@goffstownnh.gov
Danielle Morse	NH HSEM Field Rep	danielle.morse@dos.nh.gov 419-0214
Carl Quiram	DPW DIRECTOR	cquiram@goffstownnh.gov 396-8567

Minutes of the Goffstown Hazard Mitigation Committee Meeting held on
January 14, 2014 at the Goffstown Police Department,
326 Mast Road, Goffstown, New Hampshire

MEMBERS PRESENT

Robert Browne, Chair	-	Captain, Goffstown Police Department
Richard O'Brien	-	Chief, Goffstown Fire Department
Keith Chauvette	-	Lieutenant, Goffstown Police Department
Pierre Pouliot	-	Lieutenant, Goffstown Police Department
Brian Rose	-	Planning & Zoning Administrator, Goffstown Planning Department
Armando Catano	-	Operations Officer, Goffstown CERT
Carl Quiram	-	Director, Goffstown Department of Public Works
Danielle Morse	-	Field Representative, NH Homeland Security & Emergency Management
Jillian Harris	-	Senior Planner, Southern New Hampshire Planning Commission
Daniel Snyder	-	Planning Intern, Southern New Hampshire Planning Commission

1. Call to Order
The meeting commenced at 3:03 PM.

Ms. Jillian Harris, Senior Planner with the Southern New Hampshire Planning Commission introduced herself and welcomed everyone to the first meeting of the 2014 Goffstown Hazard Mitigation Committee. Members were given handouts on definitions of critical facilities and areas of risk, as well as an overview on the process of updating the town hazard mitigation plan and tentative schedule for steps to accomplish at each meeting.

Mr. Richard O'Brien motioned to nominate Mr. Robert Browne as Chair of the Hazard Mitigation Committee. Mr. Carl Quiram seconded, with no objections made by other members.

2. Overview of the Hazard Mitigation Planning Process

a. Purpose and benefits of Hazard Mitigation Plans

Ms. Harris explained that the purpose of the committee is to review and update the 2009 Goffstown Hazard Mitigation Plan in order to take steps to mitigate hazards and reduce vulnerabilities in the community. To be approved for FEMA and Homeland Security funding, a municipal Hazard Mitigation Plan must be updated every 5 years. The Plan is scheduled to be completed by April or May 2014 and will take approximately 6 additional months to go through the review process with the FEMA.

b. Scope of work to be completed

To comply with the grant's required 25% in-kind match, each participant is asked to maintain a log sheet detailing the amount of time they spend attending meetings and working outside of meetings on updating the Goffstown Hazard Mitigation Plan. All time logs will be submitted to Ms. Harris upon the completion of the plan.

3. Identify/Update Past and Potential Hazards

a. Identify past hazard events in Goffstown

GHMC members reviewed and discussed Section II: Past and Potential Hazards from the 2009 Goffstown Hazard Mitigation Plan. Updates were noted and include the following 2014 updates for past flooding events:

Area	Type of Damage and Description	Severity	2014 Update
1. Harry Brook at Henry Bridge Road			Bridge replaced after 2006 flood
2. Pollard Road (Black Brook)			Bridge replaced after 2006 flood
3. Addison Road at Winding Brook Road			Reinforced road with cap and installed bypass pipe in 2006/2007
4. Shirley Hill Road (Mystic Brook)	Prone to flooding in large events (Same brook as Addison)		Culverts replaced
5. 114 by Villa Augustina	2006/2007 flooding and recent ponding. Beaver dam let go behind Villa Augustina.		Replaced culverts
6. 114 from Park Lane to Barnard Lane	Same area as Villa Augustina, prone to flooding		Improvements made to rail trail, culverts cleaned out
7. Mt. Base - close to Wallace Brook	2006/2007 washouts		Culverts replaced
8. Mt. Base by McFarland Road	Prone to flooding/washouts		Remains prone to flooding currently
9. Mt. Road from Merrill Road to KnollCrest Road	Dam breach in 2009 caused flooding	Severe	Dam has been removed and hazard is no longer a threat
10. Bog Road between Lesnyk Lane and Pleasant Street	Prone to flooding		Repaired damaged bridge. This hazard area is part of a proposed study for the Uncanoonuc Lake Dam
11. Stinson Road near Paige Hill Road	Prone to flooding		Repaired shoulder, still needs ditching and beaver dam mitigation
12. Gorham Pond Road by Stone Bridge Country Club	Undersized pipe	Severe	Upsized pipe

Area	Type of Damage and Description	Severity	2014 Update
13. New Boston Road/Route 13 at Town Line	Flat, wet area, no drainage		Will improve ditch lines in 2014/2015
14. Montelona Road by Mercier Court	Undersized culvert		Upsized culvert/upgraded to box culvert
15. East Dunbarton Road near Jenny Lane (Brook crossing)	Floods in large events		Reconstruction project planned for Summer 2014
16. Tirrell Hill Road between Black Brook Road and Sunbeam	Wetland area, prone to flooding		Bridgework planned for 2014/2015
17. Main Street	Undersized culvert, water runs under buildings and businesses, buildings prone to damage. Town Hall affected from debris.	Severe	Still needs mitigation. Private property affected and mitigation will require public/private cooperation.
18. Mast Road and Roy Street	Jacque's Flowers property parking lot floods		Mitigation will require pipe upgrades and connection work
19. Mast Road at College Road	Intersection prone to flooding		Mitigation will require pipe upgrades and connection work. High priority mitigation project.
20. Center Street at Juniper Driver	Downstream abutter infilled outflow pipes, private property floods		Easement proposed for mitigation, coordination in progress currently
21. Worthley Hill Road from Tyler Drive to Wallace Road	Undersized pipe		Needs funding
22. Police Station (Mast Road)	Low-lying area prone to flooding, DOT culvert issue from 2007		Need to upgrade culvert (DOT responsibility)
23. High School (Wallace Road)	Prone to flooding from undersized culverts/pipes and impermeable surfaces. Water has nowhere to go.		Engineer hired, project currently being scoped
24. Addison Road by Tanager Road	Narrow valley, may be prone to flooding again		Upgraded pipe

Area	Type of Damage and Description	Severity	2014 Update
25. Danis Park Road	Neighborhood lies within a flood zone and major flooding is continuously an issue in large events. Evacuation has been necessary in the past and will continue to be a necessary response to flooding in this area.	Severe	Although no new development is allowed in this area per floodplain management regulations for the Town, this will continue to remain an issue as long as there is development here. Mitigation would require acquiring property from private property owners and placing the land into conservation.
26. Goffstown back road at Manchester TL	Flooding an issue due to new subdivision and runoff impacting roads		Drainage extension needed to channel water
27. St. Anselm's on Manchester Town Line	Problem area originates in Manchester and floods into Goffstown		
28. County Farm/Behind Piggery	Culvert collapsed on rail trail		Stabilized culvert
29. Maple Avenue by Elm	Undersized pipe, prone to flooding		Re-occurring flooding, pipe needs to be upsized
30. Mt. Road near Hampton Court	prone to flooding		Flood conditions still occur. Connected to Mt. Road from Merrill Road to KnollCrest Road issue

GHMC members also noted updates to the rest of the Past and Potential Hazard Section. SNHPC staff will make updates to the plan and send it to GHMC members via email for review in between meetings.

b. Map past hazard events and other areas of concern

GHMC members reviewed maps of past hazard events during the discussion and Ms. Harris will make updates to the maps based on updates cited within the text of the plan.

4. Identify/Update Critical Facilities

a. Definition of Critical Facilities, Areas at Risk, Commercial Economic Impact Areas and Hazardous Waste Sites

The Hazard Mitigation Committee tabled this item for the next meeting, due to time constraints.

b. Review Critical Facilities in current plan and identify those that are not listed or those that have changed

The Hazard Mitigation Committee tabled this item for the next meeting, due to time constraints.

5. Review Repetitive Loss Properties

a. Review Flood Hazard Areas for any change in the past 5 years

The Hazard Mitigation Committee tabled this item for the next meeting, due to time constraints.

b. Review Repetitive Loss Properties by type and estimate numbers located in identified flood hazard areas.

The Hazard Mitigation Committee tabled this item for the next meeting, due to time constraints.

6. Agree on Next Committee Meeting Date, Time, Location

The Hazard Mitigation Committee agreed upon Tuesday, February 11, 2014 at 2PM in the Goffstown Police Department.

Before the next meeting, Ms. Harris requested that all members review Section 3 on Critical Facilities and bring a list of updates to discuss. New hazards will be identified and added on maps.

7. Adjournment

The meeting adjourned at 4:32 PM.

Goffstown Hazard Mitigation Committee Meeting

Meeting Number 2
February 11, 2014
2:00 pm

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

AGENDA

1. **Call to Order**

2. **Review Past and Potential Hazards Section**

3. **Identify/Update Critical Facilities**
   a. Definition of Critical Facilities, Areas at Risk, Commercial Economic Impact Areas and Hazardous Waste Sites
   b. Review Critical Facilities in current plan and identify those that are not listed or those that have changed

4. **Review Repetitive Loss Properties**
   a. Review Flood Hazard Areas for any change in the past 5 years
   b. Review Repetitive Loss Properties by type and estimate numbers located in identified flood hazard areas.

5. **Review Goals and Objectives**
   a. Revise Goals and Objectives as needed for plan update

6. **Mitigation Strategy**
   a. Review Existing Mitigation Strategies, Matrix and summary
   b. Review and update Newly Identified Mitigation Strategies

7. **Agree on Next Committee Meeting Date, Time, Location**

8. **Adjournment**

Town of Goffstown, New Hampshire

Hazard Mitigation Committee Meeting #2

February 11, 2014
2:00 PM

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
Jillian Harris	SNHPC	
Richard O'Brien	Goffstown FD	
Armando Catano	Goffstown CERT	
Daniel Snyder	SNHPC	
Steve Pollard	GPD	
Rob Browne	GPD	

Minutes of the Goffstown Hazard Mitigation Committee Meeting held on
February 11, 2014 at the Goffstown Police Department,
326 Mast Road, Goffstown, New Hampshire

MEMBERS PRESENT

Robert Browne, Chair	-	Captain, Goffstown Police Department
Richard O'Brien	-	Chief, Goffstown Fire Department
Pierre Pouliot	-	Lieutenant, Goffstown Police Department
Armando Catano	-	Operations Officer, Goffstown CERT
Carl Quiram	-	Director, Goffstown Department of Public Works
Jillian Harris	-	Senior Planner, Southern New Hampshire Planning Commission
Daniel Snyder	-	Planning Intern, Southern New Hampshire Planning Commission

1. Call to Order
The meeting commenced at 2:03 PM.

Ms. Jillian Harris welcomed everyone to the second meeting of the 2014 Goffstown Hazard Mitigation Committee (GHMC). Mr. Carl Quiram motioned to adopt the January 14, 2014 minutes. Mr. Rob Browne seconded, with the minutes unanimously approved by the Committee.

2. Review Past and Potential Hazards Section
Members of the Committee reviewed the Past and Potential Hazards table from the first GHMC meeting. SNHPC staff has added a "Severity" column to classify the damage of the past hazard or how severe it could become in the future if left untreated. Severity is classified according to low, moderate, high and severe. This data has been integrated into the table for the 2014 Plan.

3. Identify/Update Critical Facilities

a. Definition of Critical Facilities, Areas at Risk, Commercial Economic Impact Areas and Hazardous Waste Sites

Committee members reviewed the definitions for these terms and their importance in mitigating hazards within the Town of Goffstown.

b. Review Critical Facilities in current plan and identify those that are not listed or those that have changed

Several new items were added to the list of Critical Facilities, including shelters and wireless towers.

4. Review Repetitive Loss Properties

a. Review Flood Hazard Areas for any change in the past 5 years

b. Review Repetitive Loss Properties by type and estimate numbers located in identified flood hazard areas

A list of repetitive loss properties was passed around for committee members to review. It was noted that there are 32 repetitive loss properties in Goffstown, most of which are single-family residential dwellings. Eight of these properties are considered "mitigated" by NFIP.

5. Review Goals and Objectives

a. Revise Goals and Objectives as needed for plan update

Committee members reviewed the State Hazard Mitigation Goals and agreed that all goals are relevant to the Town of Goffstown. Mr. Quiram discussed the importance of evolving engineering design standards for public infrastructure in order to accommodate climate change and increase community resiliency. The Committee agreed to include a recommendation, in addition to the goals, that will be worded as follows:

"To address the challenges posed by climate change, the Town of Goffstown will recognize and implement updated engineering designs and standards that adequately prepare public infrastructure for increasing stormwater runoff. With this goal, the town seeks to adapt to events featuring heavy precipitation causing severe flood damage to public and private property. The Department of Public Works will seek to adopt guidelines that are properly vetted and endorsed by national or state standards."

6. Mitigation Strategy

a. Review Existing Mitigation Strategies, Matrix and summary

Ms. Jillian Harris will contact Brian Rose and inquire about the status of the Flood Development Ordinance. In addition, Ms. Harris will also ask Brian Rose about existing ordinances regulating mobile homes and trailers.

Upon reviewing the existing mitigation strategies, the committee noted that the Town Radio System content will need to be updated to reflect changes since 2009, such as the Police and Fire Departments moving to a digital narrow-banded radio system.

In the "Existing Protection Matrix and Proposed Improvements for the Town of Goffstown," the Steep Slopes & Class VI Roads protection item had been completed and can be removed from the matrix. Fire Chief O'Brien explained that the town was using more current International Building Codes (IBC), but the version would need to be confirmed with the Building Department. Groups associated with protecting Glen Lake and Namesake Lake were identified as potential allies in establishing a River Stewardship program. Mr. Quiram expressed the importance for the flood gauge to be more precise, along with a need for an additional gauge to be positioned at the Goffstown/New Boston town line. The Flood Warning System item will be clarified to be a town-wide system, not just for residents within close proximity of the Piscataquog River.

b. Review and update Newly Identified Mitigation Strategies

This item was deferred to the next meeting due to time constraints.

7. Agree on Next Committee Meeting Date, Time, Location

The Goffstown Hazard Mitigation Committee agreed upon Tuesday, March 25, 2014 at 2PM in the Goffstown Police Department.

8. Adjournment

The meeting adjourned at 3:51 PM.

Goffstown Hazard Mitigation Committee Meeting

Meeting Number 3
March 25, 2014
2:00 pm

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

AGENDA

1. **Call to Order**

2. **Approve the Minutes of the February 11, 2014 meeting**

3. **Fluvial Erosion Hazard Data - Status and Incorporation**

4. **Updates to:**
    a. **Section IV: Newly Identified Mitigation Strategies and Critical Evaluation**
    b. **Section V: Prioritized Implementation Schedule and Funding Sources**

5. **Discuss New Mitigation Strategies and Set Objectives for Future Mitigation Efforts**

6. **NFIP**
    a. **Identify, analyze and prioritize actions related to continued compliance with NFIP**

7. **Questions?**

8. **Schedule meeting #4**

9. **Adjournment**

Minutes of the Goffstown Hazard Mitigation Committee Meeting held on
March 25, 2014 at the Goffstown Police Department,
326 Mast Road, Goffstown, New Hampshire

MEMBERS PRESENT

Robert Browne, Chair	-	Captain, Goffstown Police Department
Richard O'Brien	-	Chief, Goffstown Fire Department
Pierre Pouliot	-	Lieutenant, Goffstown Police Department
Keith Chauvette	-	Lieutenant, Goffstown Police Department
Brian Rose	-	Planning & Zoning Administrator, Goffstown Planning Department
Carl Quiram	-	Director, Goffstown Department of Public Works
Jillian Harris	-	Senior Planner, Southern New Hampshire Planning Commission
Daniel Snyder	-	Planning Intern, Southern New Hampshire Planning Commission

1. Call to Order
The meeting commenced at 2:11 PM.

2. Approve the Minutes of the February 11, 2014 meeting
Mr. Richard O'Brien motioned to adopt the February 11, 2014 minutes. Mr. Pierre Pouliot seconded. The minutes were approved by the Committee.

3. Fluvial Erosion Hazard Data – Status and Incorporation
Ms. Jillian Harris reported that the Department of Environmental Services' Fluvial Erosion Hazard study findings have been delayed. Data was expected in the fall, but is now slated to be submitted in May. Without the data, the Goffstown Hazard Mitigation Committee cannot conclude on appropriate mitigation strategies. Mr. Robert Browne mentioned that Eagle Creek, the dam operators along the Piscataquog River are interested in this data. Melissa, the local Eagle Creek contact, will be notified of the next meeting in June.

4. Updates to:

a. Section IV: Newly Identified Mitigation Strategies and Critical Evaluation

b. Section V: Prioritized Implementation Schedule and Funding Sources

Committee members reviewed Section V from the 2009 plan, making alterations and consolidating similar strategies.

After analyzing the FEH data and developing new mitigation strategies at the next meeting, members will be invited to rank strategies according to STAPLEE criteria.

5. Discuss New Mitigation Strategies and Set Objectives for Future Mitigation Efforts
The committee tabled this item until after FEH data is submitted.

6. NFIP

a. Identify, analyze and prioritize actions related to continued compliance with NFIP

The Town of Goffstown has implemented the following actions related to continued compliance with the National Flood Insurance Program (NFIP):

- Participate in NFIP training offered by the State and/or FEMA (or in other training) that addresses flood hazard planning and management
- Establish mutual aid agreements with neighboring communities to share a building inspector to address administering the NFIP following a major storm event.
- Revise/adopt floodplain ordinance regulations to improve floodplain management in the community
- Pursue applying and joining NFIP's Community Rating System (CRS)
- Prepare, distribute or make available NFIP, insurance and building codes explanatory pamphlets as well as maps
- Identify and become knowledgeable of non-compliant structures in the community
- Identify cause of submit-to-rate structures and analyze how to prevent non-compliant structures in the future
- Inspect foundations at time of completion before framing to determine if lowest floor is at or above Base Flood Elevation (BFE), if they are in the floodplain
- Require the use of elevation certificates
- Enhance local officials, builders, developers, local citizens and other stakeholders' knowledge of how to read and interpret the FIRM
- Work with elected officials, the state and FEMA to correct existing compliance issues and prevent any future NFIP compliance issues through continuous communications, training and education

7. Questions?

No questions were posed by committee members at this time.

8. Schedule meeting #4

Due to the delay in acquiring the fluvial erosion hazard data from the NH Department of Environmental Services, the next Goffstown Hazard Mitigation Committee Meeting is scheduled for June 24, 2014 at the Goffstown Police Station from 2-4PM.

In the meantime, committee members are encouraged to review the packet of FEMA Hazard Mitigation Strategies and identify those they feel are worth incorporating.

9. Adjournment

The meeting adjourned at 3:41 PM.

Goffstown Hazard Mitigation Committee Meeting

Meeting Number 4
June 24, 2014
2:00 pm

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

AGENDA

1. **Call to Order**
2. **Approve the Minutes of the March 25, 2014 meeting**
3. **Fluvial Erosion Hazard Data - Status**
4. **Assess programs on Existing Protection Proposed Improvements Matrix**
5. **Discuss New Mitigation Strategies**
6. **Introduce SPAPLEE exercise.**
7. **Questions?**
8. **Schedule meeting #5**
9. **Adjournment**

Town of Goffstown, New Hampshire

Hazard Mitigation Committee Meeting #4

June 24, 2014
2:00 PM

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
Karen Mattor	Senior Planner, SNHPC	
Jack Munn	Chief " "	
Keith Chauvette	Lt. Goffstown P.D.	Kchauvette@goffstownnh.gov
Richard O'Brien	Fire Chief / EMD	robrien@goffstownnh.gov
ROBERT BROWNE	CHIEF OF POLICE	rbrowne@goffstownnh.gov
Danielle Morse	Field Rep / NH HSEM	419-0214 danielle.morse@dos.nh.gov
Parker Moore	Hazmit Planner HSEM	parker.moore@dos.nh.gov

Minutes of the Goffstown Hazard Mitigation Committee Meeting held on
June 24, 2014 at the Goffstown Police Department,
326 Mast Road, Goffstown, New Hampshire

MEMBERS PRESENT

Robert Browne, Chair	-	Chief, Goffstown Police Department
Richard O'Brien	-	Chief, Goffstown Fire Department
Keith Chauvette	-	Lieutenant, Goffstown Police Department
Brian Rose	-	Planning & Zoning Administrator, Goffstown Planning Department
Carl Quiram	-	Director, Goffstown Department of Public Works
Karen Mattor	-	Senior Planner, Southern New Hampshire Planning Commission
Jack Munn	-	Chief Planner, Southern New Hampshire Planning Commission
Danielle Morse	-	Field Representative, NH HSEM
Parker Moore	-	Hazard Mitigation Planner, NH HSEM

1. Call to Order
The meeting commenced at 2:00 PM.

2. Approve the Minutes of the March 25, 2014 meeting
The minutes were approved by the Committee.

3. Section III. Existing Protection Matrix and Proposed Improvements:

The Committee went over the "Existing Protection Matrix and Proposed Improvements for the Town of Goffstown" Chart on page 80-85 and assessed whether or not the programs were working. They added an "Effectiveness Rating" with three possible ratings: poor-needs improvement or does not meet goals; satisfactory – meets goals; and excellent – exceeds goals.

1. Best Management Practices – Poor; Needs improvement and funding; Doing job but needs more funding resources.
2. Life Safety Codes/State Adopted Fire Standards – Satisfactory; Needs more staff for 100% enforcement.
3. Town-Adopted Building Codes – Satisfactory: Building Code needs MS4
4. Flood Hazard District – Satisfactory; To better identify enforcement and powers; Flood maps in feet.
5. River Stewardship – Satisfactory; Fluvial Plan;
6. Steep Slopes & Class VI Roads – This was taken out.
7. Road Design Standards – Satisfactory; Need to update and consider NFPA Fire Standards and Private versus Public. Drainage design comes from Cornell. There has been a change in the way rainfall is evaluated and there is an increased cost. Update with a block grant..
8. Wetland and Surface Water Conservation District - Ask Town Planner. Re-evaluated 100 Foot buffers. Need to determine if it's doing the job and how state is doing it.

