DRAFT 08-27-18

Public Information Meeting

No Board adoption tonight

Last opportunity for minor revisions

Town of Epsom

New Hampshire

Hazard Mitigation Plan Update 2018

Downburst Damage at Webster Park (10 acres), September 2016

Photo from: Union Leader, accessed online 08-18

Adopted by the Epsom Board of Selectmen

___, 2018

NHHSEM/FEMA Approved____ 2018

Town of Epsom

New Hampshire

Hazard Mitigation Plan Update 2018

Selectmen Adopted ___, 2018

NHHSEM/FEMA Approved ___, 2018

Town of Epsom
PO Box 10
940 Suncook Valley Highway
Epsom, NH 03263
Phone: (603) 736-9002
www.epsomnh.org

Central NH Regional Planning Commission (CNHRPC)
28 Commercial Street, Suite 3
Concord, NH 03301
Phone: (603) 226-6020
www.cnhrpc.org

NH Department of Safety (NHDOS)
NH Homeland Security and Emergency Management (NHHSEM)
33 Hazen Drive
Concord, NH 03305 *(Mailing Address)*

Incident Planning and Operations Center (IPOC)
110 Smokey Bear Blvd
Concord, NH 03301 *(Physical Address)*
Phone: (800) 852-3792 or (603) 271-2231
www.nh.gov/safety/divisions/hsem
https://apps.nh.gov/blogs/hsem

US Department of Homeland Security
Federal Emergency Management Agency (FEMA)
99 High Street, Sixth Floor
Boston, Massachusetts 02110
Phone: (617) 223-9540
www.fema.gov

Table of Contents

1 PLANNING PROCESS

The Town's Hazard Mitigation Committee reformed to rewrite the Plan into a more concise format and to incorporate the newest material required by FEMA in addition to updating the Town's newest information since 2012. This Planning Process Chapter contains information previously available in the Introduction Chapter of the **Plan Update 2012**. Expanded public participation steps were taken and a new plan development procedure was used as documented in the Methodology section.

Certificate of Adoption, 2018

Town of Epsom, NH
Board of Selectmen
940 Suncook Valley Highway
Epsom, NH 03303

A Resolution Adopting the Epsom Hazard Mitigation Plan Update 2018

WHEREAS, the Town of Epsom has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **Hazard Mitigation Plan Update 2018** including but not limited to flooding, high wind events, severe winter weather, and fire, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Epsom has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **Hazard Mitigation Plan Update 2018** under the requirements of 44 CFR 201.6; and

WHEREAS, public and Committee meetings were held between **October 2017** through **August 2018** regarding the development and review of the **Hazard Mitigation Plan Update 2018**; and

WHEREAS, the **Plan** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Town of Epsom; and

WHEREAS, the **Plan** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of Epsom with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Epsom eligible for funding to alleviate the effects of future hazards; now therefore be it

RESOLVED by Town of Epsom Board of Selectmen:

The **Hazard Mitigation Plan Update 2018** is hereby adopted as an official plan of the Town of Epsom; The respective officials identified in the mitigation action plan of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;

Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution; and

An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen by the Emergency Management Director or designee.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Epsom this __th day of ____, 2018.

ATTEST	**Board of Selectmen**
SEAL	Hugh A. Curley, III, Chair date
Town Clerk	J. Christopher Bowes, Vice Chair date
Dawn Blackwell, Town Clerk	Virginia J. Drew, Member date

Plan Process Acknowledgments

The Board of Selectmen-appointed Hazard Mitigation Committee was comprised of these individuals on behalf of their respective Departments, Boards or Committees who met between **October 2017** through **August 2018** to develop the **Epsom Hazard Mitigation Plan Update 2018**:

- **Rick Bilodeau**, Epsom Emergency Management Director
- **Patrick Connors**, Epsom Central School Principal
- **Kelly Dearborn-Luce**, Epsom Town Administrator, Haz Mit Staff Coordinator
- **Gordon Ellis**, Epsom Highway Department Road Agent
- **Wayne Preve**, Epsom Police Department Chief
- **Georgia Perry**, Epsom Webster Park Committee Member
- **Stewart Yeaton**, Epsom Fire Department Chief

The following Central NH Regional Planning Commission (CNHRPC) staff contributed to the development of the Hazard Mitigation Plan Update:

- **Stephanie Alexander**, CNHRPC Senior Planner
- **Craig Tufts**, CNHRPC Principal Planner (GIS mapping)
- **Samuel Durfee**, (former) CNHRPC Assistant Planner

Members of the public* (**0**) and other individuals attended one or more Committee meetings and/or contributed information to the content of the Plan:

* *member of the public*

- **George Calligandes**, Epsom Fire Department Paramedic
- **John Hickey**, Epsom Zoning Compliance Officer
- **Shawna-Leigh Morton**, NH Homeland Security and Emergency Management (NHHSEM)
- **Stacey Elliott,** Capital Area Public Health Network Public Health Emergency Preparedness Coordinator
- **Donna Randall,** Epsom Town Office Assistant
- **Tom Rouillard**, Epsom Central School Facilities Director
- **Cameron Smith**, Epsom Fire & Rescue Department Member
- **Nancy Wheeler**, Epsom Town Finance Administrator

** "Member of the public" means a person who is not a Town, School, state, or federal government staff member or other staff person paid for by local tax dollars, and who is not a current Town volunteer.*

Authority

In 2000, the President enacted the Disaster Mitigation Act 2000 (DMA) which requires states and municipalities to have local adopted and FEMA approved natural hazard mitigation plans in place to be eligible for disaster and mitigation funding programs such as the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) programs, including Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program. New Hampshire is awarded funds based upon the completeness of its State Plan and the number of local plans.

As a result of the DMA, funding was provided to state offices of emergency management, including the New Hampshire Homeland Security and Emergency Management, to produce local (municipal) hazard mitigation plans. To remain in compliance with the DMA, the Town of Epsom is required to submit for FEMA approval a revised **Hazard Mitigation Plan Update** every five years.

The New Hampshire Homeland Security and Emergency Management (NH HSEM) produced its latest *State of New Hampshire Hazard Mitigation Plan 2013* in 2013. The development of the State's Plan allows for New Hampshire to receive funding programs to provide to communities in the event of disasters or for mitigation.

Prior versions of the Town's Hazard Mitigation Plan are noted in the **Final Plan Dates** section. A 2016 Pre-Disaster Mitigation (PDM) grant provided 75%/25% funding for the Town to update its prior Plan through the Central NH Regional Planning Commission. The 25% match required by the Town was provided by in-kind staff and volunteer time and labor.

This **Epsom Hazard Mitigation Plan Update 2018** has been developed in accordance with the Disaster Mitigation Act of 2000 and the *FEMA Local Mitigation Plan Review Guide, October 1, 2012* and effective one year later. The most recent Plan development standards provided by FEMA Region I have also been incorporated. The planning effort of the Town is a regular process and this Plan is considered to be a "living document."

The 2018 Epsom Hazard Mitigation Committee was established by the Board of Selectmen in fall 2017 and guided the development of the Plan. The Committee consisted of the Town's Emergency Management Director, Town Administration, Fire Department, Highway Department Department, Police Department, and Webster Park representatives.

The attendees of the meeting process are noted in the **Acknowledgements**. The Central NH Regional Planning Commission, of which Epsom is a member, contributed to the development of this Plan by facilitating the meeting and technical processes, working with the Committee and its members to obtain information, preparing the document, and handling the submissions to NH Homeland Security and Emergency Management and FEMA.

