



Londonderry  
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TOWN OF LONDONDERRY  
*Community Development*  
Planning & Economic Development Division

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# PUBLIC ANNOUNCEMENT

## Town of Londonderry Community Development Department

The Town is seeking public input on its  
**HAZARD MITIGATION PLAN**

The Town and Southern NH Planning Commission will be accepting public comment on the draft plan ***between the dates of Monday November 8, 2010 and Friday December 17, 2010.***

The draft plan is available at:

- Town of Londonderry Community Development Department, 268B Mammoth Road, Londonderry and also online at [www.londonderrynh.org/planning/planning\\_005.htm](http://www.londonderrynh.org/planning/planning_005.htm)
- Southern New Hampshire Planning Commission, 438 Dubuque Street, Manchester

All interested parties are invited to review the plan and submit comments.

Call the Town of Londonderry Community Development Department at 432-1100 x134 or the Southern NH Planning Commission at 669-4664 x305 for more information.

# TOWN OF LONDONDERRY, NEW HAMPSHIRE



*Town of Londonderry, New Hampshire, Town Offices*

## HAZARD MITIGATION PLAN

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# TOWN OF LONDONDERRY NEW HAMPSHIRE

## HAZARD MITIGATION PLAN

\_\_\_\_\_ 2010

**Prepared by the Southern New Hampshire Planning Commission**

The preparation of this document has been financed in part by a grant from the State of New Hampshire Department of Safety, Homeland Security and Emergency Management.

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## Acknowledgements

Appreciation is extended to the following people for contributing their time and effort to complete the *Londonderry Hazard Mitigation Plan*:

### 2010 Londonderry Hazard Mitigation Committee Members

Kevin MacCaffrie - Emergency Management Director, Fire Chief, Chair  
Richard G. Canuel - Assistant Inspector, Building, Health and Zoning  
Department  
Sharon Carson - Resident of the Town of Londonderry  
Tim Jones - Lieutenant, Londonderry Police Department  
Tim Thompson - Town Planner, Londonderry Community Development  
Department  
John R. Trottier - Assistant Director of Public Works and Engineering,  
Department of Public Works  
Jodie Levandowski - Intern, Londonderry Community Development  
Department  
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Thanks also to:

- The New Hampshire Department of Safety, Division of Fire Safety and Emergency Management, Homeland Security and Emergency Management (NHHSEM), which developed the *New Hampshire Natural Hazards Mitigation Plan*;
- The Southwest Region Planning Commission, which developed *Hazard Mitigation Planning for New Hampshire Communities*; and
- The Bedford, Derry, Goffstown, Hooksett, Manchester and New Boston Hazard Mitigation Committees and their respective Hazard Mitigation Plans.

All the above publications served as models for this plan.

*"We will of course be there to help after disaster strikes, but as you all know, there's no substitute for mitigation before it does....*

*As a poet once wrote, "the test of men lies in action." We as emergency managers and first responders cannot afford to wait for action....*

*Through planning, mitigation, education, and cooperation, we can make sure our at-risk communities are prepared before the first drop of rain or gust of wind ever threatens our shores."*

—Joe Allbaugh, Director of FEMA,  
addressing the 2002 National Hurricane Conference

## Preface

Hazard mitigation planning is a relatively new field, spearheaded by the Federal Emergency Management Agency (FEMA) during the 1990s after Hurricane Andrew caused more than \$20 billion in damage across several southern states. That event resulted in 54 fatalities and the disruption of millions of lives. The Disaster Mitigation Act of 2000, developed by FEMA, was intended to help both communities and states prepare for, and deal with, such disasters. While New England normally does not have hurricanes of Andrew's magnitude, this area does experience many types of natural disasters that cost both lives and money.

These disasters and other natural hazards occur during all four seasons in the Northeast: winter ice, snow, and nor'easters; spring flooding; summer downbursts and thunderstorms; and fall hurricanes. Planning to make a community *disaster-resistant* before these events occur can help save lives as well as homes and infrastructure. FEMA has several programs designed to strengthen the nation's disaster resistance by reducing risks, and changing conditions and behaviors before a disaster in order to protect lives and prevent the loss of property.

FEMA has also raised its budget to upgrade the existing Flood Insurance Rate Maps through the Map Modernization project. Many communities have outdated maps that do not reflect the true extent of flooding potential.

A community's eligibility for hazard mitigation funding depends upon its having adopted a hazard mitigation plan that addresses these issues. Mitigation measures contained within the *Londonderry Hazard Mitigation Plan* may be sufficient to receive grant funding.

It is hoped that this document will be a good first step toward analyzing hazards in Londonderry, forecasting where potential disasters might occur, and reducing their impact on people and the community.

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## Town of Londonderry, New Hampshire Hazard Mitigation Plan Executive Summary

The *Londonderry Hazard Mitigation Plan* has been developed to help Londonderry become a disaster-resistant community by taking measures to reduce future losses from natural or man-made hazardous events before they occur. The Londonderry Hazard Mitigation Committee (LHMC), made up of community members and town officials, developed the plan.

Natural hazards are addressed as follows:

- |             |                        |                   |
|-------------|------------------------|-------------------|
| A. Flooding | C. Fire                | E. Seismic Events |
| B. Wind     | D. Ice and Snow Events | F. Other Hazards  |

The Londonderry Hazard Mitigation Committee identified critical facilities, areas at risk, commercial economic impact areas, and hazardous materials facilities.

### **Critical Facilities:**

- Town Offices
- Federal Facilities
- Post Offices
- Police and Fire Stations
- Emergency Operations Centers
- Military Stations
- Public Works Garages
- Emergency Fuel Facilities
- Emergency Shelters
- Airport and Related Facilities
- Wireless Communication Facilities and Radio Towers
- Public Water Systems, Pumps and Booster Stations
- Water Storage Tanks
- Sewer Systems and Pumps
- Electrical Power Substations
- Gas Pump Stations

### **Areas at Risk:**

- Solid Waste and Recycling Facilities
- Telephone Facilities
- Media Communications
- Major Roads and Bridges
- Dams
- Historic Properties
- Libraries
- Schools
- Child Care Facilities
- Senior Housing and Nursing Homes
- Hotels
- Recreation Areas
- Commercial Resources
- Medical Facilities
- Religious Facilities

## **Existing Hazard Mitigation Strategies**

The Londonderry Hazard Mitigation Committee identified existing strategies related to hazard mitigation as follows:

- Emergency Operations Plan
- Floodplain Development Ordinance
- Elevation Certificates
- Zoning Ordinance
- Subdivision and Site Plan Regulations
- International Building Code and Local Building Codes
- Excavation Regulations
- Stormwater Regulations
- Road Design Standards
- Snow Emergency Regulations
- Fire Codes
- Hazardous Materials Regulations
- Town Radio System
- Police Department
- Comprehensive Emergency Management Planning for Schools
- State Dam Program
- Shoreland Protection Act
- Best Management Practices

## **New and Ongoing Mitigation Programs and Policies**

The Londonderry Hazard Mitigation Committee identified 23 *new* hazard mitigation strategies as follows:

- Update the Schools Emergency Plan
- Continue to increase public outreach
- Develop a Local Sheltering Plan
- Develop Aquifer and Groundwater Protection Strategies by updating the Water Resource and Management Protection Plan
- Prioritize and upgrade inadequate culverts
- Work to mitigate repetitive flood problems on Brookview Drive
- Post high water level warnings along Kendall Pond
- Publish and distribute educational materials for residents of isolated areas outlining disaster preparedness, response, and limited access to homes by emergency vehicles
- Publish and distribute educational materials for residents of flood prone areas outlining disaster preparedness, response, and supply flood proofing/mitigation information to protect their property from flood damages
- Prioritize and upgrade Class VI roads

This plan is to be reviewed on an annual basis and updated every three to five years by the Londonderry Planning Department in coordination with the Londonderry Town Council. The next review will be during 2011.

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## SECTION I INTRODUCTION

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

### **Natural Hazards and Their Consequences**

During the past decade, 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 is expected to top \$1 billion in damage. 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. Much of this damage might have been averted with the implementation of foresighted hazard mitigation efforts.



*Photo of four homes lost in Tennessee due to a mile-wide tornado during November 2002. Portions of the Midwest and South are assessing the damage from more than 70 tornados 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 tornados. 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)*

Floods, tornados, winter storms, hurricanes, earthquakes, and wildfires – natural disasters – are part of the world around us. Their occurrence is inevitable. These



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 tornados 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.

### **What Is Hazard Mitigation?**

Hazard mitigation is the practice of reducing risks to people and property from natural hazards. FEMA's Federal Response Plan defines hazard mitigation as "activities designed to alleviate the effects of a major disaster or emergency or long-term activities to minimize the potentially adverse effects of future disaster in affected areas (A-5)." 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, 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, tornados, 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 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; and
- **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.

## Background: Londonderry Hazard Mitigation Planning

The Federal Emergency Management Agency (FEMA) has recommended that all communities establish local hazard mitigation plans as a means to reduce future losses from natural or man-made hazard events before they occur. Beginning November 1, 2004, FEMA has mandated an approved hazard mitigation plan be in place to receive specific disaster related grants. With a Pre-Disaster Mitigation Grant from FEMA, New Hampshire Homeland Security and Emergency Management (NHHSEM) provided funding to the Southern New Hampshire Planning Commission (SNHPC) to develop a local hazard mitigation plan for the Town of Londonderry. SNHPC began working with Londonderry representatives during May 2010 to update this plan.

## Purpose

The *Londonderry Hazard Mitigation Plan* serves as a strategic planning tool for use by the Town of Londonderry in its efforts to reduce future losses from natural or man-made hazard events before they occur. This *Plan* may constitute a new section of the Londonderry Master Plan, in accordance with RSA 674:2.

## Authority

This *Hazard Mitigation Plan* was prepared in accordance with the Town of Londonderry's Emergency Operations Plan, currently being updated in 2010, and under the authority of the Planning Mandate of Section 409 of Public Law

93-288 as amended by Public Law 100-707, the Robert T. Stafford Act of 1988, and the Disaster Mitigation Act of 2000. The *Londonderry Hazard Mitigation Plan* will be referred to as the "*Plan*." After a public hearing was held at the Londonderry Town Offices on \_\_\_\_\_, the Londonderry Town Council formally adopted this *Plan* on \_\_\_\_\_. Documentation of the adoption of this *Plan* is provided in Appendix H.

### **Scope of the *Plan***

The scope of the *Londonderry Hazard Mitigation Plan* includes the identification of natural hazards affecting the town, as identified by the Londonderry Hazard Mitigation Committee. The committee reviewed hazards in the following categories as outlined in the *State of New Hampshire Natural Hazard Mitigation Plan* and identified by the committee:

- A. Flooding - including riverine flood events, hurricanes, debris-impacted infrastructure, river ice jams, erosion, mudslides, rapid snowpack melt, dam breach or failure, and other water retention facility failure;
- B. Wind - including hurricanes, tornados, nor'easters, downbursts, and lightning;
- C. Fire - including wild land fires, target hazards, and isolated areas;
- D. Ice and snow events - including heavy snowstorms, ice storms, and hailstorms;
- E. Seismic Events - including earthquakes and landslides; and
- F. Other events - including utility pipe failure, airport related hazards, geomagnetism, drought, and extreme heat or cold.

### **Methodology**

In September 2004, the Londonderry Hazard Mitigation Committee (LHMC) was formed to begin the initial planning stages of the *Londonderry Hazard Mitigation Plan*. The LHMC developed the contents of the *Plan* using the 10-step planning process set forth in the Southwest Regional Planning Commission's *Hazard Mitigation Planning for New Hampshire Communities* handbook along with the FEMA *State and Local Mitigation Planning How-To Guides*. The SNHPC assisted the LHMC in the development of this *Plan*. The Committee consisted of representatives from various local agencies, including the Londonderry Planning and Economic Development Department, Fire Department, Police Department, Public Works and Engineering Department, Building Department, Town Administration, and public citizens. The Committee held five meetings beginning in September 2004 and ending in May 2005 to collect information, compile, and review the *Plan*.

### **2010 Plan Update Methodology**

In May 2010, the Londonderry Hazard Mitigation Committee (LHMC) was formed to begin updating the plan. The Update Committee used the same ten-step planning process set forth in the *Hazard Mitigation Planning for New Hampshire Communities* handbook as did the original Committee. Each section of the plan was reviewed and updated according to new information and the events of the past 5 years. The Update Committee consisted of representatives from various local agencies, including the Community Development Department, Fire Department, Police Department and Department of Public Works, among other citizens who attended the meetings. The Committee held a total of five public meetings beginning in June 2010 and ending in October 2010 to collect information, compile the plan update, and review the plan update.

### **2010 Plan Update Public Committee Meetings**

On the following dates, the Londonderry Hazard Mitigation Committee held committee meetings at the Londonderry Town Offices: June 15, 2010, July 20, 2010, August 17, 2010, September 21, 2010, and October 19, 2010. Committee meetings were made public and posted in a minimum of two public places as required by New Hampshire state law for public meetings.

Minutes were kept for each meeting and brainstorming sessions were recorded. Each committee member received an E-mail that contained minutes of the previous meeting and an agenda. The minutes were available to the public. Copies of the meeting agendas, minutes, and attendance sheets are provided in Appendix F.

### **Coordination with Other Agencies and Individuals**

The Hazard Mitigation Committee members and their respective Town Departments contributed the contents and reviewed the *Plan* drafts. Departments represented were:

- Building Department
- Fire Department
- Community Development Department
- Police Department
- Public Works and Engineering

Committee Chair, Chief Kevin MacCaffrie contacted the following individuals and agencies for their review and comment on the *Plan* during the week of \_\_\_\_\_

- American Red Cross
- Londonderry Town Council
- Conservation Commission
- Manchester Airport
- Londonderry Elder Affairs

- Londonderry School Department
- SE HazMat Mutual Aid District
- Manchester Water Works
- Pennichuck Water Works
- Londonderry Planning Board

The *Plan* was distributed to all abutting communities, including Manchester, Auburn, Derry, Windham, Hudson, and Litchfield for their review and comments. Additionally, copies of the *Plan* were left at the Town Assessing Department, Town Planning Department, and SNHPC office, for public review and comment from \_\_\_\_\_ through \_\_\_\_\_.

Availability of the *Plans* and their locations were publicized during the week of \_\_\_\_\_ by public notice on the Londonderry Town website and postings at the Town Hall and SNHPC's office. Comments were received from \_\_\_\_\_ and were reviewed at the \_\_\_\_\_ Londonderry Hazard Mitigation Committee meeting. Documentation of the public process and solicitation of comments from both the public and outside agencies may be found in Appendix G.

### **Existing Londonderry Emergency Operations Plan**

The Town of Londonderry's 2002 *Town of Londonderry Emergency Management Plan* is currently in the process of being updated and will be completed during 2010. This *Plan* describes *preparedness* activities to improve the Town's ability to respond to an incident; *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 2002 *Londonderry Emergency Management Plan* states in part:

*The Comprehensive Hazard Analysis shows that the community could be subjected to the damaging effects of several hazards. Various programs are available to prevent or lessen these effects through mitigation. In order that these mitigation programs be effective, certain regulations and/or ordinances must be enacted by the community and must be accomplished during a pre-crisis period.*

*The citizens would be receptive to initiating mitigation programs when the potential benefits are properly explained. Private companies, which might present potential hazards to the community, would cooperate with officials to plan for mitigating these hazards. (Town of Londonderry, EMP 53)*

### **State of New Hampshire Legislation Related to Master Plans**

During 2002, the State of New Hampshire adopted legislation related to master plans that requires 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 incorporated into the master plan. The *Londonderry Hazard Mitigation Plan* may serve as a new section of the existing or future *Londonderry Master Plan*. This legislation, *RSA 674:2 Master Plan; Purpose and Description*, reads:

*The Master Plan may also include the following sections:*

*...(e) 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.*

### **Plan Development Steps**

To complete this *Plan*, the Londonderry Hazard Mitigation Committee followed 10 planning steps during five committee meetings.

#### **Step 1: Map the Hazards**

Committee members identified areas where damage from natural disasters had previously occurred, areas of potential damage, and man-made facilities and other features that were at risk for loss of life, property damage, and other risk factors. Base maps provided by SNHPC were used in the process. A summary map illustrating hazard zones, as identified by the Londonderry Hazard Mitigation Committee, is presented at the end of Section II.

#### **Step 2: Determine Potential Damage**

Committee members identified facilities that were considered to be of value to the Town for emergency management purposes, for provision of utilities and services, and for historic, cultural, and social value. The assessed value was noted for each facility, as well as its proximity to the hazard zones. Summary tables of assets in each hazard zone are located in Section III.

#### **Step 3: Identify Plans and Policies Already in Place**

Using information and activities outlined in the handbook *Hazard Mitigation Planning for New Hampshire Communities*, the Committee and SNHPC staff identified existing mitigation strategies and ordinances related to flood, wind, fire, ice and snow events, earthquakes, and other hazards that are already being implemented by the Town. A summary chart is presented in Section IV.

#### **Step 4: Identify the Gaps in Protection and Mitigation**

Existing strategies were reviewed for coverage, effectiveness, and implementation, as well as need for improvement. A summary chart and the results of these activities are presented in Section IV. Additionally, the Committee brainstormed what past and potential hazards are not protected by existing mitigation efforts. A list of these future mitigation strategy objectives can be found at the beginning of Section V.

### **Step 5: Determine Actions to be Taken**

During a brainstorming session, the Committee developed a list of other possible actions and strategies to improve Londonderry's response to hazardous events. Ideas put forth included culvert replacements, public education programs, and road improvements, among many other programs. New strategies were developed to respond to the mitigation gaps and identified future mitigation strategy objectives. These new strategies are shown in Section V.

### **Step 6: Evaluate Feasible Options**

The Committee reviewed each of the hazard mitigation actions and strategies that were identified in the brainstorming session using the evaluation charts from Chapter 2 of FEMA's *Developing the Mitigation Plan*. Fourteen evaluation factors (based on the STAPLEE criteria) were used to evaluate feasible actions. Each mitigation action was then scored individually by five committee members and all scores were averaged and totaled for each strategy. The results of this analysis are shown in Section V's Preliminary Prioritization. A description of the STAPLEE criteria and scores is found in Appendix E.

### **Step 7: Determine Priorities**

The Committee reviewed the preliminary prioritization list in order to make changes and determine a final prioritization for hazard mitigation actions. The priorities can be found at the end of Section VI, in the Implementation Strategy.

### **Step 8: Develop Implementation Strategy**

Using the chart provided under Step 9 in the handbook, the Committee created an implementation strategy that includes department(s) responsible for implementation, a schedule for completion, and a funding source or technical assistance source for each identified hazard mitigation action. Additionally, the Committee reviewed the estimated cost of each project. The implementation strategy can be found in Section VI.

### **Step 9: Coordinate with Other Agencies/Entities**

Chief Kevin MacCaffrie, Londonderry Fire Department, contacted agencies with expertise in hazard mitigation or missions related to any of the mitigation strategies identified herein. A copy of the draft *Plan* was made available to these agencies for their review and comments. Additionally, the *Plan* was made available to the public at three locations for review. A listing of these agencies can be found in the previous pages of this section.

### **Step 10: Adopt and Monitor the Plan**

SNHPC staff compiled the results of Steps 1 to 9 in a draft document, as well as helpful and informative materials from the *State of New Hampshire Natural Hazard Mitigation Plan*. The Londonderry Hazard Mitigation Committee reviewed, revised, and approved a draft of the *Londonderry Hazard Mitigation Plan*. A revised draft document was then submitted to the Londonderry Town Council for its review. The *Plan* shall be reviewed on an annual basis to be certain the

goals and objectives are being met, and that the policies are being adopted. Section VII of the *Plan* details the adoption and monitoring requirements.

*"... [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

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## **Hazard Mitigation Goals of the Town of Londonderry**

The *Town of Londonderry Hazard Mitigation Plan*, which was prepared by the Southern New Hampshire Planning Commission and the Londonderry Hazard Mitigation Committee and is maintained by the Londonderry Planning Department, sets forth the following hazard mitigation goals:

1. To improve upon the protection of the general population, citizens and guests of the Town, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the Town's Critical Support Services and Critical Facilities.
3. To reduce the potential impact of natural and man-made disasters on the Town's infrastructure.
4. To improve the Town'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's economy.
7. To reduce the potential impact of natural and man-made disasters on the Town's natural environment.
8. To reduce the Town'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's specific historic treasures.
10. To identify, introduce and implement cost effective Hazard Mitigation measures so as to accomplish the Town's Goals.
11. To address the challenges posed by climate change as they pertain to increasing risks in the Town's infrastructure and natural environment.

The Londonderry Hazard Mitigation Committee adopted the above goals, derived from the 2007 State of New Hampshire Hazard Mitigation Plan, for the Town of Londonderry, New Hampshire at the July 20, 2010 committee meeting.

More specific objectives, established after the Committee's analysis of past and potential hazards and review of existing mitigation strategies, may be found at the beginning of Section V: Newly Identified Mitigation Strategies and Critical Evaluation.

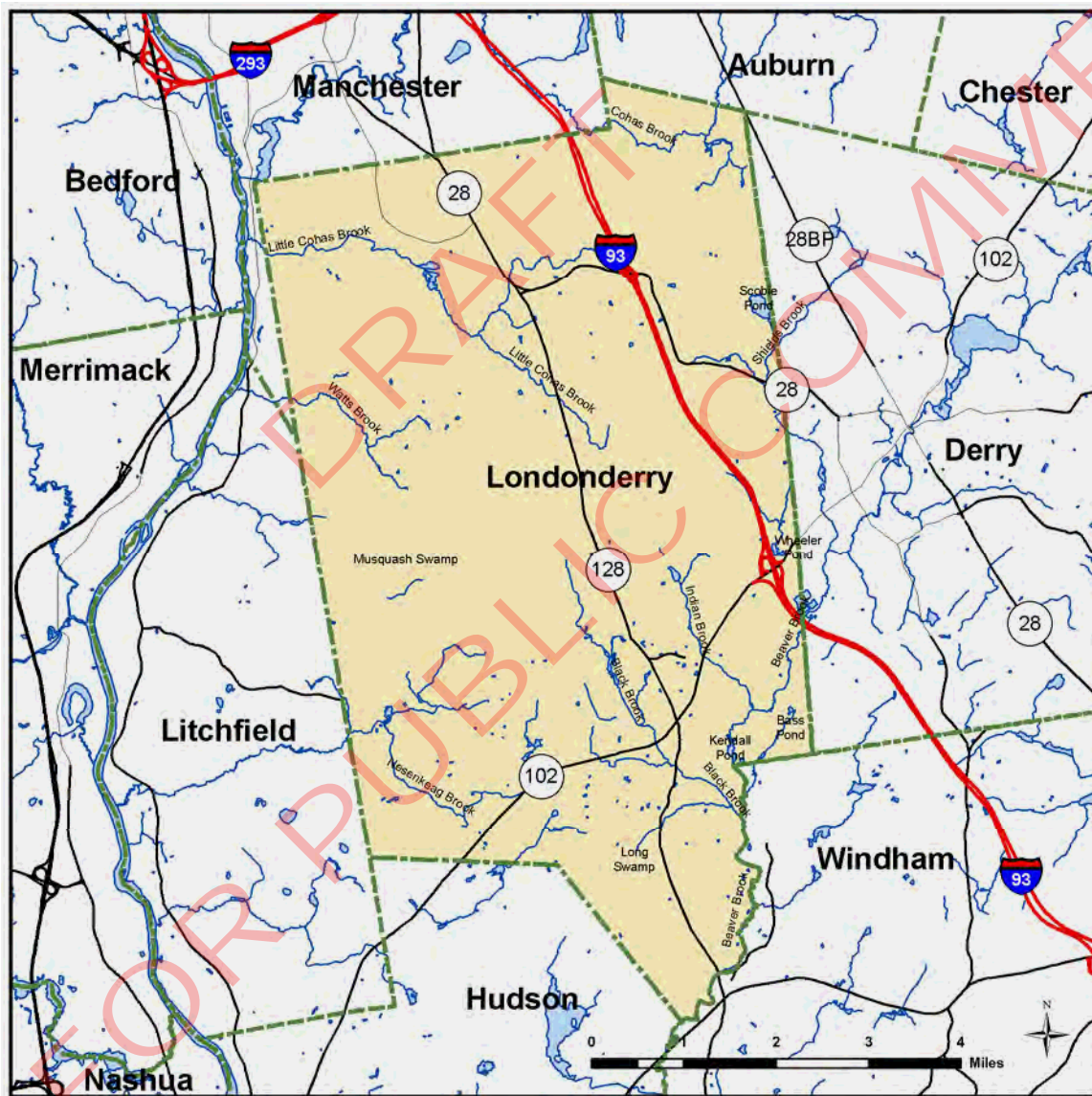
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## SECTION II

### HAZARD IDENTIFICATION

#### Location, Population, Topography, and Climate

The Town of Londonderry is located in the south-central portion of the State of New Hampshire in Rockingham County. Londonderry is bordered by the City of Manchester to the north; the towns of Derry and Windham to the east; the Town of Hudson to the south; and the Town of Litchfield to the west. It is located 30 miles south of the City of Concord and about eight miles north-east of the City of Nashua. U.S. 93, along with N.H. Routes 128, 28, and 102 provide primary highway access to the Town.