9. Manufactured Homes and Manufactured Home Parks (Zoning Ordinance) – Satisfactory; Updated 1-2 years ago, after 2006 Mother's Day Flood. State updated the code. Enforcement Fire Department. Call State Assessment since can't enforce?
10. Open Space Development Ordinances – Satisfactory
11. Public Education – Satisfactory; Upgrading emergency notification system and website. Nexhil has voluntary enrollment and want non-voluntary like Code Red.
12. Elevation Certificates – Satisfactory; Matter of enforcement. Brian Roto.
13. Conservation and Open Space District – Excellent; Village Water Precipt for Water Supply.
14. Town Radio System – Conventional VHF Radio – Satisfactory; Functional but frequency a problem. Voter Receiver Repeater System. First Net?
15. Town Radio System – Conventional VHF Radio – Poor; Needs improvement. Requires system upgrade to DPW and to summit. Needs a couple more spots like schools. NPG Grant (Police and Fire) but DPW not on Voter System and that's a big need. Maybe need a conventional system like Cable Comcast?
16. Flood Gauge – Poor; Needs improvement. There needs to be a gauge maintained before the town at the New Boston/Goffstown Line. The gauge is between the dam and Henry Bridge. There is an Early Warning and Advance Notice system for a list of who is downstream from the dams. It is an old radio system for notification. Check with the Dam Bureau.
17. Flood Warning System – Poor; Needs improvement. Help is required when it is at its crest.

4. Section IV: Newly Identified Mitigation Strategies and Critical Evaluation

The Committee went over the Summary of New Strategies in the 2009 Hazard Mitigation Plan to determine which ones are completed, which ones will be deleted and which ones will be used in the updated plan.

- Consider implementing a Wireless mesh network in town for increased communication and response in emergency situations. Now have a Voter Repeater System which was completed in 2013.
- Coordination and communication needed between the town and PSNH/Utilities during hazard situations. There is a local liaison, a PSNH local representative.
- Additional Carbon Monoxide monitoring equipment needed. Fire Department purchased so it's satisfactory.
- Seek Grant Resources for improvement of BMPs. Created stormwater MSP's according to SF4.
- Seek Grant Resources for Signal Coverage upgrades to Town Radio System. Completed in 2010-2011.
- Seek Grant resources for Town Radio Purchases. Same as above.
- Prioritize and upgrade critical crossings. Two bridges including Henry Bridge and Main Street need to be done.
- Upgrade the Goffstown Emergency Management Response Unit with additional safety and traffic control equipment. Purchased Gemru so this one can be taken off.
- Consider adopting the IBC National Maintenance Code for Manufactured Homes. State Building Code is changing.
- Seek Grant resources for Automated backup power for Fuel Pumps/Sanitation. Keep.

- Consider applying to the CRS program through NFIP for reduced insurance rates to citizens. Keep.
- Purchase a proximity meter for DPW/Safety personnel to determine live and dead power lines for the clearing of downed trees/limbs after ice and wind storms. Not best practice.
- Conservation Commission should have a Timber Management Plan for land owned on Mt. Uncanoonuc. Ask Planners.
- Additional training needed for DPW and safety personnel in relation to mitigation of downed trees, limbs and power lines after ice and wind storms.
- Consider regulating the distance of trees to power lines to decrease downed limbs/trees during ice and wind storms. Take out since PSNH takes care of this. Have a Tree Management Program.
- Continue to pursue a river stewardship program for river maintenance and to control debris and sediment and develop a floodplain management plan. Not yet; Pistacaquog River.
- Seek approval from Army Corp of Engineers and funding for a Flood warning system. River Gauge.
- Conservation Commission should pursue the purchase of flood prone properties in town.
- Sewer/water infrastructure needed in Danis Park and Lynchville Park.
- Flood mitigation inspection program needed for enforcement of floodplain management zoning ordinances. Take out.
- Increased salt storage capacity is needed.
- Purchase remote camera system for safety personnel in the event of building collapse. Have Mutual Aid.
- Public education on cleaning needed to mitigate large amounts of tree, limb, brush debris after ice and wind storms.
- Urban Wildland Interface Education needed for town and increased development.
- Seek Grant resources for the creation of a Town wide warning system.
- Purchase portable traffic lights for power outages.
- Additional snow removal equipment for DPW needed.

5. Fluvial Data – Jack Munn told the Committee that Shane Cisky from the NH DES will be meeting with him on July 7th to go over the data compiled to assess the stream flow and how it affects the bank of the river, particularly where the banks change and the ones with flooding potential. In the 1980s there was dam failure and this data will correlate to past events. Trouts Unlimited also did a study on culvert assessment.

6. Discuss New Mitigation Strategies and Set Objectives for Future Mitigation Efforts
The committee tabled this item until after FEH data is submitted.

7. Schedule meeting #6

8. Adjournment
The meeting adjourned at 3:40 PM.

Goffstown Hazard Mitigation Committee Meeting

Meeting Number 5
July 15, 2014
2:00 pm

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

AGENDA

1. **Call to Order**

2. **Review and Approve the Minutes of the June 24, 2014 meeting**

3. **Review list of Mitigation Measures and consider source of funding, agency responsible and time-frame**

4. **Discuss New Mitigation Strategies (see attachment of hazards)**

5. **Introduce STAPLEE exercise**

6. **Questions?**

7. **Schedule meeting #6…**Fluvial Erosion Hazard Data is available and Amy at SNHPC is working on the map which will be done the first week of August so next meeting should be the third week of August.

8. **Adjournment**

Town of Goffstown, New Hampshire

Hazard Mitigation Committee Meeting #5

July 15, 2014
2:00 PM

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
Karen Mattor	Senior Planner, SNHPC	kmattor@snhpc.org
Chris Quinn	[illegible]	cquinn@goffstownnh.gov
Danielle Morse	Field Rep NH HSEM	417-0214 danielle.morse@dos.nh.gov
Keith Chauvette	GPD, Lieutenant	kchauvette@goffstownnh.gov.
ROB BROWNE	GPD - CHIEF	rbrowne@goffstownnh.gov
BRIAN ROSE	GOFFSTOWN PLANNING	brose@goffstownnh.gov
RICHARD O'BRIEN	FIRE CHIEF / EMD	robrien@goffstownnh.gov

Minutes of the Goffstown Hazard Mitigation Committee Meeting held on
July 15, 2014 at the Goffstown Police Department,
326 Mast Road, Goffstown, New Hampshire

MEMBERS PRESENT

Robert Browne, Chair	-	Chief, Goffstown Police Department
Richard O'Brien	-	Chief, Goffstown Fire Department
Keith Chauvette	-	Lieutenant, Goffstown Police Department
Brian Rose	-	Planning & Zoning Administrator, Goffstown Planning Department
Carl Quiram	-	Director, Goffstown Department of Public Works
Karen Mattor	-	Senior Planner, Southern New Hampshire Planning Commission
Danielle Morse	-	Field Representative, NH HSEM

1. Call to Order
The meeting commenced at 2:00 PM.

2. Approve the Minutes of the June 24, 2014 meeting
The minutes from the last meeting will be reviewed by the Committee members at home and will be approved at the next meeting.

4. Section IV: Newly Identified Mitigation Strategies and Critical Evaluation

The Committee went over the Summary of New Strategies from the 2009 Hazard Mitigation Plan to confirm which ones will be changed for the 2014 Update, such as which ones will be deleted. The also discussed what town agency has responsibility for getting it done, what the time-frame is and what the funding sources are.

- Consider implementing a Wireless mesh network in town for increased communication and response in emergency situations. Now have a Voter Repeater System which was completed in 2013. To be deleted because it is complete.
- Coordination and communication needed between the town and PSNH/Utilities during hazard situations. There is a local liaison, a PSNH local representative. Resolved since there is a new process with a new liaison.
- Additional Carbon Monoxide monitoring equipment needed. Fire Department purchased so it's satisfactory. To be deleted because it is complete.
- Seek Grant Resources for improvement of BMPs. Created stormwater BMP's according to MS4. Town of Goffstown various agencies. Board of Selectmen. Years 0-5
- Seek Grant Resources for Signal Coverage upgrades to Town Radio System. Completed in 2010-2011. Fire/Police Departments within 5 years. Weaknesses.
- Seek Grant resources for Town Radio Purchases. Same as above. Fire/Police Departments within 5 years.
- Prioritize and upgrade critical crossings. Two bridges including Henry Bridge and Main Street need to be done. Department of Public Works, State level, CIP for Henry Bridge in 2019.

- Upgrade the Goffstown Emergency Management Response Unit with additional safety and traffic control equipment. Purchased Gemru so this one can be taken off. To be deleted since it is complete.
- Consider adopting the IBC National Maintenance Code for Manufactured Homes. State Building Code is changing. Delete since modifying Town Building Code.
- Seek Grant resources for Automated backup power for Fuel Pumps/Sanitation. Keep. Emergency Management, Fire Department, Within 1 year. Grants.
- Consider applying to the CRS program through NFIP for reduced insurance rates to citizens. Keep. Planning Department, Within 5 Years.
- Purchase a proximity meter for DPW/Safety personnel to determine live and dead power lines for the clearing of downed trees/limbs after ice and wind storms. Not best practice. Delete because no longer do since PSNH does it.
- Conservation Commission should have a Timber Management Plan for land owned on Mt. Uncanoonuc. Ask Planners. Conservation Commission (ask Patty)
- Additional training needed for DPW and safety personnel in relation to mitigation of downed trees, limbs and power lines after ice and wind storms. Fire Department.
- Consider regulating the distance of trees to power lines to decrease downed limbs/trees during ice and wind storms. Take out since PSNH takes care of this. Have a Tree Management Program. Delete.
- Continue to pursue a river stewardship program for river maintenance and to control debris and sediment and develop a floodplain management plan. Not yet; Pistacaquog River. See if SNHPC has a Watershed Plan by the Pistacaquog Watershed Association.
- Seek approval from Army Corp of Engineers and funding for a Flood warning system. River Gauge at New Boston/Goffstown line. Emergency Management Department, 1-3 Years, Grant. Goffstown Village Water precept.
- Conservation Commission should pursue the purchase of flood prone properties in town. Conservation Commission, 2-5 Years
- Sewer infrastructure needed in Danis Park and Lynchville Park. Deleted water. Sewer Commission. Residents pay for it.
- Flood mitigation inspection program needed for enforcement of floodplain management zoning ordinances. Take out.
- Increased salt storage is needed. DPW, Budget, Grant
- Purchase remote camera system for safety personnel in the event of building collapse. Have Mutual Aid. Keep in.
- Public education on cleaning needed to mitigate large amounts of tree, limb, brush debris after ice and wind storms. 1-3 Years, Website. DOT Forms on website.
- Urban Wildland Interface Education needed for town and increased development. Ways homeowners can protect property such as tree clearing; NFPA?
- Seek Grant resources for the creation of a Town wide warning system. Emergency Management Department and Fire Department. Possible grant, between 1-3 years; Code Red-public/private.
- Purchase portable traffic lights for power outages.
- Additional snow removal equipment for DPW needed.

5. Hazards Category Update

Before developing new mitigation measures the list of hazards and whether or not they were low, medium or high probability in the 2009 Plan was reviewed and the following changes were made.

A. Flooding
   a. 100 Year Floodplain – High Probability
   b. Hurricanes – High Probability
   c. Debris-Impacted Infrastructure – Moderate Probability
   d. Erosion/Mudslides – High Probability
   e. Rapid Snow Melt – Moderate Probability
   f. River Ice Jams – Moderate-High Probability Decided there was nothing to do for Ice James. There is a trestle at New Boston line which takes out gazebo and runs off at Route 113.
   g. Dam Breach or Failure – all areas below dam
      Gregg Falls Dam, hydroelectric dam, owned by Eagle Creek is a High Hazard. Measures include Community Notification and Inundating mapping will be helpful to prepare for failure.

B. Wind
   a. Hurricanes – High Probability
   b. Tornadoes – Low Probability Frequent nationally. Have tornado warnings.
   c. Nor'easters – Moderate to High Probability Changed to High
   d. Downbursts – Low to Moderate Probability
   e. Lightning – Low to Moderate Probability

C. Wildfires –
   a. Wildfires – Moderate Probability
   b. Isolated Homes – Low Probability

D. Ice and Snow Events
   a. Heavy Snow Storms – Moderate Probability Changed to High
   b. Ice Storms – Moderate Probability
   c. Hail Storms – Low Probability Changed to Moderate

E. Earthquakes – Moderate Probability

F. Landslides – Low Probability Extend the landslide area on the rail bed/pine? To Henry Bridge Road?

G. Other
   a. Geomagnetism – Low Probability
   b. Radon – High Probability
   c. Drought – Moderate Probability Tap into tank on High Street. There are three water precincts. Have water restriction program.
   d. Extreme Heat – Low Probability Changed to Moderate.

H. Man-Made
   a. Civil Disorder – Low Probability
   b. Prison Breaks/Disturbance – Low Probability
   c. Terrorism – Moderate to High Probability When there is a diverse crowd and the Police Department is trained for this.
   d. Critical Infrastructure – Moderate to High Probability
   e. Sink Holes – Low Probability. Add since there have been a few in the middle of the road because of aging pipes, such as Mast Road. Need to fund upgrade of drainage pipe and prioritize drainage infrastructure (3-5 years.)

6. New Mitigation Strategies and Set Objectives for Future Mitigation Efforts

The Committee went through the FEMA Mitigation Ideas (January 2013) Handbook and made the following list including responsible agency in town, funding sources and time-line.

1. Write a Debris Management Plan
    - DPW
2. Perform Culvert Assessment to improve storm water capacity, prioritize upgrades and create budget utilizing the Culvert Assessment Program developed by Trouts Unlimited.
    - Department of Public Works
    - Grant money, NH DES
3. Develop a Storm water Runoff Plan
    - DPW
    - Budget
    - Immediately and they are finalizing now.
4. Update Flood Plan for Dam failure (such as Eagle Creek, owners of Gregg Fall Dam)
    - Fire Chief
    - Budget
    - Within 1 Year
5. Participate in Credit Rating System
6. Establish local funding mechanisms
    - DPW and Emergency Management Department
7. Establish a Storm water Utility Fee
    - DPW
8. Educate Homeowners on building structures such as elevating structures
    - Planning Board
9. Develop a planning regulation for new developments in floodplain, to restrict development in floodplains.
10. Increase severe wind awareness.
11. Develop an emergency fund for severe wind.
12. Encourage putting wires underground for new development and critical infrastructure.
13. Develop View Works for drainage infrastructure.
    - DPW
14. Develop site and building standards to minimize erosion risks.
15. Stabilizing slope failure
    - DPW
    - Budget
16. Develop more emergency shelters in addition to the Middle and High Schools.
17. Write an emergency back-up plan for emergency shelters.
18. Have portable measures available for emergency shelters.
19. Get more snow and ice equipment.
20. Improve public awareness on wildfires.
21. Determine where the landslide hazards are.
22. Develop Extreme Heat measures
    - Emergency Management

7. Schedule meeting #6- Next meeting August 19, 2014 at 2:00 p.m.

8. Adjournment

The meeting adjourned at 3:40 PM.

Goffstown Hazard Mitigation Committee Meeting

Meeting Number6
August 19, 2014
2:00 pm

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

AGENDA

1. **Call to Order**
2. **Review and Approve the Minutes of the July 15, 2014 meeting**
3. **Update of Fluvial Erosion Hazard Maps**
4. **Review STAPLEE Exercise.**
5. **Draft of Plan Review**
6. **Schedule final meeting #7 for September**
7. **Adjournment**

Hazard Mitigation Plan Committee Meeting
August 19

Name	Organization
Karen Matter	SNHPC
RICHARD O'BRIEN	GOFFSTOWN PD / EMD
BRIAN ROSE	~~[illegible]~~ Planning / Goffstown
Keith Chauvette	Goffstown P.D.

Minutes of the Goffstown Hazard Mitigation Committee Meeting held on
August 19, 2014 at the Goffstown Police Department,
326 Mast Road, Goffstown, New Hampshire

MEMBERS PRESENT

Richard O'Brien	-	Chief, Goffstown Fire Department
Keith Chauvette	-	Lieutenant, Goffstown Police Department
Brian Rose	-	Planning & Zoning Administrator, Goffstown Planning Department
Karen Mattor	-	Senior Planner, Southern New Hampshire Planning Commission

1. **Call to Order**
The meeting commenced at 2:00 PM.

2. Approve the Minutes of the July 15, 2014 meeting
The minutes from this meeting were approved..

3. Update of the Fluvial Erosion Maps
Review of the maps was tabled again until the next meeting on Tuesday, August 23 since Amy is still working on the maps. But, a draft outline for an amendment to the plan adding in the information from the NH DES Fluvial Erosion study and assessment of fluvial erosion hazards along the Piscataquog River in the Town of Goffstown was handed out and discussed.

Examples of Fluvial Erosion additions to the plan include adding it as a natural hazard. Under the Scope of the Plan it will be added, "Fluvial Hazards (associated with flood events and the potential for significant erosion and catastrophic bank failures)". The State of New Hampshire has adopted legislation related to fluvial erosion hazard ordinances. RSA 674:56.II. (a) and (b) authorizes municipalities to adopt fluvial erosion hazard ordinances either as an amendment to an existing ordinance or as a separate ordinance. The State of New Hampshire Natural Hazards Mitigation Plan added another hazard mitigation goal/objective: Protecting mapped river and stream reaches that are highly subject to erosion due to naturally occurring stream channel migration and adjustment. Estimated potential property damage will be added for fluvial erosion hazards. Fluvial erosion hazards will fall under flooding. Two appendices will be added to the plan. Appendix I will be the Fluvial Erosion Hazard Assessment of the Piscataquog River – Executive Summary and FEH Maps. Appendix J will be the NH DES Environmental Fact Sheet: Fluvial Erosion Hazards and River Geomorphic Assessment Program

4. STAPLEE Exercise
The STAPLEE Exercise with all the mitigation measures on it listed below was reviewed in detail by the group. The Committee was told to do it on the computer and then return it by the following week to Ms. Mattor so she can consolidate the results and prioritize the mitigation measures. They mitigation measures to be prioritized are as followed:

1. Write Debris Management Plan.
2. Perform Culvert Assessment to improve storm water capacity and prioritize upgrades utilizing Culvert Assessment Program.
3. Develop a Storm Water Runoff Plan.
4. Update Flood Plan for Dam failure (such as Gregg Fall Dam)

5. Participate in Credit Rating System through NFIP for reduced insurance rates to citizens.
6. Establish local funding mechanisms.
7. Establish a Storm Water Utility Fee.
8. Educate homeowners on building structures such as elevating structures.
9. Develop a planning regulation for new developments in floodplain, to restrict such development.
10. Public education on cleaning needed to mitigate large tree debris after ice and wind storms.
11. Develop an emergency fund for severe wind.
12. Encourage putting wires underground for new development and critical infrastructure.
13. Develop View Works for drainage infrastructure.
14. Develop site and building standards to minimize erosion risks.
15. Develop strategies to stabilize slope failure.
16. Develop more emergency shelters in addition to the Middle and High Schools.
17. Write an Emergency back-up plan for emergency shelters.
18. Have portable measures available for emergency shelters.
19. Acquire more snow and ice equipment to increase ability to clear snow.
20. Improve public awareness and education on wildfires.
21. Determine where the landslide hazards are.
22. Develop Extreme Heat measures.
23. Need to update Road Design Standards and consider NFPA Fire Standards and private versus public.
24. Examine Wetland buffers to determine effectiveness.
25. Determine enforcement of Manufactured Homes and Home Parks Zoning Ordinance
26. Improve Town Radio System so DPW and summit is included.
27. Work with Army Corp of Engineers to get a flood gauge at the new Boston/Goffstown line.
28. Improve the Flood Warning System.
29. Upgrade critical crossing bridges (Henry Bridge and Main Street)
30. Seek grant resources for automated backup power for Fuel Pumps/Sanitation.
31. Timber Management Plan for Mt. Uncanoonuc.
32. Develop a new river stewardship program for river maintenance and to control debris and sediment.
33. Develop a floodplain management plan.
34. Conservation Commission should pursue purchase of flood prone properties in town.
35. Increased salt storage needed.
36. Purchase remote camera system for safety personnel in event of building collapse.
37. Urban Wildland Interface Education needed for town and increased development.
38. Seek grant resources for creation of Town wide warning system.

.**4. Schedule meeting #6-** Next meeting September 23, 2014 at 2:00 p.m. This should be the final meeting.

8. Adjournment

The meeting adjourned at 3:00 PM.

Goffstown Hazard Mitigation Committee Meeting

Meeting Number 7
September 23, 2014
2:00 pm

Goffstown Police Department
326 Mast Rd
Goffstown, NH 03045

AGENDA

1. **Call to Order**
2. **Review and Approve the Minutes of the August 19 meeting**
3. **Review of Map Locations**
4. **Review STAPLEE Exercise results**
5. **Draft Final Plan Discussion**
6. **Fluvial Erosion Amendment**
7. **Adjournment**

Meeting Attendance
September 23, 2014

	Name	Organization / Position
1	Karen Mattar	SNHPC, Senior Planner
2	Brian Rose	Town of Goffstown
3	Parker Moore	NH HSEM
4	ROB BROWNE	GOFFSTOWN POLICE
5	Keith Chauvette	Goffstown P.D.
6	RICHARD O'BRIEN	FIRE CHIEF / EMD

Minutes of the Goffstown Hazard Mitigation Committee Meeting held on
September 23, 2014 at the Goffstown Police Department,
326 Mast Road, Goffstown, New Hampshire

MEMBERS PRESENT

Richard O'Brien	-	Chief, Goffstown Fire Department
Rob Browne	-	Chief, Goffstown Police
Keith Chauvette	-	Lieutenant, Goffstown Police Department
Brian Rose	-	Planning & Zoning Administrator, Goffstown Planning Department
Karen Mattor	-	Senior Planner, Southern New Hampshire Planning Commission
Parker Moore	-	State Hazard Mitigation Planner
Amy Kizak	-	SNHPC

1. **Call to Order**
The meeting commenced at 2:00 PM.