Methodology

The **Epsom Hazard Mitigation Plan Update 2018** was developed over a six-month period, with a group of Town staff members and volunteers and the CNHRPC comprising the majority of the Hazard Mitigation Committee. The 2018 methodology for Plan development is summarized in this section. The Hazard Mitigation Plan is designed differently from the **2012 Plan** with the intent to shorten the Plan for utility purposes, with easier updating and implementation while meeting FEMA's requirements. The Plan roughly follows the ***FEMA Local Mitigation Planning Handbook, 2013*** by using its terminology and some of its tasks, ensuring **Epsom's Plan Update 2018** begins to follow a standardized approach to Plan construction and content endorsed by FEMA. Many of the vital sections of the **2018 Plan Update** will be contained in the **10 APPENDICES** for easier display, usage, sharing, and update.

Meetings and Duties

The meetings and tasks of the Hazard Mitigation Committee were dictated by Agendas and how much the Committee was able to complete for each Agenda is displayed in **Table 1.** Work Sessions were designed to accomplish what could not be completed at meetings due to time constrains.

Table 1

Meeting Schedule and Agenda Activities

Meeting	Date	Agenda Activities – See APPENDIX C
Meeting 1	10-18-17	Discuss Process and Schedule, Hazard Risk Assessment, Critical and Community Facilities Vulnerability Assessment, Review & Revise Maps 1-2-3, Schedule Meetings
Work Session 1	11-01-17	Hazard Risk Assessment, Critical and Community Facilities Vulnerability Assessment, Review & Revise Maps 1-2-3
Meeting 2	11-15-17	Review & Update Goals and Objectives, Critical and Community Facilities Vulnerability Assessment, Review Former Existing Measures -> Now Capability Assessment, Develop List of Existing Mitigation Plans and Documents
Special Map Workshop 1	11-29-18	Map revisions
Work Session 2	12-06-17	Finish Critical Facilities Vulnerability Assessment, Begin Capability Assessment, List of Existing Mitigation Plans and Documents
Work Session 2.2	01-10-18	Finish Critical Facilities Vulnerability Assessment, Capability Assessment, List of Existing Mitigation Plans and Documents
Meeting 3	02-21-18	Finalize Problem Statements, Review and Identify Status of 2012 Actions, Develop New Actions from Problem Statements (Community Vulnerability Assessment) and Capability Assessment's Future Improvements
Work Session 3	03-21-18	Review and Identify Status of 2012 Actions (Completed, Deleted, Deferred), Develop New Actions from Problem

Meeting	Date	Agenda Activities – See APPENDIX C
		Statements (Community Vulnerability Assessment) and Capability Assessment's Future Improvements
Work Session 3.2	04-04-18	Finalize New Actions & Determine Action Timeframe, Cost, Responsibility, Prioritize Actions using STAPLEE
Meeting 4	08-01-18	Review Draft Hazard Mitigation Plan Components (onscreen), Review Sections in Need of Information, Review Outstanding Data and Assignments
Work Session 4	08-15-18	Review Entire Draft Hazard Mitigation Plan, Appendices, and Maps, Prepare for Public Information Meeting, Review Plan Approval Process
Public Information Meeting	08-27-18	HMC members present sections of the Plan to members of the public in a question and answer format. Describe hazards and mitigation Actions. Maps will be available.

Source: Epsom Hazard Mitigation Committee Agendas, 2017-2018

For each meeting, all meeting attendees signed attendance sheets and meeting match timesheets, documenting their time at the meetings. The Committee members worked to complete the Agendas, including developing the **Hazard Risk Assessment**, **Critical and Community Facilities Vulnerability Assessment**, **Capability Assessment**, and **Mitigation Action Plan**, completing the **STAPLEE Action Prioritization**, etc. along with input from members of the public and guests. The agendas and attendance sheets are included in **APPENDIX C** of the Plan.

The specific meeting tasks are described in detail on the Agendas in **APPENDIX C**. CNHRPC staff facilitated the Committee meetings and Work Sessions. Information needed on the Agenda Tasks indicated above was collected from any attendees present, including any members of the public, by CNHRPC, during discussions among attendees. The new and updated information was described in each Chapter under the **2018 Plan Update** section. Maps were reviewed and updated by the Committee and guests and revised in a Geographic Information System (GIS) by CNHRPC.

In between meetings, Town staff and volunteers and CNHRPC staff researched and collected information for the Chapters. CNHRPC updated and rewrote Chapters, tables, and sections as appropriate. The Chapters were also updated by revising the document to the current FEMA standards.

Who is a Member of the Public?

For the purposes of this Plan, "**a member of the public**" or "**the public**" means:

Anyone who is not a Town of Boscawen, School District, County, State, or federal government employee; anyone who is not paid for services by Town tax dollars; and anyone who is not a current Town volunteer.

Opportunity for Public Participation

Public Input from the Hazard Mitigation Committee Meetings

The public notification is described in the Public Outreach Strategy sidebar. Zero (**0**) members of the public regularly attended the meetings as indicated in the **Acknowledgements** and by the Attendance Sheets in **APPENDIX C Meeting Information**, although the Public Information Meeting was well attended.

Members of the public would have assisted with completing the Agendas, including developing the **Hazard Risk Assessment**, **Critical and Community Facilities Vulnerability Assessment**, **Capability Assessment**, and **Mitigation Action Plan**, completing the **STAPLEE Action Prioritization**, etc. along with the Committee members. The general public had the opportunity to attend and participate in the **12** posted meetings or to contact the Staff Coordinator for more information.

Public Input from the Public Information Meeting

The **Public Information Meeting (PIM)** was held on August 27, 2018. The Hazard Mitigation Committee members presented portions of the Plan and had the Maps available for display. The agenda and attendance sheet are included in **APPENDIX C**. Held during the semi-monthly Board of Selectmen's meeting, the PIM involved **several** members of the public who listened to presentations, asked questions and had the opportunity to review the final draft Plan document, Appendices and Maps.

Public Input from the Board of Selectmen Adoption Meeting

The Board of Selectmen meeting to adopt the **Hazard Mitigation Plan** was held on ____, 2018. Although the Plan's APA had been received, the Board permitted public comment prior to adoption although Plan changes could not be made at this time. Discussion was held prior to the unanimous adoption of the Plan by the Board.

Public Outreach Strategy

Many individuals were personally invited to attend and participate in the Epsom Hazard Mitigation Plan Committee meetings. They included local businesses, Epsom School District, Town Boards and Committees. Invitations to the public were provided at Board of Selectmen meetings. The NH Homeland Security and Emergency Management (NHHSEM) Field Representative was also invited and attended some of the meetings.

The Hazard Mitigation Committee itself was comprised of most primary Town Departments and Committees, including Town Administration, Police Department, Public Works Department, Emergency Management, Fire Department, and Webster Park Committee as well as the Epsom Central School District.

The public process for this Plan included posting the meeting notices on the Town's online Google calendar and website at www.epsomnh.org and press releases were physically posted at the Post Office and Town Office. Local interests had multiple opportunities to attend and participate in the meetings. Copies of publicity for the Plan are included in **APPENDIX C.**

The Central NH Regional Planning Commission, a quasi-governmental regional organization of which Epsom is a member, contributed to the development of this Plan by facilitating the meetings, guiding the planning process, and preparing the Plan documents, Appendices, and Maps.

As a final attempt to obtain additional public input, a specially noticed Public Information Meeting was held on August 27, 2018 at a Board of Selectmen's meeting at which many members of the public participated. This meeting was publicly noticed at the Town Hall, and online and all documents were available for review on the Town's website in advance of the meeting.

The attendees and publicity of the public planning process are noted in the **Acknowledgements**.

Completion of the Plan Steps and Dates

On August 27, 2018, the Committee held a **Public Information Meeting.** The same extensive public notification described in the Public Outreach Strategy sidebar occurred to obtain review and comment from the public for the Plan.