*Location Map of Londonderry, New Hampshire*

Londonderry encompasses a total of approximately 42 square miles. The 2000 U.S. Census population of Londonderry was 23,236, an increase of

approximately 71 percent since 1980 and 335 percent since 1970. The most recent population estimate, 2008, for Londonderry is 24,567, which is approximately 584.9 persons per square mile. (NHOEP)

Despite Londonderry's rapid growth since 1970, the community has retained its rural quality and notable orchards. Londonderry's predominant land use is residential. Despite recent growth, commercial and industrial uses continue to comprise a small amount of the Town's area. High rates of residential growth are anticipated to continue, particularly with the impending widening of Interstate 93, connecting to Boston and Manchester. (Town of Londonderry, 2004 Master Plan)

Londonderry is situated in the seaboard lowland section of New Hampshire "on a southeast-sloping plain which has been greatly modified by Pleistocene glaciation." The area is typified by ice-carved bedrock hills, where the northwest slopes are thickly covered with till and southeast slopes thinly covered. The valleys are characterized by stratified and unstratified material, consisting of silt, sand and gravel deposited by the meltwaters of a retreating glacial ice sheet. Additionally, there are glacial kettle holes and swampy areas that serve as the headwaters for the many streams in the area. Elevation ranges from approximately 150 feet near the Merrimack River, at the northwest corner of the Town, to 523 feet on a hilltop near Hardy Road and the PSNH right of way. (FEMA, FIS 6)

The major watercourse flowing through Londonderry is Beaver Brook, which flows from Auburn, Chester, and Derry before entering southeastern Londonderry, emptying into Kendall Pond, then forming the town boundary with Windham. Other major brooks in Londonderry are Black Brook, a tributary of Beaver Brook; Little Cohas Brook and Watts Brook to the northwest; Cohas Brook and Shields Brook to the northeast; Nessenkeag Brook to the southwest; and Indian Brook to the southeast. Water bodies of significance include Scobie Pond and Wheeler Pond along the eastern town line and Kendall Pond to the southeast of Town. Additionally, there are two swamps, Musquash Swamp, the most notable, and Long Swamp. (Ibid 5)

The climate of Londonderry is typical of southern New Hampshire, with warm summers and cool winters. Temperatures during the month of July range from an average high of 82.1 degrees Fahrenheit to an average low of 54.6 degrees. January temperatures range from an average high of 32.3 degrees to an average low of 5.2 degrees. Prolonged periods of severe cold are rare. Annual average precipitation is 39.82 inches. (Golden Gate Weather Services)

### **Current Land Use Development Trends in Londonderry**

The Town of Londonderry's land use development patterns have remained constant since the residential boom began following the creation of Interstate 93

in 1963. Since that time the community has been transformed from a rural community, with sparse housing along rural roads and village centers, to a large commuter based residential community with easy access to Boston and Manchester. The total population from 1960 to 2000 grew by almost 850 percent. (Town of Londonderry, 2004 Master Plan 3-4)

The greatest land use change in Londonderry since the 1960s was the conversion of forest and farmland to residential neighborhoods because of the high rate of population growth. Ten percent of the Town's land area was farmland and 4 percent residential in 1964. As of 1998, only 4 percent of the community was farmland and 27 percent residential. (Ibid)

Commercial and industrial uses comprise the smallest percentage of the Town's area, approximately 7 percent. Change within these land uses has occurred more slowly than residential growth and has made its largest increases in approximately the last 10 years. Londonderry's 2004 Master Plan anticipates future commercial and industrial growth, particularly facilitated by the impending Interstate 93 widening. (Ibid 3-1 and 3-2)

Today, the greatest concentrations of residential land are located to the east and west of Mammoth Road and in the southern most part of Town. Commercial uses are concentrated along NH Route 102, nearest Interstate 93. Industrial uses are predominantly located in the northwest corner of Londonderry, in the airport vicinity. The northern and western most extents of the town remain forested.

Growth in all land use categories is anticipated to continue in Londonderry, however, at slower rates. Future development and growth is expected to occur as:

- industrial expansion near the airport;
- commercial and industrial development near the future I-93 exit 4a area;
- continuation of commercial, industrial, office, mixed use development near I-93's exit 5;
- continued development of the historic town center;
- continued residential growth throughout the Town;
- a new residential/mixed use center in the Page Road area; and
- the creation of "green corridors" between large conservation or undeveloped areas. (Ibid 3-13 to 3-15)

For many of the areas above, new road construction is the catalyst for anticipated new development. This will render formerly inaccessible areas open to growth and development. (Ibid 3-13 to 3-15)

Overall, according to Southern New Hampshire Planning Commission build out analysis preliminary data, approximately 56 percent of Londonderry's 26,814 land area acres is developed. There are an additional 144 acres of water in the



Town, totaling 26,958 acres. Of the 11,763 acres of undeveloped land, 1,301 acres are in permanent conservation and 8,460 acres are constrained by natural features such as steep slopes, and floodplains. This leaves approximately 507 undeveloped and buildable lots totaling 6,181 acres, allowing up to 50 percent of the lot to be covered with development constraints such as steep slopes or floodplains. There are another 118 undeveloped marginal lots, totaling 2,759 acres, where 50 percent or more of the lot is covered with development constraints. The majority of this undeveloped land is located along the eastern, western, and northern perimeters of the Town.

The Master Plan sets recommendations for future growth, ordinance standards to channel development away from natural constraints, and standards for environmental protection. The following are many of the recommendations and standards outlined in the Master Plan:

- protect sensitive resources (aquifers, streams, floodplains, wetlands, steep slopes, etc.) and water quality;
- coordinate with the EPA's Phase II Storm Water Management Program;
- continue open space protection efforts and reduce development through the purchase of land and development rights;
- complete a town-wide greenbelt;
- integrate smart development procedures and low impact development concepts;
- institute environmentally based zoning in the Agricultural-Residential (AR-1) zoning district;
- minimize air, light, and noise pollution; and
- encourage the use of best management practices.

(Town of Londonderry, 2004 Master Plan 4-14 to 4-30)

The Town of Londonderry's existing Zoning Ordinance, Floodplain Development Ordinance, Stormwater Management Regulations, and Subdivision and Site Plan Regulations all work to minimize the impacts, if not eliminate, any development in the flood and steep slope hazard areas. Within the floodplain district no new development is allowed, without a variance, which would increase flood levels during the occurrence of a 100-year flood event. Steep slopes in excess of 25 percent in residential zones and 33 percent in the Performance Overlay District are determined to be unsuitable for development. The Stormwater Regulations require that the post-development run-off rate not exceed the pre-development run-off rate. Additionally, surface run-off must be directed to managed systems prior to entering existing water bodies. These programs are further outlined in Section IV "Existing Mitigation Strategies and Proposed Improvements."

The land outside of the special flood hazard areas and areas of steep slopes remain the preferred development location of development in Londonderry, by the Town and developers. Future development may increase pressure to utilize

these hazard areas, despite their inherent risks. Nonetheless, any proposed new developments or significant improvements in these zones would require variances from the Zoning Board of Authority and the Planning Board. The Town may assure low risk and low impact future development in the hazard zones given these review opportunities.

### **National Flood Insurance Program**

Londonderry has been participating in the National Flood Insurance Program (NFIP) since 1980. Currently, Flood Insurance Rate Maps (FIRMS), bearing the effective date of May 17, 2005, are used for flood insurance purposes, and are on file with the Londonderry Planning and Building Departments. In addition the town has implemented the following actions related to continued compliance with 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 address administering the NFIP following a major storm event.
- Address NFIP monitoring and compliance activities
- Revise/adopt subdivision regulations, erosion control regulations, board of health regulations, etc. to improve floodplain management in the community
- Prepare, distribute or make available NFIP, insurance and building codes explanatory pamphlets or booklets
- Identify and become knowledgeable of non-compliant structures in the community
- 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

According to FEMA's most recent Biennial Report, there were approximately 85 residential structures and 32 other structures located in the FEMA designated special flood hazard areas (100 year floodplain), with an approximate population of 127.

The Town currently has 55 NFIP policies and nine claims have been filed with NFIP since 1978 totaling \$400,729 in losses. There are currently three repetitive loss properties insured under the NFIP within the Town of Londonderry. Repetitive loss areas are mapped on the Past Hazards Map at the end of this chapter. The land use within this area is Agricultural-Residential.

## **Past and Potential Hazards**

The Londonderry Hazard Mitigation Committee identified past hazard events, which include flooding, wind, wildfire, ice, snow, and seismic events. Other hazards include geomagnetism, radon, drought, and extreme heat or cold. These hazards were identified in a brainstorming session with the Committee. The State of New Hampshire Hazard Mitigation Plan was consulted, as well as other supporting information derived from the resources listed in Appendix C. The Identified Hazard Zones Map at the end of this section reflects the impact areas for each hazard. The Committee reviewed background information, areas at risk, and the potential for each hazard to occur, pose a risk to, or cause damage to structures, infrastructure or human life.

### **A. Flooding**

The Londonderry Hazard Mitigation Committee reviewed the following kinds of hazards related to flooding:

#### **1. Riverine Flooding**

"Typical riverine flooding involves the overflowing of the normal flood channels or rivers or streams, generally as a result of prolonged rainfall or rapid thawing of snow cover. The lateral spread of floodwater is largely a function of the terrain, becoming greater in wide, flat areas, and affecting narrower areas in steep terrain. In the latter cases, riparian hillsides in combination with steep declines in riverbed elevation often force waters downstream rapidly, sometimes resulting in flash floods." (Schwab 208)

"The goal of flood hazard mitigation planning is to eliminate or reduce the long-term risks to human life and property from flooding by reducing the cause of the hazard or reducing the effects through preparedness, response and recovery measures. Hazard mitigation is the only phase of emergency management that can break the cycle of damage, reconstruction and repeated damage (NHBEM 13)." Riverine flooding is the most common and significant hazard event in the State of New Hampshire, as well as all of its municipalities.

Some of the more severe flooding in Londonderry occurs during the spring, fall, and winter seasons. Spring floods are typically due to rapid snowmelt and heavy rains in conjunction with ice jams. Fall floods are frequently caused by tropical storms associated heavy rainfall. However, Londonderry is prone to flooding at all points in the year from heavy thunderstorms, causing rapid run-off and flooding. (FEMA, FIS 6-7)

From 1973 through 2010 there have been nine flood-related FEMA declared disasters in Rockingham County and seventeen in the State of New Hampshire. (FEMA, "Federally Declared Disasters by Calendar Year").



In 2005, 2006, 2007 and recently in 2010 Manchester and much of Southern New Hampshire experienced significant flood events. The 2005, 2006, and 2007 events all exceeded 100 year flood recurrence intervals in some or all areas and the frequency of these events in the past 5 years is a major concern for the Town of Londonderry along with the rest of the State.

The following areas in the Town of Londonderry have had past recurring flood problems, including erosion and problem culverts:

Area	Type of Damage	Severity
Brookview Drive	Road flooding, basement flooding of adjacent homes, in the SFHA, annual flooding	Severe
South Road at Kendall Pond (dam at southern Kendall Pond and bridge over Beaver Brook)	High water levels at the dam, debris obstruction at dam and bridge, road flooding	Minor
South Road	Road flooding/ Inadequate culvert	Minor
Auburn Rd at Whispering Pines	Road flooding/ Inadequate culvert	Minor
Intersection of Routes 28 and 128	Road flooding	Minor
Parmenter Road at Route 102	Road flooding/ Inadequate culvert	Minor
Intersection of Route 102 and High Range Road	Road flooding/ Inadequate culvert	Minor
Gilcreast Road at Beaver Brook	Road flooding- during the fall of 1996 moderate flooding, bridge rebuilt in 1998 to mitigate future impacts.	Minor
Litchfield Road East of Misty Ln	Road flooding/ Inadequate culvert	Minor

**All special flood hazard areas (SFHAs) in the Town of Londonderry** are potentially at risk in the event of riverine flooding. The SFHAs are located on the Identified Hazard Zones Map at the end of this section.

*High probability for riverine flooding to occur and cause damage in Londonderry.*

## 2. Hurricanes

"A hurricane is a heat engine that derives its energy from ocean water. These storms develop from tropical depressions which form off the coast of Africa in the warm Atlantic waters. When water vapor evaporates, it absorbs energy in the form of heat. As the vapor rises, it cools within the tropical depression, and then condenses, releasing heat, which sustains the system... A tropical depression

becomes a hurricane when its sustained recorded winds reach 74 mph." (NHBEM 56)

From 1938 to 1999 there were 10 hurricanes or tropical storms in New Hampshire (State of New Hampshire Natural Hazards Mitigation Plan 2007, p. III-30). The September 1938 hurricane was a more notable flooding event to strike Londonderry and other municipalities in southern New Hampshire. Hurricanes Carol and Edna caused some damage in August and September 1954.

Potential effects of a hurricane include flooding, run-off not handled adequately, and disrupted travel. The most recent hurricanes were: September 1985 – Gloria, August 1991 – Bob, and September 1999 – Floyd. During these events, trees and power lines came down, and there was minimal structural damage.

**All areas of the Town of Londonderry** are potentially at risk if a hurricane reaches Rockingham County, New Hampshire.

*Moderate probability for hurricanes to occur and cause flood damage in Londonderry.*

### 3. Debris-impacted infrastructure and river ice jams

The potential effects of flooding are increased when infrastructure is obstructed either by debris or ice formations. These obstructions compromise the normal stormwater flow, creating an artificial dam or narrowing of the river channel causing a backup of water upstream and forcing water levels higher. Debris obstructions can be caused from vegetative debris, silt, soils, and other riparian structures that have been forced into the watercourse. Ice jams are caused by ice formations "in riverbeds and against structures." (NHBEM 13, 16) Bridges, culverts, and related roadways are most vulnerable to ice jams and debris-impacted infrastructure.

Historically, floods in Londonderry have been due to snow melt and heavy rains in conjunction with ice jams or debris-impacted infrastructure. If flooding occurs in the Town of Londonderry, there is the potential for debris-impacted infrastructure and ice jams to cause damage. Debris obstruction problems have occurred at South Road at the southern extents of Kendall Pond where there is a dam and a bridge crossing Beaver Brook.

**All special flood hazard areas in the Town of Londonderry** are potentially at risk if there is an ice jam or debris-impacted infrastructure. Particular concern should be given to bridges along the many brooks in Londonderry including Beaver, Todd, Little Cohas, and Shields Brooks.

*Moderate probability for debris-impacted infrastructure or ice jams to occur and cause damage in Londonderry.*

#### 4. Erosion and mudslides

The New Hampshire Department of Environmental Services (NHDES) defines erosion as "the process in which a material is worn away by a stream of liquid (water) or air, often due to the presence of abrasive particles in the stream (NHDES Watershed Management Bureau)." As it relates to this *Plan*, erosion is the gradual or rapid wearing away of stream banks or shores, due to prevailing winds, natural water movement, and more catastrophic events. Additional causes of erosion are removal of vegetation and soil disturbance. Riparian construction sites are one non-natural contributor (NHDES Shoreland Protection). Stream bank erosion may eventually result in mudslides.

Land in Londonderry which has at least a 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 stream banks. Areas of steep slopes in Londonderry are shown on the Identified Hazard Zones GIS map at the end of this section.

**All areas of steep slopes**, as mapped in this *Plan*, are potentially at risk in the case of potential erosion and mudslide events.

*Moderate probability for erosion and mudslides to occur and cause damage in Londonderry.*

#### 5. Rapid snowpack melt

Rapid snowpack melt, much as its name suggests, is a "seasonal rapid melting of the snowpack coupled with warming temperatures and moderate to heavy rains." These events typically occur during the spring as temperatures are rising. "The lower lying areas of the State may experience either flash flooding or inundation events accelerated by the rapid melting of the snowpack." (NHBEM 15)

Structures and improvements located on, along, or at the base of steep slopes are most vulnerable to rapid snowpack melt. These areas can be seen on the Identified Hazard Zones GIS map's depiction of steep slopes.

**All areas of steep slopes**, as mapped in this *Plan*, are potentially at risk in the event of rapid snowpack melt.

*Low to moderate probability for rapid snowpack melt to occur and cause damage in Londonderry.*

#### 6. Dam breach or failure

The New Hampshire Department of Environmental Services indicates several failure modes for dams. Most typical include hydraulic failure or the uncontrolled overflowing of water, seepage or leaking at the dam's foundation or gate, structural failure or rupture, general deterioration, and gate

inoperability. These modes vary between dams depending on their construction type. (NHDES Dam Bureau, Environmental Fact Sheets DB-4 through 7)

The State of New Hampshire uses a hazard potential classification based on the impact of dam breach or failure. All class S (Significant) and H (High hazard) dams have the potential to cause damage if they breach or fail. Londonderry has 19 Class NM dams (Non-menace), and 9 Class L dams (low hazard potential). There are no Class S dams (significant hazard potential) or Class H dams (high hazard potential). The dam classes are defined in Appendix B. (NHDES Dam Bureau, "Dams")

"The Department of Environmental Services (DES), through its Dam Bureau, is charged with the responsibility of ensuring the public safety as it relates to the regulation of dams (NHBEM 17)." In 1988, the New Hampshire State Legislature recognized the need for dam owners to prepare a plan to assist the local community in responding effectively to a dam failure. The legislature amended RSA 482:2 and RSA 482:12 and adopted RSA 482:11a to require that dam owners develop an Emergency Action Plan for all dams that may be a menace to public safety due to their condition, height, and location. (NH DES Dam Bureau, Environmental Fact Sheet DB-11)

**The SFHAs in proximity to Londonderry's dams** as well as their designated floodways would be impacted by a dam breach.

*Moderate probability for dam breach or failure to occur and cause damage in Londonderry.*

#### 7. Other water retention facility failure

Londonderry is home to one operational 2.3 million gallon water storage tank. Failure typically occurs in water storage tanks when a lateral force applied to the tower exceeds the structural capabilities of the tower. Examples of these sorts of events would be earthquakes or high force winds. Inadequate or weakened welds, insufficient reinforcement at beam-column connections, and the buckling of tall slender steel structural supports are other modes of failure. (U. Cal. Berkeley) Londonderry's water storage tank, owned by Manchester Water Works, is constructed using pre-stressed concrete and is designed to withstand seismic loading or forces.

If failure were to occur, potential impacts include high waves and flash floods and the surrounding environment torn up by debris carried with the waves. Secondary effects of water storage tank failures would include shortages of potable water and compromised fire services.

**The area near Vista Ridge and Josephine Drive** would be impacted by a water storage tank failure.

*Low probability for water facility failures to occur and cause damage in Londonderry.*

## **B. Wind**

The Londonderry Hazard Mitigation Committee reviewed the following kinds of hazards related to wind:

### **1. Hurricanes**

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. Tropical depressions are considered to be of hurricane force when winds reach 74 miles per hour, see following table for hurricane categorization according to the Saffir-Simpson Scale. Substantial damage may result from winds of this force, especially considering the duration of the event, which may last for many hours. Potential effects of hurricane force winds include fallen trees, telephone poles, and power lines.

<b>Saffir-Simpson Hurricane Scale</b>		
<b>Category</b>	<b>Winds (mph)</b>	<b>Potential Damage</b>
1	74-95	Minimal
2	96-110	Moderate
3	111-130	Extensive
4	131-155	Extreme
5	>155	Catastrophic

Winds from the hurricane of 1938, previously mentioned, reached a high of 186 miles per hour, a category 5 on the Saffir-Simpson scale. (NHBEM 56)

**All areas of Londonderry** are at risk if a hurricane reaches Rockingham County, NH.

*Moderate probability for hurricane force winds to occur and cause damage in Londonderry.*

### **2. Tornadoes**

"A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one mile wide and 50 miles long." Tornadoes originate from hurricanes and thunderstorms, and are created when cold air overrides warm air causing the warm air to rise rapidly. (FEMA, Understanding Your Risks, 2-20) Tornadoes are measured using the Fujita Tornado Damage Scale, as seen in the table below (National Oceanic and Atmospheric Administration).

Fujita Tornado Damage Scale		
Category	Winds (mph)	Potential Damage
F0	<73	Light
F1	73-112	Moderate
F2	113-157	Considerable
F3	158-206	Severe
F4	207-260	Devastating
F5	261-318	Incredible

Between 1950 and 1995 there were 9 known tornados in Rockingham County. Two were rated an F0, two were F1, four were F2 (August 1951, June 1957, July 1961 and June 1963), and one was a F3 (June 1953). During the F3 storm in 1953, five people were injured. (Tornado Project Online)

**All areas of Londonderry** are potentially at risk if a tornado reaches the Town.

*High probability for tornados to occur and cause damage in Londonderry.*

### 3. Nor'easters

A Nor'easter, or winter extra-tropical storm, is "[a] large weather system traveling from south to north passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a northeasterly direction. The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours in terms of duration." (NHBEM 58)

"Unlike the relatively infrequent hurricane, New Hampshire generally experiences at least one or two "significant" events each year... with varying degrees of severity. These storms have the potential to inflict more damage than many hurricanes because ... high winds can last from 12 hours to three days, while the duration of hurricanes ranges from six to 12 hours." (Ibid)

Nor'easters are measured on the Dolan- Davis scale, as presented below.