2. Approve the Minutes of the August 19, 2014 meeting
The minutes from the prior August 19, 2014 meeting were approved..

3. Map Review
Amy Kizak from SNHPC reviewed the maps with the Committee and made some changes in locations.

4. Review of STAPLEE Exercise
The prioritized mitigation measures were reviewed by the committee and reworded as necessary. The timelines were more specified based on the State and FEMA requirements wanting both month season and year for the deadline.

.4. Final Draft Schedule was discussed
Ms. Mattor said a draft will be sent out in a week for the Committee's chance to provide feedback and then the Final Draft a week later after the fluvial data and maps are provided.

5. Adjournment
The meeting adjourned at 3:20 PM.

APPENDIX G

Documentation of Public Hearings and Plan Adoption

Town of Goffstown, New Hampshire
Goffstown Board of Selectmen

A Resolution Adopting the Town of Goffstown, New Hampshire Hazard Mitigation Plan Update 2015

Town of Goffstown, New Hampshire
Office of Goffstown (address)
Certificate of Adoption
Board of Selectmen

WHEREAS, the Town of Goffstown has historically experienced severe damage from natural hazards and continues to be vulnerable to the effects of the natural hazards profiled in the plan resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Goffstown has developed and received "Approval Pending Adoption" from the Federal Emergency Management Agency (FEMA) for its hazard Mitigation Plan under the requirements of 44 CFR 201.6; and

WHEREAS, the Southern New Hampshire Planning Commission received funding from the New Hampshire Department Homeland Security and Emergency Management under a Pre-Disaster Mitigation Grant to assist the Town of Goffstown in the preparation of the Goffstown Hazard Mitigation Plan Update 2015; and

WHEREAS, several public planning meetings/hearings were held between January 2014 and September 2014 regarding the development and review of the Goffstown Hazard Mitigation Plan Update 2015; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Goffstown; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Goffstown, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Goffstown eligible for funding to alleviate the impacts of future hazards; now therefore be it

WHEREAS, a public hearing was held by the Goffstown Board of Selectmen on_____ , 2015 to formally adopt the Goffstown Hazard Mitigation Plan Update 2015.

NOW, THEREFORE BE IT RESOLVED that the Goffstown Board of Selectmen adopt the Goffstown Hazard Mitigation Plan Update 2015.

- The Plan is hereby adopted as an official plan of the Town of Goffstown.
- The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
- Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
- An annual report on the progress of the implementation elements shall be presented to the Board of Selectmen by _____.

APPROVED and SIGNED this _____ day of _____, 2015.

Board of Selectmen

_____
Collis Adams

_____
Mark Lemay

_____
John "Allen" Brown

_____
Nicholas Campasano

_____
Peter Georgantas

ATTEST_____

APPENDIX H

2004 Prioritized Implementation Schedule with 2009 Update and Funding Sources

ACTION #	MITIGATION ACTION	PRIORITY POINTS	WHO (LEADERSHIP)	WHEN (DEADLINE)	HOW (FUNDING)	2009 UPDATE
1	Update Flood Maps (FIRMS)	38	Planning	2003	Town Budget / FEMA NFIP, MM	FEMA is still in the process of digitizing, anticipated in 2009. Engineering will still need updating
2	Disease Prevention Control	36	Town Administrator / Health Officer	As Needed	Town Budget / Grant(s)	Ongoing through Manchester Health Dept.
3	Erosion Control for New Housing Development	36	Planning / DPW	Ongoing	Update as needed	Ongoing
4	Mobility for Emergency Personnel	36	Fire / Police	2004	Grant(s)	Ongoing
5	Town Radio Purchases	36	Fire / Police / DPW	2004	Town Budget / Grants	Completed and Ongoing, grant sources still needed
6	Education for Hazard Mitigation	34	Emergency Management (Fire / Police)	2004	Algonquin Power Co.	Completed and Ongoing
7	Dam Failure Warning System	33	Emergency Management (Fire / Police)	2004	Algonquin Power Co.	Completed and Ongoing
8	Flood Gauge Maintenance	33	Emergency Management (Fire / Police)	2003	NOAA	Completed and Ongoing
9	Signal Coverage Upgrades	27	Fire / Police / DPW	2007	Town Budget / Grants	Ongoing, grant Sources still needed
10	Backup Power for Fuel Pumps / Sanitation	-	DPW	2004	Town Budget	Ongoing, grant Sources still needed

ACTION #	MITIGATION ACTION	PRIORITY POINTS	WHO (LEADERSHIP)	WHEN (DEADLINE)	HOW (FUNDING)	2009 UPDATE
11	Town Wide Warning System	-	Fire / Police / DPW	2004	Town Budget	Ongoing, grant Sources still needed

ADDITIONAL INFORMATION

The following represents clarification of the Implementation Strategy for Priority Mitigation Actions on the preceding page. Statements below provide more detail regarding the adopted action items.

Action Number **Additional Information**

1 Most current Flood Insurance Rate Maps are dated June 1979. The town feels that with the maps nearly 25 years old, the floodplain should be reexamined for changes and remapped if necessary.

2 Disease prevention generally related to flooding but may involve other hazards such as earthquakes. Potential risks to residents should be noted and strategies formulated for mitigating disease proliferation.

3 Erosion caused by construction of new housing units. Additionally, on site erosion problems should be addressed during the project review phase and if it is viewed to be a problem the developer should be requested to remedy the situation.

4 4 and/or 6-wheeled vehicles (ATVs) needed by Police and Fire for flooding events and other rescue.

5 The Police and Fire Departments are working with 2 different radio systems and neither system is 100 percent effective. The systems should be upgraded so that the 2 departments are compatible and communications between the 2 are facilitated.

6 Basic Education campaign to distribute information on Hazard Mitigation to Goffstown Residents. To be focused for downstream residents.

7 Expand existing dam failure warning systems where possible and most needed.

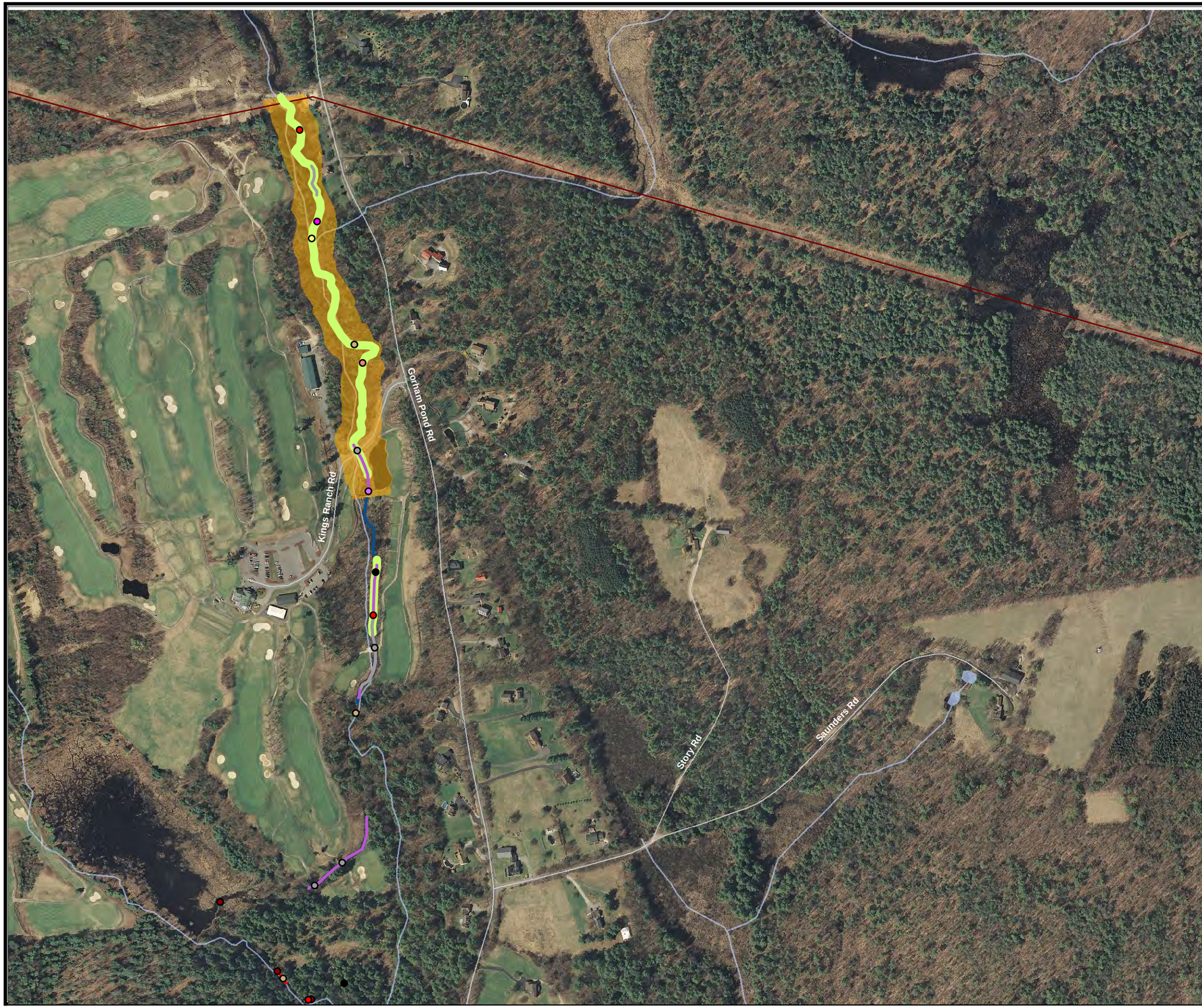
8 Flood gauge, in the Piscataquog River at the Henry Bridge, owned by NOAA which may be the appropriate agency for maintenance funding.

9 The existing system is a trunked system using five frequencies dependent on phone lines between the Police Department and the mountain top. As with any system, areas exist where communication is not ideal. Issues related to topography, limitations of phone lines, and intermodulation can interfere with communications. As new technology becomes available, enhancements to the overall communication should be explored.

Summary of Grant Source Acronyms in the Prioritized Implementation Schedule:
MM= Map Modernization program
ICEG= Interoperable Communications Equipment Grant

APPENDIX I

Fluvial Erosion Hazard Assessment of the Piscataquog River – FEH Maps 1-12



Map 1 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

- Erosion
- Mass Failure
- Bank Armoring or Revetment
- Buffers Less than 25 feet
- Straightening
- Development
- Encroachment

Fluvial Erosion Hazard Zones *

Zones

- Extreme
- Very High
- High

* A full descrition of FEH zones can be found in the Goffstown Hazard Mitigation Plan.

- Political Boundary
- Parcels
- Streams
- Lakes
- Utility Lines
- Interstate
- US and State Routes
- Local Roads

0 0.05 0.1 0.2 Miles

N W E S

SNHPC

Data Sources:
Granit Digital Data (1:24,000)
NH Department of Transportation
Individual Community Parcel Data

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Map produced by SNHPC September 2014.

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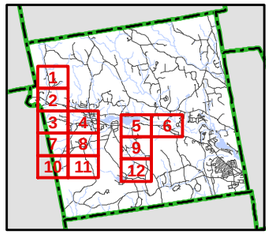

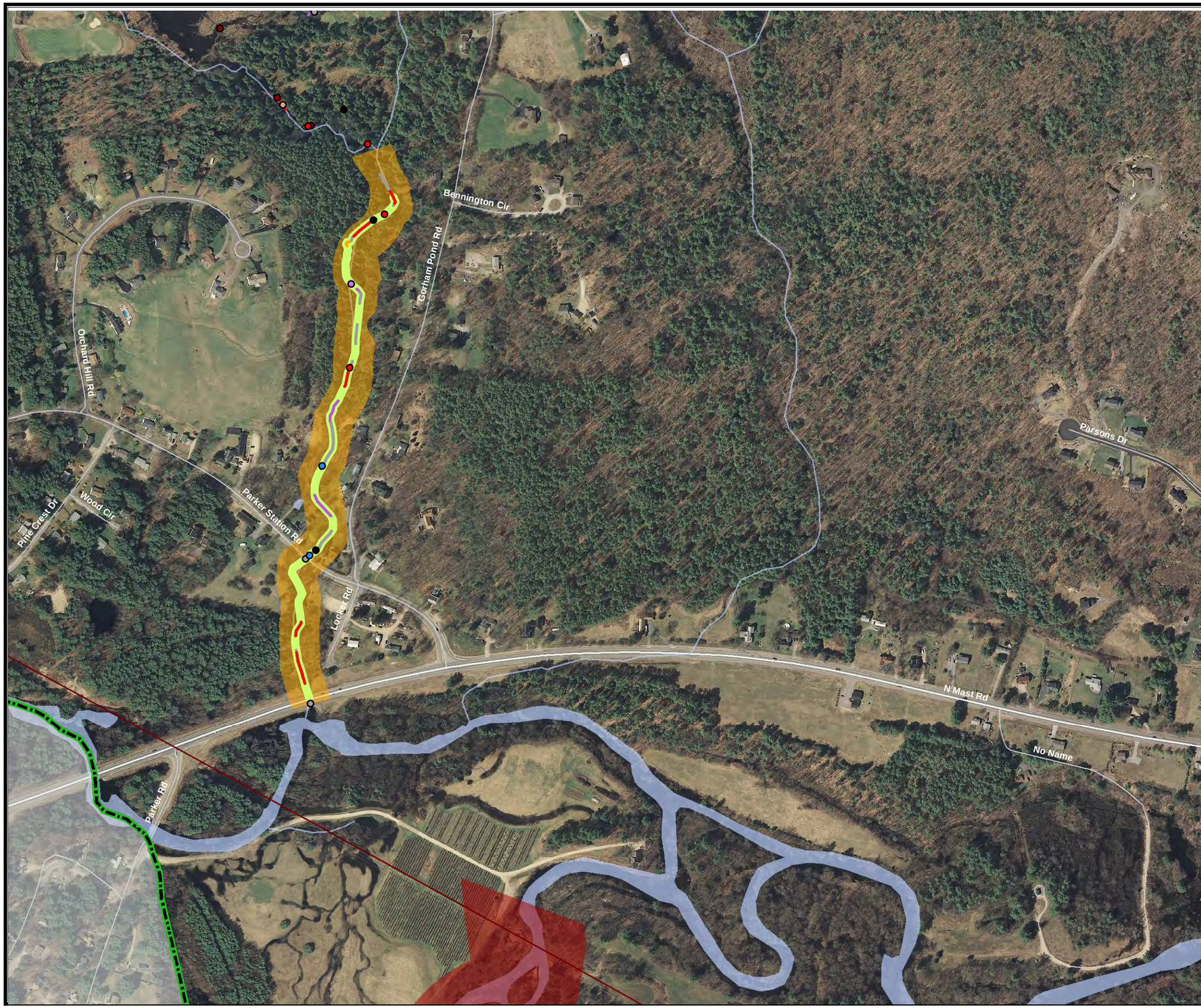

Map 2 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

- Erosion
- Mass Failure
- Bank Armoring or Revetment
- Buffers Less than 25 feet
- Straightening
- Development
- Encroachment

Fluvial Erosion Hazard Zones *

Zones

- Extreme
- Very High
- High

* A full descrition of FEH zones can be found in the Goffstown Hazard Mitigation Plan.

- Political Boundary
- Parcels
- Streams
- Lakes
- Utility Lines
- Interstate
- US and State Routes
- Local Roads

0 0.05 0.1 0.2 Miles

N W E S

SNHPC

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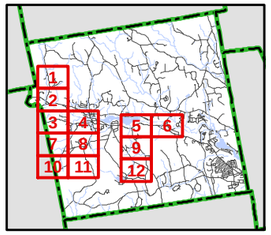

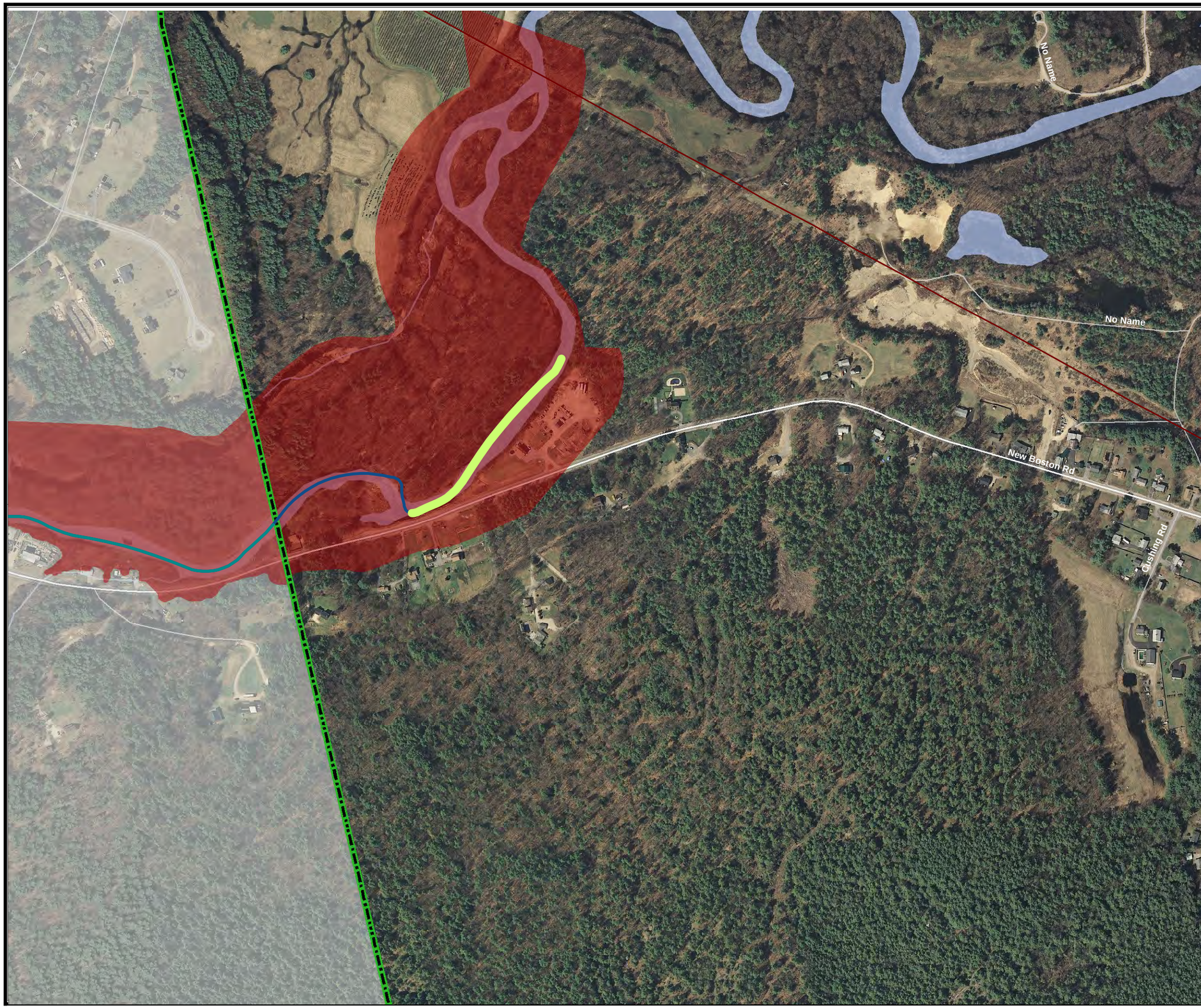

Map 3 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

- Erosion
- Mass Failure
- Bank Armoring or Revetment
- Buffers Less than 25 feet
- Straightening
- Development
- Encroachment

Fluvial Erosion Hazard Zones *

Zones

- Extreme
- Very High
- High

* A full descrition of FEH zones can be found in the Goffstown Hazard Mitigation Plan.