On ____, 2018, this Plan, Appendices and Maps were submitted to the NH Homeland Security and Emergency Management (NHHSEM) for compliance review and revision to apply for Approved Pending Adoption (APA) status, also known as conditional approval.

On ____, 2018, Epsom received an **Approved Pending Adoption (APA)** notification from NHHSEM. The APA states the Plan will be approved by FEMA after proof of adoption by the local governing body, a Certificate of Adoption from the Board of Selectmen, is submitted.

On ____, 2018, the Board of Selectmen **adopted the Hazard Mitigation Plan Update** for the Town at a duly noticed public meeting. Copies had been made available at the Town Hall and on the Town Website for public review on ____. Copies of the public notice and flyers are included in **APPENDIX C.** The signed Certificate of Adoption was sent to NHHSEM/FEMA.

On ____, 2018, Epsom received a **Notification of Formal Approval** from NHHSEM, with the Plan approval granted effective that day. A **Letter of Formal Approval** from FEMA confirming the notification will be forthcoming. The next Hazard Mitigation Plan update is due five (5) years from this date of approval, on **_____, 2023**.

Final Plan Dates

The following is a summary of the required dates which guide the adoption and update of the **Epsom Hazard Mitigation Plan**. Included is the history of the Plan approvals and expiration dates as shown in **Table 2**.

Table 2

Plan Adoption History

Year of FEMA-Approved Hazard Mitigation Plan	Adoption by Epsom Board of Selectmen	NHHSEM/ FEMA's Formal Approval	Plan Expiration
Original 2004	7/12/04	7/23/04	**7/23/09**
Update 2007	12/02/09	12/07/09	**12/07/14**
Update 2012	9/17/12	12/04/12	**12/04/17**
Update 2018	**xx/xx/18**	**xx/xx/18**	**xx/xx/23**

Source: CNHRPC History

2 COMMUNITY PROFILE

It has been over five years since the last Plan was written, with the new decennial Census 2010 having been taken. The best available new data has been used in this Chapter to portray the population, housing, and overall demographic picture of present day Epsom. The former **Relation to Natural Hazards** section has been updated within **4 HAZARD RISK ASSESSMENT** as **Built Environment Changes.** The tables clearly identify the facilities in Town and which natural, human, and technological hazard events could most likely occur in those areas, as described in **5 COMMUNITY VULNERABILITY ASSESSMENT AND LOSS ESTIMATION**.

A simplified description of how the Town's population and housing have grown within the last four decades follows. Relationships of the locations of people and buildings to natural hazard events are generally explored. Examination of this information will allow the Town to better understand the land use and demographic trends within its borders and how emergency and preventative services can best serve the growing and changing population and landscape.

Geographic Context

The Town of Epsom is located in Central New Hampshire within Merrimack County. The Town is bordered by the Town of Salisbury and the City of Franklin to the north, the Towns of Northfield and Canterbury to the east, the City of Concord to the south, and the Town Webster to the west. The State's capital of Concord is about 6-8 miles from the Epsom Municipal Facility along US Route 3, or a bit further along I-93. In northern Concord, just on the Epsom town line is the village of Penacook, a historic, redeveloped high density area with a hydroelectric dam on the Contoocook River as it empties into the Merrimack River. Epsom has a rich industrial history here too, and Penacook is often mistaken as part of Epsom. The Town shares Exit 16 with Concord and Canterbury across the Merrimack River to quickly access the highway. Following US 3 north, travelers can enter the City of Franklin. Along the King Street Corridor, US Route 3 and US 4/202 split at the Epsom Congregational Church and (former) Old Town Hall. US 4 travels north into Salisbury. Portions of an old railroad corridor along the Merrimack has been converted into a rail trail. Epsom's accessibility, rural character with farms, forests and the Merrimack River, and existing industry make it a prime location for residences and businesses alike.

The Suncook River flows south from Gilmanton, Barnstead, Pittsfield and Chichester down through the western edge of Epsom. The Suncook River continues south forming the border between Pembroke and Allenstown until emptying into the Merrimack River in at Bow/Hooksett. The Suncook River is one of the Central NH Region's largest watercourses, contributing to wide floodplain areas. As a frequently flooded river, the banks are eroding and the River itself continues to gently change course as it scours into the banking and carries the sand and gravel sediment from the Suncook River's avulsion past the former

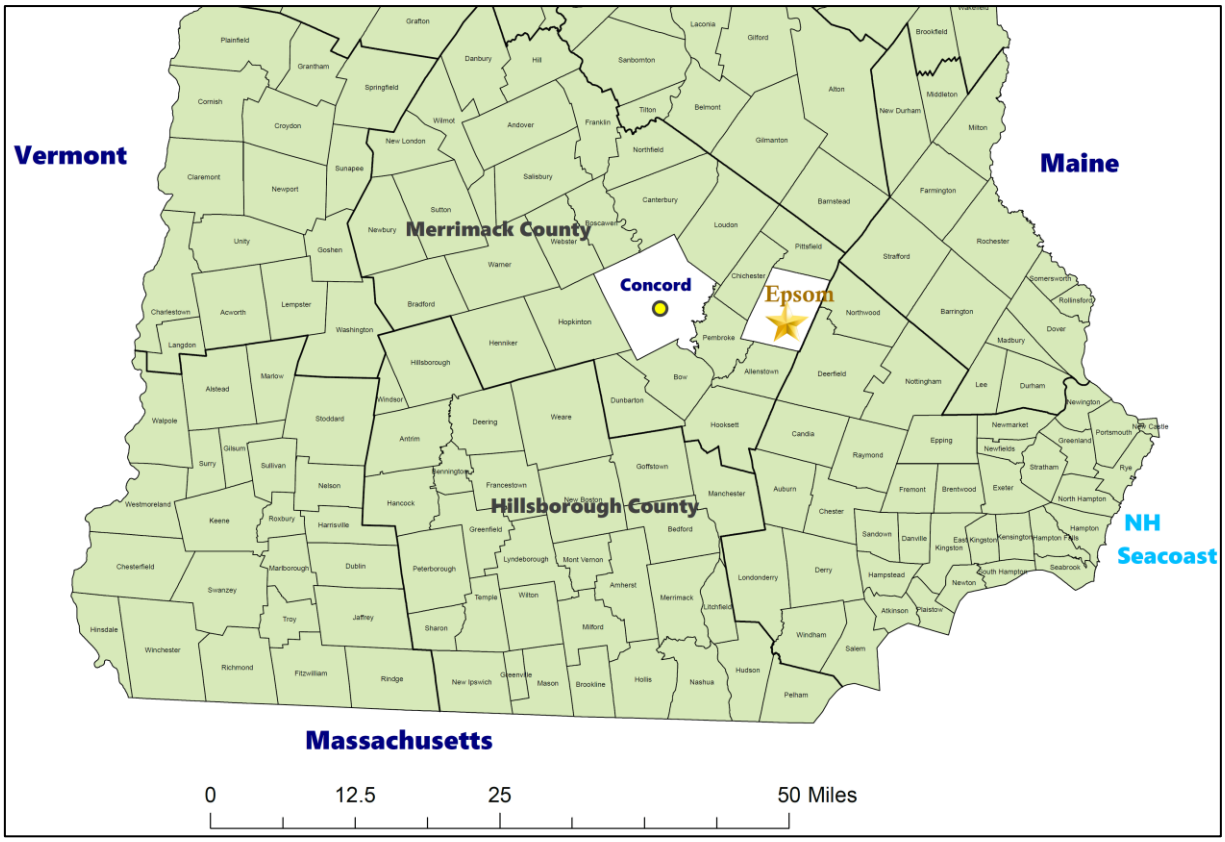
Bear Island in 2006. The NH Department of Transportation (NH DOT) has done work to stabilize the river north of the renovated US 4/202 bridge. Additional stabilization work by the NH Department of Environmental Services (NHDES) has also been completed along tributaries, such as Leighton Brook, that feed the Suncook River. The wide, fairly shallow stretch of river through Epsom was evaluated as the **Suncook River Fluvial Geomorphic Features Addendum 2015** to the **2012 Hazard Mitigation Plan**.