Dolan-Davis Nor'easter Classification Scale				
Storm Class	% of Nor'easters	Avg. Return Interval	Avg. Duration (hours)	Impact
1- WEAK	49.7	3 days	8	No property damage
2- MODERATE	25.2	1 month	18	Modest property damage
3- SIGNIFICANT	22.1	9 months	34	Local-scale damage and structural loss
4- SEVERE	2.4	11 years	63	Community scale damage and structural loss
5- EXTREME	0.1	100 years	95	Extensive regional-scale damage and structural loss

Source: State of NH Natural Hazards Mitigation Plan and NC Division of Emergency Management



**All areas of Londonderry** are potentially at risk for property damage and loss of life due to nor'easters.

*High probability for nor'easters to occur and cause wind damage in Londonderry.*

#### 4. Downburst

"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." (NHBEM 59)

**All locations in Londonderry** are at risk for property damage and loss of life due to downbursts.

*Moderate probability for downbursts to occur and cause damage in Londonderry.*

#### 5. Lightning

"During the development of a thunderstorm, the rapidly rising air within the cloud, combined with the movement of the precipitation within the cloud, causes electrical charges to build up within the cloud. Generally, positive charges build up near the top of the cloud, while negative charges build up near the bottom. Normally, the earth's surface has a slight negative charge. However, as the negative charges build up near the base of the cloud, the ground beneath the cloud and the area surrounding the cloud becomes positively charged. As the cloud moves, these induced positive charges on the ground follow the cloud like a shadow. 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. In the initial stages of development, air acts as an insulator between the positive and negative charges. However, when the potential between the positive and negative charges becomes too great, there is a discharge of electricity that we know as lightning." (NHBEM 63)

There were two recorded lightning strikes in the Town of Londonderry. The first occurred in June of 1996 when lightning struck a wire mounted to a house causing an attic fire that was quickly extinguished by firefighters. The second event, in August of 2001, was a direct strike to a garage causing extensive damage to the garage and vehicles parked inside. (NOAA National Climatic Data Center)

**All areas of Londonderry** are potentially at risk for property damage and loss of life due to lightning.

*Moderate probability for lightning to occur and cause damage in Londonderry.*

### **C. Fires**

The Londonderry Hazard Mitigation Committee reviewed the following kinds of hazards related to fires:

#### **1. Wild Land Fires**

"Historically, large New Hampshire wild land fires run in roughly 50-year cycles. The increased incidence of large wild land fire activity in the late 1940s and early 1950s is thought to be associated, in part, with debris from the hurricane of 1938. Significant woody 'fuel' was deposited in the forests during that event. In the past the New Hampshire Department of Resources and Economic Development, Division of Forests & Lands was concerned that the Ice Storm of 1998 has left a significant amount of woody debris in the forests of the region and may fuel future wildfires (NH BEM 34)." Present concerns are that the Ice Storm of 2008 has also left a significant amount of woody debris in the forests of the region and may fuel future wildfires.

The Town of Londonderry has three fire stations, each equipped with a "first-run" engine company and forestry unit, serving 42 square miles. The central fire station also serves as the Emergency Operations Center, housing two ambulances, a command car, and additional specialized equipment.

Data pertaining to fires can be found in the Londonderry Annual Town Reports. There were 455 fires from 2005-2009, including tree, brush, and grass fires; structure fires; vehicle fires; and other fire types including controlled burns, cooking, trash, or refuse fires, outside of structure fires, and other unauthorized burns. A summary of data from 2005-2009 is provided below.

Fire Type	Number of Responses				
	2009	2008	2007	2006	2005
Structure Fire	31	31	30	32	35
Tree, Brush, or Grass Fire	22	32	31	60	28
Vehicle Fire	14	17	16	18	18
Other Fires	12	7	6	4	11
<b>Total Number of Fires</b>	<b>79</b>	<b>87</b>	<b>83</b>	<b>114</b>	<b>92</b>

**In the Town of Londonderry, the following areas are susceptible to wild land fires:**

- all new developments (when trees are cut, soil dries leaving dead grass) and
- Musquash Swamp area from Wiley Hill Road to the PSNH right-of-way and Watts Brook.

These areas have been identified on the Identified Hazard Zones GIS map.



*High probability for wild land fires to occur and cause damage in Londonderry.*

## 2. Target Hazards

Target Hazards are facilities or areas of town that require a greater amount of pre-fire tactical planning to address emergencies larger than the average fire event. In the Town of Londonderry, there are several airport related and other industrial areas which have high concentrations of combustible or hazardous materials which, were a fire to occur, could increase the severity of the fire and possibly have catastrophic results.

**In the Town of Londonderry, the following areas are susceptible to target hazard related fires:**

- airport area or northwestern most corner of the Town limits to Harvey Road at the east and to the southern extent of Industrial Drive;
- Route 102 east and west of I-93, a tier 2 reporting area and concentration of commercial and industrial development;
- entire lengths of I-93, Route 28, Route 128, and Route 102 which are throughways for many vehicles carrying toxic or hazardous materials; and
- Tennessee Gas line corridor
- AES Granite Ridge Power Plant

These areas have been identified on the Identified Hazard Zones GIS map.

*Moderate probability for target hazard related fires to occur and cause damage in Londonderry.*

## 3. Isolated Homes

"New Hampshire is heavily forested and is therefore exposed to this hazard ... The proximity of many populated areas to the State's forested lands exposes these areas and their populations to the potential impact of wildfire." (NHBEM 34)

**In the Town of Londonderry, the following areas have isolated residential developments:**

- Page Road (eastern segment);
- Clark Road (northern segment);
- Jerry Lane;
- Watts Road (western segment);
- Trolley Car Lane (northern segment); and
- Brewster Road.

These areas have been identified on the Identified Hazard Zones GIS map.

*Low probability for isolated homes to be damaged in Londonderry.*

## **D. Ice and Snow Events**

The Londonderry Hazard Mitigation Committee reviewed the following kinds of hazards related to ice and snow events:

### **1. Heavy Snowstorms**

"A heavy snowstorm is generally considered to be one which deposits four or more inches of snow in a 12-hour period." (NHBEM 69-70)

"A blizzard is a winter storm characterized by high winds, low temperatures, and driving snow, according to the official definition given in 1958 by the U.S. Weather Bureau, the winds must exceed 35 miles per hour and the temperatures must drop to 20°F (-7°C) or lower. Therefore, intense nor'easters which occur in the winter months are often referred to as blizzards. The definition includes the conditions under which dry snow, which has previously fallen, is whipped into the air and creates a diminution of visual range. Such conditions, when extreme enough, are called 'white outs'." (NHBEM 71)

For the intents of this *Plan*, heavy snowstorms include all storms with four or more inches of snow in a 12-hour period, including all blizzards and nor'easters with large snow accumulation.

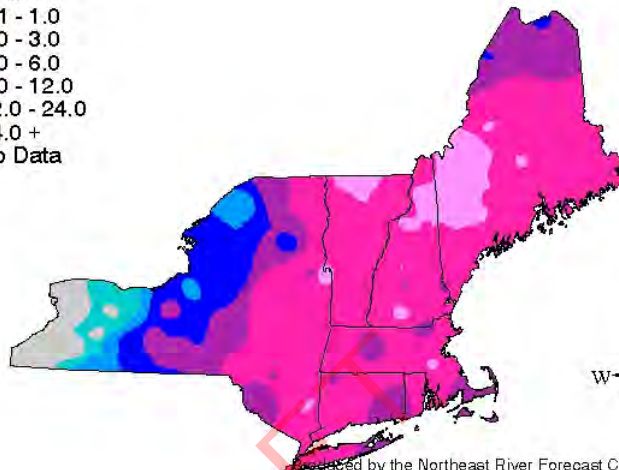
Since, the Federal Emergency Management Agency declared five snowstorms-related Emergency Declarations for Rockingham County. The first was declared by FEMA in March of 1993 for statewide heavy snow. The second was for snowstorms during March of 2001 covering seven of the State's 10 counties. (FEMA, "Federally Declared Disasters by Calendar Year")

The third declared emergency was for a snowstorm on February 17-18, 2003. This storm accumulated approximately 11 inches of snow in Londonderry by 9 am on February 18. (National Weather Service, "Winter Weather Summaries"). This snow was added to an existing base of snow to create an approximate snow depth of 29 inches (National Weather Service, "Climate Data").

The fourth declared emergency was on December 6-7, 2003. This emergency was declared for eight out of 10 New Hampshire counties. The storm accumulated approximately 20 inches of snow in the Londonderry area and winds were measured at up to 39 miles per hour (National Weather Service, "Winter Weather Summaries"). Following is a map depicting snowfall during this storm.



### Storm Total Snowfall 8 am 12/05/2003 thru 8 am 12/08/2003

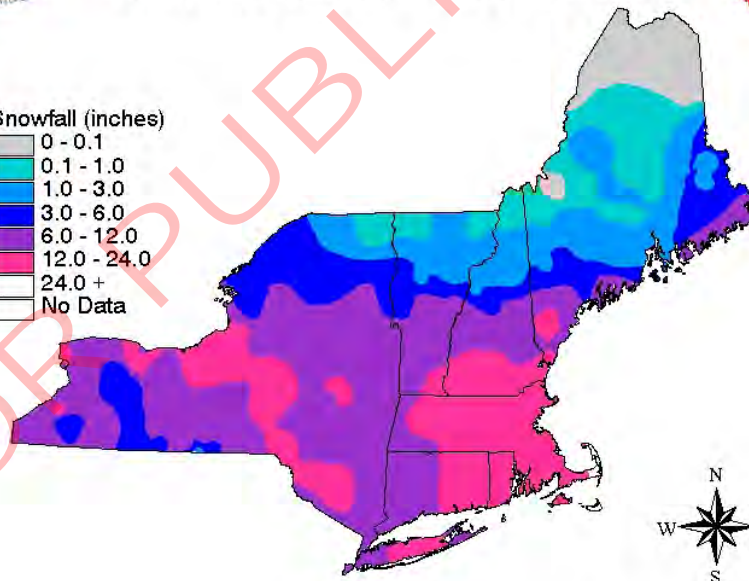
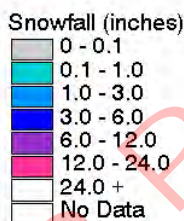


Produced by the Northeast River Forecast Center  
Source: National Weather Service Forecast Office, [http://www.erh.noaa.gov/er/gyx/storm\\_map\\_120503\\_120803.jpg](http://www.erh.noaa.gov/er/gyx/storm_map_120503_120803.jpg)

The most recent declared emergency was for January 22-23, 2005 and was declared for all New Hampshire counties, except Coos. The storm accumulated 19.5 inches of snow on top of an existing six inch snow depth. (National Weather Service, "Winter Weather Summaries" and "Climate Data") Following is a map depicting snowfall during this storm.



### Storm Total Snowfall 8 am 01/22/2005 thru 8 am 01/24/2005



Produced by the Northeast River Forecast Center  
Source: National Weather Service Forecast Office, [http://www.erh.noaa.gov/er/gyx/storm\\_map\\_012405.jpg](http://www.erh.noaa.gov/er/gyx/storm_map_012405.jpg)

**All areas of Londonderry** are potentially at risk for property damage and loss of life due to heavy snows.

***High probability for heavy snowstorms, blizzards, and nor'easters to occur and cause damage in Londonderry.***

## 2. Ice Storms

"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 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."

"The ice storm of January 1998 was not unique in either its spatial scope or its devastating consequences. A similar event in 1929 is believed to have been comparable to this event." The 1998 ice storm was a Declared Disaster by FEMA for nine of the State's 10 counties; the sole exclusion was Rockingham County." (NHBEM 80)

### **2010 Update:**

***Londonderry, including 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 Rockingham. 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.***

***"It was absolutely unprecedented in devastation. Take the largest number of outages in any past storm, multiply that figure by three, and it still won't equal the outages in the 2008 ice storm." PSNH spokesman, Matt Chagnon, went on to***

*say that, "the response was as unprecedented as the storm itself. PSNH put 2,400 linemen to work. On average, they restored power to 28,000 customers a day."<sup>1</sup> The 2008 ice storm is believed to be the worst ice storm ever recorded in New Hampshire.*

**All areas of Londonderry** are potentially at risk for property damage and loss of life due to ice storms.

*High probability for ice storms to occur and cause damage in Londonderry.*

### 3. Hailstorms

"Hailstones are balls of ice that grow as they are held up by winds, known as updrafts, that 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." (Ibid 67)

"Most hailstones are smaller in diameter than a dime, but stones weighing more than a pound have been recorded. Details of how hailstones grow are complicated but the results are irregular balls of ice that can be as large as baseballs, sometimes even bigger. While crops are the major victims, hail is also a hazard to vehicles and windows. Hail damage events can be severe to persons, property, livestock and agriculture." (NHBEM 67)

Between 1963 and 1994 the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC) online database recorded 11 hail storms in Rockingham County and four have been recorded since 1994 in Londonderry. Storms occurred during the months of June, July, and August. Hailstone diameters recorded ranged from .75 to 1.75 inches.

**All areas of Londonderry** are potentially at risk from this hazard.

*Moderate probability for hailstorms to occur and cause damage in Londonderry.*

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<sup>1</sup> Sullivan, Margo. *State, power companies explore ice storm response*. 12/29/08.  
[http://www.eagletribune.com/punews/local\\_story\\_364030134.html](http://www.eagletribune.com/punews/local_story_364030134.html)



## E. Seismic Events

The Londonderry Hazard Mitigation Committee reviewed the following kinds of hazards related to seismic events:

### 1. Earthquakes

An earthquake is "[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." (NHBEM 37)

In the State of New Hampshire, earthquakes are due to intraplate seismic activity, opposed to interplate activity or shifting between tectonic plates as occurs in California. The causes of intraplate earthquakes have yet to be scientifically proved. One accepted explanation for the cause of intraplate "earthquakes in the Northeast is that ancient zones of weakness are being reactivated in the present-day stress field. In this model, pre-existing faults and/or other geological features formed during ancient geological episodes persist in the intraplate crust, and, by way of analogy with plate boundary seismicity, earthquakes occur when the present-day stress is released along these zones of weakness." (Kafka)

**For the figure to the right:**

Depth is in kilometers.

Purple Triangles: Cities

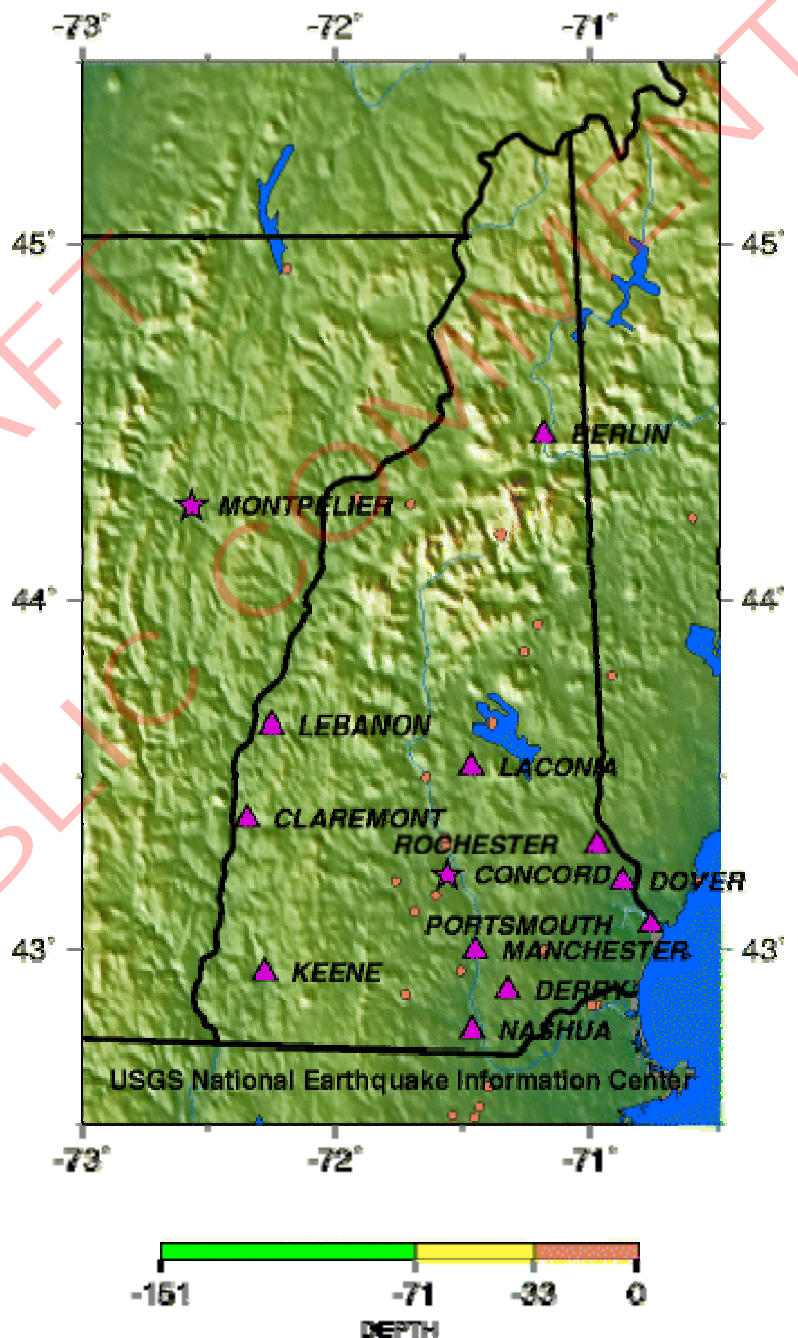
Purple Star: Capital City

Circles: Earthquakes (color represents depth range)

- Earthquake locations are from the USGS/NEIC PDE catalog.

## **Seismicity of New Hampshire**

**1990 - 2006**



There are two scales that measure earthquakes, the Modified Mercalli (MM) and the Richter scales. The Richter scale is a measurement of magnitude of the quake as calculated by a seismograph and does not measure damage. The Modified Mercalli scale denotes the intensity of an earthquake as it is perceived by humans, their reactions, and damage created. It is not a mathematically based scale but a ranking of perception. (USGS, "The Severity of an Earthquake") Refer to page 41 of the State of New Hampshire Natural Hazards Mitigation Plan for detailed descriptions of each.

One of New England's more notable seismic zones runs from the Ossipee Mountain area of New Hampshire, through the Londonderry area, and continues south toward Boston, Massachusetts. This particular area has a mean return time of 408 years for a 6.0 Richter scale earthquake or a 39 percent probability of occurrence in 200 years. Additionally for a 6.5 Richter scale quake, there is a mean return time of 1,060 years or a 17 percent probability of occurrence in 200 years. (Pulli) When New England is generalized as a whole for earthquake probability estimation, the risk increases from the specific hazard zone noted above. For New England there is an estimated return time of every 10 years for an earthquake with a 4.6 Richter scale magnitude and 1000 years for 7.0 magnitude. (NHBEM 43)

From 1728 to 1989, there were 270 earthquakes in New Hampshire. This averages to approximately one quake per year. There were six quakes over 4.0 on the Richter scale during the 1900s. (Ibid 39-42) The most recent quake occurred on June 9, 2010, near Berlin, New Hampshire, with a magnitude of 1.8 on the Richter scale (USGS Earthquake Hazards Program).

**All areas of Londonderry** are potentially at risk for property damage and loss of life due to earthquakes.

*Moderate to high probability for earthquakes to occur and cause damage in Londonderry.*

## 2. Landslides

According to Webster's Dictionary a landslide is "[t]he 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 typically occur due to the over-saturation of soil on a slope during heavy precipitation or snow melting or they occur during a seismic event such as an earthquake. (NHBEM 45)

**All areas of steep slopes** in Londonderry, as shown on the Identified Hazard Zones Map, are at risk for landslides.



*Moderate probability for landslides to occur and cause damage in Londonderry.*

#### **F. Other Hazards**

The Londonderry Hazard Mitigation Committee reviewed the following other kinds of hazards:

##### **1. Utility pipe failure**

Failure of utility pipe systems, including water, gas, and sewer, can be caused by joint leakage, contamination, pipe fracture or tuberculation. Pipe fractures are the most costly and potentially damaging of the failure modes. (Makar 2) Fractures can be caused by blunt force (e.g. construction digging) or ground shifting caused by the natural expansion and contraction of freezing and thawing soil during the winter months or from earthquakes. Pipe blocks in sewer systems can cause a buildup of harmful gasses and lead to explosions. (SCWA)

Potential effects of water main failures can include immediate loss of water supply in the surrounding area, flooding, and road collapse. Sewer main failures can cause sewage backups, effluent leakage, and exposure to harmful bacteria. Leaks in gas mains can lead to fires or explosions if there is either an ignition source or pressure built up in the pipe. Explosions occurring in underground pipes can create craters, and possibly result in death, injuries, and property damage. (NTSB, "Pipeline Accidents")

There are approximately 39 miles of sewer, 90 miles of water, seven miles of Tennessee Gas mains, and 36 miles of Keyspan natural gas delivery lines in Londonderry. Water mains range in diameter from four to 30 inches. Manchester Water Works maintains 231 fire hydrants, 186 fire services (4 to 12 inch diameter pipes), and 481 domestic services ( $\frac{3}{4}$  to 16 inch pipes) in Londonderry. Additionally, Pennichuck Water Works maintains 194 fire hydrants, 77 fire services (2 to 8 inch diameter pipes), and 1,519 domestic services serving a population of 4,086 ( $\frac{3}{4}$  to 2 inch pipes) in Londonderry. (Londonderry Hazard Mitigation Committee)

Manchester Water Works main breaks occur at an approximate frequency of .06 breaks per mile, compared to the national average of .20 breaks per mile.

**All areas of Londonderry** should be considered at risk for utility system failures. The Tennessee Gas Pipeline bisects the Town, running north to south. Particular concern should be given to the center of Town, where the gas pipeline passes the high school, middle school, and an elementary school.

*Moderate probability for utility system failures to occur and cause damage in Londonderry.*

## 2. Airport related hazards

Typically, airport related hazards are the result of aircraft mechanical malfunctions. Collisions can occur in flight with other aircraft or birds; with structures such as buildings, lights, or towers; or with the terrain. While major commercial aircraft disasters are infrequent, when they do occur the majority are off airfield and nearly three-quarters of these accidents occur on either approach or departure. Less frequently, aircraft and airport disasters can be the result of terrorism. This may include hijackings, bombings, or intentional collisions with selected targets.

Events addressed by the Manchester Airport Emergency Plan include:

- bomb threats;
- structural fires within airport buildings;
- fires at fuel farms and fuel storage facilities;
- severe weather and natural disasters;
- hazardous materials incidents;
- sabotage and other unlawful interferences to civil aviation;
- power failures;
- medical emergencies; and
- disabled aircrafts obstructing active runways.

In the last 10 years, the National Transportation Safety Board (NTSB) listed five aircraft accidents in the Londonderry area or at the Manchester Airport in their online aviation accident database<sup>2</sup> (details below). The Federal Aviation Administration (FAA) in the same period listed an additional seven incidents in their National Aviation Safety Data Analysis Center. These incidents involved aircraft departing from, arriving to, or in the vicinity of the Manchester Airport and the Londonderry area.

Incidents reported to the FAA include, but are not limited to, loss of cabin pressure, falling oil pressure, and rough landings causing minor damage to the aircraft.

The Manchester Airport, departure and final approach paths to the airport which over-fly Londonderry, as defined by FAR Part 77, may pose a risk for airport related hazards in Londonderry.