- Political Boundary
- Parcels
- Streams
- Lakes
- Utility Lines
- Interstate
- US and State Routes
- Local Roads

0 0.05 0.1 0.2 Miles

N W E S

SNHPC

Data Sources:
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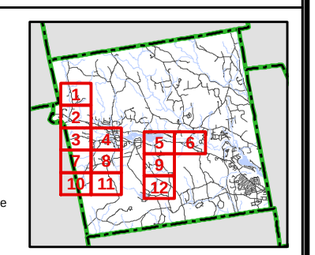

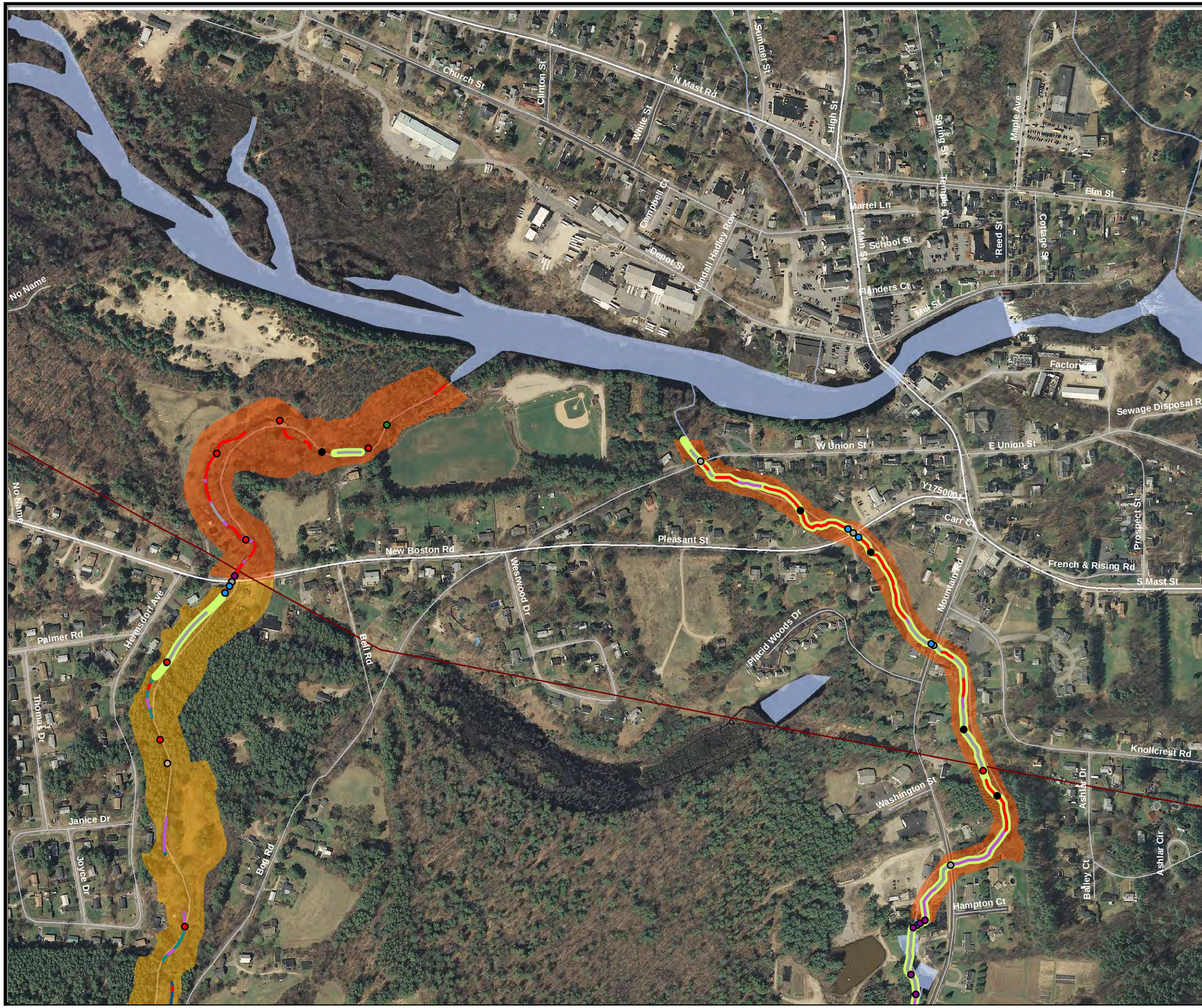

Map 4 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

- Erosion
- Mass Failure
- Bank Armoring or Revetment
- Buffers Less than 25 feet
- Straightening
- Development
- Encroachment

Fluvial Erosion Hazard Zones *

Zones

- Extreme
- Very High
- High

* A full descrition of FEH zones can be found in the Goffstown Hazard Mitigation Plan.

- Political Boundary
- Parcels
- Streams
- Lakes
- Utility Lines
- Interstate
- US and State Routes
- Local Roads

0 0.05 0.1 0.2 Miles

N W E S

SNHPC

Data Sources:
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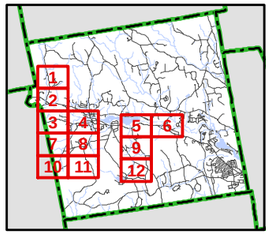

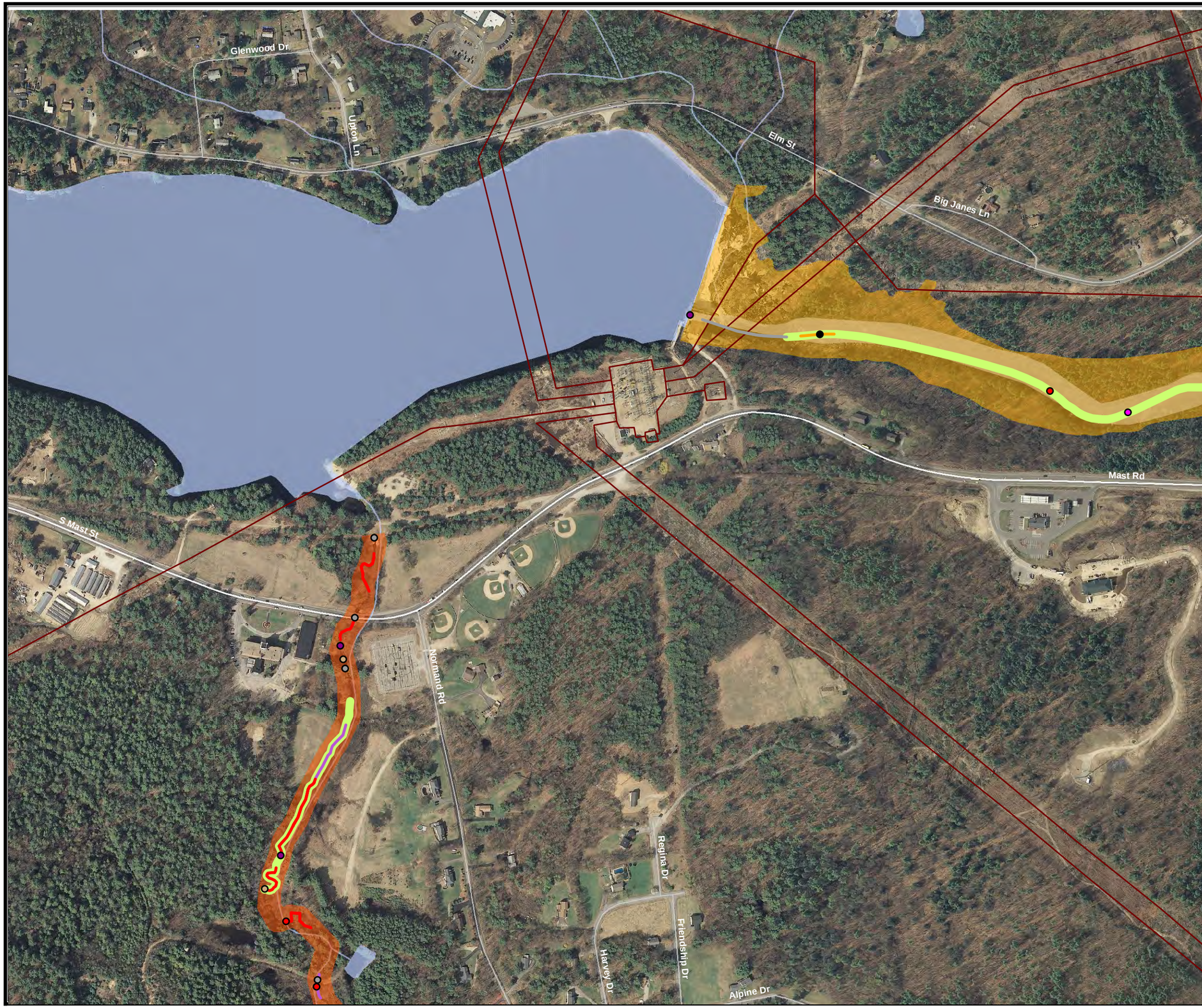

Map 5 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

- Erosion
- Mass Failure
- Bank Armoring or Revetment
- Buffers Less than 25 feet
- Straightening
- Development
- Encroachment

Fluvial Erosion Hazard Zones *

Zones

- Extreme
- Very High
- High

* A full descrition of FEH zones can be found in the Goffstown Hazard Mitigation Plan.

- Political Boundary
- Parcels
- Streams
- Lakes
- Utility Lines
- Interstate
- US and State Routes
- Local Roads

0 0.05 0.1 0.2 Miles

N W E S

SNHPC

Data Sources:
Granit Digital Data (1:24,000)
NH Department of Transportation
Individual Community Parcel Data

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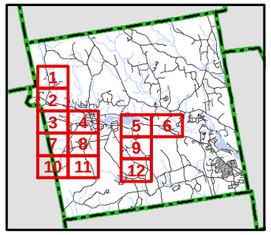

Map 6 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

- Erosion
- Mass Failure
- Bank Armoring or Revetment
- Buffers Less than 25 feet
- Straightening
- Development
- Encroachment

Fluvial Erosion Hazard Zones *

Zones

- Extreme
- Very High
- High

* A full descrition of FEH zones can be found in the Goffstown Hazard Mitigation Plan.

- Political Boundary
- Parcels
- Streams
- Lakes
- Utility Lines
- Interstate
- US and State Routes
- Local Roads

0 0.05 0.1 0.2 Miles

N W E S

SNHPC

Data Sources:
Granit Digital Data (1:24,000)
NH Department of Transportation
Individual Community Parcel Data

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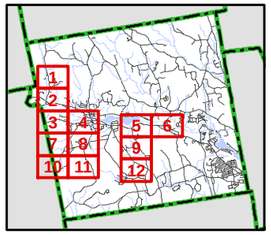

Map 7 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
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Line Features

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Fluvial Erosion Hazard Zones *

Zones

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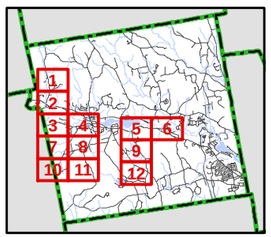
SNHPC



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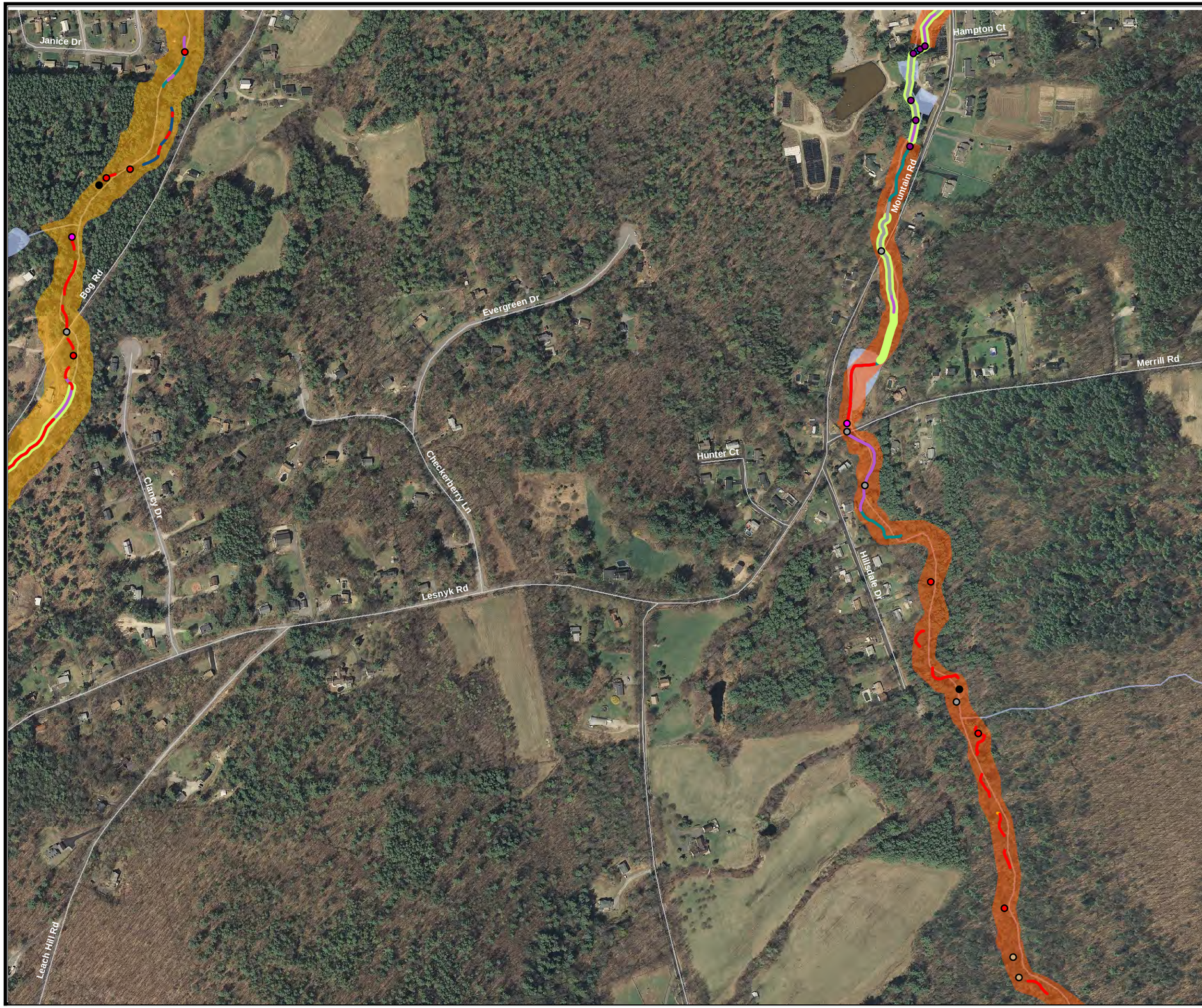

Map 8 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
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Zones

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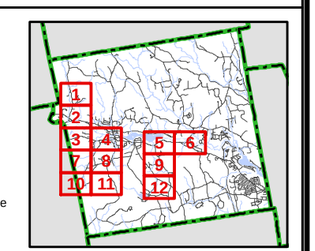

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
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- Flow Regs and Withdrawals
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- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

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Fluvial Erosion Hazard Zones *

Zones

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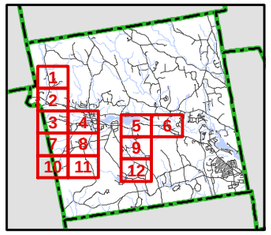

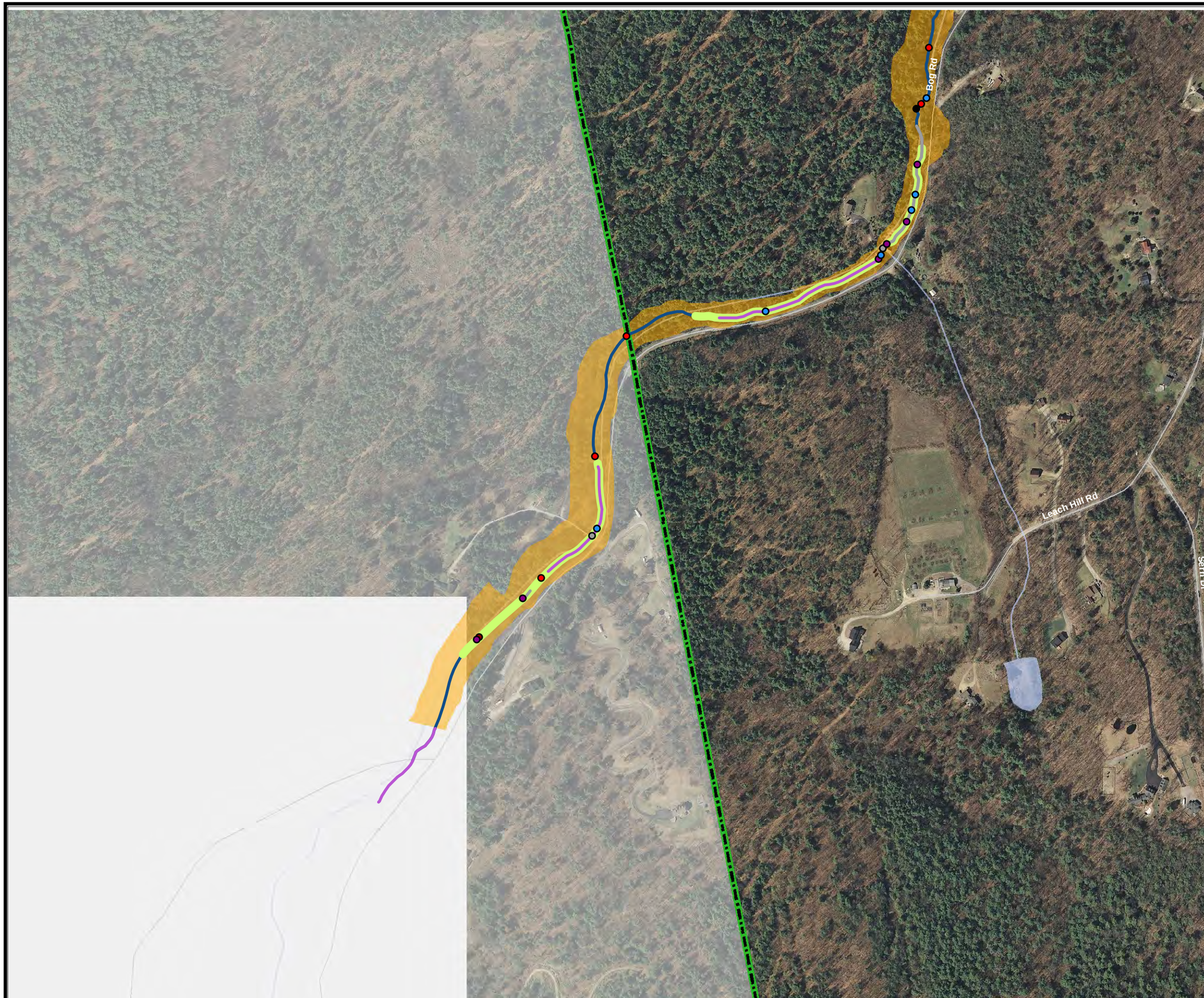

Map 10 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

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- Bank Armoring or Revetment
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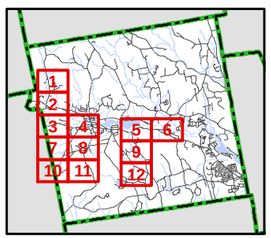

Map 11 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
- Grade Control
- Migration
- Steep Riffle or Head Cut
- Stormwater Input
- Stream Crossing

Line Features

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- Mass Failure
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Fluvial Erosion Hazard Zones *

Zones

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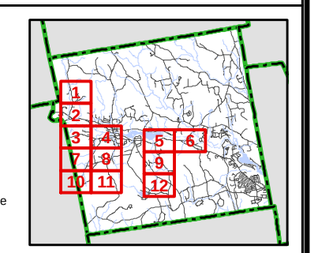

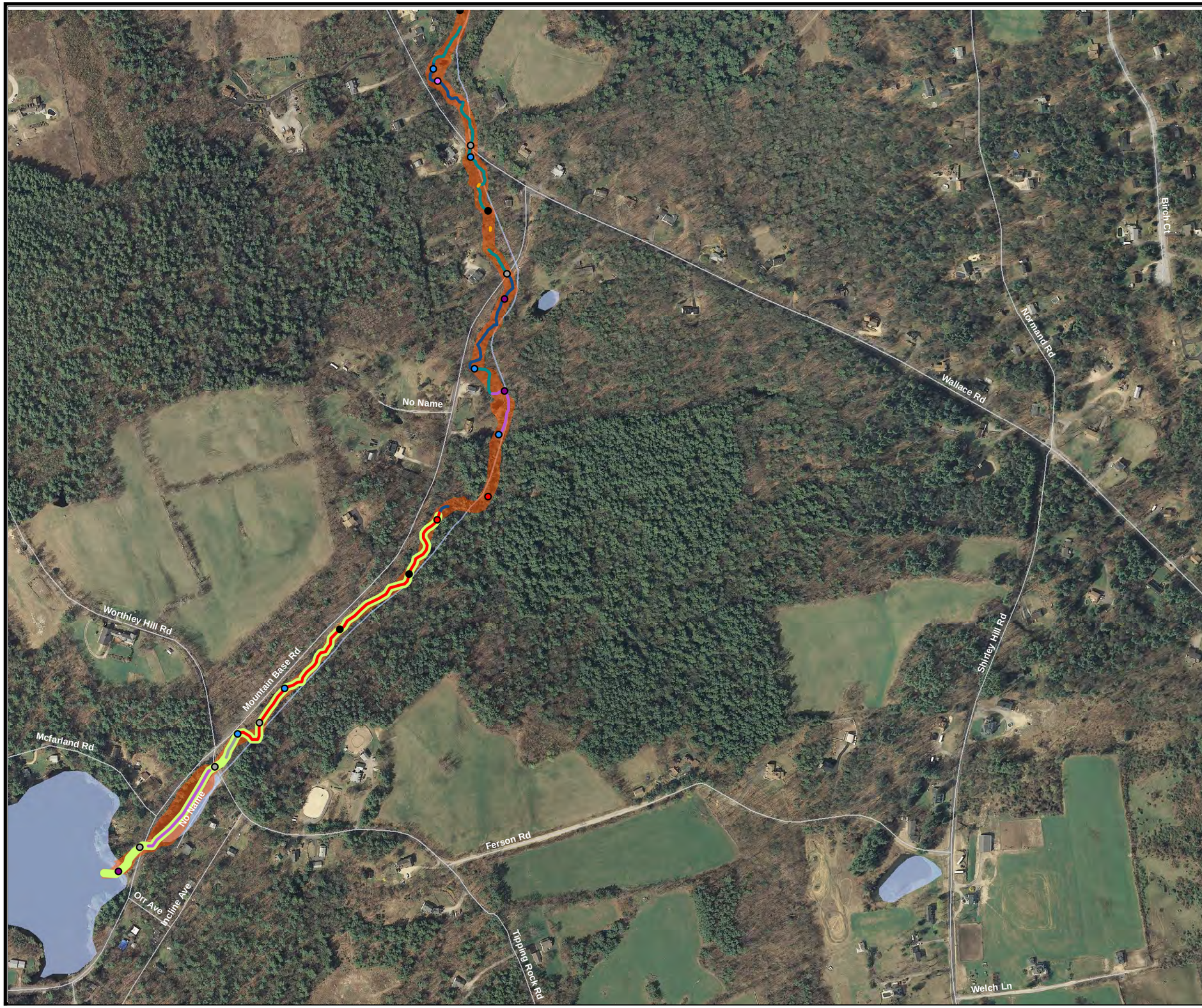

Map 12 of 12

River Geomorphology Goffstown, NH

Point Features

- Alluvial Fan
- Beaver Dam
- Bridge or Culvert
- Cross Section Location
- Debris Jam
- Dredging
- Flow Regs and Withdrawals
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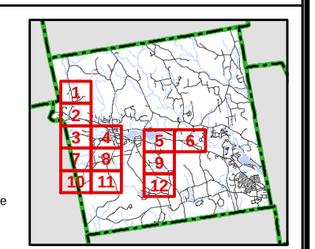


APPENDIX J

NH DES Environmental Fact Sheet: Fluvial Erosion Hazards and River Geomorphic Assessment Program

ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

CO-GEO-10 2013

Fluvial Erosion Hazards and River Geomorphic Assessment Program

Overview

Rivers are among the most beautiful features of nature, but we are frequently reminded that they are dynamic systems. While every Granite State river is prone to flooding, people are often surprised when the rivers themselves change, sometimes dramatically. New Hampshire has endured multiple flood events in recent years that have washed out culverts, undermined bridges and roads, and washed away streambanks. In response, the New Hampshire Geological Survey (NHGS) has been focusing its scientific and mapping expertise to address some of the hazards associated with flood events and the potential for significant erosion and catastrophic bank failures. Most recently, the impacts of Tropical Storm Irene across the North County should remind us all of the power of running water to alter the landscape.