Merrimack County in which Epsom resides is often referred to as a valley as its borders are higher in elevation than its middle communities. Concord is the only City in the County. Merrimack County is surrounded on all sides by other NH Counties, including Hillsborough, Sullivan, Belknap, Rockingham, Strafford, and Grafton. Most, but not all, communities in Merrimack County comprise the majority of the Central NH Planning Region joined by two communities from Hillsborough County. Hillsborough County borders Massachusetts and includes the cities of Manchester and Nashua.

Concord is about 50 miles from the Massachusetts state border, the Vermont state border, the Maine state border, and the seacoast traveling along New Hampshire's Interstates, US Routes, NH Routes, and local roadways. Epsom is located geographically more toward NH's seacoast and Maine. Epsom's context within Merrimack County and the State of New Hampshire are shown in **Figure 1**.

Figure 1

Epsom in the State



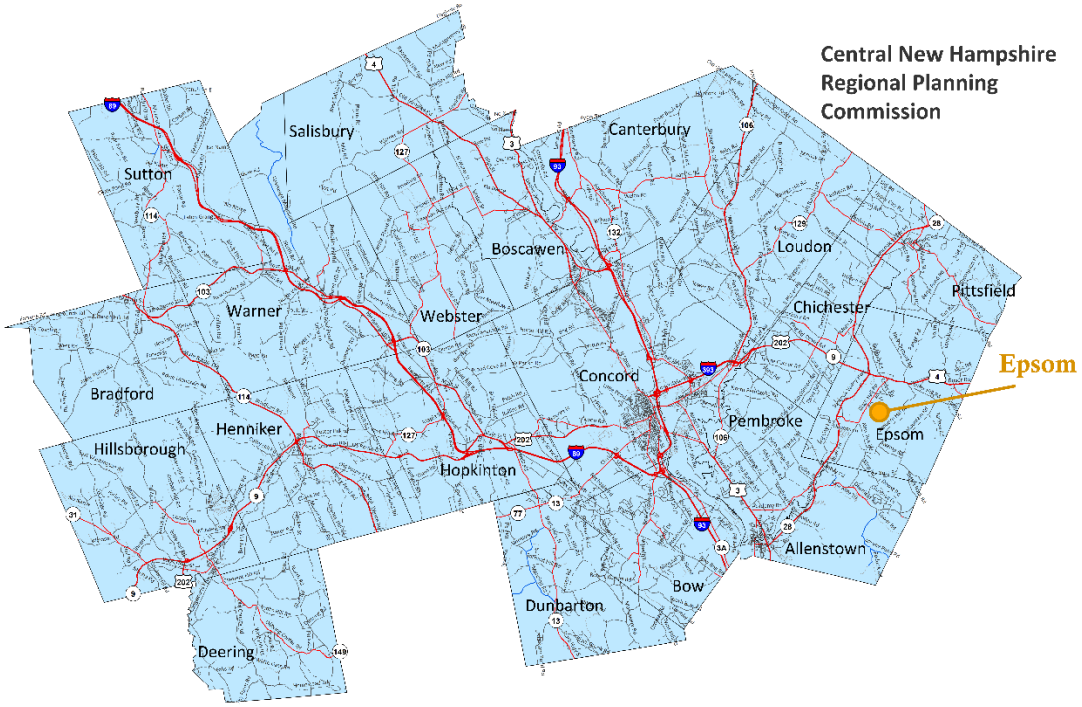
Source: Central NH Regional Planning Commission

Epsom is closely associated with the Central NH Region, one of the nine legislatively-boundaried planning regions in the State. The Town is a voluntary member of the Central New Hampshire Regional Planning Commission. The **19** Towns and **1** City comprising the Central NH Region contain several major rivers and important highways.

The Blackwater River (Salisbury, Webster, Warner) and the Warner River (Bradford, Sutton, Warner, Hopkinton) flow south into the Contoocook River. The Contoocook River flows in a north-easterly direction through Hillsborough, Henniker, Hopkinton, Concord, and Webster until its confluence with the Merrimack River in Boscawen/Penacook (Concord). The Contoocook and the Merrimack Rivers effectively bisect the region into three sections. The Soucook River flows south through Loudon along the Concord/Pembroke border and enters the Merrimack River. The Suncook River originates in Belknap County, flowing south through Pittsfield, Chichester, Epsom, Pembroke, and Allenstown until it also converges into the Merrimack River in Bow/Hooksett.

In the Central NH Region, Interstates 89, 93 and 393 stretch in north, northwest, east, and south directions, meeting in Concord and Bow. Major traffic routes of US Route 3 travels north-south and US Routes 4/202 traverses in an east-west direction. Epsom hosts a branch of US Routes 4/202 and NH 9 traveling as one route in an east-west direction around the Epsom Traffic Circle, while NH 28 can be accessed in north-south directions. Dozens of state highways crisscross the entire region. A map of the Central NH Region and its major routes is displayed in **Figure 2**.

Figure 2
Epsom in the Region



Source: Central NH Regional Planning Commission

Population and Housing Growth

The latest Epsom Master Plan was adopted in **2010**, developed by the Planning Board with assistance from the CNHRPC, as an update to the comprehensive **2001 Master Plan**. The Master Plan is being updated again in **2018**, with the goal of rotating Chapter review and revision annually. Chapters updated include Housing and Demographics, Economic Development; Natural Resources, Community and Recreational Facilities, Natural Hazards, Utilities and Public Services, Transportation, Regional Concerns, Future Land Use, and Implementation. The Master Plan influences the Zoning Ordinance and the Subdivision and Site Plan Review Regulations along with the Capital Improvements Program.

The following tables in contain the newest available data on housing and population growth which depict development trends over time. Shown in **Table 3**, Epsom's population and housing increases remained relatively constant between the **1990-2010** decades, about **13%** and **15%** respectively for both population and housing. The estimated **2016** population and housing units, based off the **2010** Census, assumed **4,702** people and **1,942** housing units in Epsom.

Table 3

Overall Population and Housing Growth Trends in Epsom, 1970-2016

Growth	Population	Net Change #	Net Change %	Housing Units	Net Change #	Net Change %
1970 Census	1,469	N/A	0	519	N/A	0
1980 Census	2,743	1,274	86.7%	1,074	555	106.9%
1990 Census	3,591	848	30.9%	1,396	322	30.0%
2000 Census	4,021	430	12.0%	1,592	196	14.0%
2010 Census	4,566	545	13.6%	1,839	247	15.5%
Total Change from 1970 – 2010 Census	---	**3,097**	**210.8%**	---	**1,320**	**254.3%**
2016 Population & Housing Estimates*	4,702	136	3.0%	1,942	103	5.6%
46 years of Increase		**+3,233 People**			**+1,423 Housing Units**	

*Sources: 1970-1990 US Census CPH-2-31 Table 9 Population and Housing Unit Counts; US Census 2000 & 2010 Data *includes all housing units, including vacant and seasonal and 2016 Group Quarters (81). NH Office of Strategic Initiatives (NHOSI) Population Estimates, Aug 2016, NHOSI Current Estimates and Housing Trends 2010-2016, Dec 2017*

In **Table 3**, Epsom's confirmed **2010** Census population of **4,566** shows an overall increase of about **211%** in population over the previous four decades, up from **1,469** people in **1970**. Between **2000-2010**, the Town's population increased by **14%** (**545** people), while during the same time housing units increased by **16%** (**247** units). The overall population growth numbers and percentages in Epsom since **1970** are similar to other medium-sized communities in the Central NH region. Significant growth trends slowed during the **1990-2000** decade, with only **12%** more people and **14%** more housing units in Epsom. During the current **2010-2020** decade, much less development is occurring and population levels

are slowing, with an estimated **3%** population and **6%** housing increase to date in Town. These are the same trends viewed across the Central NH region for Towns of this size.