***Moderate probability for airport related hazards to occur and cause damage in Londonderry.***

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<sup>2</sup> Complete listing of accidents (1982-2004) can be accessed from NTSB's online "Accident Database and Synopses" at: <http://www.nts.gov/ntsb/query.asp> and incidents at the FAA's online "Accident/Incident Data System" at <http://www.nasdac.faa.gov/> and then follow links to the FAA Accident/Incidents Database from the Data and Information Resources page.

### 3. Geomagnetism

The State of New Hampshire Natural Hazards Mitigation Plan defines geomagnetism as "...of, or pertaining to, the Earth's magnetic field and related phenomena. Large geomagnetic disturbances commonly known as magnetic storms, if global in scale, or as magnetic substorms, if localized in scale and limited to night time high altitude auroral regions, are of particular significance for electric power utilities, pipeline operations, radio communications, navigation, satellite operations, geophysical exploration and GPS (global positional system) use." (NHBEM 50)

Geomagnetism includes both solar wind coupling and magnetic storms. Solar wind coupling is the relationship between solar events and winds with geomagnetic activity within the earth's magnetosphere. "Magnetic storms occur when the radiation belts become filled with energetic ions and electrons. The drift of these particles produces a doughnut shaped ring of electrical current around the Earth...Magnetic storms are often initiated by the sudden arrival of a high-speed stream of solar wind, carrying high particle density and high magnetic field." (NHBEM 50)

**High-tension lines and communications towers** are at risk in Londonderry.

*Low probability for geomagnetism to occur and cause damage in Londonderry.*

### 4. Drought

"Hydrological drought is evidenced by extended periods of negative departures from normal rainfall" (Ibid 30). New Hampshire has been under several drought warnings, including a drought emergency, since 1999. The most severe drought conditions occurred between 1960 and 1969; the event had a greater than 25 year recurrence interval (Ibid). The Southern New Hampshire region experienced a 100-year drought event from 1964 to 1965 (MWW).

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, especially those which depend on groundwater for water supply. Additionally, the dry conditions of a drought may lead to an increase wild fire risk. (NHBEM 30-31)

**All areas of Londonderry** would be affected by a drought.

*Moderate probability for drought to occur and cause damage in Londonderry.*

### 5. Extreme Heat

"A heat wave is defined as a period of three consecutive days during which the air temperature reaches 90 degrees Fahrenheit or higher on each day" (NHBEM 33). Extreme heat is an occasional and short-lived event in southern New Hampshire. While there have been no extended periods of extreme heat in

Londonderry, the State of New Hampshire Natural Hazards Mitigation Plan notes one of the hottest summers of record as 1999. There were 13 days above 90 degrees, five days over 95 degrees and two days over 97 degrees. From 1960-1994 there were 45 heat waves recorded in Concord. This is an average of 1.3 heat waves per year. In 1988 there were a total of five heat waves. (Ibid 32-33)

**All areas of Londonderry** would be affected by extreme heat, in its event. Particular areas and populations at a greater risk are:

- elderly populations and day care centers and
- electrical power and communication systems may become overburdened.

*Low probability for extreme heat to occur and cause damage in Londonderry.*

#### 6. Extreme Cold

While most New Hampshire residents are rather habituated to the extreme cold situations in the State, and this is not a section identified by the State of New Hampshire Natural Hazards Mitigation Plan, it was decided to include a statement in this *Plan*. For the purposes of this *Plan* extreme cold will be referred to in a general manner, without a scientific definition. Periods of extreme cold pose a life-threatening situation for Londonderry's low-income populations. With the rising costs of heating fuel and electric heat, many low-income citizens are not able to adequately heat their homes, exposing themselves to cold related medical emergencies or death.

In Concord there are on average 21 days below 32 degrees Fahrenheit in November, 29 days in December, 30 days in January, 27 days in February, and 26 days in March. The coldest temperatures recorded for each month were -5 degrees Fahrenheit in November, -22° in December, -33° in January, -37° in February, and -16° in March. (Northeast Regional Climate Center)

**All areas of Londonderry** would be affected by extreme cold, in its event. Particular areas and populations at a greater risk are:

- elderly populations and day care centers;
- power system may become overburdened; and
- low income populations.

*Moderate to high probability for extreme cold to occur and cause damage in Londonderry.*

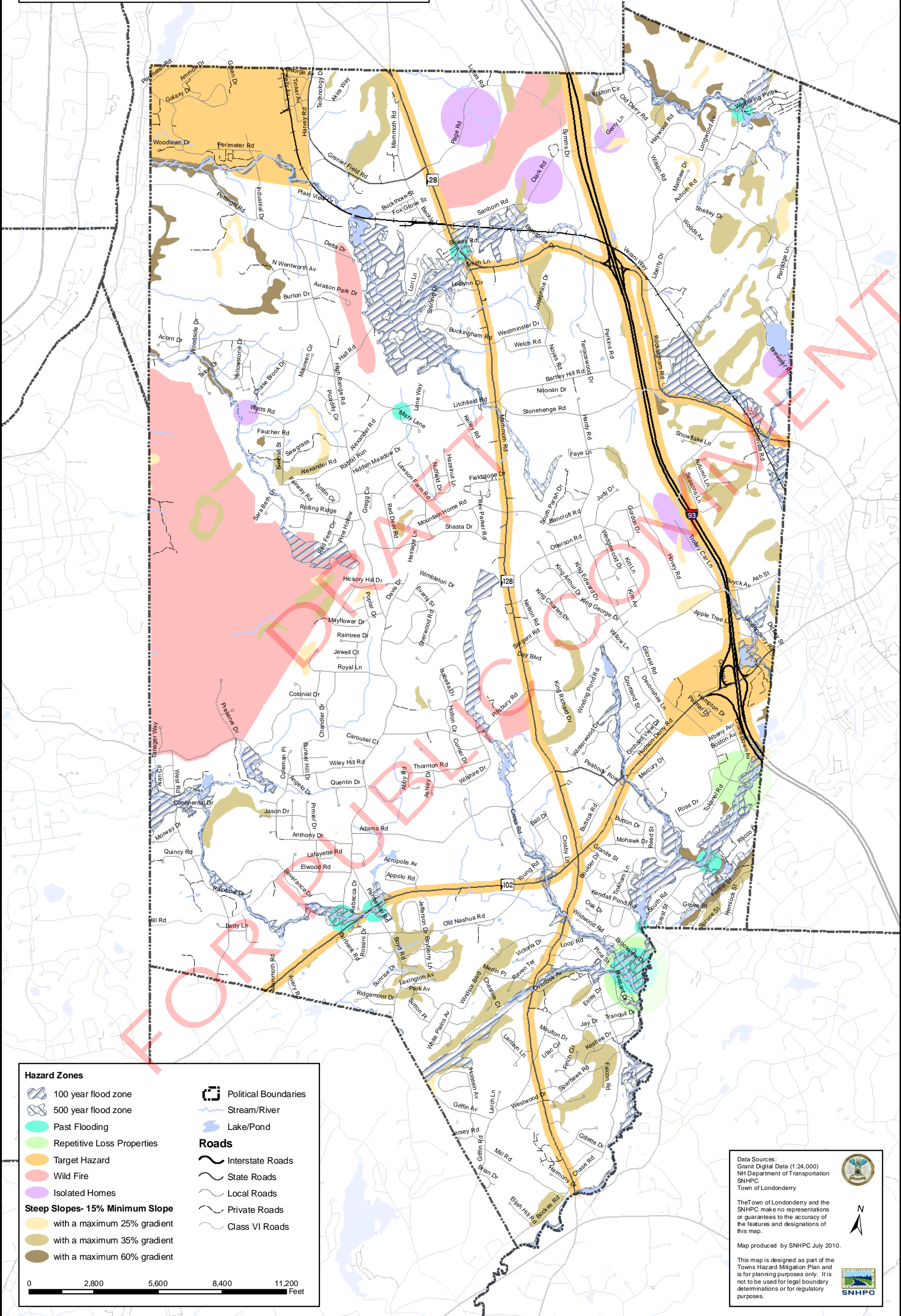
A GIS-generated map, following this page, was prepared to illustrate the Identified Hazard Zones.

DRAFT  
FOR PUBLIC COMMENT



# IDENTIFIED HAZARD ZONES

## Londonderry, NH





# CRITICAL FACILITIES

## Londonderry, NH

- Essential Facilities**
- Town Offices
  - Federal Facilities
  - Post Office
  - Police Station
  - Fire Station
  - EOC
  - Military
  - Public Works Garage
  - Emergency Fuel
  - Emergency Shelter
  - Airport
  - Wireless Towers
  - Public Water System
  - Water Pump/Booster
  - Water Storage Tank
  - Wastewater Pump
  - Electrical Power
  - Gas Pump Station
  - Sewer Pump Station
- Utility Lines**
- Gas Pipeline
  - Power Transmision Line
  - Electrical Substation
  - Telephone Line
  - Water Service Areas
  - Sewer Service Areas

- Hazard Zones**
- 100 year flood zone
  - 500 year flood zone
  - Past Flooding
  - Repetitive Loss Properties
  - Target Hazard
  - Wild Fire
  - Isolated Homes
- Steep Slopes- 15% Minimum Slope**
- with a maximum 25% gradient
  - with a maximum 35% gradient
  - with a maximum 60% gradient
- Roads**
- Interstate Roads
  - State Roads
  - Local Roads
  - Private Roads
  - Class VI Roads
- Political Boundaries**
- Stream/River
  - Lake/Pond

Data Sources:  
Grant Digital Data (1:24,000)  
NH Department of Transportation  
SNHPC  
Town of Londonderry

TheTown of Londonderry and the SNHPC make no representations or guarantees to the accuracy of the features and designations of this map.

Map produced by SNHPC July 2010.

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.



# AREAS AT RISK

## Londonderry, NH

- Areas at Risk**
- Electrical Power
  - Solid Waste
  - Telephone Facilities
  - Media Communications
  - Bridges
  - Dams
  - Transportation Systems
  - Historic Properties
  - Libraries
  - Schools
  - Child Care Centers
  - Adult Day Cares
  - Age Restricted Housing
  - Hotels
  - Recreation - Indoor
  - Recreation - Outdoor
  - Commercial Resources
  - Medical Facilities
  - Religious Facilities
  - Community Centers
  - Major Flood Damage
  - Minor Flood Damage

- Hazard Zones**
- 100 year flood zones
  - 500 year flood zones
  - Past Flooding
  - Repetitive Loss Properties
  - Target Hazard
  - Wild Fire
  - Isolated Homes
- Steep Slopes- 15% Minimum Slope**
- with a maximum 25% gradient
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  - Private Roads
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- Political Boundaries**
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## SECTION III

### VULNERABILITY ASSESSMENT

#### Disaster Risk and Vulnerability Assessment

Based on the hazards outlined in Section II, the following is an estimate of damage, in dollars, that may result if a natural hazard occurs in the Town. These estimates were calculated using FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses*, August 2001. The publication's methodology was modified for this *Plan* based on the data available. The vulnerability estimates utilize available NFIP data, 2009 Town valuation, and identified essential facilities. Data is not yet available in a format (i.e. assessing data linked to a GIS layer of tax maps and building footprints) to locate property specific information in a given hazard zone other than as produced expressly for this *Plan*. The following calculations used available current or historical data and "Worksheet 4" in the Estimating Losses section of *Understanding Your Risks: Identifying Hazards and Estimating Losses*. Background, historical information, associated risks, and summary of assets considered in the estimation process are described in the following estimates.

Human losses were not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. The estimates typically represent only structural loss, unless sufficient data was available to incorporate contents, structure use, or function loss. Current valuation of the Town is:<sup>3</sup>

Land Use Classification	2009 Assessed Valuation		
	Land	Buildings	Total
Current Use	\$747,580		\$747,580
Discretionary Easement	\$305,400	\$58,500	\$363,900
Residential	\$666,811,377	\$1,602,143,554	\$2,268,954,931
Manufactured Housing		\$16,306,900	\$16,306,900
Commercial/Industrial	\$182,869,623	\$383,432,206	\$566,301,829
Utilities**		\$481,207,000	\$481,207,000
<b>Total Assessed Valuation</b>			<b>\$3,333,882,340</b>
<b>2009 Equalized Valuation*</b>			<b>\$3,074,934,591</b>

\* Assessed values were estimated to be 106.8 percent of the full market value in 2009

\*\* The NH PUC only provides assessed value as a combination of land and structure value.

<sup>3</sup> From the NH Department of Revenue Administration, "2009 Tables by County"

## **Flooding**

**\$1.3 - \$4.9 million**

As of the most recent FEMA biennial report, the Town of Londonderry had 85 residential structures located in the floodplain, with an estimated population of 127. The average residential house sale price is \$228,000<sup>4</sup>. 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 and the non-residential structures are two-story without 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" was used to determine the actual estimates.

The low estimate was \$726,750 in structural damages, \$545,063 in contents loss, and \$56,685 in structure use and function loss. The total low estimate loss was \$1,330,497. The high estimate was \$2,713,200 in structural damages, \$2,034,900 in contents loss, and \$145,874 in structure use and function loss. The total high estimate loss was \$4,893,974.

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 Londonderry could benefit greatly from any flood mitigation measures that would help reduce typical losses that occur during a major flood event.

## **Hurricanes**

**up to \$30 million**

Most of the damage from hurricanes is caused by high water and strong winds. While Londonderry is less vulnerable to hurricanes than coastal areas, significant damage could be expected, particularly in areas with manufactured homes. Assuming a community-wide assessed structural valuation, adjusted to market value, of approximately \$3 billion, damaging 1 percent of these structures could result in losses of up to \$30 million. This does not include other damages expected to occur on public property within the community.

## **Debris-Impacted Infrastructure and River Ice Jams**

**\$10,000 to \$5 million**

Damage from these two hazards could be expected to occur not only to privately owned structures, but also to infrastructure such as roads, bridges, and culverts. An estimate of damage, in dollars, from this type of hazard can range widely depending on the nature and severity of the hazard. Past debris-impacted infrastructure damage, in Londonderry, has been minimal. Therefore, it is difficult to separate actual damages to represent this type of hazard. A small-to-medium-sized event could be expected to produce a loss from \$10,000 to \$5 million.

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<sup>4</sup> An average of all single and multi-family structures sold from January 2009 through July 2009, NHHFA Purchase Price Trends data

**Erosion, Mudslides and Rapid Snowpack Melt** **up to \$125,000**

Erosion, mudslides, and rapid snowpack melt damage usually affects infrastructure such as roads and bridges, but can also affect individual structures and businesses. The inventory of essential facilities located in the areas of steep slopes was used to prepare an estimate of this type of damage, since a complete inventory was not available. There are no value estimates for two cell towers, five public water suppliers, and one historic facility that would be vulnerable to these hazards. However, data is available for the remaining structures in the hazard zone. For a moderate event, assuming from 1 percent to 5 percent structural damages, and from .5 percent to 2.5 percent content loss, damages could be expected between \$25,000 and \$125,000. Since this hazard has not been widespread in Londonderry, damages from this hazard should be minimal.

**Dam Breach or Failure** **\$0.3 million to \$3.7 million**

Londonderry has no Class S dams that could cause serious failure damage. The nine Class L dams have a low potential for causing damage in the surrounding areas. Damage estimates could be expected to be about 25-75 percent of the flooding estimate, or \$0.3 to \$3.7 million.

**Water Retention Facility Failure** **\$62,612 to \$1.15 million**

Minimal information is available on the fiscal impacts of this type of event. Damages would be inflicted if the one 2.3 million gallon water tower failed. No past water retention facility failures have occurred in Londonderry to base an estimate of potential losses on. Therefore, damages are estimated to impact from 1 to 20 houses, depending on the surrounding residential density and path of the resulting water path. Assuming basement flooding equal to two feet below the first floor elevation, structural and contents damages could amount to \$62,612 to \$1.15 million.

**Tornados** **\$500,000 to \$15 million**

The Fujita Scale is used to determine the intensity of tornados. Most tornados are in the F0 to F2 Class, in a range that extends to F5 Class. Building to modern wind standards provides significant property protection from tornados. The design wind speed in Londonderry is 100 miles per hour, Exposure Category B, in accordance with the 2009 International Building Code. While it is difficult to assess the monetary impact a tornado may have on a community, as there are no existing standard loss estimation models, the dollar range shown above indicates an approximation of what might be expected. Tornados rarely occur in this part of the country, so damage from this hazard would be uncommon.

**Heavy Snowstorms, Nor'easters, Ice Storms** **\$10,000 to \$3 million**

Damage from heavy snowstorms, nor'easters and ice storms vary greatly depending on the amount of snow and ice that accumulates during the storm. The ice storm of 2008 caused much damage to power lines, structures, and the agricultural economy in northern New England and is said to be the most

damaging ice storm on record. These types of storms in Londonderry could be expected to cause damage ranging from several thousand dollars to several million, depending on the severity of the storm.

### **Lightning**

**\$1,000 - \$15,000**

Damage from lightning is typically minimal and occurs in isolated events without record of actual costs incurred. Incidences throughout the region, occurring to municipal facilities, have incurred damages ranging between \$1,000 and \$15,000.

### **Wild Land Fires**

**\$0.3 million to \$2.7 million**

A fire can strike at any time, but may be expected to occur during years of drought and particularly in the spring and fall months. From 2005 through 2009 there were 455 fires encompassing small isolated events, car fires, building and structural fires, and wild land fires.

Grass or wild land fires can spread more rapidly between structures due to the increased intensity and size of the fire. Presuming a small-to-medium-sized fire that destroys from one to 20 homes, damage from this hazard could be expected to range from \$342,000 to \$2,736,000. Other damage, such as to utilities, was not included in this estimate.

### **Earthquakes**

**up to \$14 - \$33.3 million**

Assuming a moderate earthquake occurs in Londonderry, where structures are not built to a high seismic design level and are mostly of wood frame construction, it is estimated that about 1 percent to 5 percent of the community-wide assessed structural valuation adjusted to market value could be lost, including both partial and total damage.

This estimate used "Worksheet 4" and the Town-wide assessed valuation adjusted to market value of residential, commercial, and industrial structures. Londonderry's actual peak ground acceleration (PGA) is .0597g. This represents the average strength of an earthquake with a 10 percent probability of reoccurring in 50 years. FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses* provides data to conduct damage estimates for PGAs of .05g or .07g. The following estimate uses these two PGA levels, assumes low seismic design for all structures, and estimates the upper limits of expected damages if an earthquake were to impact Londonderry. The first calculation (.05 PGA) yields \$2,918,914 in structural damages, \$921,445 in content damages, and \$10,481,795 in structure use loss for a total estimate of \$14,322,092 in damages. The second calculation (.07 PGA) yields \$8,972,356 in structural damages, \$2,746,344 in content damages, and \$21,595,297 in structure use loss for a total estimate of \$33,313,996 in damages.

**Utility Pipe Failure****\$200 to \$40,000**

No information on water or gas main failures is available for specific properties in Londonderry. Other communities in the SNHPC region have incurred damages of \$200 to \$40,000 from water and sewer main leaks or breaks. The Tennessee Gas Pipeline does run behind three of Londonderry's schools making these three essential facilities vulnerable despite increased safety precautions designed into this length of pipeline.

**Airport Related Disasters****\$5,000 to \$462.4 million**

There is a great range in the type, magnitude, and cost of airport or aircraft related disasters. Most accidents or incidences at the Manchester Airport, as outlined in the previous section, involved minor damages to the aircraft itself, with no other damages or human casualties. Incidences like these could generate \$5,000 or more in damages.

More tragic accidents or plane crashes, which have not previously occurred at the Manchester Airport, could involve the destruction of one major airliner or even two in the event of a collision. Commercial jets range in price from \$40 million to \$230 million. Additionally, if a crash occurred in a residential or populated area there is the potential for the loss of lives and the destruction of one to five homes. The replacement cost of these homes would be \$475,000 to \$2,375,000 (see the estimate of wild land fires for data derivation). Given these values damages, not including human lives, could range from \$30.5 million (one home and one smaller commercial craft) to \$462.4 million (five homes and two larger commercial crafts).

**Downbursts, Hailstorms, Landslides, Geomagnetism, Drought, Extreme Heat/Cold**

No major damage is known to have occurred in the Town of Londonderry related to these types of events. Therefore, no potential loss estimates have been prepared for these categories.

*Note: The above figures are estimates only. The amount of damage from any hazard will vary from these figures depending on the time of occurrence, severity of impact, weather conditions, population density, building construction at the exact event local, and the triggering of secondary events.*

## Critical Facilities

The following are summary tables of the critical facilities located in each of the five identified hazard zones within the Town. For the purposes of this *Plan* a critical facility is defined as a building, structure or location which:

- is vital to the hazard response effort;
- maintains an existing level of protection from hazards for the Town; and
- Would create a secondary disaster if a hazard were to impact it.

These summaries were queried from a database of all essential facilities created for this *Plan*.<sup>5</sup> The Hazard Mitigation Committee, based on its knowledge of the Town, Town of Londonderry Department of Public Works and GIS Manager, and SNHPC, using various directories, were the primary sources for the Critical Facilities listing. The assessed values presented are the total building values and do not include the cost of land or building contents. Assessments were conducted during 2009 and at the time of this *Plan* are assumed to be 100 percent of the full market value.

The five identified hazard zones are:

- **Town Wide Hazards** include hurricanes, tornados, nor'easters, downbursts, lightning, heavy snow, ice storms, hailstorms, earthquakes, geomagnetism, utility pipe failure, drought, or extreme heat/cold;
- **Special Flood Hazard Areas** include riverine flooding, hurricanes, debris-impacted infrastructure, ice jams, rapid snowpack melt, or dam breach;
- **Steep Slopes** include erosion, mudslides, or landslides;
- **Wild Land Fires** include wild land fire hazards; and
- **Target Hazards** include target hazards.

Summary of Critical Facilities by Hazard Zones		
Hazard Zone	No. of Facilities	Total Assessed Building Value
Town Wide (all facilities)	85	\$96,186,500
Flood Hazard Zones	9	\$621,300
Special Flooding Areas	2	\$439,400
Steep Slopes	10	\$377,800
Wild Land Fires	0	NA

<sup>5</sup>All facilities' proximity to the various hazard zones was identified using GIS as follows:

- Special Flood Hazard Zones and Steep Slopes- intersecting or within 100 feet of the mapped area
- Wild Land Fires and Target Hazards- intersecting the mapped area

The 100 foot buffer was applied to allow for mapping accuracies of +/- 200 feet and to include buildings mapped only by a point that are partially located within the specified hazard zone. The other two zones are acknowledged to be approximate locations as mapped.



Town Wide Hazards (Summary of all Critical Facilities)		
Facility Type	No. of Facilities	Assessed Building Value
<b>Government Facilities</b>		
Municipal Offices	2	NA
Federal Facilities	1	NA
Post Office	1	\$483,500
<b>Emergency Response Facilities</b>		
Police Station	1	NA
Fire Station	3	\$556,500
Emergency Operations Center	1	NA
Military Facilities	1	NA
Public Works Garage	1	\$107,900
Emergency Fuel Facilities	1	\$486,300
Emergency Shelters	3	\$23,702,400
Airport Facilities	1	\$63,741,700
<b>Utility Systems</b>		
Wireless Communication Facilities	16	\$3,445,700
Public Water System	35	\$2,852,800
Water Pump or Boost Station	8	\$269,100
Wastewater Pump Station	5	\$540,600
Electrical Power Substations/Lines	4	NA
Gas Pump Station	1	NA

Special Flood Hazard Zones		
Facility Type	No. of Facilities	Assessed Building Value
Public Water System	7	\$181,900
Wastewater Pump Station	2	\$439,400

Steep Slopes		
Facility Type	No. of Facilities	Assessed Building Value
Wireless Communication Facilities	4	\$61,400
Public Water System	4	\$316,400
Electrical Power Substations/Lines	1	NA

Wild Land Fires		
Facility Type	No. of Facilities	Assessed Building Value
There are no Critical Facilities in the Wild Land Fire Zones.		