Floods are well known for posing inundation risks to properties and infrastructure in floodplains adjacent to rivers, but there is a less-appreciated danger associated with sudden channel scouring and riverbank collapse, bridge abutment failure and culvert washouts, or even wholesale changes in the course of rivers. These phenomena all fall under the general heading of "fluvial erosion hazards," where the term "fluvial" is used by earth scientists to indicate action by flowing water and by rivers in particular. Fluvial erosion, a natural process, is the wearing away of river beds and banks by the action of running water, and is most active during flood events. The most dramatic kind of erosion event, known as an "avulsion," occurs when a river cuts through one of its banks and erodes an entirely new path, usually abandoning its old path in the process. Such an event

occurred on the Suncook River in the town of Epsom during the Mother's Day Flood of 2006 when Huckins Mill Dam and Bear Island were bypassed by a new channel that cut through an area of wetlands and a working gravel pit. Avulsions are relatively rare, but the effects on property owners and natural ecosystems can be significant and long-lasting.

Flooding in the News

In the aftermath of Tropical Storm Irene, while national media attention was focused on the flood damage that occurred in Vermont, New Hampshire's North Country was trying to recover from its own erosion impacts and resulting property damage. In particular, the East Branch Pemigewasset River (Lincoln); Peabody River (Gorham); and Saco River (Bartlett/Conway) were hard hit. Like other floods in recent memory in the state, damage was greatest where bridges and culverts were unable to adequately convey flood flows, or where long ago actions such as channel straightening increased the speed of river flow, increasing the force available to erode and undermine river banks and lead to collapse.

Following close on the heels of Irene, New Hampshire was reminded that even a small watershed or brook can suffer erosion problems and damage if the right ingredients come together. On May 29, 2012, a thunderstorm became stationary over a small watershed (Mill Brook) in Westmoreland and dumped about 8 inches of rain directly on the watershed in about 2 hours (the end result of which can be seen in the photo at left). People in New Hampshire are becoming increasingly aware of their vulnerability to fluvial erosion hazards and the need to plan accordingly. To do this effectively requires site-specific information that characterizes the form, function, and dynamic behavior of the state's rivers and streams. Investigations to obtain such information are in the realm of the science of fluvial geomorphology, a specialized branch of the earth sciences that studies how running water in river channels shapes the physical landscape.

Fluvial Geomorphology Assessments

Fluvial geomorphology has received an increasing amount of attention in recent years for its potential to contribute not only to flood hazard mitigation, but also for stream restoration. The State of Vermont is recognized as one of the leading practitioners in this area, having developed a set of comprehensive protocols for conducting river geomorphic assessments, with the goals of understanding a river's current condition, to assist in making sound management and restoration decisions. The protocols are organized into three successive phases, reflecting an increasing dependence on field survey and greater site-specific measurement detail and accuracy. Since this program began in New Hampshire in 2008, NHGS staff have made some specific adjustments to customize the protocol for application within our own borders. Also, multiple partners developed a New Hampshire bridge and culvert assessment protocol to collect data about stream

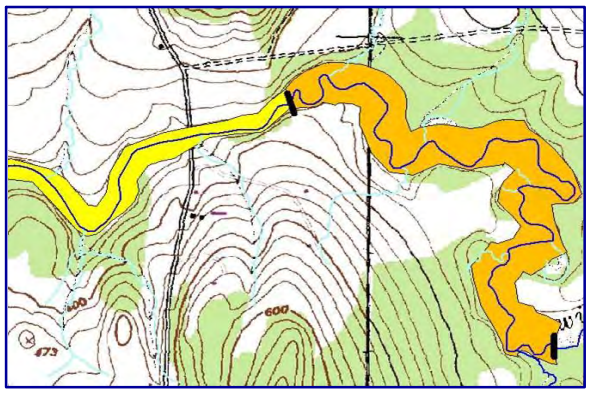
crossings. This information is placed into a scoring tool which ranks crossings (especially culverts) for their compatibility with river form and process (an example of the output is at right). Towns can use this information as a guide to prioritize those crossings most in need of retrofit or replacement.

Table 1
Fowler Brook Crossings

Crossing	Structure Type	Percent Bankfull Width[1]	Geomorphic Compatibility[2]	Aquatic Organism Passage (AOP)[3]
Maple Street	Culvert	77%	Fully Compatible	Reduced AOP
Buck Street Extension	Culvert	39%	Mostly Incompatible	Full AOP
i28	Culvert	69%	Mostly Incompatible	Reduced AOP
Drolet Road	Culvert	94%	Mostly Compatible	Full AOP
Jug City Road[4]	Culvert	-	-	-

[1]Shaded for bankfull width percentage less than 50%; [2]Scores and ratings developed with the Culvert Geomorphic Screening Tool; [3]Scores and ratings developed with the Culvert Aquatic Organism Passage Screening Tool; [4]Jug City Road culvert assessed but scores and ratings not calculated given the wetland features existing just upstream

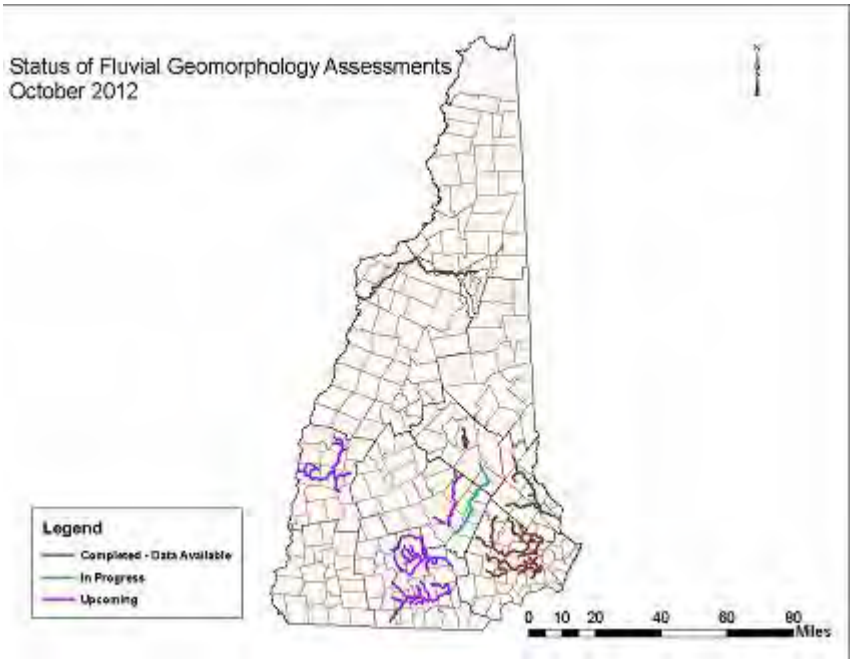
The basic unit of river assessment is the geomorphic "reach", which is a specific length of the river channel and adjacent floodplain that shares characteristics that differ from its upstream and downstream neighbors. Each study reach is defined through analysis of a number of key natural physical attributes of the river and its valley. Earth scientists consult topographic and geologic maps and aerial photographs as part of this effort. By providing a consistent, logical framework for describing streams and rivers, classification of a stream or river into a collection of geomorphic reaches represents a critical first step in the assessment process. In the field, data about features, such as the height and form of banks, lengths of riprap, and the locations of active erosion are collected. Cross-sections are collected to measure the width of the river and depth across the channel. This information, together with observations about aquatic habitats, and bridge and culvert data, can be used to classify river constrictions, the potential for scouring and damage to crossings and the potential for debris and ice jams. Towns can then develop actions that will help prevent or reduce the same kinds of flood damage experienced in previous years.



The river geomorphic assessment tools allow individual reaches to be scored for erosion sensitivity based on data that has been collected in the field. The scoring allows for the determination of the vulnerability of a particular reach to future erosive events that could lead to bank failures and the subsequent potential for property and infrastructure damage during high flow events. With the right flow and geological conditions, a river could also carve a new path for itself - an avulsion. Maps that identify those areas at greatest risk of erosion represent a useful product derived from the geomorphic assesments. The figure to the right is an example of such a map showing fluvial erosion hazard (FEH) zones adjacent to rivers.

As of 2012, rivers and watersheds have been assessed in southeastern New Hampshire and in the White Mountains, where data products are available. These include the Ammonoosuc, Cocheco, Exeter, Isinglass and Lamprey Rivers and select tributaries. Present efforts are focused on

watersheds in south-central and western New Hampshire, including the Piscataquog, Soucook, Souhegan, Sugar and Turkey. Final products include maps and digital datasets that identify river features mapped in the field and those areas that are susceptible to potential future erosion events.



More information

For more information about the fluvial erosion hazards program, contact Shane Csiki, Fluvial Geomorphology Specialist at the New Hampshire Geological Survey, DES at (603) 271-2876, or by e-mail: Shane.Csiki@des.nh.gov.

APPENDIX K

Description of Fluvial Geomorphology Data

Description of Fluvial Geomorphology Data

The fluvial geomorphology data collected for the Piscataquog Watershed in Goffstown is incorporated in two primary components: collection of river reach length scale features; assessment of stream crossings on assessed reaches. There were three primary outputs that are available from the data collected, which include:

- Fluvial Erosion Hazard zones (i.e. River meander belts)
- Stream crossing geomorphic and aquatic organism passage (AOP) compatibility data
- River geomorphic data (spatial distribution of mapped river features)

The Fluvial Erosion Hazard (FEH) zones/meander belts and the stream crossing geomorphic and AOP compatibility data are described in the report. The meaning of features contained within the special distribution of mapped river features are described below.

Geomorphic Data

Geomorphic river features mapped in the field by NHDES Geologic Survey are represented in two ways: points and lines. Points represent features such as the location of a flood chute, or existing channel migration features, while lines represent features that have a length associated with them, such as bank erosion or channel straightening. These features are represented in two corresponding shapefiles for each assessment project: one for points, with the other for lines. These features are shown on the maps.

For the purposes of these assessments, each river that is assessed is divided into individual reaches, which formed the basis for the assessment. A river reach is the length of stream that has characteristics similar enough that condition data collected within that length is representative of the reach as a whole. Among the suite of geomorphic features collected in the field, the actual mapped locations are provided for certain features, while a metric of representation is provided for others. Metrics are provided by each river assessed. These metrics can be obtained directly from the NH DES Geological Survey.

The following table outlines the features available in the dataset, and whether each is represented by its actual spatial location, or a metric (Table 1).

Table 1 Representation of each geomorphic feature reported in datasets

Geomorphic Feature	**Point/Line**	**Spatial Location/Representative Metric**
Alluvial Fan	Point	Spatial Location
Bank Armoring or Revetment	Line	Metric = % length of bank revetment in reach relative to reach length
Bank Erosion	Line	Metric = % length of bank erosion in reach relative to reach length
Beaver Dams	Point	Spatial location
Berms	Line	Metric = % length of berms in reach relative to reach length
Buffers less than 25 feet	Line	Metric = % length of buffer width 0-25 feet in reach relative to reach length
Channel Migration features (including braiding, channel avulsions, flood chutes and neck cut-offs)	Point	Spatial location
Debris Jams	Point	Spatial location
Development	Line	Metric = % length of development in reach relative to reach length
Flow Regulations	Point	Spatial location
Grade Controls	Point	Spatial location
Improved Paths	Line	Metric = % length of improved paths in reach relative to reach length
Mass Failures	Line	Metric = % length of mass failures in reach relative to reach length
Railroads	Line	Spatial Location
Roads	Lines	Spatial Location
Steep Riffles and Head Cuts	Point	Spatial Location
Stormwater Inputs	Line	Metric = # stormwater inputs in reach
Straightening	Line	Spatial location

The point feature shape file represents geomorphic features that occur at one location. Each feature contained within the attribute table of the shape file can be extracted or symbolized/classified as needed for a particular application.

For those impacts where the actual spatial location in the field is reported, the line feature shape file represents features that occur along a linear path of the channel or on one or both banks. For those where metrics are reported, the metric value will be represented along each reach length. Linear features represented by metrics are presented in the form of dynamic segmentation. There will be one record in the attribute table for each represented feature existing on the line. The next section briefly describes the significance of each feature contained within these shape files from a geomorphic and river management perspective.

Point features

Alluvial fan is a fan-shaped deposit of sediment that is found in a river, or on the directly adjacent floodplain, at the mouth of a contributing tributary, if that tributary is very steep and enters a stream or its valley that is less so. This is a result of the velocity decrease when a stream reaches a more level area, and drops all or a portion of its sediment load. Alluvial fans are usually comprised of loose material, can be very mobile, and if large enough, a river can carve multiple channels through them. A river that flows through a steep, narrow valley and then enters a section where the valley widens and is less steep can also create an alluvial fan. Over time, sediment is continually introduced to the fan from upstream at a rate faster than can be moved through. Alluvial fans can be highly active, and if multiple flow paths are present on them, such paths can rapidly change position during flood events, particularly those generated by short-intensity, high precipitation events (flash floods), which generate high velocities, the ability to erode, and in the worst cases, cause changes in flow paths, the locations of which cannot be predicted.

Beaver dams often create impoundments that store water behind them. Beavers, through building dams, can create far-reaching effects on river form, sediment transport (by storing sediment upstream of them), hydrology, and habitat. If these are large enough, or if there are multiple beaver dams in the same area, they can lead to the creation of wetlands through their large impoundments. Beaver dams are typically not permanent, and are at risk of failure during high flow events.

Debris jams can cause the creation of a constriction in a river flow what can lead to concentration of flow forces into the river bed in their vicinity (potentially causing bed scour), and laterally into river banks (potentially causing erosion). Jams are comprised of trees and logs of varying sizes that have accumulated at a location in a river channel. However, these are features that are created naturally over time, and have been documented globally. The key to interpreting the locations of these features is their

proximity to infrastructure or a nearby road crossing that could be at risk from the erosive forces these can produce. If other features are present nearby, such as mapped channel migration, it suggests that a debris jam is producing effects on the river channel. If a jam is large enough, or if multiple jams occur in eh same vicinity, they can sometimes store a sufficient amount of sediment to cause the formation of multiple channels within the stored sediment.

Flow regulations are features used to either store (such as a dam) water from a river to support a number of uses, including but not limited to: hydropower, irrigation, public water supplies, snowmaking, flood control or recreation. A dam that is large enough can lead to decreased flows downstream, storage of sediment upstream of them, and bed and bank erosion downstream.

Grade controls are steps that span the width of a river channel at which the streambed elevation is typically higher upstream compared to downstream of it. Grade controls ca be natural, such as a bedrock outcrop, or built, such as a dam. For the purposes of these assessments, grade controls are noted as an isolated feature in the context of a river not dominated by other such features in the vicinity upstream and downstream. Grade controls maintain the bed elevation at a particular location, and will prevent disturbances from downstream translating upstream past it. For example, the shortening of the path of the Suncook River at Epsom in the 2006 flood-induced change in course created a step in the channel (head cut-defined below) that migrated upstream in an attempt to level out the bed elevations in the new channel. In the case of the Suncook River, this head cut has migrated to a point close to the Route 4 bridge crossing, posing risks to it. A channel spanning grade control (either natural or installed) can stop a head cut from migrating further upstream.

Head Cuts are steps in the channel where the river bed downstream of the step is lower than that upstream, constituting a slope break on the river bed. These are different than grade controls, which are comprised of bedrock and will not move on time scales of concern. Rather, head cuts are comprised of boulders or smaller size material that can be moved under high flow conditions. High flows will erode into the step as the force cascades over it, causing the eroded material to be transported downstream and a gradual movement of the top of the step in the upstream direction. This can lead to erosion of the base of the river banks downstream of the head cut, and slumping of bank material, potentially threatening downstream infrastructure. Left unchecked, a head cut typically will decrease in size and effect over time.

Migration is a broad category of features that identify different processes by which movement of the channel is occurring. These processes are often seen and enhanced where sediment is accumulating in the channel, forcing flow into the banks, and increasing the rates of lateral migration in the floodplain. Additional features included under the broad category of "migration" include:

Braiding denotes a section of river that has divided into an interlacing network of branching and reuniting shallow channels separated from each other by islands or bars, resembling in form a complex braid. These typically form where there is a large quantity of sediment moving through the river which is too great to be moved through one channel.

Channel avulsions are situations where a river abruptly changes its primary flow path from one channel to another by abandoning the original flow path. The Suncook River in Epsom, which changed course during floods in 2006, is an example of an avulsion. Channel avulsions can potentially endanger nearby infrastructure if they occur at the wrong place and time. Obstructions in and of a river channel can lead to avulsions. This parameter not only is used to identify where actual avulsions have been mapped in the field, but also locations where, based on the field assessment, there is an increased likelihood of occurrence.

Flood chutes are additional interconnected paths on a river which can be accessed during high flows. Chutes are often formed when sediment accumulation in the channel forces flow into the banks, creating erosion and ultimately cutting one or more additional accessible paths of least resistance. If the main path of the river becomes blocked by additional sediment accumulation or trees, a flood chute can capture the flow and become the main flow path.

Neck Cut-Offs occur where a river, beginning at the entry point into a meander bend, and ending at the exit of the bend, creates a more direct path for itself by creating a new channel that is straighter and that abandons the old meander path (Figure 1). This is a natural process.

Steep riffles represent locations where an accumulation of sediment has occurred (can range in any size from boulders to clay). Such a feature has a steep face on the downstream side. Riffles are typically comprised of cobbles and gravels, though this is not always the case.

Stormwater inputs can be one of several types of inputs to a stream channel which drain stormwater, typically from roads. Stormwater inputs an enhance stream bank erosion across the channel or downstream, if placed in such a way that the output is directed into a stream bank that is already eroding or is comprised of material that could be eroded in the future.

Line features

Bank armoring or revetment are features installed on riverbanks to stop erosion (i.e., riprap, walls, etc.). Their presence is a sign of erosion that has required protection. The

presence of riprap along a streambank, increases the velocity of flow along the smooth surface of the revetment, which can lead to scour of the bed at the base of the installed riprap, leading to the potential for it to be compromised in the future. Revetment can also enhance erosion directly downstream of the installation, which could contribute to further issues, particularly if infrastructure is situated there.

Bank erosion represents a considerable flood hazard, particularly when erosion is located near buildings and infrastructure, where such processes can cause damage. It is important to realize that bank erosion is a natural process, and most riverbanks (unless underlain by bedrock) will experience a small amount of erosion at the lowest part of the banks, termed background erosion. Thus, bank erosion can never be eliminated. Bank erosion is naturally enhanced at the outsides of meander bends. The bank erosion parameter captures situations where erosion is occurring beyond this background level, where whole or portions of bank faces show raw, barren soil, are not held by vegetation, or that have overhanging earth above them. Then, the water can access and erode during high flow events. If more geomorphic features are present in a reach experiencing a high percentage of bank erosion relative to the reach length, then it suggests an active river channel with an enhanced ability to experience further erosion and lateral channel migration within its floodplain during high flow events. For example, if flood chutes, active channel migration or braiding are occurring in a reach combined with erosion, then you have a clear indicator of an active channel in that area. Additionally, river reaches where mapped straightening coincides with a high percentage of erosion is a potential sign of future risks to adjacent buildings and infrastructure, as rivers will over time look to recreate meanders for themselves.

Buffers less than 25 feet represent locations where the width of land, extending away from the top of the riverbank that is naturally vegetated ranges from 0 to 25 feet. From the public safety perspective, a river experiencing a narrow or nonexistent vegetated buffer is a sign that the banks are potentially at greater risk for erosion, given the reduced presence of vegetation that can assist in providing integrity to the banks. Situations where buffer width is less than 25 feet can be of particular concern where slopes adjoining a river channel are steep, as this can increase the velocity of runoff, and consequently, erosion.