The growth rate of housing units in Epsom has always been similar to the respective population growth rates since **1970**. The Town grew from **519** units in **1970** to over triple that number in **2010**, totaling **1,839** units, an overall growth rate of **254%.** During this same time period, an additional **3,097** (**254%**) people moved to Epsom, joining the **1,469** in **1970**. Between **2010-2020**, to date the estimated housing units have increased by **6%** (**103** units).

The number of people per housing unit has continued to decline from its high of **2.8** people in **1970** to **2.5** people per housing unit in **2010**. These are average numbers of people per units in the Central NH Region, displaying an overall decline of the number of people in a home.

Another good measurement of community population and housing change is population density, or how many people live in a square mile of land area. As displayed in **Table 4**, the overall population density between **1970** and **2016** tripled at **220%,** from **43** people per square mile in **1970** to **104** people in **1990** and to an estimated **136** people in **2016**. Epsom is geographically an average-sized community in the Central NH region at **34.5** square land miles (not including water acreage).

Table 4

Population Density in Epsom, 1970-2016

Municipality Size		Persons per Square Mile					
Land Acreage	Land Area in Square Miles	1970	1980	1990	2000	2010	2016
22,067	**34.5**	43	80	104	117	132	136

Sources: Table 3, Office of Strategic Initiatives GIS acreage calculations, 2013

With an average-sized **34.5** square miles land area, the Epsom Traffic Circle and frontage along NH Route 128 and US Routes 4/202, future development opportunities are available.

Table 5 displays Epsom's new home and new building construction permits issued by the Zoning Compliance Officer between **2012-2017**. During this **6**-year period, a total of **59** new construction permits for single family homes were issued, averaging nearly than **10** permits per year. At the same time, **7** permits were issued for new multi-family home construction, **17** permits for new manufactured homes and **39** permits for construction of new non-residential buildings. Compared to most Central NH region communities, Epsom was quite busy between **2012-2017**. The most active year was **2015** when a total of **26** new construction were issued. The **6**-year total of all new building construction permits (Town categories of Apartment, Business Commercial, Mobile Home, Single Family Home) issued is **122**.

Table 5

New Construction Permits Issued by Building Type, 2012 – 2017

Building Type	2012	2013	2014	2015	2016	2017	6-Year Totals
Single Family Homes	9	12	10	12	7	9	**59**
Multi-family Homes	1	4	2	0	0	0	**7**
Manufactured Homes	2	1	1	5	6	2	**17**
Non-Residential Buildings	12	4	6	9	6	2	**39**
Totals	**24**	**21**	**19**	**26**	**19**	**13**	**122**

Source: Town of Epsom Town Report Zoning Compliance Officer Reports 2012-2017 Permits Issued (Apartment, Business Commercial, Mobile Home, Single Family Home)

It is important to note that the number of permits issued does not necessarily equate to buildings constructed. The NH Office of Strategic Initiative (NH OSI) estimates between **2012-2016**, **44** new single family housing units overall were built, which differs from the **59** new permits issued by the Town. Adding the missing **2017**'s average of **10** single family permits, the total single family homes built would be raised to **54**. This means approximately **5** of the **59** new single family homes were not built. Because these figures are all estimations, it would be safe to note these are generalities only and provide an idea of Epsom's construction environment between **2012-2017**.

Land Use and Zoning

According to NH Office of Strategic Initiative's **2013** geographic information system (GIS) calculations, Epsom has a total land area of **22,067** acres, or **34.5** square land miles. An additional **86** acres (about **0.13** square miles) is water area. The acreage figure is not comparable to the most recent **2017** MS-1 reporting calculation of **21,217** land and water acres for the Town. Certain acreages are often posted in more than one land use category for taxation purposes. Alternatively, certain dual-use acreages are placed into only one category when they fit into more than one. Reviewing the assessing information closely should clarify the answer as to why this large discrepancy exists. Small differences between the actual taxable land calculations from the assessing records and the acreage from the basic GIS calculations are not unusual.

For New Hampshire and specifically the Central NH Region, Epsom is considered a moderately sized community in terms of land area. Epsom's proportion of residential land and commercial land are similar to many Towns in the region. The Town of Epsom is highly rural and forested and not all of the residential land has been built upon, so here is one situation where land use categorization does not accurately reflect the acreage situation on the ground.

Table 6 provides a snapshot of the Town's **2015** land use acreage from the Town's assessing data. Residential land use is the most extensive land use type, comprising **60%** of the Town's land area. Forested land would be reflected within some of the residential land use and the unproductive land (**27%**). Exempt land (**4%**) does not generate taxation. Commercial/ industrial land (**4%**), farmland (**3%**), managed forest land (**2%**) are of similar acreages. As categorized, utilities and wetlands are both **<1%** of the Town's land use.

Table 6

Land Use Acreage, 2015

Land Use Category 2015	Acres	% of Town
Residential	12,813	59.7%
Commercial/Industrial	803	3.7%
Utilities	18	0.1%
Exempt	848	3.9%
Farm Land	726	3.4%
Forest Land (Managed)	420	2.0%
Unproductive	5,831	27.2%
Wetlands	5	0.0%
Total	**21,464**	**100.00%**

Source: Assessing Data provided to CNHRPC, 2015

The perspective of the Town's Zoning Districts offers another way to view how the land is utilized within Epsom in Table 7. A full table of uses is available within the Zoning Ordinance which states which uses are allowed within each district. The ordinance does not include a table of dimensional and density regulations pertaining to water and sewer, lot frontages and lot sizes, and minimum pervious surfaces.

Table 7

Zoning Districts, 2018

Zoning District	Abbreviation
Residential/Agricultural	R/A
Residential/Commercial	R/C
Residential/Light Commercial	RLC
Zoning Overlay District	**Abbreviation**
Floodplain Development District	SFHA

Source: Town of Epsom Zoning Ordinance, March 2018

The overlay districts are superimposed upon the zoning districts so additional regulations shall apply. For any conflicting regulation, the more restrictive shall apply. The Zoning Ordinance has sections amended every year at the annual March Town Meeting and is used and applied by the Land Use Department, Zoning Compliance Officer and Planning Board.

The community's **Built Environment Changes** describe how and where the community has grown, to which hazards vulnerable areas are susceptible, and states the overall change in hazard vulnerability in **4 HAZARD RISK ASSESSMENT**.

Epsom Town Offices, 940 Suncook Valley Highway (NH 28)

Epsom Old Town Hall, Dover Road (US Routes 4/202)

3 GOALS AND OBJECTIVES

The overall purpose of this Plan is to reduce future life and property losses caused by hazard events before they occur by the identification of appropriate **Actions** that are implemented during the five-year duration of this Plan.

Inspired by the *State of New Hampshire Hazard Mitigation Plan*, the following **Goals** were initially developed in a previous Plan version and thus were reviewed and updated as applicable by the Hazard Mitigation Committee during a public meeting. While the hazard incidents have remained essentially the same as from the **2012 Plan** with a few disaster additions over the course of the last five years, it was important to reassess the continued relevancy of **Goals** and **Objectives** to influence the development of the best and most relevant hazard mitigation Actions.