Target Hazard Zones		
Facility Type	No. of Facilities	Assessed Building Value
<b>Government Facilities</b>		
Municipal Offices	1	NA
Post Office	1	\$483,500
<b>Emergency Response Facilities</b>		
Police Station	0	NA
Fire Station	2	\$556,500
Emergency Operations Center	1	NA
Emergency Fuel Facilities	1	\$486,300
Emergency Shelters	2	\$15,602,300
Airport Facilities	1	\$63,741,700
<b>Utility Systems</b>		
Wireless Communication Facilities	1	NA
Public Water System	8	\$2,243,300
Water Pump or Boost Station	2	NA
Wastewater Pump Station	2	\$439,400

## Areas at Risk

The following are summary tables of the areas at risk located in each of the five identified hazard zones within the Town. For the purposes of this *Plan* an area at risk is defined as emergency equipment or areas not needed to respond at the time of a natural disaster, but which could still be threatened if a natural disaster were to occur. These include:

- critical facilities not utilized for emergency response;
- people and facilities to be protected in the event of a disaster; and/or
- potential resources for services or supplies in the event of a disaster.

These summaries were queried from a database of all essential facilities created for this *Plan*.<sup>6</sup> Resources for the Areas at Risk database entries included the Committee, SNHPC, NH Department of Environmental Services GIS data, NH Office of Energy and Planning GIS data, UNH GRANIT GIS data, and the National Register of Historic Places. The assessed values presented are the total building values and do not include the cost of land or building contents. Assessments were conducted during 2009 and at the time of this *Plan* are assumed to be 100 percent of the full market value.

The five identified hazard zones are:

- **Town Wide Hazards** include hurricanes, tornados, nor'easters, downbursts, lightning, heavy snow, ice storms, hailstorms, earthquakes, geomagnetism, utility pipe failure, drought, or extreme heat/cold;
- **Special Flood Hazard Areas** include riverine flooding, hurricanes, debris-impacted infrastructure, ice jams, rapid snowpack melt, or dam breach;
- **Steep Slopes** include erosion, mudslides, or landslides;
- **Wild Land Fires** include wild land fire hazards; and
- **Target Hazards** include target hazards.

Summary of Areas at Risk by Hazard Zones		
Hazard Zone	No. of Facilities	Total Assessed Building Value
Town Wide (all facilities)	164	\$145,473,900
Flood Hazard Zones	27	\$3,498,700
Special Flooding Areas	2	\$0
Steep Slopes	10	\$1,290,800
Wild Land Fires	2	\$185,300

<sup>6</sup>All facilities' proximity to the various hazard zones was identified using GIS as follows:

- Special Flood Hazard Zones and Steep Slopes- intersecting or within 100 feet of the mapped area
- Wild Land Fires and Target Hazards- intersecting the mapped area

The 100 foot buffer was applied to allow for mapping accuracies of +/- 200 feet and to include buildings mapped only by a point that are partially located within the specified hazard zone. The other two zones are acknowledged to be approximate locations as mapped.

Town Wide Hazards (Summary of all Areas at Risk)		
Facility Type	No. of Facilities	Assessed Building Value
<b>Utility Systems</b>		
Solid Waste & Recycling Facilities	2	\$1,824,300
<b>Communication Systems</b>		
Media Communications/Cable TV and Public Access	7	\$2,624,300
<b>Special Consideration</b>		
Bridges	19	N/A
Dams	7	NA
Historical Facilities	8	570,700
Library	1	NA
<b>Vulnerable Populations</b>		
Schools	6	\$ 28,439,900
Child Care Facilities	30	\$11,429,600
<b>Other Resources</b>		
Recreation Areas	14	\$20,047,800
Commercial Resources	31	\$44,996,700
Medical Facilities	7	\$12,107,400
Religious Facilities	13	\$12,142,200
Community Centers	4	\$922,800

Special Flood Hazard Zones		
Facility Type	No. of Facilities	Assessed Building Value
<b>Special Consideration</b>		
Bridges	10	N/A
Dams	5	3,497,800
Historical Facilities	4	194,300
<b>Vulnerable Populations</b>		
Child Care Facilities	1	\$181,900
<b>Other Resources</b>		
Commercial Resources	1	\$78,200
Medical Facilities	1	\$2,340,500

Steep Slopes		
Facility Type	No. of Facilities	Assessed Building Value
<b>Special Consideration</b>		
Dams	1	N/A
Historic Properties	1	N/A
<b>Vulnerable Populations</b>		
Child Care Facilities	3	\$783,800
Elderly Housing	1	NA
<b>Other Resources</b>		
Recreation Areas	2	\$316,400
Commercial Resources	1	\$190,600

Wild Land Fires		
Facility Type	No. of Facilities	Assessed Building Value
<b>Vulnerable Populations</b>		
Child Care Facilities	1	\$185,300
<b>Other Resources</b>		
Recreation Areas	1	NA

Target Hazard Zones		
Facility Type	No. of Facilities	Assessed Building Value
<b>Utility Systems</b>		
Solid Waste and Recycling Facilities	1	\$ 343,400
<b>Communication Systems</b>		
Telephone Facilities	3	\$ 26,000
Media Communications	4	\$ 909,000
<b>Special Consideration</b>		
Bridges	12	N/A
Dams	1	N/A
Transportation Systems	1	\$ 472,800
Historic Properties	2	N/A
Libraries	1	N/A
<b>Vulnerable Populations</b>		
Schools	4	\$ 23,776,900
Child Care Facilities	11	\$ 1,709,700
Adult Day Cares	1	\$ 181,600
Age Restricted Housing	1	\$ 5,220,900

Target Hazard Zones (continued)		
Facility Type	No. of Facilities	Assessed Building Value
<b>Other Resources</b>		
Hotels	1	\$ 3,345,700
Recreation - Indoor	2	\$ 3,606,800
Recreation - Outdoor	3	\$ 665,000
Commercial Resources	7	\$ 8,598,600
Medical Facilities	5	\$ 5,071,100
Religious Facilities	8	\$ 7,796,100
Community Center	2	\$ 437,000

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## Commercial Economic Impact Areas

The following is a summary table of the commercial-economic impact areas located in each of the five identified hazard zones within the Town. For the purposes of this *Plan*, a commercial economic impact area includes organizations and businesses with more than 20 employees. These are facilities that are vital to the community's economic well-being.

This summary was queried from a database of all essential facilities created for this *Plan*.<sup>7</sup> The facilities were taken from a database of employers developed by the Town of Londonderry Planning and Economic Development Department and were mapped by SNHPC by a combination of GIS automated address matching and manual placement using tax map and lot locations.

The five identified hazard zones are:

- **Town Wide Hazards** include hurricanes, tornados, nor'easters, downbursts, lightning, heavy snow, ice storms, hailstorms, earthquakes, geomagnetism, utility pipe failure, drought, or extreme heat/cold;
- **Special Flood Hazard Areas** include riverine flooding, hurricanes, debris-impacted infrastructure, ice jams, rapid snowpack melt, or dam breach;
- **Steep Slopes** include erosion, mudslides, or landslides;
- **Wild Land Fires** include wild land fire hazards; and
- **Target Hazards** include target hazards.

Commercial Economic Impact Areas		
Hazard Zone	Number of Employers	Number of Employees
Town Wide	132	7,830
Flood Hazard Zones	5	317
Special Flood Hazard Areas	1	30
Steep Slopes	5	372
Wild Land Fires	0	0

<sup>7</sup>All facilities' proximity to the various hazard zones was identified using GIS as follows:

- Special Flood Hazard Zones and Steep Slopes- intersecting or within 100 feet of the mapped area
- Wild Land Fires and Target Hazards- intersecting the mapped area

The 100 foot buffer was applied to allow for mapping accuracies of +/- 200 feet and to include buildings mapped only by a point that are partially located within the specified hazard zone. The other two zones are acknowledged to be approximate locations as mapped.



## Hazardous Materials Facilities

The following is a summary table of the hazardous materials facilities located in each of the five identified hazard zones within the Town. For the purposes of this *Plan*, hazardous materials facilities include active hazardous waste generators, underground storage tanks, and above-ground storage tanks. As defined by the N.H. Department of Environmental Services, active hazardous waste generators may include businesses that produce household hazardous waste, or treat, store, or dispose of hazardous waste, or be a waste handler or used oil marketer.

This summary was queried from a database of all essential facilities created for this *Plan*.<sup>8</sup> The listing of Hazardous Materials Facilities was created from the NH Department of Environmental Services GIS data layers for hazardous waste generators, above ground, and underground storage tanks.

The five identified hazard zones are:

- **Town Wide Hazards** include hurricanes, tornados, nor'easters, downbursts, lightning, heavy snow, ice storms, hailstorms, earthquakes, geomagnetism, utility pipe failure, drought, or extreme heat/cold;
- **Special Flood Hazard Areas** include riverine flooding, hurricanes, debris-impacted infrastructure, ice jams, rapid snowpack melt, or dam breach;
- **Steep Slopes** include erosion, mudslides, or landslides;
- **Wild Land Fires** include wild land fire hazards; and
- **Target Hazards** include target hazards.

Number of Hazardous Material Facilities within the Hazard Zones			
Hazard Zone	Hazardous Waste Generators	Above Ground Storage Tank Sites	Underground Storage Tank Sites
Town Wide	203	21	79
Flood Hazard Zones	13	1	4
Special Flooding Areas	4	0	1
Steep Slopes	4	0	1
Wild Land Fires	1	0	0

<sup>8</sup>All facilities' proximity to the various hazard zones was identified using GIS as follows:

- Special Flood Hazard Zones and Steep Slopes- intersecting or within 100 feet of the mapped area
- Wild Land Fires and Target Hazards- intersecting the mapped area

The 100 foot buffer was applied to allow for mapping accuracies of +/- 200 feet and to include buildings mapped only by a point that are partially located within the specified hazard zone. The other two zones are acknowledged to be approximate locations as mapped.

## SECTION IV

### EXISTING MITIGATION STRATEGIES AND PROPOSED IMPROVEMENTS

#### **Description of Existing Programs**

The Town of Londonderry has adopted several programs and ordinances for hazard mitigation. Below are brief descriptions of these programs and how they aid in hazard mitigation.

#### **Emergency Operations Plan**

Londonderry maintains an Emergency Operations Plan. The plan is currently being updated in 2010. The plan coordinates the Town Departments' actions and responses before, during, and after a disaster. Events planned for range from aircraft disasters and hazardous materials incidents to flooding and snowstorms. The plan was prepared to conform to guidelines by the Federal Emergency Management Agency, U.S. Nuclear Regulatory Commission, Federal Energy Regulatory Commission, the New Hampshire Emergency Management Agency and the NH Emergency Operations Plan. The plan establishes the Emergency Operations Center (at the Central Fire Station). The Emergency Operations Plan addresses shelters, evacuation procedures, emergency notification, and health and medical services. Additionally, it includes a section on weapons of mass destruction and a domestic terrorism contingency plan.

#### **Floodplain Development Ordinance (Zoning Ordinance)**

Floodplain district regulations apply to all lands designated as special flood hazard areas by FEMA in its *Flood Insurance Study for the Town of Londonderry, N.H.* and *Flood Insurance Rate Maps (FIRMs)* dated May 17, 2005. Encroachments, including fill, new construction, substantial improvements to existing structures, and other development are prohibited unless certification by a registered professional engineer is provided by the applicant demonstrating that such encroachment will not result in any increase in flood levels during the occurrence of the 100-year base flood. 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. In 2005, the Town of Londonderry adopted new Digital FIRMs and Flood Insurance Study, effective May 17, 2005, produced under FEMA's Map Modernization Program.

#### **Elevation Certificates**

An Elevation Certificate is required when a structure is built or substantially improved within a known flood zone, or if the flood map shows a part of the lot within the flood zone and the certified foundation plan shows the house is located within the flood zone. The land surveyor must supply the footing elevation.

### **Conservation Overlay District (Zoning Ordinance)**

The Conservation Overlay District, contained within the Zoning Ordinance, requires setbacks ranging from 50 to 150 feet from the edge of a wetland or the centerline of a stream dependent on the water body's classification. The primary objectives of this ordinance are to mitigate any development that may negatively interfere with these water systems' natural functions and reduce any potential financial impacts that may be caused by the inappropriate use of these lands.

### **Airport Zoning Regulation and Noise Overlay Zoning (Zoning Ordinance)**

The Airport Zoning Regulation is currently being updated in 2010 and aims to mitigate potential disasters related to the operation of the Manchester Airport, sited on land in both Londonderry and Manchester. The ordinance regulates against the creation of any potential obstructions to aerial approach, radio system functioning, and visibility. The zone is defined as all areas within a 100,000-foot radius of the Airport Reference Point. The Noise Overlay District establishes soundproofing requirements for varying land uses and is anticipated to be updated with new regulations provided by the Airport Authority.

### **Manufactured Housing (Zoning Ordinance)**

Regulations are established to provide suitable and affordable living environments in manufactured home parks and on individual lots in the Agricultural-Residential (AR) District. Minimum standards are set regulating densities and available utilities and construction and safety standards in order to protect the occupants and reduce the homes' vulnerability to natural disasters.

### **Steep Slopes (Zoning Ordinance)**

Londonderry's Zoning Ordinance excludes any slopes greater than 25 percent from the calculation of "Usable Land" in the Multi-Family Residential and Elderly Housing Districts. All other residential zones use soil based lot sizing to determine buildable lot area and permitted density. One input factor in making the lot size determination is slope, acting as constraint on the buildable area. Within the Performance Overlay District, steep slopes of 33 percent are regulated to mitigate hazards associated with the development of these areas.

### **Londonderry Building Codes (Chapter II, Zoning Ordinance)**

The Londonderry Building, Health and Zoning Department enforces the *International Building Code* 2009 edition, *International Plumbing Code* 2009 edition, the *International Residential Code* 2009 edition, and the *National Electrical Code* as in the State Building Code with certain additions, insertions, deletions and changes. Building codes set minimum safety standards for occupants utilizing structural, fire and life safety provisions, wind loads and design, seismic design, flood proofing, and egress design.

### **Excavation Regulations**

Earth removal regulations minimize safety hazards created by open excavations; safeguard the public health and welfare; preserve the natural assets of soil, water, forests and wildlife; maintain aesthetic features of the environment; prevent land and water pollution; and promote soil stabilization. Excavation regulations are maintained within the Londonderry Zoning Ordinance.

### **Stormwater Regulations**

The Town of Londonderry has had extensive stormwater regulations in place to address run-off from development sites. These regulations require that the post-development run-off rate not exceed the pre-development runoff rate. Additionally, surface run-off shall be directed to managed systems prior to entering existing water bodies.

### **Erosion, Drainage and Flood Control (Subdivision and Site Plan Regulations)**

Londonderry's Subdivision and Site Plan Regulations set development standards requiring erosion controls as are consistent with New Hampshire Best Management Practices. The regulations set minimum standards for storm drainage throughout the Town and in the Special Flood Hazard Areas (SFHAs). Additional SFHA specific requirements include mandated planning board review, base flood elevations, and proposals be designed to mitigate any potential damages from run-off or flooding.

### **Road Design Standards (Subdivision and Site Plan Regulations)**

Londonderry maintains road design regulations as part of the Town's Subdivision and Site Plan Regulations. The Subdivision Regulations specifically cite the following standards and specifications as applicable to all improvements in the Town:

- Manual on Drainage Design for Highways, State of New Hampshire, Department of Public Works and Highways, current edition;
- Manual on Uniform Traffic Control Devices (MUTCD), U.S. Department of Transportation, Federal Highway Administration, current edition;
- Standard Specifications for Road and Bridge Construction, State of New Hampshire, Department of Transportation, 1997 or latest revision;
- Highway Design Manual, State of New Hampshire, Highway Design Division, current edition; and
- A Policy on Geometric Design of Highways and Streets, AASHTO – 1990.

### **Snow Emergency Regulations**

The Snow Emergency Regulations allow the Public Works Department to declare snow emergencies triggering parking bans to expedite the flow of traffic and snow removal.

### **Fire Codes**

The Town of Londonderry Fire Code, as adopted by the Town Council in 2010, includes sections of the 2009 *International Fire Code*, NFPA, and the 2009 *International Building Code* to protect residents from fire hazards in residential and non-residential facilities. Single family residences are required to have all gas and oil fired systems inspected by the Fire Department prior to receiving a certificate of occupancy. Commercial and industrial structures must have inspections reviewing sprinkler, mechanical, and fire alarm systems, structural components including firewalls. Additionally, site plans must be reviewed by the fire inspector to ensure proper hydrant placement and adequate access is provided for fire and emergency vehicles.

### **Hazardous Materials Regulations**

The Town of Londonderry enforces state regulations regarding hazardous materials. Londonderry's Fire Department participates in the Southeastern New Hampshire Hazardous Materials Mutual Aid District (SNHHMMAD). SNHHMMAD provides technical expertise during an emergency on decontamination, rescue, and control, as well as hazardous materials mitigation. The district is composed of 15 member communities incorporating over 140,000 residents and 400 square miles.

### **Town Radio System**

Each of the Fire, Police, and Public Works Departments maintain separate, but interoperable, radio networks for day-to-day operations. These systems are comprised of base stations and individual mobile radios. The systems can also interface with regional mutual aid and state agencies.

### **Police**

The Chief of Police is charged with preserving public peace, preventing riots and disorder, and receiving and issuing emergency warnings. During fires the police are to prevent theft and further unwarranted destruction of property.

### **Comprehensive Emergency Management Planning for Schools (CEmps)**

Comprehensive Emergency Management Planning for Schools is available from the New Hampshire Office of Emergency Management. CEMPS outlines training for schoolteachers, administrators, and students on actions to be taken during an emergency at school. The school district will continue to implement this program.

### **Manchester Water Works Emergency Operations Manual**

This manual establishes an action plan for the department and its employees in the event of a natural or man-made disaster. Specific response plans are outlined for each hazard type as it pertains to the individual Water Works divisions. The manual also includes emergency contact lists, a list of Manchester Water Work's buildings and structures, emergency action and notification forms, and additional information on the hazards.

### **Pennichuck Water Works Londonderry Water Supply System Emergency Response Plan**

This plan provides a description of the water system, emergency contacts and the chain of command during an emergency, emergency response protocols and a section on pre-emptive planning. Hazard events have been group together into three tiers and individual response plans have been established for each of the tiers. Additionally, the appendices provide supplemental information on standard operation procedures for isolating system components, EPA multi-tiered treat advisory system, public notification guide and forms, news release guide, and water efficiency practices.

### **State Dam Program**

The 19 Class 'NM' dams and 9 Class 'L' dams in Londonderry are maintained in compliance with the State Dam Program. Town staff inspects the Town owned dams are inspected on a regular basis. Inspections look for seepage, erosion, animal burrows, spalling, cracking, vegetation growth, and security issues. Preventive maintenance is conducted as needed.

### **New Hampshire Shoreland Protection Act**

The Shoreland Protection Act, adopted during 1994 and last updated in 2008, establishes minimum standards for the future subdivision, use, and development of all shore lands within 250 feet of the ordinary high water mark. When repairs, improvements, or expansions are proposed to existing development, the law requires these alterations to be consistent with the intent of the Act. The N.H. Department of Environmental Services 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.

### **Best Management Practices**

The State has established Best Management Practices (BMPs) for 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 because of site-specific conditions that reflect natural background conditions.

### **Existing Protection Matrix**

The Londonderry Hazard Mitigation Committee has developed a summary matrix of existing strategies that support hazard mitigation efforts, which is presented on the following pages. This matrix, a summary of the preceding information, includes the existing protection program (column 1), a description of the existing protection (column 2), the area of town affected (column 3), the enforcing department or agency (column 4), and the identified improvements or changes needed and funding sources (column 5).

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## Existing Protection Policies, Programs and Proposed Improvements for the Town of Londonderry

Existing Protection Program	Description	Effective Area	Implementing Department or Agency	Improvements or Changes Needed (Funding Sources)	2010 Update
Emergency Operations Plan	Describes Town department and personnel duties and equipment available during an emergency; evacuation and notification; and Terrorism Assessment. Last updated 2002	Town-wide	<ul style="list-style-type: none"> <li>Emergency Management Director</li> </ul>	Currently under review Update early 2005 (Emergency Management Performance Grant from the State of NH, Division of Fire Safety and Emergency Management)	Currently being updated in 2010
Floodplain Development Ordinance (Zoning Ordinance)	Guides development in the floodplain to prevent increased risk to existing buildings in the SFHAs	Special flood hazard areas as mapped on FIRMs	<ul style="list-style-type: none"> <li>Planning Board</li> <li>Community Development</li> </ul>	Adopt new Digital FIRMs (FEMA Map Modernization Program)	Adopted
Elevation Certificates	Records building first floor elevations for new construction /substantial improvements in SFHA	Special flood hazard areas as mapped on FIRMs	<ul style="list-style-type: none"> <li>Community Development</li> </ul>	No changes needed at this time.	No changes needed at this time.

Existing Protection Program	Description	Effective Area	Implementing Department or Agency	Improvements or Changes Needed (Funding Sources)	2010 Update
Conservation Overlay District (Zoning Ordinance)	Protects wetlands and includes buffers between wetlands or streams and buildings, structures or parking lots	All wetlands and streams as identified in the Zoning Ordinances	<ul style="list-style-type: none"> <li>• Planning Board</li> <li>• Conservation Commission</li> <li>• Community Development</li> </ul>	No changes needed at this time.	No changes needed at this time.
Airport Zoning Regulation and Noise Overlay Zoning (Zoning Ordinance)	Overlay districts that minimize navigational disturbances, set height limitations to prevent airspace obstructions, and mitigate adverse impacts of noise on surrounding development	For radio/electrical disturbances the area within 100,000 feet of the control tower. For noise the N-1, N-2, and N-3 zones	<ul style="list-style-type: none"> <li>• Community Development</li> <li>• Airport Authority</li> <li>• FAA</li> </ul>	Adopt new noise overlay zoning codes as produced by the Airport Authority (Airport Authority, Operating Budget)	No changes needed at this time.
Manufactured Housing (Zoning Ordinance)	Sets minimum standards for densities, utilities, construction, and safety standards	All parks or individual lots in the Apartment Residential Zone	<ul style="list-style-type: none"> <li>• Community Development</li> <li>• Planning Board</li> </ul>	No changes needed at this time.	No changes needed at this time.

Existing Protection Program	Description	Effective Area	Implementing Department or Agency	Improvements or Changes Needed (Funding Sources)	2010 Update
Steep Slopes (Zoning Ordinance)	Steep slopes of 25 percent or greater are excluded from the calculation of usable land in the multi-family residential and elderly housing districts; other residential districts use soil based lot sizing incorporating slope into the calculation; slopes of 33 percent or more are regulated in the Performance Overlay	Multi-Family Residential, Elderly Housing, all other residential districts, and Performance Overlay Districts	<ul style="list-style-type: none"> <li>Planning Board</li> <li>Community Development</li> </ul>	No changes needed at this time.	No changes needed at this time.
Londonderry Building Codes	Regulates construction of buildings and fire protection; sets a minimum standard of protection to building occupants	Town-wide	<ul style="list-style-type: none"> <li>Community Development</li> </ul>	No changes needed at this time.	No changes needed at this time.