Mass failures are larger features than bank erosion, and occur when a stream erodes into or undercuts a high erodible landform, such as a tall terrace. These will be characterized by a tall feature adjacent to a river channel where part or all of the constituent material is exposed for the flow forces to further cut into and erode.

River corridor encroachments

Berms – Berms are features that can be found adjacent to a river channel that runs parallel, or nearly parallel, to a stream. Berms are often built by constructing material dredged from the river channel into mounds, and thus are often comprised

of rounded stones that reduces the ability of the berms to withstand flow forces in a high flow event. In New Hampshire, many berms have been in place for decades, and thus have trees and shrubs growing through them, sometimes making them hard to discern in the field. Berms can, but not always, be found adjacent to river lengths that have been straightened in the past. These are typically built to reduce the risk of floodwater inundation of the adjacent floodplain, and are typically found where infrastructure on the floodplain needs to be protected.

Development – Development, which includes buildings and parking lots, when placed near a river, are at particular risk for the effects of floodwater. Additionally, if a river experiences bank erosion and lateral movement at such a location, the development can be at risk for being encroached upon by the river.

Improved Paths – While improved paths can be found in floodplains adjacent to rivers in New Hampshire, they can be at risk for effects during flood events. For the purposes of these assessments, maintained improved paths, surfaced with dirt, gravel or pavement are digitized as such. These are represented as a percentage value of the reach that contains these features in the dataset.

Railroads – Because railroads can be found in floodplains adjacent to rivers in many locations in New Hampshire, they can be at risk for effects during flood events. For the purposes of these assessments, all railroad beds and tracks, used or unused, are digitized. If the railroad bed is raised above the flood plain elevation, and if they are close to the stream, railroads can reduce the lateral access that floodwaters would normally use to spread out during high water.

Roads – While roads are found in floodplains adjacent to rivers throughout New Hampshire, they can be at risk for effects during flood events. For the purposes of these assessments, all roads that are state, town or private and that are made of dirt, gravel or pavement are digitized. If the road travel surface is raised above the floodplain elevation, and if they are close to the stream, roads can reduce the lateral access that floodwaters would normally use to spread out during high water. If the road is very close to a river, and the river experiences severe erosion during a high flow event, the earth material under between the river and road can be eroded by the river and the road can be compromised, creating a public safety risk, particularly if a route is severed and it provides the only access available to homes or businesses.

Straightening - Many river reaches throughout New Hampshire have been historically straightened (also known as channelization). Rivers, left to their natural devices, meander across their floodplains over time. Straightening is the process of creating a straight channel path by removing natural meanders. The dredging of river channels and the use of the dredged material to place berms on the banks was often part of this process. This was a historical practice designed to protect adjacent infrastructure and

properties from flooding by increasing the speed at which water moved by a site, and thus this is often seen in town centers or adjacent to roads. Also, larger rivers in New Hampshire were sometimes straightened in the past to support log drives. However, the faster velocities recurring over time lead to erosion and scour of the channel bed and eventually, re-initiation of meandering of the river channel. This process has been seen occurring on multiple rivers in New Hampshire, and has threatened parking lots and buildings near riverbanks in recent years.

APPENDIX L

Culverts from the Piscataquog River Watershed Stream Crossing Vulnerability Assessment Project

Appendix L

Town of Goffstown Piscataquog River Watershed Stream Crossing Vulnerability Assessment Project

Town	Road Name	Stream Name	Crossing ID	Structure Type	Latitude	Longitude	Condition	Culvert Width (ft)	Culvert Slope	Culvert Outlet	Culvert Drop (ft)	Length (ft)	Bankfull %	AOP Status	Return Interval				
															2	10	25	50	100
GOFFSTOWN	Allard Park Rd	Piscataquog	LP_PSCR_33	Culvert	43.0122	-71.51105	Old	2	1.7	Cascade	0.8	22		GRAY	P	P	F	F	F
GOFFSTOWN	Autumn	Piscataquog	LP_PSCR_05	Culvert	43.02467	-71.60906	New	1.3	0.7	At Grade	0	42	21.7	GREEN	F	F	F	F	F
GOFFSTOWN	Back Mtn Rd	Bog Brook	LP_BOBK_08	Culvert	42.97534	-71.59885	Old	1	2.6	At Grade	0	44		GRAY	F	F	F	F	F
GOFFSTOWN	Back Mtn Rd	Bog Brook	LP_BOBK_09	Arch	42.97734	-71.60807	Old	3.5	8.4	At Grade	0	32	22.4	GRAY	P	P	P	T	T
GOFFSTOWN	Bog Brook Rd	Bog Brook	LP_BOBK_28	Culvert	42.98979	-71.63177	New	1.5	3.8	Cascade		40		GRAY	-	-	-	-	-
GOFFSTOWN	Center Street	Cemetary Brook	LP_CEBK_01	Culvert	43.02221	-71.54323	New	2.25	3	Free Fall	0.6	67	42.0	RED	T	F	F	F	F
GOFFSTOWN	Dumont Park Rd	Piscataquog	LP_PSCR_31	Culvert	43.01257	-71.52031	Old	1.3	1.7	At Grade	0	42.7	8.1	GRAY	F	F	F	F	F
GOFFSTOWN	Durango Dr	Catamount Brook	LP_CTBK_04	Culvert	43.02258	-71.52194	New	3	3.4	Cascade	0	51	19.7	GRAY	P	T	F	F	F
GOFFSTOWN	Elm	Piscataquog	LP_PSCR_16	Culvert	43.02268	-71.59665	New	6	6	Free Fall	0.2	70	56.2	RED	P	P	F	F	F
GOFFSTOWN	Elm st	Piscataquog	LP_PSCR_24	Culvert	43.01885	-71.57381	Old	2	3.2	Free Fall	1.9	132	27.8	RED	F	F	F	F	F
GOFFSTOWN	Elm St	Piscataquog	LP_PSCR_26	Culvert	43.0191	-71.56728	Old	1.3		Free Fall	0.6	60	7.9	RED	F	F	F	F	F
GOFFSTOWN	Elm St	Piscataquog	LP_PSCR_27	Culvert	43.01908	-71.5671	New	1	1.8	At Grade	0	43.5	23.4	GRAY	F	F	F	F	F
GOFFSTOWN	Glenwood Dr	Piscataquog	LP_PSCR_22	Culvert	43.01947	-71.57632	Old	2	1	Free Fall	0.3	41	22.0	RED	F	F	F	F	F
GOFFSTOWN	Goffstown Back Rd	Piscataquog	LP_PSCR_32	Culvert	43.01319	-71.50752	Old	3	4	At Grade	0	100	11.8	GRAY	P	P	P	T	F
GOFFSTOWN	Goffstown Back Rd	Whiting brook	LP_WHBK_02	Culvert	43.02091	-71.53599	New	1.5	1.8	At Grade	0	67	3.1	GRAY	F	F	F	F	F
GOFFSTOWN	Gorham Pond Rd	Gorham Brook	UP_GOBK_10	Culvert	43.05367	-71.62934	New	2.5	2.1	At Grade	0	38		GRAY	P	F	F	F	F
GOFFSTOWN	Gorham Pond Rd	Gorham Brook	UP_GOBK_12	Culvert	43.04127	-71.6282	New	1.3	2.7	Free Fall	1	40.6	10.1	RED	F	F	F	F	F
GOFFSTOWN	Hemlock	Piscataquog	LP_PSCR_13	Culvert	43.02644	-71.59356	New	2.6	1.4	Cascade	2	83	10.0	GRAY	T	F	F	F	F
GOFFSTOWN	Horizon Dr	Henry Brook	LP_HABK_15	Culvert	43.04351	-71.56799	New	3	2.1	At Grade	0	70.4	25.1	GRAY	P	P	T	F	F
GOFFSTOWN	Juniper Dr	Henry Brook	LP_HABK_17	Culvert	43.03186	-71.54821		6	1.6	Free Fall	1.5	88.8	61.2	RED	P	P	P	P	P
GOFFSTOWN	Keith Dr	Catamount Brook	LP_CTBK_03	Culvert	43.02595	-71.52005	New	1.8	1.5	At Grade	0	48.5		GRAY	T	F	F	F	F
GOFFSTOWN	Leach Hill Rd	Bog brook	LP_BOBK_31	Culvert	42.99462	-71.61729	New	4	13.4	Free Fall	2.5	30	45.7	RED	P	P	T	F	F
GOFFSTOWN	Magnolia	Piscataquog	LP_PSCR_42	Culvert	42.98655	-71.54173	New	4	3	Cascade	3	69	21.6	GRAY	P	P	T	T	F
GOFFSTOWN	Maple	Piscataquog	LP_PSCR_15	Culvert	43.02264	-71.59662	Old	2.5	2.3	At Grade	0	75	29.9	GRAY	F	F	F	F	F
GOFFSTOWN	Mast	Gorham Brook	UP_GOBK_17	Culvert	43.02529	-71.62272	Rusted			At Grade	0			GRAY	-	-	-	-	-
GOFFSTOWN	Medford Farm Rd	Catamount Brook	LP_CTBK_06	Culvert	43.01979	-71.52711	Old	2	3.8	Free Fall	0.3	48.4	21.9	RED	F	F	F	F	F
GOFFSTOWN	Miles Ave	Catamount Brook	LP_CTBK_02	Culvert	43.02582	-71.5248	New	4	2.4	Free Fall	0.9	39.1	30.3	RED	P	T	F	F	F
GOFFSTOWN	Morgan Circle	Piscataquog	LP_PSCR_30	Culvert	43.00762	-71.52687	Old	1.9	1	At Grade	0	63	21.0	GRAY	P	F	F	F	F
GOFFSTOWN	Mosett	Catamount Brook	LP_CTBK_01	Culvert	43.03235	-71.5248	New	1.9	0.1	At Grade	0	50.1		GRAY	F	F	F	F	F
GOFFSTOWN	N Mast Rd	Piscataquog	LP_PSCR_08	Culvert	43.02106	-71.60194	New	4.3	0.4	At Grade	0	70	33.7	GRAY	F	F	F	F	F
GOFFSTOWN	Norman	Dan Little Brook	LP_DLBK_05	Culvert	43.0007	-71.56417	Old	1.5	3.2	At Grade	0	43		GRAY	F	F	F	F	F
GOFFSTOWN	Paige Hill Rd	Piscataquog	LP_PSCR_21	Culvert	43.02206	-71.57832	Old	2	6.7	At Grade	0	37	28.6	GRAY	T	F	F	F	F
GOFFSTOWN	Parsons Dr	Piscataquog	LP_PSCR_04	Culvert	43.02574	-71.61332	Old	2.5	0.5	Backwatered	0	60	23.1	GRAY	P	T	F	F	F
GOFFSTOWN	Pasrsons Dr	Piscataquog	LP_PSCR_03	Culvert	43.02753	-71.61494	New	1.6	5.1	Free Fall	1	80	19.8	RED	P	F	F	F	F
GOFFSTOWN	Range Rd	Henry Brook	LP_HABK_14	Culvert	43.0422	-71.56104	Eroding	3.3	4.3	Free Fall	1.2	53		RED	P	T	F	F	F
GOFFSTOWN	Range Road	Henry Brook	LP_HABK_16	Culvert	43.04111	-71.56669	New	3	3.9	At Grade	0	98.2	41.3	GRAY	P	P	T	F	F
GOFFSTOWN	Roby	Bog Brook	LP_BOBK_11	Culvert	42.97656	-71.61346	New	1.5	3.5	At Grade	0	47	22.1	GRAY	F	F	F	F	F
GOFFSTOWN	Roby Rd	Bog Brook	LP_BOBK_10	Culvert	42.97866	-71.61109	Old	2	2.7	Free Fall	1.5	46	25.0	RED	F	F	F	F	F

Appendix L

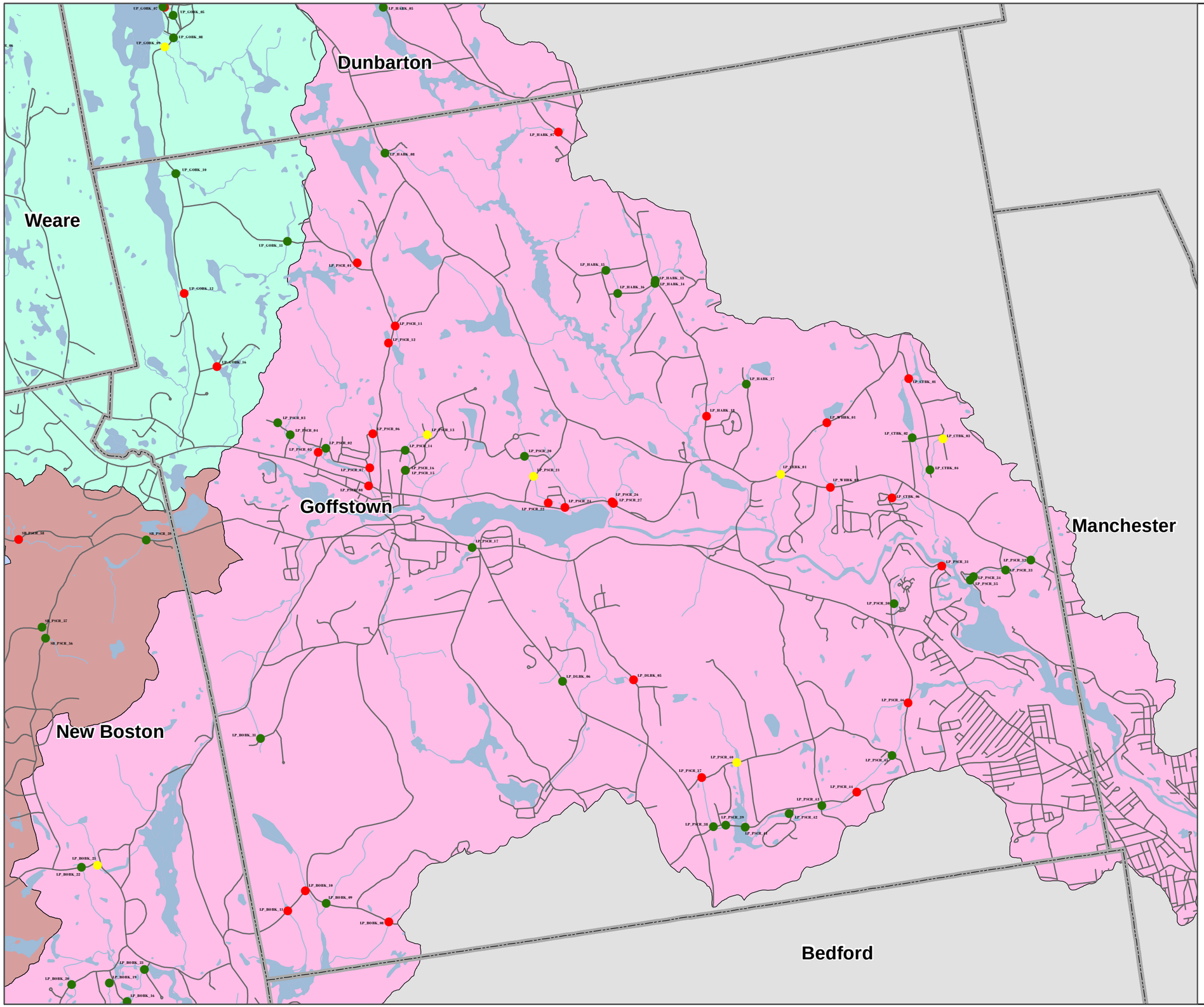
Town of Goffstown Culverts, continued

Town	Road Name	Stream Name	Crossing ID	Structure Type	Latitude	Longitude	Condition	Culvert Width (ft)	Culvert Slope	Culvert Outlet	Culvert Drop (ft)	Length (ft)	Bankfull %	AOP Status	Return Interval				
															2	10	25	50	100
GOFFSTOWN	Rt 114	Piscataquog	LP_PSCR_46	Culvert	42.99826	-71.52508	New	3	0.7	At Grade	0	130	7.5	GRAY	F	F	F	F	F
GOFFSTOWN	Rte 13	Piscataquog	LP_PSCR_12	Culvert	43.03598	-71.59882	New	2	2.5	Free Fall	0.2	85	23.5	RED	F	F	F	F	F
GOFFSTOWN	S Main St	Piscataquog	LP_PSCR_17	Culvert	43.01471	-71.587	New	5	1.9	At Grade	0	56.5	11.8	GREEN	P	T	T	F	F
GOFFSTOWN	Sarette	Piscataquog	LP_PSCR_34	Culvert	43.0116	-71.51562	Old	3	4.7	Cascade	0.8	28.5	32.0	GRAY	P	P	P	F	F
GOFFSTOWN	Saunders Rd	Gorham Brook	UP_GOBK_16	Culvert	43.03353	-71.62355	New	1.5	0.5	At Grade	0	22		GRAY	F	F	F	F	F
GOFFSTOWN	Shirley Hill	Piscataquog	LP_PSCR_44A	Culvert	42.98785	-71.53448	New	7	1.9	Free Fall	0.6	50	62.6	RED	P	P	P	P	P
GOFFSTOWN	Shirley Hill Rd	Piscataquog	LP_PSCR_38	Bridge	42.98529	-71.55281	New	8.4	0.7	At Grade	0	25.6	45.6	GRAY	P	P	P	P	P
GOFFSTOWN	Shirley Hill Rd	Piscataquog	LP_PSCR_39	Bridge	42.98556	-71.55106	New	7.7	3.8	At Grade	0	24	77.2	GRAY	P	P	P	P	P
GOFFSTOWN	Shirley Hill Rd	Piscataquog	LP_PSCR_41	Bridge	42.98531	-71.54825	New	6	5.6	At Grade	0	25		GRAY	P	P	P	P	P
GOFFSTOWN	Shirley Hill Rd	Piscataquog	LP_PSCR_44	Culvert	42.98887	-71.53226	New	1.3	0.3	At Grade	0	44	9.7	GRAY	F	F	F	F	F
GOFFSTOWN	Smith	Piscataquog	LP_PSCR_14	Culvert	43.02475	-71.59676	Rusted	5.3	0.6	Free Fall	0.5	70	44.3	RED	P	P	T	F	F
GOFFSTOWN	Snook	Piscataquog	LP_PSCR_01	Culvert	43.04426	-71.60384	New	1.5	0.7	Cascade	0.3	40	5.4	GRAY	F	F	F	F	F
GOFFSTOWN	Snook Rd	Gorham Brook	UP_GOBK_11	Culvert	43.04663	-71.6134	New	2.3	2.4	Free Fall	1.6	52	21.4	RED	P	T	F	F	F
GOFFSTOWN	Stark Hwy	Harry Brook	LP_HABK_08	Culvert	43.0559	-71.59949	Old	3	1.1	Free Fall	0.4	57	11.4	RED	P	F	F	F	F
GOFFSTOWN	Stinson	Piscataquog	LP_PSCR_11	Culvert	43.03777	-71.5982	New	1	2	At Grade	0	52		GRAY	F	F	F	F	F
GOFFSTOWN	Summer st	Piscataquog	LP_PSCR_07	Culvert	43.02296	-71.60193	New	2.2	3.8	At Grade	0	55.5	33.8	GRAY	F	F	F	F	F
GOFFSTOWN	Tibbett Hilll Rd	Henry Brook	LP_HABK_18	Culvert	43.02833	-71.55363	Old	2	2.2	Free Fall	0.5	40	14.2	RED	F	F	F	F	F
GOFFSTOWN	Tibetts Hill Rd	Henry Brook	LP_HABK_07	Culvert	43.05779	-71.57465	New	1	6.3	At Grade	0	36.7		GRAY	F	F	F	F	F
GOFFSTOWN	Tibetts Hill Rd	Henry Brook	LP_HABK_13	Culvert	43.04257	-71.56109	New	3	4.5	Free Fall		60	18.2	GRAY	P	F	F	F	F
GOFFSTOWN	Tirrell Hill Rd	Whiting brook	LP_WHBK_01	Culvert	43.02758	-71.5365	New	1.5	3.7	At Grade	0.1	58	4.3	GRAY	F	F	F	F	F
GOFFSTOWN	Wallace	Dan Little Brook	LP_DLBK_06	Culvert	43.00057	-71.57415	Old	1.5	3.5	Cascade	1.9	41	24.8	GRAY	P	F	F	F	F
GOFFSTOWN	Walnut Hill	Piscataquog	LP_PSCR_43	Culvert	42.98701	-71.53738	New	7		Cascade	0.7		57.4	GRAY	P	P	T	T	F
GOFFSTOWN	Water St	Piscataquog	LP_PSCR_35	Culvert	43.01103	-71.51611	Old	3	1.8	Backwatered	0	42	38.1	GRAY	P	P	T	F	F
GOFFSTOWN	Whipple	Piscataquog	LP_PSCR_06	Culvert	43.02651	-71.60142	Old	2	2.7	At Grade	0	34	16.1	GRAY	F	F	F	F	F
GOFFSTOWN	Winter Hill Rd	Piscataquog	LP_PSCR_20	Culvert	43.02416	-71.57967	New	4	1	At Grade	0	60	46.5	GRAY	P	P	P	P	P

Town	Road Name	Stream Name	Crossing ID	Structure Type	Latitude	Longitude	Condition	Culvert Width (ft)	Culvert Slope	Culvert Outlet	Culvert Drop (ft)	Length (ft)	Bankfull %	AOP Status	Return Interval				
															2	10	25	50	100
GOFFSTOWN	1st Ave	Piscataquog	LP_PSCR_02	Culvert	43.02493	-71.60793	Rusted	3.6	0.7	Backwatered	0	40	37.9	GREEN	P	T	F	F	F
GOFFSTOWN	Addison	Piscataquog	LP_PSCR_37	Culvert	42.99047	-71.55456	New	1	0.9	Free Fall	0.15	41		RED	F	F	F	F	F
GOFFSTOWN	Addison	Piscataquog	LP_PSCR_40	Culvert	42.99207	-71.54931	New	2.3	0.7	Free Fall	0.6	41		RED	T	F	F	F	F
GOFFSTOWN	Addison	Piscataquog	LP_PSCR_45	Arch	42.99279	-71.52742	Old	3.3	0.2	Cascade	0.4	57	35.8	GRAY	P	P	P	P	P

Piscataquog River Hydrology Assessment 2014

Potential Status of Culvert at 2 Year Storm Event



Potential Status of Culvert at 2 Year Storm Event

- Pass
- Transitional
- Fail
- Town Boundary
- Roads
- Lakes and Wetlands
- Streams

HUC 12 Sub-Watersheds

- Everett Lake
- Lower Piscataquog River
- Middle Branch Piscataquog River
- Rand Brook-South Branch
- South Branch Piscataquog River
- Upper Piscataquog River
- Weare Reservoir

Data Sources:
NH GRANIT Digital Data (1:24,000)
NH Department of Transportation
NH Department of Environmental Services
Trout Unlimited
Southern New Hampshire Planning Commission

Map Produced by
GIS Service SNHPC 2014.
Contact: gis@snhpc.org
Ph: (603) 669-4664

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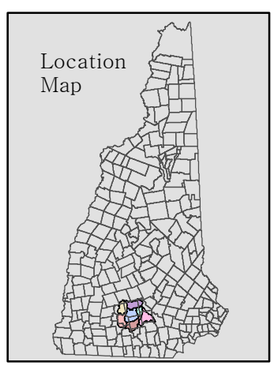
This map is for planning purposes only. It is not to be used for legal boundary determinations or for regulatory purposes.