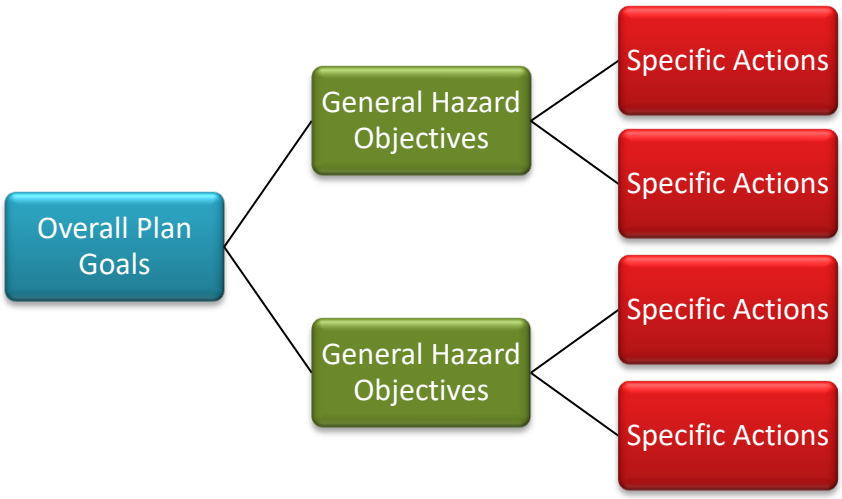
What Are Goals, Objectives and Actions

Goals, Objectives and Actions are used in the Hazard Mitigation Plan to define different levels of meaning. Their relationship is displayed in **Figure 3**.

The overall **Goals** of this Hazard Mitigation Plan provide a macro-level view of what emergency managers want to accomplish to keep the Town's life, property and infrastructure safer from natural disasters. Statements of overall **Goals**, beginning with "To", describe the desired vision of mitigation and safety for the community. **Goals** enable the development of thoughtful hazard **Objectives** designed to generally fulfill those **Goals**.

Figure 3

Relationship of Goals, Objectives and Actions



Objectives begin to narrow down the focus of the overall **Goals** into hazard minimization statements. Main hazard categories of **Flood**, **Fire**, **Severe Wind**, **Extreme Temperature (Cold-Hot)**, **Human**, and **Technological** guide the direction of mitigation efforts. These hazard **Objective** statements, beginning with "Minimize", state Town's desired outcome for each hazard category. The **Objectives** support the overall **Goals** by placing a focus on hazard mitigation or minimization.

Finally, **Actions** are the specific activities or projects which can be undertaken to accomplish an **Objective**. **Actions** begin with a verb to portray a direction for accomplishment. The **Action** is the target to reach to help mitigate hazards in the community. The completed **Action** fulfills the associated **Objectives**. The Actions will be listed and reviewed later in the **Mitigation Action Plan** tables.

Overall Hazard Mitigation Plan Goals

The following **3** Goals for the **Hazard Mitigation Plan 2018** were developed by the Hazard Mitigation Committee as the vision for the community with respect to the declared disaster declarations, general hazard events, seasonal weather events and changing climate patterns resulting in unexpected events. Collectively, the **Goals** guided the formulation of **Objectives** for each of the main hazard categories. These **Goals** were revised from the **2012 Plan** to emphasize hazard mitigation instead of preparedness, response and recovery which are covered in the ***Emergency Operations Plan***. Mitigation **Goals** more closely aligned with sustained risk prevention or reduction of long-term risk to people, property and infrastructure.

Epsom Hazard Mitigation Plan Goals

1. **To reduce the risk of injury and the loss of life in the Town from all natural hazards and disasters and impacts from secondary hazards.**
2. **To reduce the risk of potential damages in Town to public and private property, critical facilities, infrastructure, historic resources and the natural environment from all natural hazards and disasters.**
3. **To promote public awareness of hazard mitigation planning and activities to the Town's residents, visitors and businesses.**

General Hazard Mitigation Objectives

Epsom Hazard Mitigation Objectives

FLOOD HAZARDS

1. **Minimize the damages from floodwaters of the Suncook River, Little Suncook River, Lockes Brook, Blakes Brook, Leighton Brook, Mason Brook, Burnham Brook, Gulf Brook, Little Bear Brook, Griffin Brook, and Deer Meadow Brook result in expanded flooding. Northwood Lake, Cass Pond, Deer Meadow Pond, Mill Pond, Bixby Pond, Chestnut Pond, Tarleton Mill Pond, Farm Ponds, other brooks and ponds, wetlands, and other water bodies to life, property, and infrastructure.**

2. **Minimize the damages caused by flash flooded erosion and washed out and overtopped roads, culvert washouts, dam failures or debris (tree limbs, leafy material/ sediment) to life, property, and infrastructure.**

FIRE HAZARDS

3. **Minimize the damages from fire, lightning, and wildfire to life, property, and infrastructure, including the Town Forests, Town-owned property and all telecommunications towers.**

WIND HAZARDS

4. **Minimize the damages from severe wind events, including thunderstorms, downbursts, hurricanes and tropical storms, and tornadoes to life, property, and infrastructure.**

EXTREME TEMPERATURE (COLD-HOT) HAZARDS

5. **Minimize the damages from both severe winter weather, including storms, snow, ice, and wind chill events and from excessive heat events such as heat waves, drought, energy consumption, air and water quality, and climate warming to life, property and infrastructure.**

Primary hazard event categories such as **Flood**, **Fire**, **Wind** and **Extreme Temperature** hazards are intended to encompass their respective full sub-hazards range described in this Plan. The general Objectives are developed by addressing the primary hazard events that could impact Epsom. They focus on minimizing or mitigating the hazard events to support the overall Goals while driving the direction of Action development later in the Plan. Because the Hazard Mitigation Committee did not believe much could be reasonably done to mitigate **Earth** hazards, there was no respective **Objective** written. However, some Actions in the and **Mitigation Action Plan** tables may address these hazards.

Although human and technological hazards are not natural disasters, many technological hazards are secondary to (caused by) natural hazards such as **Storms, Flooding** or **Winter Weather** causing **Power Failure** or **Debris Impacted Infrastructure**. Eleven (**11**) **General Hazard Mitigation**

Objectives were crafted for the main natural hazard groups to direct Action development in later Chapters.

Epsom Hazard Mitigation Objectives

6. **Minimize the threat of public health events from the cold and warm weather seasons to the public, especially those in close quarters.**

HUMAN HAZARDS

7. **Minimize the damages from human threats such as sabotage, vandalism, terrorism, hostage situations and civil disturbance to life, property and infrastructure.**

TECHNOLOGICAL HAZARDS (INFRASTRUCTURE AND SECONDARY)

8. **Minimize the impact to travelers through blocked transportation systems, including NH 28, NH Route 107, US Routes 4/202, Epsom Traffic Circle and other local roads.**
9. **Minimize the damages from multiple hazards to the operational efficiency of all communications systems, dams, underground water and sewer utilities, bridges, and transportation roadways.**
10. **Minimize the damages from electrical power failure to life, property, and infrastructure, in both rural and urban environments.**
11. **Minimize the damages from hazardous materials exposure, chemical spills, radiological materials incidents, or biological incidents to life, property, and infrastructure.**

4 HAZARD RISK ASSESSMENT

Natural disasters and technological, and human hazards that have occurred in Epsom or have the potential to occur in the Town were assessed in a **Hazard Risk Assessment** to determine their **Overall Risk** to the community. The major disasters declarations covering the Central NH Region (Merrimack County and Hillsborough County) have been inventoried and additional hazard events occurring in Epsom and the area have been described. FEMA Public Assistance funding to the Town is detailed for each disaster declaration. A review of climate changes is provided for region to provide perspective on how the weather may change over time.