Existing Protection Program	Description	Effective Area	Implementing Department or Agency	Improvements or Changes Needed (Funding Sources)	2010 Update
Excavation Regulations	Minimize safety hazards created by open excavations	Town-wide	<ul style="list-style-type: none"> <li>Planning Board</li> <li>Community Development</li> </ul>	Consolidated the Zoning Ordinance requirements with the separate Excavation Regulations (Operating Budget)	Completed
Stormwater Regulations	Mandate all run-off from new development not exceed pre-development rates	Town-wide	<ul style="list-style-type: none"> <li>Planning Board</li> <li>Department of Public Works</li> </ul>	No changes needed at this time.	No changes needed at this time.
Erosion, Drainage and Flood Control (Subdivision and Site Plan Regulations)	Sets standards for erosion and flood controls consistent with the State Best Management Practices and the Town's Floodplain Development Ordinance	Town-wide	<ul style="list-style-type: none"> <li>Planning Board</li> <li>Department of Public Works</li> </ul>	No changes needed at this time.	No changes needed at this time.
Road Design Standards (Subdivision and Site Plan Regulations)	Standards for design and engineering to ensure visibility and safety	All new improvements	<ul style="list-style-type: none"> <li>Planning Board</li> <li>Department of Public Works</li> </ul>	No changes needed at this time.	No changes needed at this time.

Existing Protection Program	Description	Effective Area	Implementing Department or Agency	Improvements or Changes Needed (Funding Sources)	2010 Update
Snow Emergency Regulations	Provisions regulating parking during winter months to expedite traffic flow and ease of snow removal	Town-wide	<ul style="list-style-type: none"> <li>• Department of Public Works</li> <li>• Fire Department</li> <li>• Police Department</li> <li>• Town Council</li> </ul>	No changes needed at this time.	No changes needed at this time.
Londonderry Fire Codes	Adopts the International Fire Code, NFPA, and International Building Code; protection for building occupants from fire hazards including, design suppressant and alarm systems.	Town-wide	<ul style="list-style-type: none"> <li>• Fire Department</li> </ul>	No changes needed at this time.	No changes needed at this time.
Hazardous Materials Regulations	State hazardous materials regulations are enforced; Londonderry participates in the Southeastern NH HazMat Mutual Aid District	Town-wide	<ul style="list-style-type: none"> <li>• Fire Department</li> </ul>	No changes needed at this time.	Continue to work on regional emergency planning committee
Town Radio System	Mobile radio and dispatch system for fire, police and public works personnel	Town-wide	<ul style="list-style-type: none"> <li>• Fire Department</li> <li>• Police Department</li> <li>• Public Works</li> </ul>	No changes needed at this time.	No changes needed at this time.

Existing Protection Program	Description	Effective Area	Implementing Department or Agency	Improvements or Changes Needed (Funding Sources)	2010 Update
Police	Police to preserve public peace, prevent riots and disorder, prevent destruction of property during fires, and investigate criminal acts	Town-wide	<ul style="list-style-type: none"> <li>Police Department</li> </ul>	Update operating policy (Operating Budget)	All operating policies up to date at this time.
Comprehensive Emergency Management Planning for Schools	Education for school teachers, administrators and children for emergency situations	All Schools	<ul style="list-style-type: none"> <li>School Department</li> <li>Fire Department</li> <li>Police Department</li> </ul>	Update plan after a comprehensive review by Federal and State agencies; add new information on emergency prevention (NHBEM)	No changes needed at this time.
Manchester Water Works Emergency Operations Manual	Emergency response plans for each MWW division based on hazard types	Town-wide	<ul style="list-style-type: none"> <li>Manchester Water Works</li> </ul>	No changes needed at this time.	No changes needed at this time.
Pennichuck Water Works' Londonderry Water Supply System Emergency Response Plan	Emergency response plans for PWW service to Londonderry including chain of command and response actions	Town-wide	<ul style="list-style-type: none"> <li>Pennichuck Water Works</li> </ul>	No changes needed at this time.	No changes needed at this time.



Existing Protection Program	Description	Effective Area	Implementing Department or Agency	Improvements or Changes Needed (Funding Sources)	2010 Update
NH State Dam Program	Maintenance of dams in coordination with the State Dam Program.	One Town owned and 19 privately owned dams and adjacent land area	<ul style="list-style-type: none"> <li>NHDES</li> <li>Public Works</li> </ul>	No changes needed at this time.	No changes needed at this time.
NH Shoreland Protection Act	Standards for all protected shorelands within 250 feet of the ordinary high water mark of state public waters	All property within 250 feet of public waters	<ul style="list-style-type: none"> <li>NHDES</li> <li>Planning Board</li> <li>Community Development</li> </ul>	No changes needed at this time.	No changes needed at this time.
Best Management Practices (BMPs)	State guidelines for sediment and erosion control; protection of natural environment; and prevention of potential damage due to poor construction methods	Town-wide	<ul style="list-style-type: none"> <li>State of NH</li> <li>Public Works</li> <li>Planning Board</li> <li>Community Development</li> </ul>	No changes needed at this time.	No changes needed at this time.

### **Summary of Recommended Improvements to Existing Programs**

Improvements to existing programs were reviewed, and keyed below, for their ability to reduce hazard impacts to both existing (E) and future (F) buildings and infrastructure, as well as the Town's ability to respond (R) to disasters. The Londonderry Hazard Mitigation Committee recommends the following improvements to existing mitigation programs<sup>9</sup>:

- Continue to work on regional emergency planning committee for Hazardous Materials regulations

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<sup>9</sup> More specific details on each recommended improvement can be found in Section V "Prioritized Implementation Schedule and Funding Sources."

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## SECTION V

### NEWLY IDENTIFIED MITIGATION STRATEGIES AND CRITICAL EVALUATION

#### Summary of New Strategies

The Londonderry Hazard Mitigation Committee brainstormed actions of benefit to the Town and its residents, with the potential to reduce future damages. Projects were reviewed, and keyed, for their ability to reduce hazard impacts to both existing (E) and future (F) buildings and infrastructure; as well as improve the Town's ability to respond (R) to disasters. The Londonderry Hazard Mitigation Committee identified the following 13 new or ongoing mitigation strategies<sup>10</sup>:

- Update the Schools Emergency Plan (E,F,R)
- Continue to increase public outreach (F,R)
- Develop a Local Sheltering Plan (E,F,R)
- Develop Aquifer and Groundwater Protection Strategies by updating the Water Resource and Management Protection Plan (E,F,R)
- Prioritize and upgrade inadequate culverts (E,F,R)
- Work to mitigate repetitive flood problems on Brookview Drive (E,F,R)
- Post high water level warnings along Kendall Pond (F,R)
- Publish and distribute educational materials for residents of isolated areas outlining disaster preparedness, response, and limited access to homes by emergency vehicles (E,F,R)
- Publish and distribute educational materials for residents of flood prone areas outlining disaster preparedness, response, and supply flood proofing/mitigation information to protect their property from flood damages (E,F,R)
- Prioritize and upgrade Class VI roads (F,R)

#### Summary of Critical Evaluation

Committee members reviewed each of the 13 newly identified mitigation actions (Section IV) using the following 14 STAPLEE derived criteria<sup>11</sup>. Scores were assigned to each criterion based on (1) for Poor, (2) for Average, and (3) for Good. Total average scores range from a minimum of 1.67 to a maximum of 2.74. Each Committee member individually scored all projects and then all scores were averaged to obtain the results presented in this plan. The 14 criteria were:

- *Social* - Is the project socially acceptable?
- *Social* - Any effect on segment of population?

<sup>10</sup> More specific details on each new hazard mitigation strategy can be found in Section V "Prioritized Implementation Schedule and Funding Sources."

<sup>11</sup> Explanation of STAPLEE is provided in Appendix F along with the individual scoring for each project.

- *Technical* - Is the project technically feasible/potentially successful?
- *Technical* - Is it a long-term solution?
- *Administrative* - Are there staffing and maintenance provisions?
- *Administrative* - Is there funding allocated for this project?
- *Political* - Does the project have support of the governing body?
- *Political* - Does it help achieve other community objectives?
- *Legal* - Does the project conform to State and local laws?
- *Legal* - Is there a chance the project will be legally challenged?
- *Economic* - Is it economically beneficial- benefits outweigh the costs?
- *Economic* - Does the project reduce future disaster damages?
- *Environmental* - What are the impacts on land, water, animals and plants?
- *Environmental* - Does the project conform to State and local regulations?

### **Preliminary Prioritization**

The Londonderry Hazard Mitigation Committee assigned the following scores to each of the 13 actions for their effectiveness related to the critical evaluation factors listed above. The following lists the strategies by the type of protection offered, in order of highest to lowest priority score:

<b><u>Score</u></b>	<b><u>Action</u></b>	<b><u>Hazard(s)</u></b>
<b>Preventative</b>		
2.74	Update the Schools Emergency Plan	<i>All</i>
2.74	Continue to increase public outreach	<i>All</i>
2.68	Develop a Local Sheltering Plan	<i>All</i>
2.66	Develop Aquifer and Groundwater Protection Strategies by updating the Water Resource and Management Protection Plan	<i>Other</i>
2.61	Prioritize and upgrade inadequate culverts	<i>Flooding</i>
2.61	Work to mitigate repetitive flood problems on Brookview Drive	<i>Flooding</i>
2.57	Post high water level warnings along Kendall Pond	<i>Flooding</i>
2.43	Publish and distribute educational materials for residents of isolated areas outlining disaster preparedness, response, and limited access to homes by emergency vehicles	<i>All</i>
2.39	Publish and distribute educational materials for residents of flood prone areas outlining disaster preparedness, response, and supply flood proofing/ mitigation information to protect their property from flood damages	<i>All</i>
2.30	Prioritize and upgrade Class VI roads	<i>All</i>
<b>Property Protection</b>		
2.61	Prioritize and upgrade inadequate culverts	<i>Flooding</i>
2.61	Work to mitigate repetitive flood problems on Brookview Drive	<i>Flooding</i>
2.57	Post high water level warnings along Kendall Pond	<i>Flooding</i>

### **Structural Projects**

- |      |  |                 |
|------|--|-----------------|
| 2.61 | Prioritize and upgrade inadequate culverts | <i>Flooding</i> |
| 2.30 | Prioritize and upgrade Class VI roads      | <i>All</i>      |

### **Emergency Services**

- |      |   |                 |
|------|---|-----------------|
| 2.61 | Work to mitigate repetitive flood problems on Brookview Drive | <i>Flooding</i> |
| 2.57 | Post high water level warnings along Kendall Pond             | <i>Flooding</i> |
| 2.30 | Prioritize and upgrade Class VI roads                         | <i>All</i>      |

### **Public Information**

- |      |  |                 |
|------|--|-----------------|
| 2.74 | Continue to increase public outreach   | <i>All</i>      |
| 2.61 | Work to mitigate repetitive flood problems on Brookview Drive  | <i>Flooding</i> |
| 2.57 | Post high water level warnings along Kendall Pond  | <i>Flooding</i> |
| 2.43 | Publish and distribute educational materials for residents of isolated areas outlining disaster preparedness, response, and limited access to homes by emergency vehicles  | <i>All</i>      |
| 2.39 | Publish and distribute educational materials for residents of flood prone areas outlining disaster preparedness, response, and supply flood proofing/mitigation information to protect their property from flood damages | <i>All</i>      |

### **Environmental Protection**

- |      |   |                 |
|------|---|-----------------|
| 2.66 | Develop Aquifer and Groundwater Protection Strategies by updating the Water Resource and Management Protection Plan | <i>Other</i>    |
| 2.61 | Prioritize and upgrade inadequate culverts  | <i>Flooding</i> |
| 2.61 | Work to mitigate repetitive flood problems on Brookview Drive   | <i>Flooding</i> |



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## SECTION VI

### PRIORITIZED IMPLEMENTATION SCHEDULE AND FUNDING SOURCES

#### Implementation Strategy for Priority Mitigation Actions

The Londonderry Hazard Mitigation Committee created the following prioritized implementation schedule for the 13 newly identified strategies and six improvements. Some modifications were made to the original list of 26 projects, including the combination of several individual tasks into one larger scope project. The result is a refined prioritized implementation schedule of 25 projects. All agency and grant source acronyms are listed at the end of this section.

Rank	Action		
Cost	Leadership	Time Frame	Funding
	Statement of Benefits and Costs		
1	Update the schools' emergency plan, created through Comprehensive Emergency Management Planning for Schools (CEMPS), in cooperation with State and Federal agencies and add new provisions for emergency prevention. The plan also serves to identify weaknesses and security vulnerabilities and to develop appropriate responses.		
	<i>Londonderry School District NHBEM, Fire Department, Police Department</i>	<i>Ongoing</i>	<i>NHBEM, SER&amp;CMP, School Operating Budget</i>
	NH Homeland Security and Emergency Management provides emergency management training through CEMPS at no cost to schools and municipalities. A completed plan may help to save lives in the event of an emergency.		
2	Continue to increase public outreach during disasters and emergencies by promoting the newly implemented nixle system, as well as developing other strategies of communication to the public during disasters and emergencies including links to disaster preparedness resources on the Town's Website.		
	<i>Town-wide effort including: Fire Dept, Police Dept, Community Development Dept and Cable Access</i>	<i>Ongoing</i>	<i>Town Operating Budget, other grants</i>
	All of the individual tasks in this larger project are inexpensive ways to let people know about hazard mitigation and emergency management in Londonderry, as well as, help them prepare for an emergency.		
3	Develop a Local Sheltering Plan		
	<i>Emergency Management, Fire Police and ALERT, in coordination with the Red Cross</i>	<i>1-3 years</i>	<i>Town Operating Budget, NH HSEM</i>
	Work with ALERT and the Red Cross to develop sheltering policies and to determine needs for local shelters in response to emergency and disaster situations		

4	Develop Aquifer and Groundwater Protection Strategies by updating the Water Resource and Management Protection Plan		
	<i>Community Development Dept, Planning Board</i>	<i>1-3 years</i>	<i>Town Operating Budget</i>
	The Water Resource and Management Protection Plan is in need of an update and aquifer and groundwater protection strategies should be developed as part of this plan		
5	Prioritize and upgrade inadequate culverts as funding becomes available (see list on pg. 17, Past and Potential Hazards Section)		
	<i>Dept of Public Works</i>	<i>Ongoing</i>	<i>Town Operating Budget, Bonds, EMPG</i>
	Develop a plan with prioritization of upgrading inadequate culverts in order to mitigate flooding		
6	Work with the Army Corps. Of Engineers on study of Brookview Drive area and recommendations for mitigating flood losses and damages, as well as pursue grants to purchase repetitive loss properties on this road. Also work to provide educational info to residents about flood proofing and ways to minimize potential losses		
	<i>Town Council, Community Development Dept, Town Manager</i>	<i>1-3 years</i>	<i>Town Operating Budget</i>
	Education and mitigation techniques are needed on this road to mitigate repetitive flooding problems		
7	Post warnings along Kendall Pond alerting visitors of the dangers associated with high water levels		
	<i>Department of Public Works</i>	<i>5 years</i>	<i>Operating Budget</i>
	Posting signs is an inexpensive way to alert citizens to the dangers associated with high water levels at the pond and nearby dam, potentially reducing injuries, property damage, or loss of life.		
8	Publish and distribute educational materials for residents of isolated areas outlining disaster preparedness, response, and limited access to homes by emergency vehicles.		
	<i>Fire Department, Police Department</i>	<i>Up to 5 years</i>	<i>Town Operating Budget</i>
	An inexpensive way to inform residents in isolated areas of the risks associated with their location and the potential for delayed emergency services, and how they can prepare for emergencies as well as protect themselves.		
9	Prioritize and upgrade Class VI roads		
	<i>Dept of Public Works</i>	<i>20 years</i>	<i>Private funding from Development</i>
	Develop a plan that prioritizes upgrading of Class VI roads in order to mitigate access issues for emergency services		

Rank	Action		
Cost	Leadership	Time Frame	Funding
Statement of Benefits and Costs			
10	Publish and distribute educational materials for residents of flood prone areas outlining disaster preparedness, response, and supply flood proofing and mitigation information to protect their property from flood damages.		
	Building Department, Planning Department, Fire Department	5 Years	Town Operating Budget
	An inexpensive way to inform residents in the Special Flood Hazard Zones of the risks associated with their location and the potential for flood damages, and how they can prepare for emergencies, as well as inform them of ways to flood proof their homes and mitigate any future flood damages.		
11	Adopt new FAA/ Airport Authority noise overlay zoning codes.		
	Community Development Department	3-5 years	Town Operating Budget, FAA
	The FAA and Manchester Airport Authority formulate zoning regulations based on the most current air traffic patterns and noise data to mitigate interference with airport/ aircraft safety and promote development compatible with the airport. The regulations, provided at no cost, are required to be adopted by communities neighboring the airport. Only cost incurred by the Town is staff time to see through the regulation and map adoption.		
12	Continue to work to extend the public water system		
	Town Council, Planning Board, Dept of Public Works	Ongoing	Development
	Mitigate water safety issues by continuing to work to extend the public water system		
13	Encourage mobile truck safety inspections near highway exits to stop vehicles intentionally circumventing known fixed safety inspection sites to avoid being cited for violations. Also encourage increasing the frequency of truck safety inspections and strengthen enforcement.		
	Police Department, Fire Department, NH DOT, State Police	5 years	Operating Budget, NHDOT, HMAP/CERCLA
	Stricter enforcement of safety regulation will reduce the risks posed by vehicles transporting hazardous materials and loads exceeding permitted weights on major roadways such as Routes 28, 128, and 102.		

Additional funding sources will be researched by the Town of Londonderry as required to successfully implement the mitigation actions. Grants will be particularly researched on a project-by-project basis to search out the best grant match.

### **Summary of Agency Acronyms**

NHHSEM= New Hampshire Homeland Security and Emergency Management

NHDOT= New Hampshire Department of Transportation

FAA = Federal Aviation Administration

### **Summary of Grant Acronyms**

EMPG= Emergency Management Preparedness Grant

HMAP/CERCLA= Hazardous Materials Assistance Program (CERCLA Implementation)

HMGP= Hazard Mitigation Grant Program

SER&CMP = School Emergency Response and Crisis Management Plan  
Discretionary Grant Program

Additional grant related information is in Appendix D.

## Cost of Implementation

The following table compares rough estimated costs of implementing each of the previously 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 Londonderry Hazard Mitigation Committee, past project costs in the Southern New Hampshire region, and Internet searches for project costs from either Town requests for proposals or manufacturers' specifications.

Project	Cost Range				
	< \$10,000	\$10,000-\$25,000	\$25,000-\$50,000	\$50,000-\$100,000	>\$100,000
1. Update schools' emergency plan		X			
2. Multiple educational outreach campaign projects		X			
3. Develop Local Sheltering Plan	X				
4. Water Resource and Management Protection Plan		X			
5. Upgrade Inadequate Culverts					X
6. Brookview Drive Mitigation and Education					X
7. Warning signs at Kendall Pond	X				
8. Educational materials for residents of isolated areas	X				
9. Prioritize and upgrade Class VI Roads					X
10. Educational materials for residents of flood prone areas	X				
11. Adopt new FAA/Airport Authority noise overlay zoning codes	X				



Project	Cost Range				
	< \$10,000	\$10,000-\$25,000	\$25,000-\$50,000	\$50,000-\$100,000	>\$100,000
12. Extend public water system					X
13. Mobile truck safety inspection sites	X				

## SECTION VII

### ADMINISTRATIVE PROCEDURES REGARDING ADOPTION, EVALUATION AND MONITORING OF THE PLAN

*"Incorporating hazard mitigation considerations into the thought processes and decision making that comprise local planning reinforces community sustainability and strengthens community planning programs. It ensures that the community survives natural disasters so that it can grow and develop as it was envisioned."*

– Michael J. Armstrong, Associate Director for Mitigation, FEMA

#### **Adoption**

Upon notification that FEMA has conditionally approved this *Plan*, a public hearing will be held and the Londonderry Town Council will formally adopt the ***Londonderry Hazard Mitigation Plan*** as an official statement of Town policy. In the future, this *Plan* may constitute a new section of the Londonderry Master Plan, in accordance with RSA 674:2. The public hearing shall be properly posted and advertised by the Town in accordance with New Hampshire state law. Documentation that the Londonderry Town Council has formally adopted the *Plan* will be included in the Appendix H.

Adoption of the ***Londonderry Hazard Mitigation Plan*** demonstrates the Town's commitment to hazard mitigation. It also qualifies the municipality 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.

Following adoption, the Hazard Mitigation Committee and the Town Council shall seek to incorporate the mitigation actions identified in the Prioritized Implementation Schedule of Section VI of the *Plan* into other planning mechanisms, including the Town's Master Plan and Capital Improvement Program (CIP).

#### **Monitoring, Evaluating and Updates**

The ***Londonderry Hazard Mitigation Plan*** shall be monitored and evaluated annually to track progress in implementing the mitigation strategies and actions as well as updating the goals and objectives of the *Plan*. The Londonderry Community Development director in coordination with the Emergency Management Director shall be responsible for initiating this review and scheduling an annual meeting of the Hazard Mitigation Committee. In addition to reviewing Hazard Mitigation Committee members' progress on projects, the

strategy for the following year will be reviewed and new projects will be selected for implementation at the annual meeting.

The Londonderry Community Development director will conduct updates in coordination with the Emergency Management Director and Londonderry Town Council. Updates should be made to the *Plan* every three to five years<sup>12</sup> to accommodate for 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, should be reviewed as well during the monitoring and update of this *Plan* to determine feasibility of future implementation. Also, at that time any other items identified during the annual meetings will be updated in the *Plan*, including, but not limited to, goals, objectives, identification of past hazard events, and updating the inventory of Town assets vulnerable to hazards.

Keeping with the process of adopting the *Londonderry Hazard Mitigation Plan*, a public hearing to receive comment on the *Plan* maintenance and updating shall be held during the review period, and the Town Council will adopt the final product.

### **Continued Public Involvement**

The public will continue to be invited and encouraged to be involved during this process at monitoring, evaluation and update meetings. All meetings involving implementation or updates of the *Plan* shall be open to the public as is 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 Offices and library as well as electronically on the town website. The meetings may also be publicized on the local access television station, town website or 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 document should be left for a minimum of two weeks and then all comments will be considered in drafting final revisions.

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<sup>12</sup> FEMA Disaster Mitigation Act of 2000 44 CFR Part 201.6(d)(3) mandates "Plans must be reviewed, revised if appropriate, and resubmitted for approval within five years to continue to be eligible for HMGP project grant funding." (Federal Register Vol. 36, No. 38, Feb 26, 2002, Rules and Regulations, p8852)

## APPENDICES

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## APPENDIX A

### DEFINITIONS

**Areas at Risk:** Emergency equipment or areas not needed to respond at the time of a natural disaster, but which could still be threatened if a natural disaster were to occur. These include critical facilities not utilized for emergency response, people and facilities to be protected in the event of a disaster, and/or potential resources for services or supplies in the event of a disaster. Examples include schools, parks, commercial resources, day care facilities, and senior housing.