0 0.25 0.5 1 1.5 2 Miles

N W E S

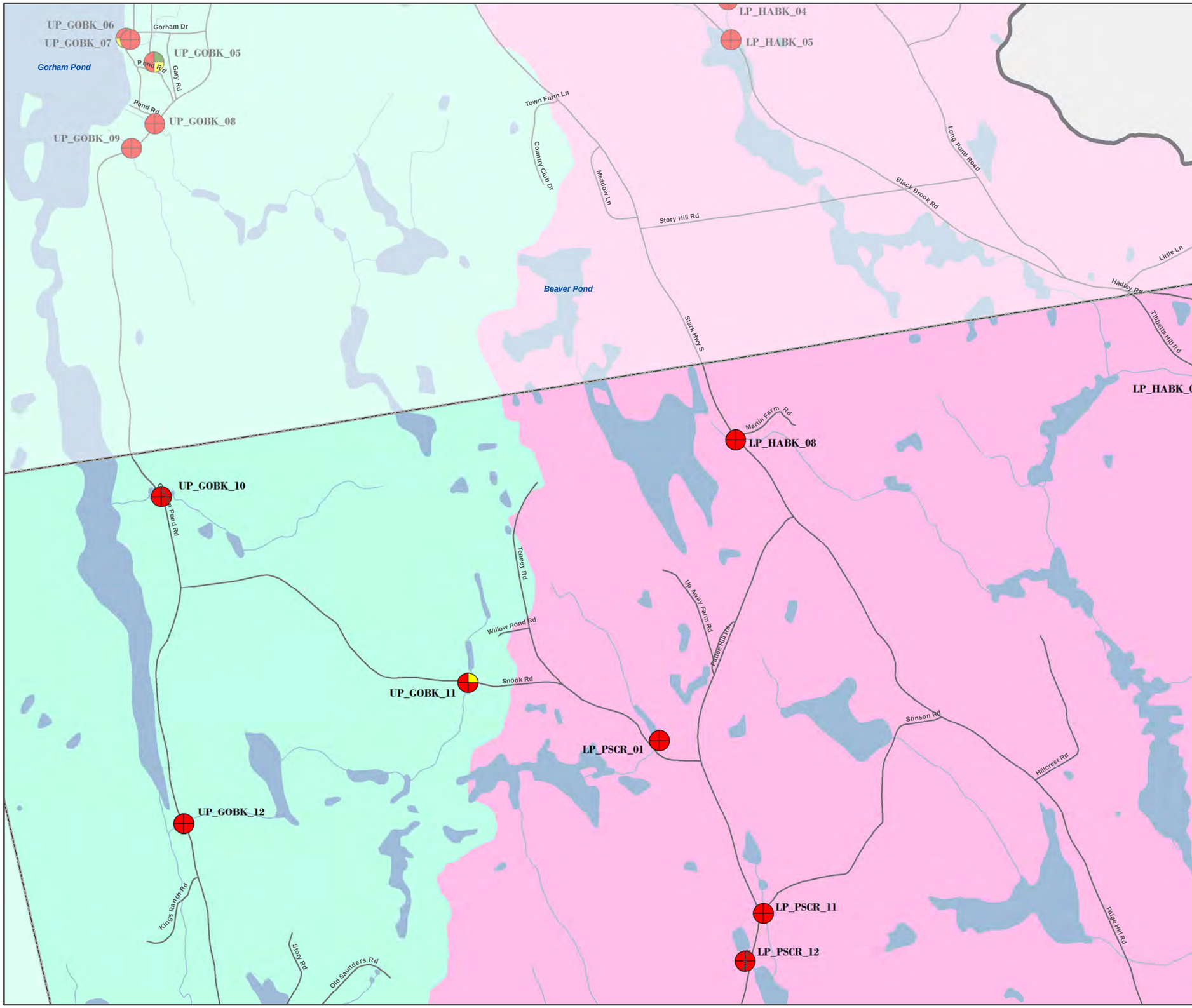
Location Map



Piscataquog River Hydrology Assessment 2014

Goffstown

Map 1 of 7



Potential Status of Culvert at Given Storm Event

- Pass
- Transitional
- Fail

Storm Year

100	10
50	25

- Town Boundary
- Roads
- Lakes and Wetlands
- Streams

HUC 12 Sub-Watersheds

- Everett Lake
- Lower Piscataquog River
- Middle Branch Piscataquog River
- Rand Brook-South Branch
- South Branch Piscataquog River
- Upper Piscataquog River
- Weare Reservoir

0 0.125 0.25 0.5 Miles

Data Sources:
NH GRANIT Digital Data (1:24,000)
NH Department of Transportation
NH Department of Environmental Services
Trout Unlimited
Southern New Hampshire Planning Commission

Map Produced by
GIS Service SNHPC 2014.
Contact: gis@snhpc.org
Ph: (603) 669-4664

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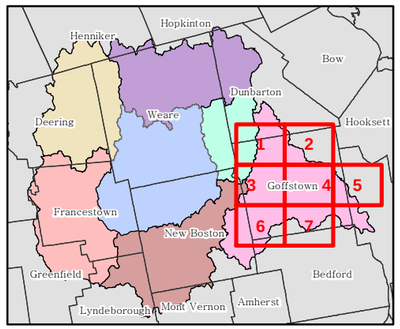

Piscataquog River Hydrology Assessment 2014

Goffstown

Map 2 of 7

Potential Status of Culvert at Given Storm Event

- Pass
- Transitional
- Fail

Storm Year

100	10
50	25

- Town Boundary
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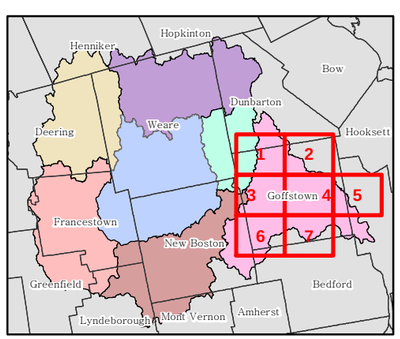
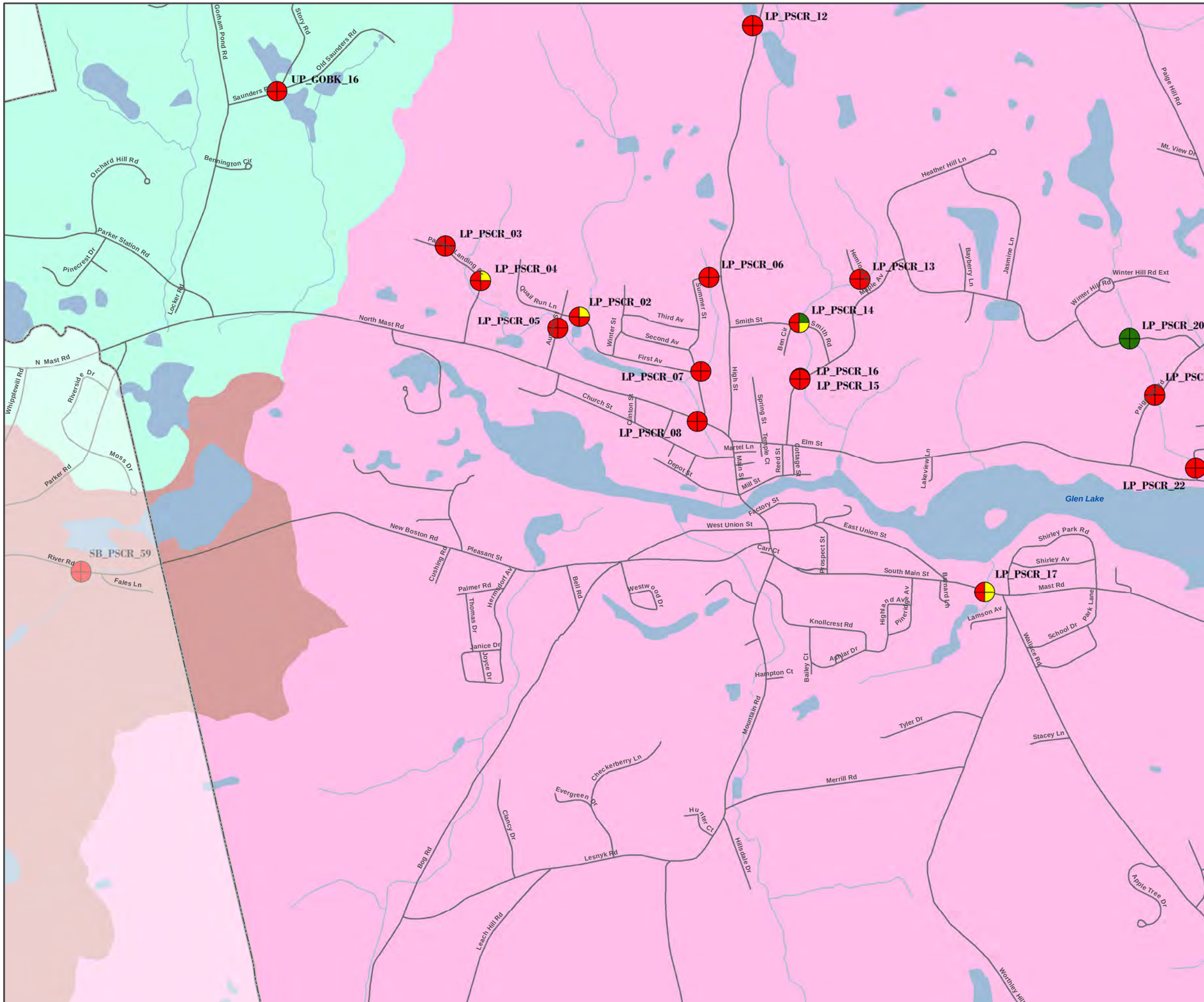


Piscataquog River Hydrology Assessment 2014

Goffstown

Map 3 of 7



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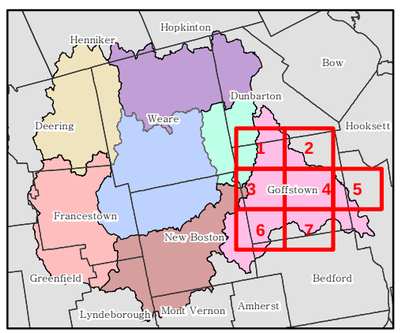
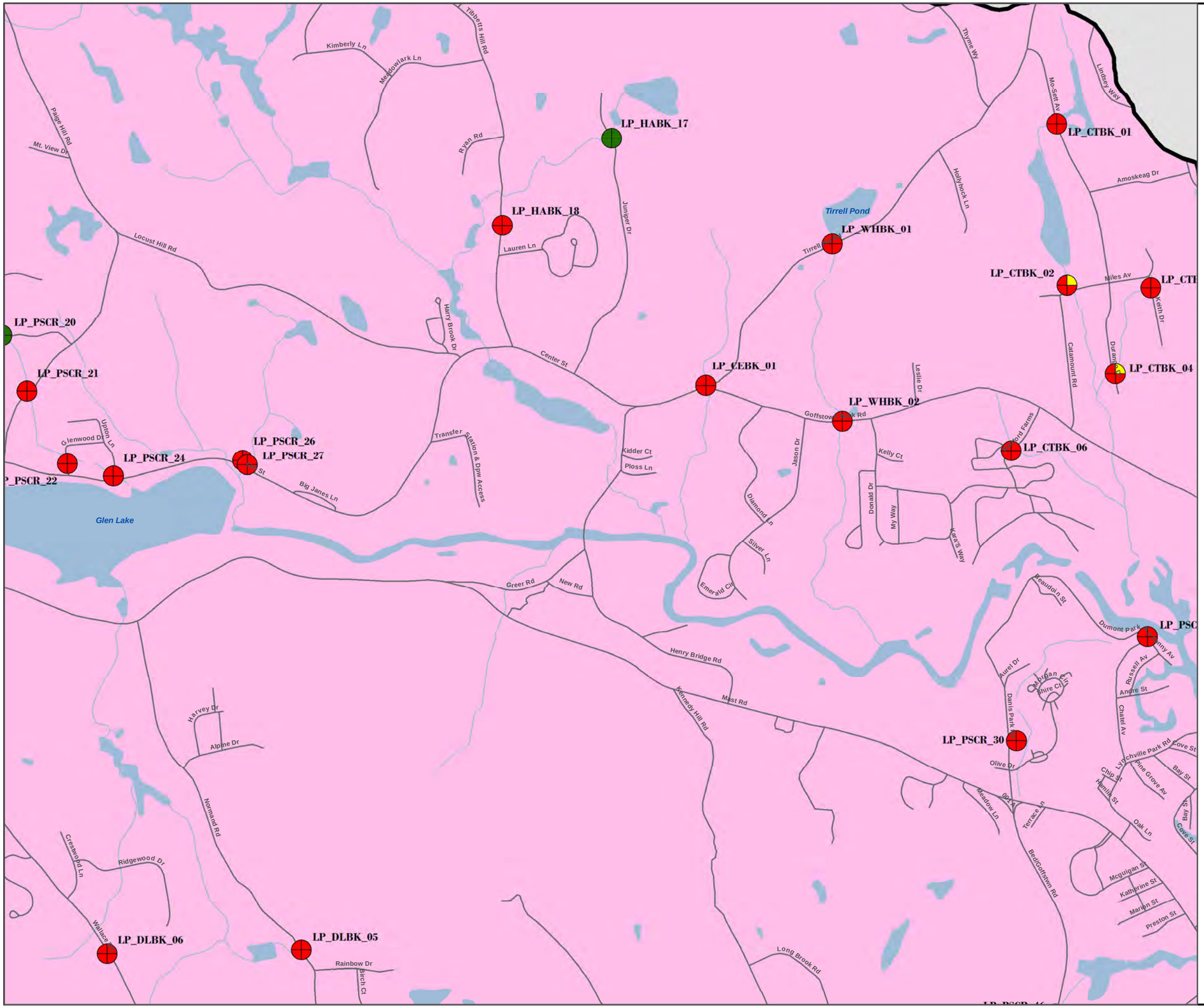


Piscataquog River Hydrology Assessment 2014

Goffstown

Map 4 of 7



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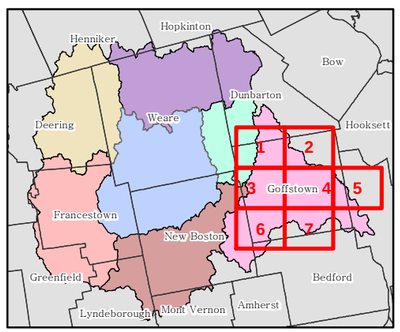
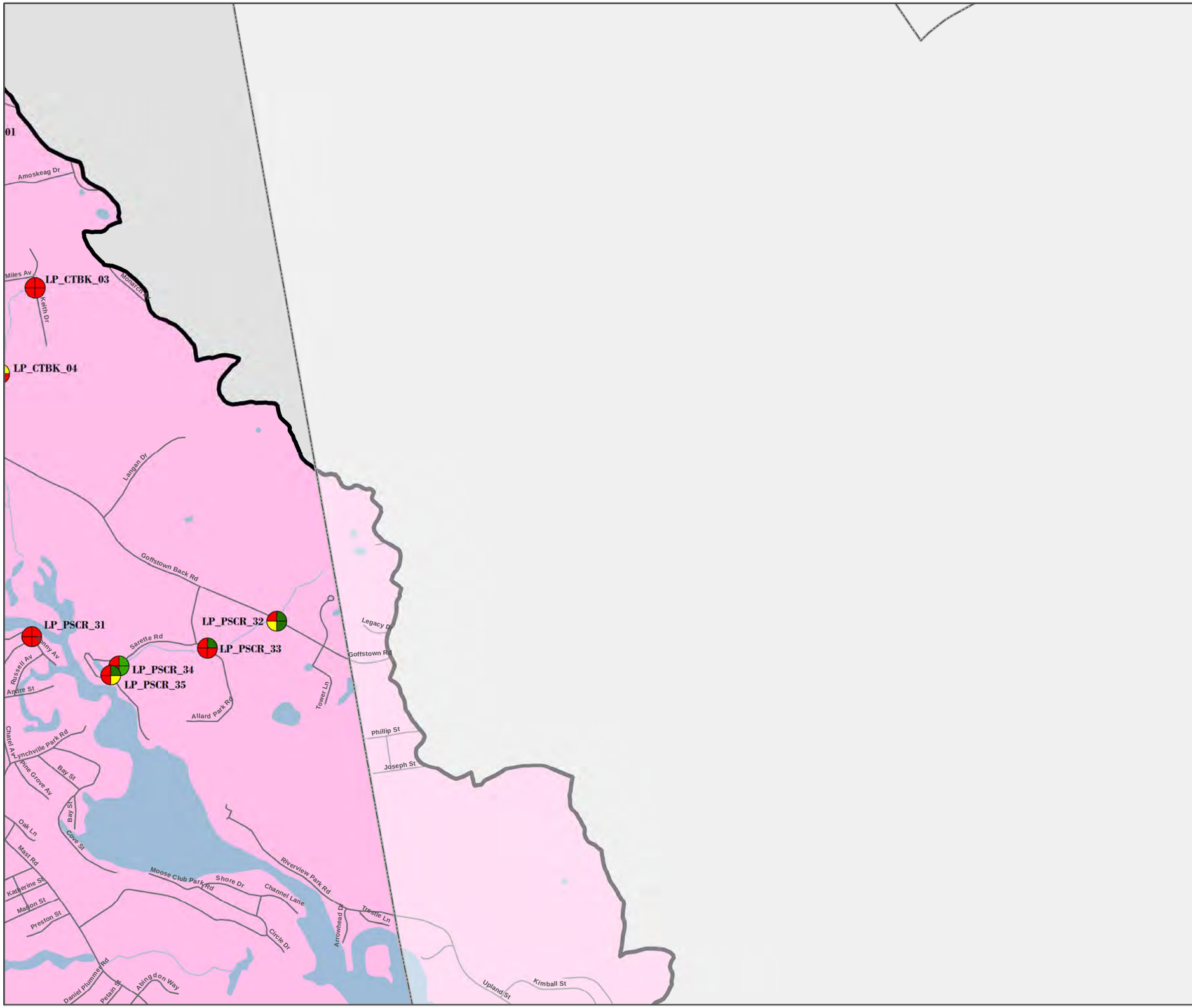