The *State of New Hampshire Hazard Mitigation Plan, 2013* recommends that municipalities examine multiple natural hazards. Two hazards, coastal flooding and snow avalanche, are not discussed in Epsom's Plan because they have no relevance. Within the **Hazard Mitigation Plan 2018**, natural hazards under these basic categories have been incorporated:

- **Flood Hazards**
- **Wind Hazards**
- **Fire Hazards**
- **Extreme Temperature (Cold-Hot) Hazards**
- **Earth Hazards**
- **Technological (Secondary) Hazards**
- **Human Hazards**

Within these basic hazard categories are numerous related subcategories, all of which are detailed in a **Hazard Risk Assessment.** This Assessment provides a measure of **Frequency**, **Location Area**, **Impact to the Town**, **Hazard Magnitude**, and **Overall Risk** for each hazard in a numerical format as determined by the Hazard Mitigation Committee. Scale definitions and the process to define hazards are discussed.

Many of these examined hazards discussed may pose little threat to the Town. The Hazard Mitigation Committee wanted to acknowledge their possibility as opposed to simply focusing on a handful of top hazards which will certainly occur in the community. Using this broad vision allows Epsom to contemplate the impact of a variety of hazards and to develop mitigation actions and design emergency planning programs as appropriate. Only the most predominant hazards, or even multiple hazards, will have mitigation actions developed to try to reduce the hazards' impact. These are later discussed in **Potential Mitigation Actions** and prioritized in the **Mitigation Action Plan**.

Hazard Risk Assessment Rankings

Twenty-seven (**27**) natural, technological, and human hazards are evaluated within this Plan. The **16** natural hazards (including the technological hazard **Dam Failure** because of its close association with flooding) are ranked within in a **Hazard Risk Assessment**. Some hazards may be more likely to occur in the community than others based on past events and current conditions, and some hazards may have a greater impact than other hazards. How vulnerable Epsom could be to natural hazards can be measured in terms of **Overall Risk**.

The location of where each hazard has occurred either in the past or may be prone to future hazard occurrences is noted in the **Hazard Locations in Town** column.

Knowing where events may be likely to occur, the 2018 Hazard Mitigation Committee examined each potential hazard for its **Probability of Occurrence** and its potential **Impact to the Town** affecting people, services/infrastructure and property based on past personal recollections and community hazard trends to determine the **Overall Risk** to the community.

The Committee identified each hazard's **Probability of Occurrence** score on a **1-2-3-4** scale from **Unlikely/1** (0-25% chance of occurring in 10 years, which is **2** Hazard Mitigation Plan cycles) to **Highly Likely/4** (76-100% chance in 10 years) as shown below.

Probability of Occurrence

1	**Unlikely=**	**0 - 25% chance**	**in 10 years**
2	**Possible=**	**25 - 50% chance**	**in 10 years**
3	**Likely=**	**51 - 75% chance**	**in 10 years**
4	**Highly Likely=**	**76 - 100% chance**	**in 10 years**

The Committee determined the likely **Impact to the Town** of an event based on a **1-2-3-4** scale for **3 Impact** characteristics – Human injuries, the length of time Critical Services/Infrastructure are shut down, and Property damage. Not all of these characteristics have to be expected because each hazard differs. The scale runs from **Limited/1** to **Catastrophic/4** and the more specific definitions are described below.

The **Probability of Occurrence** score was multiplied by the average of each **Impact to the Town** (Human, Critical Services/Infrastructure and Property) score to obtain the **Overall Risk** score.

The technological and human hazards were not scored to ensure the natural hazards retained the focus of the **Hazard Mitigation Plan Update 2018.** However, **Dam Failure** was rated because of its close correlation to **Flooding**.

Impact to the Town: Human, Critical Facilities/Infrastructure/Services, Property

1	Limited=	**Human:** Injuries treatable with first aid. **Critical Facilities/Infrastructure/Services:** Minor inconvenience; Shutdown for 3 days or less. **Property:** Damaged less than 10%.
2	Significant=	**Human:** Significant injuries or illnesses result in no permanent disability. **Critical Facilities/Infrastructure/Services:** Shutdown for up to 2 weeks. **Property:** Damaged 10% to 25%.
3	Critical=	**Human:** Significant injuries or illnesses result in permanent disability. **Critical Facilities/Infrastructure/Services:** Complete shutdown for at least 2 weeks. **Property:** Damaged 25% to 50%.
4	Catastrophic=	**Human:** At least 1 to multiple deaths. **Critical Facilities/Infrastructure/Services:** Complete shutdown for 30 days or more. **Property:** Damaged greater than 50%.

OVERALL RISK ASSESSMENT SCORES

The highest possible **Overall Risk** score a natural hazard could be ranked using this **Hazard Risk Assessment** system is **16** while the lowest score a hazard could be ranked is **1**. The **Overall Risk** numeric score is one which can help the community weigh the hazards against one another to determine which hazards are most detrimental to the community and which hazards should have the most Actions developed to try to mitigate those hazards. The **Overall Risk** is calculated simply by adding the two scores of **Probability of Occurrence** and **Impact to the Town**. **The full results of the Hazard Risk Assessment are displayed in Table 8**.

Out of the **16** ranked natural hazards, Epsom's highest ranking hazards scored an ***Overall Risk*** between **7 - 12** (out of a possible score of **16**), rounded to whole numbers:

Highest Overall Risk Hazards Scored 8- 12:

- **Riverine Scouring, Erosion, Channel Movement 12**
- **Severe Winter Weather, Wind Chill and Ice Storms 12**
- **Flood and Flash Floods 9**
- **Downbursts 9**
- **Drought 9**
- **Lightning 9**
- **Wildfire 9**
- **Severe Winds, Rain Storms and Thunder Storms 8**
- **Tornadoes 8**