**Critical Facilities:** Any building, structure, or location that is vital to the hazard response effort, maintains an existing level of protection from hazards for the Town, and would create a secondary disaster if a hazard were to impact it. Examples include emergency medical services, law enforcement, electric generators, and emergency shelters.

**Commercial Economic Impact Areas:** These areas include organizations and businesses with more than 20 employees. These are facilities that are vital to the community's economic well-being.

**Emergency Management Plan:** A jurisdiction's emergency management plan is typically designed to establish the procedures that will take place during an emergency and designate who will be responsible to perform those procedures.

**Essential Facilities:** All critical facilities, areas at risk, commercial economic impact areas, and hazardous material locations.

**GIS:** Geographic Information Systems includes a form of mapping that enables users to easily locate physical attributes of a community such as dams, bridges, wetlands, steep slopes, etc. Much of the data for these maps is maintained by Complex Systems Research Center in Durham, N.H.

**Hazard Mitigation:** The practice of reducing risks to people and property from natural hazards. FEMA defines hazard mitigation as "any action taken to reduce or eliminate the long-term risk to human life and property from hazards."

**Hazardous Materials Facilities:** These facilities include active hazardous waste generators, underground storage tanks, and above-ground storage tanks.

**Hazardous Waste Generators:** Defined by the New Hampshire Department of Environmental Services, these are businesses that produce household hazardous waste, or treat and store or dispose of hazardous waste, or be a waste handler or used oil marketer.



## APPENDIX B

### 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 2 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 C

### BIBLIOGRAPHY, AGENCIES, WEBSITES

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## II. AGENCIES

<b>New Hampshire Bureau of Emergency Management</b>		271-2231
<b>Federal Emergency Management Agency</b>		617-223-4175
<b>NH Regional Planning Commissions:</b>		
	Central NH Regional Planning Commission	796-2129
	Lakes Region Planning Commission	279-8171
	Nashua Regional Planning Commission	883-0366
	North Country Council	444-6303
	Rockingham Planning Commission	778-0885
	Southern New Hampshire Planning Commission	669-4664
	Southwest Region Planning Commission	357-0557
	Strafford Regional Planning Commission	742-2523
	Upper Valley Lake Sunapee Regional Planning Commission	448-1680
<b>NH Executive Department:</b>		
	Governor's Office of Energy and Community Services	271-2611
	New Hampshire Office of State Planning	271-2155
<b>NH Department of Cultural Affairs</b>		271-2540
	Division of Historical Resources	271-3483
<b>NH Department of Environmental Services</b>		271-3503
	Air Resources	271-1370
	Waste Management	271-2900
	Water Resources	271-3406
	Water Supply and Pollution Control	271-3504
	Rivers Management and Protection Program	271-1152
	Bureau of Dams	271-3503
<b>NH Fish and Game Department</b>		271-3421
<b>NH Department of Resources and Economic Development</b>		271-2411
	Natural Heritage Inventory	271-3623
	Division of Forests and Lands	271-2214
	Division of Parks and Recreation	271-3255
<b>NH Department of Transportation</b>		271-3734
<b>US Department of Commerce</b>		
	National Oceanic and Atmospheric Administration	
	National Weather Service; Gray, Maine	207-688-3216
<b>US Department of the Interior</b>		
	US Fish and Wildlife Service	225-1411
	US Geological Survey	225-4681
<b>US Department of Agriculture</b>		
	Natural Resource Conservation Service	868-7581

### III. WEBSITES

<i>Sponsor</i>	<i>Internet Address</i>	<i>Summary of Contents</i>
Natural Hazards Research Center, U. of Colorado	<a href="http://www.colorado.edu/litbase/hazards/">http://www.colorado.edu/litbase/hazards/</a>	Searchable database of references and links to many disaster-related web sites.
Atlantic Hurricane Tracking Data by Year	<a href="http://wxp.eas.purdue.edu/hurricane">http://wxp.eas.purdue.edu/hurricane</a>	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	<a href="http://nemaweb.org">http://nemaweb.org</a>	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center "Disaster Finder:	<a href="http://www.gsfc.nasa.gov/ndrd/disaster/">http://www.gsfc.nasa.gov/ndrd/disaster/</a>	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	<a href="http://ltpwww.gsfc.nasa.gov/ndrd/main/html">http://ltpwww.gsfc.nasa.gov/ndrd/main/html</a>	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	<a href="http://www.statelocal.gov/">http://www.statelocal.gov/</a>	General information through the federal-state partnership.
National Weather Service	<a href="http://nws.noaa.gov/">http://nws.noaa.gov/</a>	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	<a href="http://h20.usgs.gov/public/realtime.html">http://h20.usgs.gov/public/realtime.html</a>	Provisional hydrological data
Dartmouth Flood Observatory	<a href="http://www.dartmouth.edu/artsci/geog/floods/">http://www.dartmouth.edu/artsci/geog/floods/</a>	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	<a href="http://www.fema.gov/fema/csb.htm">http://www.fema.gov/fema/csb.htm</a>	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	<a href="http://www.met.fsu.edu/explores/tropical.html">http://www.met.fsu.edu/explores/tropical.html</a>	Tracking and NWS warnings for Atlantic Hurricanes and other links
National Lightning Safety Institute	<a href="http://lightningsafety.com/">http://lightningsafety.com/</a>	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	<a href="http://www.ghcc.msfc.nasa.gov/otd.html">http://www.ghcc.msfc.nasa.gov/otd.html</a>	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	<a href="http://www-ep.es.llnl.gov/www-ep/ghp.html">http://www-ep.es.llnl.gov/www-ep/ghp.html</a>	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	<a href="http://www.tornadoobject.com/">http://www.tornadoobject.com/</a>	Information on tornados, including details of recent impacts.
National Severe Storms Laboratory	<a href="http://www.nssl.uoknor.edu">http://www.nssl.uoknor.edu</a>	Information about and tracking of severe storms.
Earth Satellite Corporation	<a href="http://www.earthsat.com/">http://www.earthsat.com/</a>	Flood risk maps searchable by state.
USDA Forest Service Web	<a href="http://www.fs.fed.us/lan">http://www.fs.fed.us/lan</a>	Information on forest fires and land management.

## 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
<b>Programs to prepare the Nation to address the consequences of natural and man-made disasters and emergencies.</b>				
<b>Department of Homeland Security</b>	<i>Border and Transportation Security Directorate</i>	State Homeland Security Grant Program <a href="http://www.ojp.usdoj.gov">www.ojp.usdoj.gov</a>	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
	<i>Emergency Preparedness and Response Directorate</i>	Emergency Management Performance Grants <a href="http://www.fema.gov">www.fema.gov</a> <a href="http://www.fema.gov/government/grant/index.shtm">http://www.fema.gov/government/grant/index.shtm</a>	To assist State and local governments in enhancing and sustaining all-hazards emergency management capabilities.	States with pass through to local emergency management organizations
	<i>Emergency Preparedness and Response Directorate</i>	Assistance to Firefighters Grant Program <a href="http://www.usfa.fema.gov/grants">www.usfa.fema.gov/grants</a> <a href="http://www.firegrantsupport.com/afg/">http://www.firegrantsupport.com/afg/</a>	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.
	<i>Emergency Preparedness and Response Directorate</i>	State and Local Emergency Operation Centers (EOCs) <a href="http://www.fema.gov">www.fema.gov</a> <a href="http://www.fema.gov/government/grant/index.shtm">http://www.fema.gov/government/grant/index.shtm</a>	To improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, and interoperable Emergency Operations Centers (EOCs) with a focus on addressing identified deficiencies and needs.	States; local governments may be sub-grantees of the State
	<i>Emergency Preparedness and Response Directorate</i>	Citizen Corps <a href="http://www.citizencorps.gov">www.citizencorps.gov</a>	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

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
Department of Homeland Security	<i>Emergency Preparedness and Response Directorate</i>	National Fire Academy Training Grants <a href="http://www.fema.gov">www.fema.gov</a>	To provide financial assistance to State Fire Training Systems for the delivery of a variety of National Fire Academy courses/programs.	State fire training organizations
	<i>Emergency Preparedness and Response Directorate</i>	Emergency Management Institute Training Assistance <a href="http://www.fema.gov">www.fema.gov</a>	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
	<i>Emergency Preparedness and Response Directorate</i>	Hazardous Materials Assistance Program (CERCLA Implementation)	Provide technical and financial assistance through the States to support State, local and tribal governments in oil and hazardous materials emergency planning and exercising. To support the Comprehensive Hazardous Materials (HAZMAT) Emergency Response – Capability Assessment Program (CHER-CAP) activities.	State, local, and tribal governments, state emergency response committees, local emergency planning commissions
	<i>Emergency Preparedness and Response Directorate</i>	Interoperable Communications Equipment Grant <a href="http://www.fema.gov/government/grant/index.shtm">http://www.fema.gov/government/grant/index.shtm</a>	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.	N/A



Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
Department of Homeland Security	<i>Emergency Preparedness and Response Directorate</i>	Chemical Stockpile Emergency Preparedness Program <a href="http://www.fema.gov">www.fema.gov</a>	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.
	<i>National Preparedness Directorate</i>	<b>Metropolitan Medical Response System</b> <a href="http://www.fema.gov/mmrs">http://www.fema.gov/mmrs</a>	To provide contractual funding to the 124 largest metropolitan jurisdictions to sustain and enhance the integrated medical response plans to a WMD terrorist attack.	Local governments
Department of Justice	<i>Office of Domestic Preparedness</i>	State Domestic Preparedness Equipment Support Program <a href="http://www.ojp.usdoj.gov/odp/equipment.htm">http://www.ojp.usdoj.gov/odp/equipment.htm</a>	Funding will be provided to enhance first responder capabilities, and to provide for equipment purchases and exercise planning activities for response to Weapons of Mass Destruction (WMD) domestic terrorist incidents.	State and local governments
	<i>Office of Community Oriented Police Services (COPS)</i>	COPS Interoperable Communications Technology Program <a href="http://www.cops.usdoj.gov">www.cops.usdoj.gov</a>	To facilitate communications interoperability public safety responders at the state and local level.	Tribal, State, and local law enforcement agencies
Department of Health and Human Services		Public Health and Social Services Emergency Fund <a href="http://www.hhs.gov">www.hhs.gov</a>	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
	<i>Health Resources and Services Administration</i>	State Rural Hospital Flexibility Program <a href="http://www.ruralhealth.hrsa.gov">www.ruralhealth.hrsa.gov</a>	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
Department of Health and Human Services	<i>Health Resources and Services Administration</i>	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
	<i>National Institute of Health</i>	Superfund Hazardous Substances Basic Research and Education www.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
	<i>Centers for Disease Control</i>	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
	<i>Centers for Disease Control</i>	Surveillance of Hazardous Substance Emergency Events www.atsdr.cdc.gov	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

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
<b>Department of Health and Human Services</b>	<i>Centers for Disease Control</i>	Human Health Studies, Applied Research and Development <a href="http://www.atsdr.cdc.gov">www.atsdr.cdc.gov</a>	To solicit scientific proposals designed to answer public health questions arising from situations commonly encountered at hazardous waste sites. The objective of this research program is to fill gaps in knowledge regarding human health effects of hazardous substances identified during the conduct of ATSDR's health assessments, consultations, toxicological profiles, and health studies, including but not limited to those health conditions prioritized by ATSDR.	State health departments
<b>Department of Education</b>	Office of Safe and Drug free Schools (OSDFS)	Readiness and Emergency Management for Schools <a href="http://www.ed.gov/programs/dvpemergencyresponse/index.html/">http://www.ed.gov/programs/dvpemergencyresponse/index.html/</a>	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
<b>Department of Transportation</b>	<i>Pipeline and Hazardous Materials Safety Administration (PHMSA)</i>	Hazardous Materials Emergency Preparedness Training and Planning Grants <a href="http://phmsa.dot.gov/hazmat/grants">http://phmsa.dot.gov/hazmat/grants</a>	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.
<b>Programs to coordinate Federal response efforts and to assist states, localities, and tribes in responding to disasters and emergencies.</b>				
<b>Department of Homeland Security</b>	<i>Emergency Preparedness and Response Directorate</i>	Urban Search and Rescue <a href="http://www.fema.gov">www.fema.gov</a>	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
<b>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.</b>				
<b>Department of Homeland Security</b>	<i>Emergency Preparedness and Response Directorate</i>	Individuals and Households Program <a href="http://www.fema.gov/assistance/process/guide.shtm">http://www.fema.gov/assistance/process/guide.shtm</a>	<b>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.</b>	Individuals and Families
	<i>Emergency Preparedness and Response Directorate</i>	Public Assistance <a href="http://www.fema.gov/government/grant/pa/index.shtm">http://www.fema.gov/government/grant/pa/index.shtm</a>	<b>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</b>	State, local and tribal governments; private non-profit organizations
	<i>Emergency Preparedness and Response Directorate</i>	Fire Management Assistance Grant Program <a href="http://www.fema.gov/government/grant/fmagp/index.shtm">http://www.fema.gov/government/grant/fmagp/index.shtm</a>	<b>Provide funds to States, local, and tribal governments for the mitigation, management, and control of wildland fires posing serious threats to improved property.</b>	State, local and tribal governments
<b>Small Business Administration</b>	<i>Office of Disaster Assistance</i>	Disaster Loan Program <a href="http://www.sba.gov/services/disasterassistance/">http://www.sba.gov/services/disasterassistance/</a>	<b>To offer financial assistance to those who are trying to rebuild their homes and businesses in the aftermath of a disaster.</b>	Individuals, families, private sector
<b>Department of Justice</b>	<i>Office for Victims of Crime</i>	Antiterrorism and Emergency Assistance Program <a href="http://www.ojp.usdoj.gov/ovc/publications/infores/terrorism/">http://www.ojp.usdoj.gov/ovc/publications/infores/terrorism/</a>	<b>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.</b>	Public and private nonprofit victim assistance agencies
<b>Programs to reduce or eliminate future risk to lives and property from disasters.</b>				
<b>Department of Homeland Security</b>	<i>Emergency Preparedness and Response Directorate</i>	Hazard Mitigation Grant Program <a href="http://www.fema.gov/government/grant/hmgp/index.shtm">http://www.fema.gov/government/grant/hmgp/index.shtm</a>	<b>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 provided from the Disaster Relief Fund and administered by the states according to their own priorities.</b>	State, local, and tribal governments

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
	<i>Emergency Preparedness and Response Directorate</i>	Pre-Disaster Mitigation Program <a href="http://www.fema.gov/government/grant/pdm/index.shtm">http://www.fema.gov/government/grant/pdm/index.shtm</a>	<b>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.</b>	State, local, and tribal governments
<b>Department of Homeland Security</b>	<i>Emergency Preparedness and Response Directorate</i>	Flood Mitigation Assistance Program (FMA) <a href="http://www.fema.gov/government/grant/fma/index.shtm">http://www.fema.gov/government/grant/fma/index.shtm</a>	<b>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 <u>National Flood Insurance Program</u> (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.</b>	State, local and tribal governments
	<i>Emergency Preparedness and Response Directorate</i>	Repetitive Flood Claims Program (RFC) <a href="http://www.fema.gov/government/grant/rfc/index.shtm">http://www.fema.gov/government/grant/rfc/index.shtm</a>	<b>The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to \$10 million is available annually for FEMA to provide RFC funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).</b>	State, local and tribal governments
	<i>Emergency Preparedness and Response Directorate</i>	Severe Repetitive Loss Program (SRL) <a href="http://www.fema.gov/government/grant/srl/index.shtm">http://www.fema.gov/government/grant/srl/index.shtm</a>	<b>The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).</b>	State, local and tribal governments

Agency	Office/ Directorate	Program	Purpose	Funding Beneficiaries
	<i>Emergency Preparedness and Response Directorate</i>	Map Modernization <a href="http://www.fema.gov/plan/prevent/fhm/mm_main.shtm">http://www.fema.gov/plan/prevent/fhm/mm_main.shtm</a>	<b>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.</b>	State, local and tribal governments
<b>Programs to interdict potentially hazardous events from occurring</b>				
<b>Department of Health and Human Services</b>	<i>Centers for Disease Control</i>	Immunization Grants <a href="http://www.cdc.gov">www.cdc.gov</a>	To assist States and communities in establishing and maintaining preventive health service programs to immunize individuals against vaccine-preventable diseases.	States
<b>Other</b>				
<b>Department of Housing and Urban Development</b>	<i>NH Office of Energy and Planning</i>	Community Development Block Grant (CDBG) Program <a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/">http://www.hud.gov/offices/cpd/communitydevelopment/programs/</a>	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*
- *NHOEP/NFIP Program*
- *NHOEP Coastal Program*
- *NHDRED Division of Forests and Lands*
- *NHDES Water Resources Division – Dam Safety Program*
- *NHDES Wetlands Program*
- *NHDES Shoreline Protection*



## APPENDIX E

### STAPLEE AND PROJECT EVALUATION

**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:*** Is the proposed action technically feasible and will it work? Is it a long term solution?
- ***Administrative:*** Can the community implement the action? Is there someone to coordinate and lead the effort? Are there funding sources already allocated or available for this project?
- ***Political:*** Is the action politically acceptable? Does the project help to achieve other community objectives?
- ***Legal:*** Is the community authorized to implement the proposed action? Is there a clear legal basis of precedent for this project or is there chance of legal challenge?
- ***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? Does the project reduce potential future damages from disasters?
- ***Environmental:*** How will the action impact the environment, i.e. land, water, animals, plants? Will the action need and meet environmental regulatory approvals?

## Hazard Mitigation Actions Evaluation

List of Actions Identified during the August 17, 2010 Hazard Mitigation Committee Meeting

SCORING: 1- Poor 2- Average 3- Good		PROJECT EVALUATION																							
		S		T		A		P		L		E		E		Total Score									
		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		Low Potential to be legally challenged		Economically Beneficial- Benefits outweigh Costs		Does the project reduce future disaster damages?		Environmental impacts on land, water, animal, plants is slight or none		Conforms to State, Local, & Federal Regs	
1	Update Schools' Emergency Plan on an annual basis	3	2.6	3	3	2.6	2	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.4	3	2.743								
2	Develop and distribute materials for a hazard mitigation and disaster preparedness educational campaign	3	2.8	2.8	2.2	2.6	1.6	2.8	2.6	2	2	2.4	2.8	2.4	2.8	2.486									
3	Establish a page on the Town's website for disaster preparedness and response, hazard mitigation, and the National Flood Insurance Program.	3	3	3	2.6	2.8	2	2.8	2.8	2.2	2.2	3	2.8	2.4	2.4	2.643									
4	Adopt new FAA/ Airport Authority noise overlay zoning codes.	3	2.25	2	2.5	1.75	1.5	2.75	2	2.667	2.333	1.667	1.667	3	3	2.292									
5	Replace the inadequate 36-inch corrugated metal pipe culvert at	3	2.8	3	2.6	2.75	1.25	2.8	2.4	2.667	2.333	2.75	2.6	2.333	3	2.592									

SCORING:  
1- Poor  
2- Average  
3- Good

	Parmenter Road near the intersection of Route 102.																
6	Replace the inadequate 36-inch corrugated metal pipe culvert at South Road near Garabedian gravel pit with two 48-inch reinforced concrete pipes.	3	2.8	3	2.6	2.75	1.25	2.8	2.4	2.667	2.333	2.25	2.6	2.333	3	2.556	
7	Publish and distribute educational materials for residents of isolated areas outlining disaster preparedness, response, and limited access to homes by emergency vehicles.	3	3	2.6	2.6	2.4	1.6	2.6	2.4	1.8	2.2	2.6	2.4	2.4	2.4	2.429	
8	Publish and distribute educational materials for residents of flood prone areas outlining disaster preparedness, response, and supply flood proofing and mitigation information to protect their property from flood damages.	3	3	2.6	2.4	2.4	1.4	2.6	2.4	1.8	2	2.6	2.4	2.4	2.4	2.386	
9	Replace the inadequate culvert at Auburn Road near Whispering Pines.	3	2.75	2.75	2.75	2.75	1.25	2.5	2.75	2.667	2.333	2.75	2.5	2.25	3	2.571	

10	Provide educational information to residents along Brookview Drive about flood proofing and ways to minimize potential losses.	3	3	2.8	2.6	2.6	1.8	2.8	2.4	2.2	2.2	2.8	2.8	3	2.4	2.6
11	Establish mobile truck safety inspections near highway exits to stop vehicles intentionally circumventing known fixed safety inspection sites to avoid being cited for violations.	2.4	2	1.4	1.4	1.4	1	2	1.8	1.8	1.4	2	1.2	1.8	1.8	1.671
12	Establish remote broadcasting locations at the high school and central fire station with the capacity to broadcast to CTV 20.	3	3	2.4	2.4	2	1.2	2.6	2.8	2	1.6	2.4	2.6	2.2	2.4	2.329
13	Increase the frequency of truck safety inspections on I-93 and strengthen regulation enforcement.	2.4	2.2	1.6	1.8	1.4	1	2	1.8	1.8	1.4	2.2	2	1.8	1.8	1.8
14	Replace the inadequate culvert on High Range Road at the intersection of Route 102.	3	2.25	2.75	3	2.75	1.5	2.75	2.25	2.667	2.333	2.25	2.25	2.25	3	2.5
15	Post warnings along Kendall Pond alerting visitors of the dangers associated with high water levels	3	2.4	3	2.6	2.8	1.8	2.8	2.6	2.2	2.2	2.6	2.8	2.8	2.4	2.571

	Improve Spring Road, the connection between Trolley Car Lane and Hovey Road, creating an adequate second access point to																
16	Trolley Car Lane.	2.4	2.4	2.2	2.4	2	1.2	2	2	2	1.6	2.2	2.2	1.6	2.2	2.029	
17	Upgrade Brewster Road from Class VI to service the existing population and create a turnaround at the end for emergency vehicles.	2.8	2.8	2.4	2.6	1.8	1.4	2.6	2.4	2.2	1.8	2.2	2.6	2	2.4	2.286	
18	Upgrade Watts Road from Class VI to service the existing population and create a turnaround at the end for emergency vehicles.	2.8	2.8	2.4	2.6	1.8	1.4	2.6	2.4	2.2	2	2.2	2.6	2	2.4	2.3	
19	Upgrade Jerry Lane from Class VI to service the existing population and create a turnaround at the end for emergency vehicles.	2.8	2.8	2.4	2.6	1.8	1.4	2.6	2.4	2.2	2	2.2	2.6	2	2.4	2.3	
20	Develop local sheltering plan	3	3	3	3	2.75	1.75	2.75	2.75	2.667	2.667	2.5	2.75	3	2	2.685	
21	Develop aquifer and groundwater protection strategies by updating the Water Resource and Management Protection Plan	3	3	2.5	3	2.5	1.5	2.5	2.5	2.667	2.667	2.75	2.75	3	3	2.667	

22	Work with the Army Corps of Engineers on study of Brookview Drive area and recommendations for mitigating flood losses and damages	3	3	2.75	2.5	2.25	1.25	2.75	2.5	2.333	2.667	2.75	2.75	3	32.607
23	Pursue grants to purchase the repetitive loss properties on Brookview Drive	2.75	2.75	2.75	2.5	2	1.25	2.25	2.75	2	2	2.75	2.5	3	22.375
24	Continue to increase public outreach during disasters and emergencies by promoting the newly implemented nixle system, as well as developing other strategies of communication to the public during disasters and emergencies	3	2.75	3	2.75	2.75	1.75	3	2.75	2.667	2.667	2.75	2.75	2.75	32.738
25	Continue to work to extend the public water system	2.75	2.5	2.5	2.75	2	1.25	2.5	2.75	2.667	2	2.25	2.5	2.25	12.262
26	Prioritize and upgrade inadequate culverts as funding becomes available	3	2.25	2.75	2.75	2.75	1.5	2.75	2.5	2.667	2.667	2.5	2.75	2.75	32.613



DRAFT  
FOR PUBLIC COMMENT

## **APPENDIX F**

### **LHMC MEETING AGENDAS, MINUTES AND ATTENDANCE SHEETS**

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FOR PUBLIC COMMENT

# **Londonderry Hazard Mitigation Committee Meeting**

## **Meeting Number 1**

June 15, 2010

9:30 am

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

## **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 Londonderry
  - 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. Questions?**
- 8. Adjournment**



**Minutes of the Londonderry Hazard Mitigation Committee Meeting held on**  
June 15, 2010 in the Londonderry Town Offices,  
268 B Mammoth Rd, Londonderry, New Hampshire

**MEMBERS PRESENT**

Tim Jones	-	Lieutenant, Londonderry Police
Sharon Carson	-	Public Member
John R. Trottier	-	Asst. Director of Public Works and Engineering
John R. Gilcreast	-	ABI
Tim Thompson, AICP-		Town Planner, Community Development Dept.
Jodie Levandowski	-	Intern
Richard G. Canuel	-	Senior Building Inspector
Jillian Harris	-	Southern New Hampshire Planning Commission

**OVERVIEW OF THE HAZARD MITIGATION PLANNING PROCESS**

Ms. Harris reviewed the purpose and benefits of the Hazard Mitigation Planning Process and updates with the committee. Ms. Harris also reviewed the scope of work to be completed, which would include 5 meetings with the committee to update the plan. These meetings will be held on a monthly basis with the goal of sending the finalized plan to FEMA for conditional approval by October.