Piscataquog River Hydrology Assessment 2014

Goffstown

Map 5 of 7



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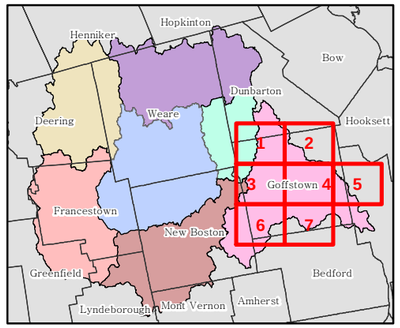
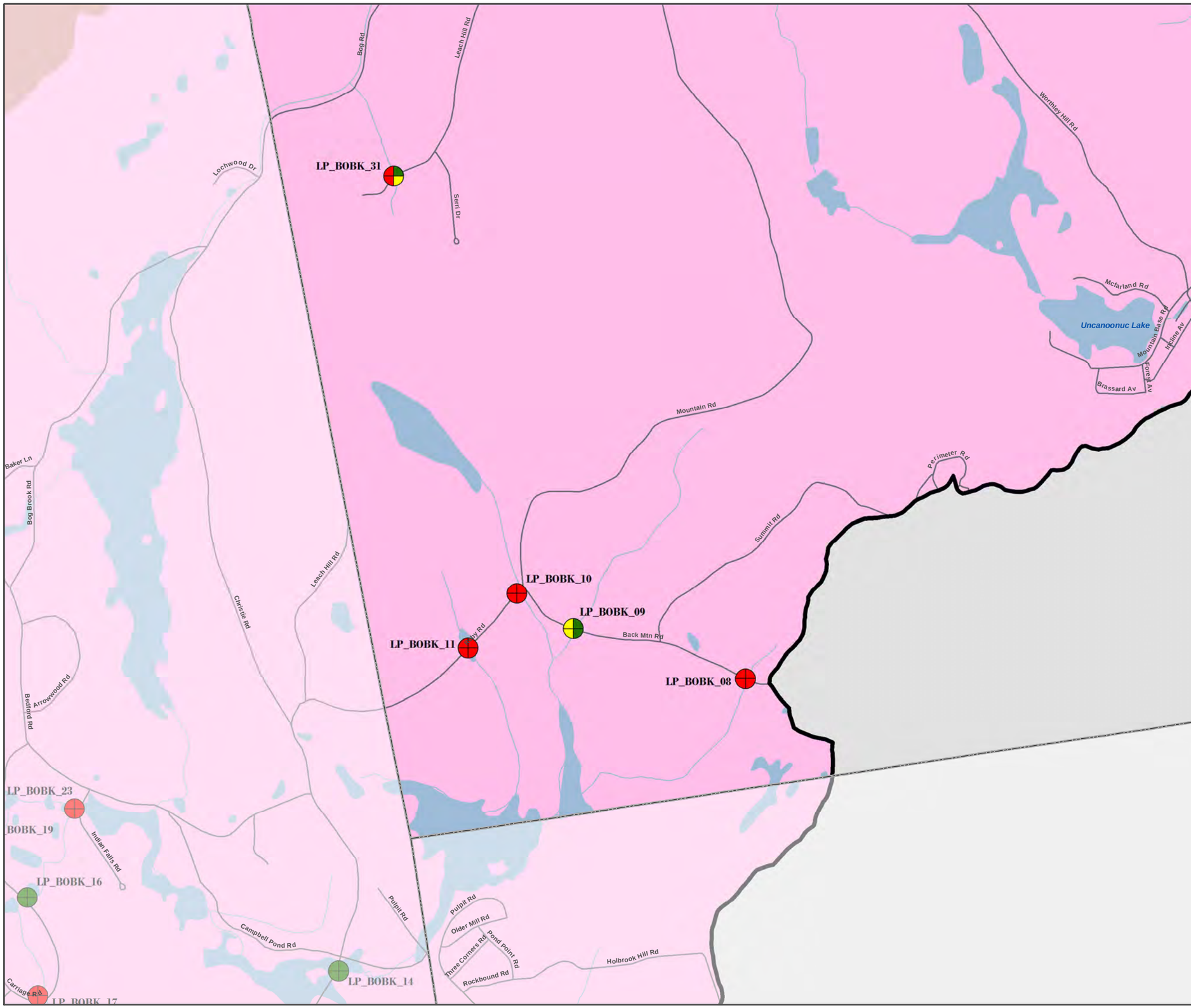


Piscataquog River Hydrology Assessment 2014

Goffstown

Map 6 of 7



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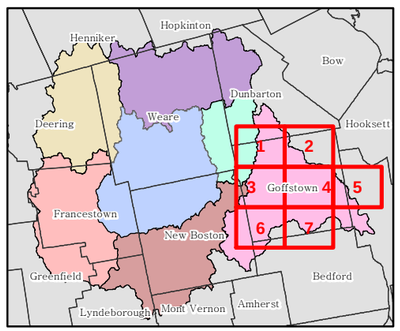
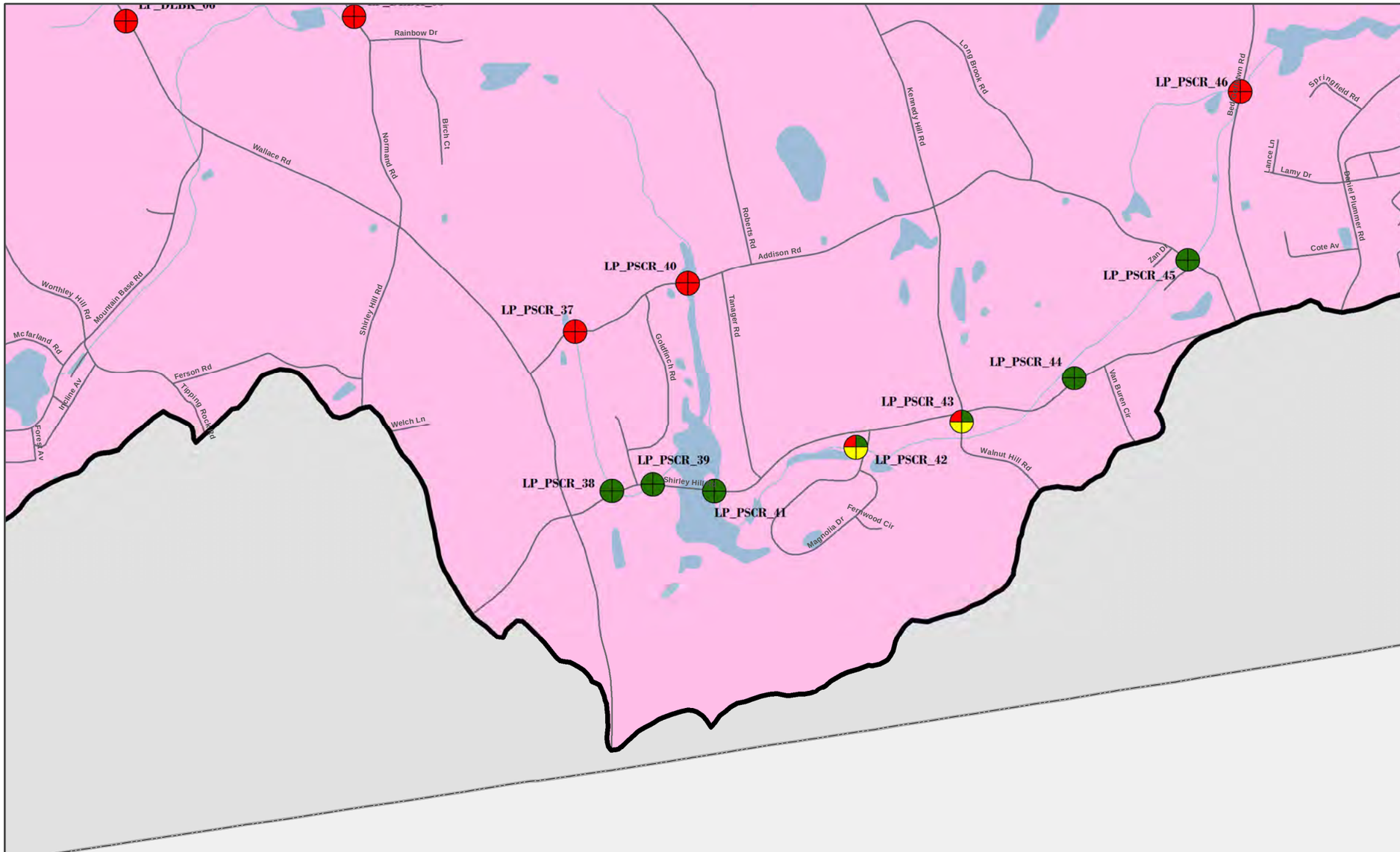


Piscataquog River Hydrology Assessment 2014

Goffstown

Map 7 of 7



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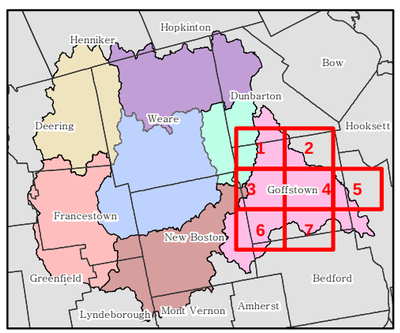

APPENDIX M

Town of Goffstown Flood Hazard (FH) Overlay District

Section 13 - OVERLAY DISTRICT DESCRIPTION
Town of Goffstown Zoning Ordinance, as amended 3-11-2014

13.1 Generally - Certain lands within the Town of Goffstown are included in the following Overlay Districts for the purposes so stated in this Section, and as shown on the Zoning Overlay District Maps, and established pursuant to Section 2.1, Zoning Districts Established. The Overlay Districts are superimposed upon the Base Districts, and the provisions of each Overlay District shall be in addition to the provisions of the Base Districts. Land subject to the restrictions of a Base District and one or more Overlay Districts shall be used only if and to the extent that a proposed use is permitted both in the Base District and the applicable Overlay Districts. Wherever the regulations differ between the Base and Overlay Districts, the regulations that impose the more restrictive provisions or the higher standards shall control.

13.2 Flood Hazard (FH) District - This ordinance, adopted pursuant to the authority of RSA 674:16, shall be known as 13.2 Flood Hazard (FH) District of the Town of Goffstown. The regulations in this ordinance shall overlay and supplement the regulations in the Town of Goffstown Zoning Ordinance, and shall be considered part of the Zoning Ordinance for purposes of administration and appeals under state law. If any provision of this ordinance differs or appears to conflict with any provision of the Zoning Ordinance or other ordinance or regulation, the provision imposing the greater restriction or more stringent standard shall be controlling.

13.2.1 Certain areas of the Town of Goffstown, New Hampshire are subject to periodic flooding, causing serious damages to properties within these areas. Relief is available in the form of flood insurance as authorized by the National Flood Insurance Act of 1968. Therefore, the Town of Goffstown, New Hampshire has chosen to become a participating community in the National Flood Insurance Program, and agrees to comply with the requirements of the National Flood Insurance Act of 1968 (P.L. 90-488, as amended) as detailed in this Floodplain Management Ordinance.

13.2.1.1 To reduce the hazards of floods in the interest of the public health, safety, and welfare;

13.2.1.2 To protect Floodplain occupants from a flood that is or may be caused by their own land use;

13.2.1.3 To protect the public from the burden of extraordinary financial expenditures for flood control and relief; and

13.2.1.4 To protect the capacity of Floodplain areas to absorb, transmit, and store runoff.

13.2.2 Authority for the FH District - The FH District is established in accordance with the provisions of RSA 674:21, Innovative Land Use Controls, and the National Flood Insurance Act of 1968. The FH District is considered to be an innovative land use control as environmental characteristics zoning.

13.2.3 The following regulations in this ordinance shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for the County of Hillsborough, N.H" dated September 25, 2009 or as amended, together with the associated Flood Insurance Rate Maps dated September 25, 2009 or as amended, which are declared to be a part of this ordinance and are hereby incorporated by reference.

13.2.4 Development Restrictions in the Floodway - The Building Code Enforcement Officer shall obtain, review, and reasonably utilize any floodway data available from Federal, State, or other sources as criteria for requiring that all development located in Zone A meet the following floodway requirement:

> "No encroachments, including fill, new construction, substantial improvements, and other development are allowed within the floodway that would result in any increase in flood levels within the community during the Base Flood discharge."

13.2.5 Development Restrictions in the One Hundred (100) Year Floodplain - Buildings or structures may be constructed or substantially improved within the One Hundred (100) Year Floodplain subject to the following standards:

> **13.2.5.1** All new construction or substantial improvement of residential structures have the lowest floor (including basement) elevated to or above the 100 Year Flood elevation.
>
> **13.2.5.2** Non-residential building or structures, shall comply with either the elevation standards for residential buildings and structures in accordance with this Section, or be flood-proofed so that below the 100 Year Floodplain, the structure is watertight, with walls substantially impermeable to the passage of water, and has structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy. It shall be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions of this section.

13.2.6 All manufactured homes to be placed or substantially improved within the One Hundred (100) Year Floodplain shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at or above the Base Flood level, and be securely anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state and local anchoring requirements for resisting wind forces.

13.2.7 All recreational vehicles placed on sites within Zones A and AE shall either:

(i) be on the site for fewer than 180 consecutive days;
(ii) be fully licensed and ready for highway use; or

(iii) meet all standards of Section 60.3 (b) (1) of the National Flood Insurance Program Regulations and the elevation and anchoring requirements for "manufactured homes" in Paragraph (c) (6) of Section 60.3.

13.2.8 Development Involving Alteration or Relocation of Watercourses

13.2.8.1 In riverine situations, prior to the alteration or relocation of a watercourse, the applicant for such authorization shall notify the Wetlands Bureau of the New Hampshire Department of Environmental Services and submit copies of such notification to the Building Code Enforcement Officer in addition to the copies required by RSA 482-A:3. The applicant shall submit to the Code Enforcement Officer, certification provided by a licensed professional engineer, assuring that the flood carrying capacity of an altered or relocated watercourse can and will be maintained. Further, the applicant shall be required to submit copies of said notification to those adjacent communities as determined by the Building Inspector, including notice of all scheduled hearings before the Wetlands Bureau.

13.2.8.2 The applicant shall submit to the Building Inspector, certification provided by a registered professional engineer, assuring that the flood carrying capacity of an altered or relocated watercourse can and will be maintained.

13.2.8.3 Until a Regulatory Floodway is designated along watercourses, no new construction, substantial improvements, or other development (including fill) shall be permitted within Zone AE on the FIRM, unless it is demonstrated by the applicant that the cumulative effect of the proposed development, when combined with all existing and anticipated development, will not increase the water surface elevation of the Base Flood more than one foot at any point within the community.

13.2.8.4 Along watercourses with a designated Regulatory Floodway no encroachments, including fill new construction, substantial improvements, and other development are allowed within the floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practices that the proposed encroachment would not result in any increase in flood levels within the community during the Base Flood discharge.

13.2.9 The Building Inspector shall review all building permit applications for new construction or substantial improvements to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is located in a special flood hazard area, all new construction or substantial improvements shall be:

13.2.9.1 Designed and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

13.2.9.2 Constructed by methods and practices that minimize flood damages, and with materials resistant to flood damage;

13.2.9.3 Constructed with electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities at an elevation that is equal to or greater than the required elevation, as determined pursuant to Section 13.2.11, Determination of Required Elevations, and which are designed and located so as to prevent water from entering or accumulating within the equipment and facilities during conditions of flooding;

13.2.9.4 Constructed such that fully enclosed areas below the lowest floor that are subject to flooding meet the following requirements:

13.2.9.5 The enclosed area is unfinished or flood resistant, usable solely for parking of vehicles, building access or storage;

13.2.9.6 The area is not a basement; and

13.2.9.7 The area shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria: A minimum of two (2) openings having a total net area of not less than one (1) square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one (1) foot above grade. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit floodwaters; and

13.2.9.8 Constructed to include adequate drainage paths to guide floodwaters around and away from the proposed structures where the structures are to be located on slopes.

13.2.10 General Application Requirements within the FH District - All proposed development in the FH District shall require a permit from the Code Enforcement Officer. The Building Code Enforcement Officer shall review all applications for permits and approval of new construction or substantial improvements to determine whether the proposed building site is in the FH District and if so, to assure that proposed buildings, structures, and improvements will be reasonably safe from flooding and in accordance with the requirements of this Section. Within the FH District, the following plans, data, information, and certification shall be provided by an applicant to the Code Enforcement Officer:

13.2.10.1 The proposed and as-built elevation in relation to the National Geodetic Vertical Datum (NGVD) of the lowest floor, including any basement;

13.2.10.2 If the structure is proposed to be flood-proofed, the elevation in relation

to NGVD to which the structure is to be flood-proofed and the as-built elevation;

13.2.10.3 Upon completion of flood-proofing, the certification of a licensed professional engineer or architect that the design and methods of construction or installation of flood-proofing were completed in accordance with accepted standards of practice for the same;

13.2.10.4 Where new or replacement on-site subsurface disposal systems are proposed in the FH District, the certification of a licensed professional engineer, assuring that new or replacement systems will be designed to minimize or eliminate infiltration of flood waters into the systems, and to minimize or eliminate discharges from the systems into flood waters, and that the systems will be located to avoid impairment to them or contamination from them during periods of flooding; and

13.2.10.5 Copies of all necessary permits from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

13.2.11 Determination of Required Elevation - The Building Code Enforcement Officer shall determine the required elevation for development in special flood hazard areas, in the following order of precedence according to the data available:

13.2.11.1 In zone A and AE, by reference to the elevation provided in the Flood Insurance Study and the accompanying FIRM or FHBM;

13.2.11.2 In A Zones, by obtaining, reviewing, and reasonably utilizing any One Hundred (100) Year Floodplain elevation data available from Federal, State, or other sources including data submitted pursuant to development applications to the Town of Goffstown; or

13.2.12 Appeals to the Zoning Board of Adjustment (ZBA) in the FH District.

13.2.12.1 Any appeal of a determination or decision made pursuant to this Section shall be made in accordance with Section 15.3, Decisions by the Zoning Board of Adjustment (ZBA).

13.2.12.2 If the applicant, upon appeal, requests a variance as authorized by RSA 674:33, I(b), the applicant shall have the burden of showing in addition to the usual variance standards under state law that:

a. The variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense.

b. If the requested variance is for activity within a designated regulatory floodway, no increase in flood levels during the Base Flood discharge will

result.

c. The variance is the minimum necessary, considering the flood hazard, to afford relief.

13.2.13 The Zoning Board of Adjustment shall notify the applicant in writing that:
a. The issuance of a variance to construct below the Base Flood level, if granted, shall result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage; and
b. Such construction below the Base Flood level increases risk to life and property.
c. Such notification shall be maintained with a record of all variance actions.

13.2.14 The community shall:
a. Maintain a record of all variance actions, including the justification for their issuance, and
b. A record of all variance actions in the FH District shall be included in the Town's regular reports to the Federal Insurance Administrator at the Federal Emergency Management Agency (FEMA).

13.2.15 Definitions: following definitions relate to the Flood Hazard (FH) District, which is an overlay district established pursuant to Section 13.2. These definitions are for words and terms used exclusively in conjunction with this District.

13.2.15.1 100 Year Flood - see "Base Flood."

13.2.15.2 Area of Special Flood Hazard – the land in the Floodplain within the Town of Goffstown subject to 1 percent or greater chance of flooding in any given year. The area is designated as Zones A and AE on the Flood Insurance Rate Map.

13.2.15.3 Base Flood or 100-Year Flood - A flood having a one percent chance of being equaled or exceeded in any given year.

13.2.15.4 Basement – means any area of a building having its floor subgrade on all sides.

13.2.15.5 Building – see "structure."

13.2.15.6 Development – means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

13.2.15.7 FEMA - The Federal Emergency Management Agency.

13.2.15.8 Flood or Flooding - A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters, or from the unusual and rapid accumulation or runoff of surface water from any source.

13.2.15.9 Flood Elevation Study or Flood Insurance Study - An examination evaluation and determination of flood hazards, and if appropriate, corresponding water surface elevations, or an examination evaluation and determination of mudslide (i.e. mudflow) and/or flood-related erosion hazards.

13.2.15.10 Flood Insurance Rate Map - Referred to as the FIRM, is the official map incorporated with this ordinance on which the Federal Emergency Management Agency has delineated both the special flood hazard areas and the risk premium zones applicable to the community.

13.2.15.11 Floodplain or Flood-prone Area - Any land area susceptible to being inundated by water from any source (see definition of "flooding".

13.2.15.12 Flood proofing - Any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

13.2.15.13 Floodway or Regulatory Floodway - The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the Base Flood without increasing the water surface elevation. These areas are designated as floodways on the Flood Boundary and Floodway maps.

13.2.15.14 Functionally dependent use - A use, which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long term storage or related manufacturing facilities.

13.2.15.15 Highest adjacent grade - the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

13.2.15.16 Historic Structure – means any structure that is:

a. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

b. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

c. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or

d. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either (i) by an approved state program as determined by the Secretary of the Interior, or (ii) directly by the Secretary of the Interior in states without approved programs.

13.2.15.17 Lowest Floor - means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such an enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

13.2.15.18 Manufactured home - means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. For Floodplain management purposes the term ‘‘manufactured home’’ includes park trailers, travel trailers, and other similar vehicles placed on-site for greater than 180 consecutive days. This includes manufactured homes located in a Manufactured Home Park or Subdivision.

13.2.15.19 Manufactured Home Park or Subdivision - means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

13.2.15.20 Mean sea level - The National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which Base Flood elevations shown on the Flood Insurance Rate Map are referenced.

13.2.15.21 New construction - for the purposes of determining insurance rates, structures for which the “start of construction” commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For Floodplain management purposes, *new construction* means structures for which the *start of construction* commenced on or after the effective date of a Floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

13.2.15.22 Recreational Vehicle - is defined as:

a. Built on a single chassis;

b. 400 square feet or less when measured at the largest horizontal projection;

c. Designed to be self-propelled or permanently towable by a light duty

truck; and

d. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use.

13.2.15.23 Regulatory Floodway - means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the Base Flood without cumulatively increasing the water surface elevation more than a designated height.

13.2.15.24 Special flood hazard area - See “Area of Special Flood Hazard."

13.2.15.25 Start of Construction - includes substantial improvements, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on-site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or part of the main structure.

13.2.15.26 Structure - For Floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home.

13.2.15.27 Substantial Damage - means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

13.2.15.28 Substantial Improvement - means any combination of repairs, reconstruction, alteration, or improvements to a structure in which the cumulative cost equals or exceeds fifty percent of the market value of the structure. The market value of the structure should equal:

(a) The appraised value prior to the start of the initial repair or improvement, or

(b) In the case of damage, the value of the structure prior to the damage occurring.

For the purposes of this definition, "substantial improvement" is considered to

occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. This term includes structures that have incurred substantial damage, regardless of actual repair work performed. The term does not, however, include any project for improvement of a structure required to comply with existing health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions or any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure".

13.2.15.29 Violation - means the failure of a structure or other development to be fully compliant with the community's Floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in 44CFR § 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

13.2.15.30 Water Surface Elevation - The height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the Floodplains.