**IDENTIFY/UPDATE PAST AND POTENTIAL HAZARDS**

Ms. Harris provided the committee with the past and potential hazards maps and the committee updated them by identifying hazard areas from the past 5 years and areas that might be new potential hazards in the future.

**IDENTIFY/UPDATE CRITICAL FACILITIES**

Ms. Harris provided the committee with the critical facilities map and the committee updated it by identifying any changes that have taken place since the previous plan.

**REVIEW REPETITIVE LOSS PROPERTIES**

Ms. Harris reviewed the new requirement for the addition of repetitive loss (RL) properties to be addressed in the plan. Londonderry has 5 total repetitive loss properties. The areas in which these properties are located will be designated on the map with a buffer of approximately ½ mile so as not to show their exact address.

## **NEXT COMMITTEE MEETING**

The committee will meet next on July 20, 2010 at 9:30 am in the Londonderry Town Offices.

Meeting adjourned.

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FOR PUBLIC COMMENT



# Town of Londonderry, New Hampshire

## Hazard Mitigation Committee Meeting #1

June 15, 2010

9:30 AM

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

### ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
Tim Jones	Lieutenant Londonderry Police	432-1118 tjones@londonderrynh.org cell-661-4555
Sharon Carson	Public Member	434-2489 Sharon Carson @leg.
JOHN R. TROTTER	ASST. DIR. OF PW & ENG PUBLIC WORKS & ENGINEERING	JRTROTTER@LONDONDERRYNH.ORG 432-1100 X-146 State. NH. US
John R. Glorast	ABF	432-1100 X 115
Tim THOMPSON, AICP	TOWN PLANNER Comm. Dev. DEPT	TTHOMPSON@LONDONDERRYNH.ORG 432-1100, X103
Jodie Levandowski	INTERN	603.512.1791 jlevandowski@gmail.com
RICHARD G. CANUEL	SENIOR BLDG INSP.	rcanuel@londonderrynh.org 432-1100 X107

# **Londonderry Hazard Mitigation Committee Meeting**

## **Meeting Number 2**

July 20, 2010

9:30 am

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

## **AGENDA**

- 1. Call to Order**
- 2. Approve the Minutes of June 15, 2010 meeting**
- 3. Review Past and Potential Hazards Draft**
  - a. Insert any missing information
  - b. Questions, comments, suggested revisions
- 4. Review Goals and Objectives**
  - a. Revise Goals and Objectives as needed for plan update
- 5. Mitigation Strategy**
  - a. Review Existing Mitigation Strategies, Matrix and summary
  - b. Review Newly Identified Mitigation Strategies
- 6. Questions?**
- 7. Set next meeting date**
- 8. Adjournment**



**Minutes of the Londonderry Hazard Mitigation Committee Meeting held on**  
July 20, 2010 in the Londonderry Town Offices,  
268 B Mammoth Rd, Londonderry, New Hampshire

**MEMBERS PRESENT**

Sharon Carson	-	Public Member
John R. Trottier	-	Asst. Director of Public Works and Engineering
John R. Gilcreast	-	ABI
Tim Thompson, AICP-		Town Planner, Community Development Dept.
Jodie Levandowski	-	Intern
Richard G. Gannel	-	Senior Building Inspector
Kevin MacCaffrie	-	Fire Chief
James Roger	-	Captain, Londonderry Fire Department
Jillian Harris	-	Southern New Hampshire Planning Commission

**MINUTES**

The Londonderry Hazard Mitigation Committee (LHMC) approved the minutes of the June 15, 2010 LHMC meeting.

**REVIEW GOALS AND OBJECTIVES**

Ms. Harris reviewed the Goals and Objectives with the LHMC. The goals were adopted from the 1999 State of NH Hazard Mitigation Plan, which has since been updated in 2007. The Committee approved updating the goals and objectives to be consistent with the updated goals and objectives from the 2007 State of NH Hazard Mitigation Plan.

**REVIEW PAST AND POTENTIAL HAZARDS DRAFT**

The LHMC reviewed the Section II - Past and Potential Hazards draft which was sent via email after the last meeting. Ms. Harris reviewed the updates made to the draft which were highlighted in red. Most updates were bringing data and statistics through the present time period.

In Section C, Fires, Ms. Harris pointed out that the 2006 data was not available on page 10. Mr. Thompson will check on the data for the next meeting

## **REVIEW MITIGATION STRATEGY**

The LHMC reviewed Section V – Newly Identified Mitigation Strategies and Critical Evaluation. Ms. Harris will incorporate all of the updates, additions and revisions discussed at the meeting into the draft plan update and send it to the Committee to review via email before the next meeting in August.

## **NEXT COMMITTEE MEETING**

The committee will meet next on August 17, 2010 at 9:30 am in the Londonderry Town Offices.

Meeting adjourned.

DRAFT  
FOR PUBLIC COMMENT

# Town of Londonderry, New Hampshire

## Hazard Mitigation Committee Meeting #2

July 20, 2010

9:30 AM

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

### ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
JOHN R. TRUTTEN	ASSISTANT DIRECTOR OF P.W. & ENG.	JRTRUTTEN@LONDONDERRYNH.ORG 432-1100 X-146
John R. Gilcrest	ASSISTANT Bldg Insp	Jrgilcrest@LondonderryNH.org 432-1100 X 105
JODIE LEVANDOWSKI	INTERN	JLLEVANDOWSKI@gmail.com
Sharon Carson	State Senator/ Public	Sharon.Carson@leg.state.NH.US
Tim Thompson	TOWN PLANNER	TTHOMPSON@LONDONDERRYNH.ORG
JAMES ROGER	LFD	Jroger@LondonderryNH.org
RICHARD G. CANUEL	SENIOR Bldg Insp.	rcanuel@londonderrynh.org
KEVIN MACCARTHY	LFD / EMD	KMaccart@LondonderryNH.org

# **Londonderry Hazard Mitigation Committee Meeting**

## **Meeting Number 3**

August 17, 2010

9:30 am

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

## **AGENDA**

- 1. Call to Order**
- 2. Approve the Minutes of the July 20, 2010 meeting**
- 3. Review of plan updates from Meeting 2:**
  - a. Section II : Hazard Identification**
  - b. Section III: Vulnerability Assessment**
  - c. Section IV: Existing Mitigation Strategies**
  - d. Section V: Newly Identified Mitigation Strategies (2005 updates moved to Appendices)**
- 4. Identify Gaps in Hazard Mitigation (New Mitigation Strategies) and Set Objectives for Future Mitigation Efforts**
  - What hazards is Londonderry particularly vulnerable to that could use additional mitigation efforts?
  - Were there events in the past 5 years that uncovered new or different hazards that need to be mitigated and planned for?
  - Brainstorming Alternatives - Brainstorm any new mitigation strategies that can be added
- 5. NFIP**
  - a. Identify, analyze and prioritize actions related to continued compliance with NFIP
- 6. Questions?**
- 7. Schedule meeting #4**



**Minutes of the Londonderry Hazard Mitigation Committee Meeting held on**  
August 17, 2010 in the Londonderry Town Offices,  
268 B Mammoth Rd, Londonderry, New Hampshire

**MEMBERS PRESENT**

Sharon Carson	-	Public Member
Tim Jones	-	Lieutenant, LPD
Tim Thompson, AICP-		Town Planner, Community Development Dept.
Jodie Levandowski	-	Intern
Jillian Harris	-	Southern New Hampshire Planning Commission

**MINUTES**

The Londonderry Hazard Mitigation Committee (LHMC) approved the minutes of the July 20, 2010 LHMC meeting.

**REVIEW OF PLAN UPDATES FROM MEETING 2**

The LHMC reviewed the following sections of the draft plan and made updates as necessary

- a. Section II : Hazard Identification
- b. Section III: Vulnerability Assessment
- c. Section IV: Existing Mitigation Strategies
- d. Section V: Newly Identified Mitigation Strategies (2005 updates moved to Appendices)

**IDENTIFY GAPS IN HAZARD MITIGATION (NEW MITIGATION STRATEGIES) AND SET OBJECTIVES FOR FUTURE MITIGATION EFFORTS**

The LHMC brainstormed new mitigation strategies to add to the plan update and set objectives for future mitigation efforts. The following strategies will be added to the plan:

- Local Sheltering Plan (work with the Red Cross on shelter policies)
- Develop aquifer and groundwater protection strategies by updating the Water Resource and Management Protection Plan
- Work with the Army Corps of Engineers on study of Brookview Drive area and recommendations for mitigating flood losses and damages



- Pursue grants to purchase the repetitive loss properties on Brookview Drive
- Continue to increase public outreach during disasters and emergencies by promoting the newly implemented nixle system, as well as developing other strategies of communication to the public during disasters and emergencies

Fire and DPW will be contacted for input on this list as well in between meetings.

### **NFIP**

The discussion on NFIP will be added to the next agenda.

### **NEXT COMMITTEE MEETING**

The committee will meet next on September 21, 2010 at 9:30 am in the Londonderry Town Offices.

Meeting adjourned.

# Town of Londonderry, New Hampshire

## Hazard Mitigation Committee Meeting #3

August 17, 2010

9:30 AM

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

### ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
Tim Jones	Lt LPD	tjones@londonderry.nh.org 432-1118
JODIE LEVANDOWSKI	INTERN	JLLEVANDOWSKI@gmail.com
Sharon H. Carson	Public Member	sharon.carson@leg.nh. State.US
TIM THOMPSON	TOWN PLANNER	TTHOMPSON@LONDONDERRY.NH.ORG 432-1100, x103

# **Londonderry Hazard Mitigation Committee Meeting**

**Meeting Number 4**  
September 21, 2010  
9:30 am

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

## **AGENDA**

- 1. Call to Order**
- 2. Approve the Minutes of the August 17, 2010 meeting**
- 3. Review STAPLEE results for updated mitigation strategies**
- 4. Cost of Implementation Estimates**
- 5. NFIP**
- 6. Review and update Section VII: Adoption, Evaluation and Monitoring section**
- 7. Review Appendices and Maps**
- 8. Questions?**
- 9. Schedule meeting #5 for final review**
- 10. Adjournment**



**Minutes of the Londonderry Hazard Mitigation Committee Meeting held on**  
September 21, 2010 in the Londonderry Town Offices,  
268 B Mammoth Rd, Londonderry, New Hampshire

**MEMBERS PRESENT**

Sharon Carson	-	Public Member
Tim Thompson, AICP-		Town Planner, Community Development Dept.
John Trottier	-	Asst. Director of Public Works and Engineering
Jillian Harris	-	Southern New Hampshire Planning Commission
Mary Brundage	-	Southern New Hampshire Planning Commissio

**MINUTES**

The Londonderry Hazard Mitigation Committee (LHMC) approved the minutes of the August 17, 2010 LHMC meeting.

**REVIEW OF STAPLEE RESULTS**

The LHMC reviewed the results of the STAPLEE for the updated mitigation strategies discussed at the last meeting. Ms. Harris asked if there were any changes and if they agreed with the prioritization. It was noted that some of the items from the last plan were completed, indicating progress is being made. The LHMC made suggestions where items could be merged into one strategy. Ms. Harris will make these updates accordingly.

**COST OF IMPLEMENTATION ESTIMATES**

After reviewing the STAPLEE results, Ms. Harris asked the committee to come up with an estimated cost for each strategy and also who (responsibility/lead), when (date to be completed), and how (money) each strategy would be implemented.

**NFIP**

Ms. Harris reviewed the NFIP compliance worksheet. The committee indicated items that the town was doing for continued compliance with NFIP.

**REVIEW AND UPDATE SECTION VII: ADOPTION, EVALUATION AND MONITORING SECTION**

The LHMC reviewed Section VII of the draft plan. A couple minor updates were indicated including adding the town website for posting public meetings and posting the draft plan electronically on the website. Also, the Planning and Economic Development director was changed to Community Development Director and both the Community Development director and Emergency Director will conduct updates to the plan.

**REVIEW APPENDICES AND MAPS**

Ms. Harris brought maps for review by the LHMC. She asked for any changes or updates to be brought to her by the next meeting.

**NEXT COMMITTEE MEETING**

The committee will meet next on October 19, 2010 at 9:30 am in the Londonderry Town Offices.

Meeting adjourned.

DRAFT  
FOR PUBLIC COMMENT

# Town of Londonderry, New Hampshire

## Hazard Mitigation Committee Meeting #4

September 21, 2010

9:30 AM

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

### ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
Tim Thompson	TOWN PLANNER/ COMMUNITY DEV'T	TTHOMPSON@LONDONDERRYNH.ORG 432-1100, X103
Shawn Carson	Public Member	bladensfield@hotmail.com 434-2489
JOHN R. TWOTICE	ASST. DIRECTOR OF PW & CWS.	JRTWOTICE@LONDONDERRYNH.ORG 432-1100 X146

# **Londonderry Hazard Mitigation Committee Meeting**

## **Meeting Number 4**

October 19, 2010

9:30 am

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

## **AGENDA**

- 1. Call to Order**
- 2. Approve the Minutes of the September 21, 2010 meeting**
- 3. Review entire document for changes/additions/deletions**
  - a. Comments from the Committee**
  - b. Any additional items?**
- 4. Next Actions**
  - a. Submission to NH HSEM and FEMA**
  - b. Following conditional approval from FEMA- public hearing and Town Council adoption**
- 5. Questions?**
- 6. Adjournment**





**Minutes of the Londonderry Hazard Mitigation Committee Meeting held on**  
October 19, 2010 in the Londonderry Town Offices,  
268 B Mammoth Rd, Londonderry, New Hampshire

**MEMBERS PRESENT**

Tim Thompson, AICP-	Town Planner, Community Development Dept.
John Trottier -	Asst. Director of Public Works and Engineering
Jillian Harris -	Southern New Hampshire Planning Commission

**MINUTES**

The Londonderry Hazard Mitigation Committee (LHMC) approved the minutes of the September 21, 2010 LHMC meeting.

**REVIEW HAZARD MITIGATION PLAN FIRST DRAFT**

The LHMC reviewed the first draft of the 2010 Londonderry Hazard Mitigation Plan and made comments and suggestions for revisions to Ms. Harris. Revisions were minor and included changing the Water Resources Plan strategy to other in the Preliminary Prioritization on page. 68 as well as changing the public notices wording on page 6 to be the town's website and the town hall.

**NEXT ACTIONS**

Ms. Harris went over the next actions for the plan, which include submission to the state/FEMA and then pending conditional approval, adoption of the plan by the town. After adoption Ms. Harris will do a final submission to FEMA for final approval. Ms. Harris will be in touch with the committee to coordinate adoption and then final submission to FEMA after adoption.

Meeting adjourned.

# Town of Londonderry, New Hampshire

## Hazard Mitigation Committee Meeting #5

October 19, 2010

9:30 AM

Londonderry Town Offices  
268 B Mammoth Rd  
Londonderry, NH 03053

### ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail & Phone
JOHN R. TROTTER	ASST. DIR. OF PW&ENG. PUBLIC WORKS & ENG.	JRTROTTER@LONDONDERRYNH.ORG 603-432-1100 X-146
TIM THOMPSON	TOWN PLANNER/CD	TTHOMPSON@LONDONDERRYNH.ORG 432-1100, X103

## **APPENDIX G**

### **PUBLIC AND OTHER AGENCY PARTICIPATION**

DRAFT  
FOR PUBLIC COMMENT

DRAFT  
FOR PUBLIC COMMENT

## APPENDIX H

### DOCUMENTATION OF PLAN ADOPTION

DRAFT  
FOR PUBLIC COMMENT

DRAFT  
FOR PUBLIC COMMENT

## APPENDIX I

### 2005 NEWLY IDENTIFIED MITIGATION STRATEGIES UPDATE

DRAFT  
FOR PUBLIC COMMENT



### 2005 Newly Identified Mitigation Strategies Update

	Mitigation Action	Who (Leadership)	When (Deadline)	How (Funding Source)	2010 Update
1	Update the schools' emergency plan, created through Comprehensive Emergency Management Planning for Schools (CEMPS), in cooperation with State and Federal agencies and add new provisions for emergency prevention. The plan also serves to identify weaknesses and security vulnerabilities and to develop appropriate responses.	<i>Londonderry School District, NHBEM, Fire Department, Police Department</i>	<i>Ongoing through 2006</i>	<i>NHBEM, SER&amp;CMP, Town Operating Budget</i>	<i>Updated Annually</i>
2	Update the Police Department's operating policies.	<i>Londonderry Police Department</i>	<i>Ongoing through 2006</i>	<i>Town Operating Budget</i>	<i>All operating policies up to date at this time</i>
3	Review and update the Emergency Management Plan.	<i>Emergency Management Director, Fire Department, Police Department</i>	<i>Ongoing through 2006</i>	<i>Town Operating Budget, EMPG</i>	<i>Completed in 2010</i>
4	Adopt new Digital Flood Insurance Rate Maps provided by FEMA for Rockingham County.	<i>Planning Department</i>	<i>Ongoing through mid 2005</i>	<i>Town Operating Budget, MM</i>	<i>Complete</i>
5	Consolidate the Excavation Regulations with excavation provisions in the Zoning Ordinance.	<i>Planning Department, Building Department</i>	<i>Up to 5 years</i>	<i>Town Operating Budget</i>	<i>Complete</i>

6	Develop and distribute materials for a hazard mitigation and disaster preparedness educational campaign including: develop a newspaper cutout ad and an educational pamphlet; run PowerPoint presentations about disaster preparedness and response on CTV 20; and conduct disaster preparedness and response presentations at schools, senior centers, and the Town meeting.	Town-wide effort including: Fire Dept, Police Dept, Planning Dept, Building Dept	Up to 5 years	Town Operating Budget, other grants	Complete and ongoing
7	Establish a page on the Town's website for disaster preparedness and response, hazard mitigation, and the National Flood Insurance Program.	Fire Department, Planning Department, Building Department, IT Department, Police Department	Up to 5 years	Town Operating Budget	Complete and ongoing
8	Adopt new FAA/ Airport Authority noise overlay zoning codes.	Planning Department	Up to 5 years	Town Operating Budget, FAA	Currently updating in 2010
9	Implement the reverse 911 system.	Fire Department, Police Department	3 years	Town Operating Budget, EMPG	Nixle implemented in 2010
10	Replace the inadequate 36-inch corrugated metal pipe culvert at Parmenter Road near the intersection of Route 102.	Department of Public Works	10 years	Town Operating Budget, PDM	Not yet completed
11	Replace the inadequate 36-inch corrugated metal pipe culvert at South Road near Garabedian gravel pit with two 48-inch reinforced concrete pipes.	Department of Public Works	10 years	Town Operating Budget, PDM	In progress
12	Publish and distribute educational materials for residents of isolated areas outlining disaster preparedness, response, and limited access to homes by emergency vehicles.	Fire Department, Police Department	5 years	Town Operating Budget	Complete and ongoing

13	Publish and distribute educational materials for residents of flood prone areas outlining disaster preparedness, response, and supply flood proofing and mitigation information to protect their property from flood damages.	Building Department, Planning Department, Fire Department	5 Years	Town Operating Budget	Complete and ongoing
14	Replace the inadequate culvert at Auburn Road near Whispering Pines.	Department of Public Works	10 years	Town Operating Budget, PDM	Design underway
15	Improve maintenance of the dam at Kendall Pond near South Road to minimize future debris obstruction	Department of Public Works	5 years	Town Operating Budget	Overflow management is working at this time
16	Provide educational information to residents along Brookview Drive about flood proofing and ways to minimize potential losses.	Building Department, Planning Department	5 years	Town Operating Budget	Complete and ongoing
17	Establish mobile truck safety inspections near highway exits to stop vehicles intentionally circumventing known fixed safety inspection sites to avoid being cited for violations.	Police Department, Fire Department, NH DOT, State Police	5 years	Operating Budget, NHDOT, HMAP/CERCLA	State controlled, Town encouraged
18	Establish remote broadcasting locations at the high school and central fire station with the capacity to broadcast to CTV 20.	Local Access Television, Fire Department	5-10 years	Operating Budget, other grants	In progress
19	Increase the frequency of truck safety inspections on I-93 and strengthen regulation enforcement.	Police Department, Fire Department, NH DOT, State Police	5 years	Operating Budget, NHDOT, HMAP/CERCLA	State controlled, Town encouraged
20	Replace the inadequate culvert on High Range Road at the intersection of Route 102.	Department of Public Works	10 years	Town Operating Budget, PDM	Not yet completed
21	Post warnings along Kendall Pond alerting visitors of the dangers associated with high water levels	Department of Public Works	5 years	Operating Budget	Complete and ongoing

22	Improve Spring Road, the connection between Trolley Car Lane and Hovey Road, creating an adequate second access point to Trolley Car Lane.	Department of Public Works	20 years	Town Operating Budget, other grants	Not yet completed
23	Upgrade Brewster Road from Class VI to service the existing population and create a turnaround at the end for emergency vehicles.	Department of Public Works	20 years	Town Operating Budget, other grants	Not yet completed
24	Upgrade Watts Road from Class VI to service the existing population and create a turnaround at the end for emergency vehicles.	Department of Public Works	20 years	Town Operating Budget, other grants	Not yet completed
25	Upgrade Jerry Lane from Class VI to service the existing population and create a turnaround at the end for emergency vehicles.	Department of Public Works	20 years	Town Operating Budget, other grants	Not yet completed