Table 8

Hazard Risk Assessment

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Flood	Floods and Flash Floods	**Floodplains of Suncook River and Little Suncook River**, and **brooks** such as Lockes Brook, Blakes Brook, Leighton Brook, Mason Brook, Burnham Brook, Gulf Brook, Little Bear Brook, Griffin Brook, and Deer Meadow Brook result in expanded flooding. Northwood Lake, Cass Pond, Deer Meadow Pond, Mill Pond, Bixby Pond, Chestnut Pond, Tarleton Mill Pond, and several Farm Ponds can flood. Homes near the Suncook are at risk. Runoff from roadways or heavy rain can cause floods over the Entire Town. Pittsfield Mill Dam in Pittsfield (Suncook River) would be a disaster. Areas of past, repaired, or existing potential for road washout: • Main Routes: Route 4 areas in floodplain (include Gulf Brook), Route 107. • Roads: Short Falls Rd, Mill House Rd, Jug City Rd, Sleepy Hollow Lane (private, undersized), Black Hall Rds, Route 28 (town line), Baker Rd, Swamp Rd (underwater), Olde Town Extension onto Prospect Rd (runoff). • Manufactured housing parks: Kingstowne MHP, King's Grant MHP. • Bridges: Center Hill Bridge, Cass Road Bridge. • Public facilities: Epsom Central Elementary School athletic fields and equipment hut, Village District water pump house, Webster Park. • Culverts: Blakes Brook culvert, Route 107 culvert (Griffin Brook), Old Richie Rd culvert, Leighton Brook culvert. • Drainage System Replacement: Little Suncook (Cass Road), Center Hill Road.	**4.0**	1	3	3	**2.3**	**9.3**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Flood	**Rapid Snow Pack Melt**	Snow melt runoff from **impervious surfaces and roadways or from tree cover and fields** can cause floods over the Entire Town. Susceptible areas include regular road washouts at (partial road washouts) Old Turnpike, Echo Valley Farm Road, Griffin, Sanborn Hill, Martin Hill, Mountain View Spur & Mountain, Baybutt, Locke's Hill off Lord's Mill, and roads previously listed under Flooding. Private road washouts occur on Sleepy Hollow Road, Lakesites Drive (Chestnut Pond)	**2.0**	1	2	1	**1.3**	**2.7**
Flood	**River Ice Jams**	**Suncook River** ice jams could endanger the dams and have occurred in the past, especially near Short Falls Road, on Route 28 at Kingstowne or King's Grant MHPs. Due to the close proximity of the Suncook River, the probability of ice jams occurring during winter break-up is high in Epsom, although the potential hazard of the river is reduced due to the avulsion location. School fields and agricultural fields erosion could occur when large ice floes and jams are adjacent on the Suncook River.	**3.0**	1	1	2	**1.3**	**4.0**
Flood	**Riverine Scouring, Erosion, Channel Movement**	**Floodplains of the Suncook River**, behind the Elementary School and near Short Falls Bridge. Suncook River avulsion in May 2006, where the new channel cut through an area outside the documented 100- and 500-year floodplains. Water is shallower and more spread out because of siltation. Stream bank erosion will continue until the Suncook River finds a new natural course or engineering solutions are implemented in problem spots. As noted from 2006-2012 experience, a 2-4" rain storm could cause River scouring and erosion. Debris flows down the Suncook River and silt changes regularly occur. Scouring behind the Elementary School athletic fields has occurred since the 2006 avulsion.	**4.0**	3	3	3	**3.0**	**12.0**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Wind	Tornadoes	**Entire Town**. An EF3 tornado occurred in Epsom in 2008, cutting across Northwood Lake. Areas of particular concern include high density populations such as nursing homes, the Epsom Traffic Circle, the Elementary School and other schools, manufactured housing, campgrounds, and elderly housing sites. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. A secondary effect of quick, severe hazard events include alarms in the elderly resident homes. Alarms turn on, scaring residents, and can cause medical emergencies due to shock and heart problems. Emergency responders report it is impossible to move the residents during these circumstances.	**2.0**	4	4	4	**4.0**	**8.0**
Wind	Downbursts	**Entire Town.** Areas of particular concern include high density populations such as nursing homes, (09-16- Webster Park, 100 trees down) the Epsom Traffic Circle, the Elementary School and other schools, manufactured housing, campgrounds, and elderly housing sites. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. Agriculture enterprises are vulnerable to wind events: Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), Yeaton Dairy Farm.	**3.0**	3	3	3	**3.0**	**9.0**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Wind	Hurricanes and Tropical Storms	**Entire Town.** Areas of particular concern include Short Falls Road and other bridges, the Epsom Traffic Circle area, and the vulnerable populations of the Schools and elderly assisted living facilities. Roadways (fallen trees), electrical power utilities, communications network, telecommunications towers, local government operations are susceptible to damage by debris impacted infrastructure, including the Water Precinct. See also previously listed wind and flood vulnerability sites.	**2.0**	2	2	2	**2.0**	**4.0**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Wind	**Severe Winds, Rainstorms and Thunder Storms**	**Entire Town,** although the highest and lowest elevations and rural neighborhoods may be at the greatest risk. Route 4 and Route 28 are main travel ways. Traffic flow, whether on main routes or on back roads, is the main issue for high wind events. Roadways become vulnerable to falling trees and limbs, and those that fall on utility lines. Although this situation can eliminate evacuation routes out of Town, traffic is rerouted as necessary. There are few options to circumventing Route 4 and the Traffic Circle. Rerouting: people (even residents) do not know the back roads during rerouting, and this can be confusing to them. The Town uses radio stations to convey alternate route information. Emergency management has observed some impatient travelers trying to drive under fallen utility wires or run over them, which poses extreme danger to vehicle occupants and potential rescuers. Utility failures are also common in high wind events. Isolation on roads can occur anywhere, from main routes to back roads. Eversource and Unitil have pre-meetings ahead of storm events to plan for action, NH Electric Co-op also serves customers. Communications network, cell towers, local government operations are susceptible to debris impacted infrastructure damage. Many elderly people on oxygen; if power lost for more than a few days, deaths may occur.	**4.0**	2	2	2	**2.0**	**8.0**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Fire	Lightning	**Entire Town.** Areas of concern are remote areas which could not be easily accessed by emergency vehicles, the Baptist Hill Meetinghouse, etc. The cell tower on Elkins Drive receives regularly lightning strikes. In response to the call, the Fire Department responds to nearby buildings purporting to be hit, after which examination proves only the tower itself was struck. Towers are also located at the Epsom Traffic Circle, on River Road, and on White Birch Lane, and all of them are regularly struck by lightning. Other areas most susceptible include forested areas, conservation areas, open recreation fields, points of higher elevation than surrounding area. Buildings without lightning rods would be more susceptible to damage from a strike. Other susceptible structures include aboveground utilities: transformers, water towers, churches and tall buildings.	**4.0**	1	3	3	**2.3**	**9.3**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Fire	Wildfire	**Entire Town.** Areas most susceptible include forested areas, conservation areas, open recreation fields, locations difficult to access by vehicle, points of higher elevation than surrounding area. Susceptible structures include aboveground utilities: transformers, telecommunications towers, water towers; churches, Baptist Hill Meetinghouse and tall buildings. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. There is a lot of wood slash remaining in the woodland interior due to the Tornado of July 2008 and the Ice Storm of December 2008, which contributes to the overall hazard for potential wildfires. The Town Forest on Tarleton Road is remote and used recreationally for illegal camping and other activities, including use by teens. See also lightning for specific areas.	**3.0**	3	3	3	**3.0**	**9.0**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Extreme Temp	**Severe Winter Weather, Cold, Wind Chill and Ice Storms**	**Entire Town.** Areas of particular concern include Elementary School, elderly housing facilities, manufactured housing (snow load), and Route 4/28 Traffic Circle. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage from debris impacted infrastructure. Epsom's dispersed residential population, located in wooded and forested sections of Town are vulnerable to loss of power and debris on roads: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. People may be subject to cold temperature, snow isolation, transportation accidents, power failure and communications failure during winter storm events.	**4.0**	3	3	3	**3.0**	**12.0**
Extreme Temp	**Drought**	**Entire Town / Region**. Susceptible farms and orchards include: Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), Yeaton Dairy Farm. Residences with private dug wells have gone dry during this latest drought, and Town fire ponds dry up, Epsom Village Water District may become impacted. Drought means increased risk of brush fire with dry vegetation (see Wildfire for areas). Gravel roads affected because can't grade them when water is low. All fire ponds will be low or dry during drought times. Higher elevations and ledgy locations tend to run dry first.	**3.0**	2	3	4	**3.0**	**9.0**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Extreme Temp	Excessive Heat	**Entire Town**. Areas of particular concern include high density populations such as Epsom Manor, the Epsom Traffic Circle area, the Elementary School and other schools, the numerous Manufactured Housing Parks, other senior housing facilities, and multiple campgrounds, and apartment buildings. Vulnerable areas most susceptible to extreme heat include farms, orchards. Shelters may need to be opened for Cooling Centers (Epsom Library or churches) during extended heat conditions.	**2.0**	1	1	2	**1.3**	**2.7**
Earth	Earthquake	**Entire Town.** The Central NH Region is seismically active and earthquakes are regularly felt from area epicenters. Damage to utility poles and wires, roadways and infrastructure (dams, water lines, bridges) could be significant. Areas with underground utilities, community water systems, old buildings, Epsom Traffic Circle, Manufactured Housing Parks, Baptist Hill Meetinghouse, and the Elementary School may be particularly susceptible.	**2.0**	1	1	1	**1.0**	**2.0**
Earth	Landslide	**Development and areas of steep slopes** (greater than 25%) are at risk for these events. Roads with steep ditching or embankments are most vulnerable to landslide or rockslide of ledges include Route 4 along the Little Suncook River, Goboro Road, Echo Valley Road,	**1.0**	1	1	1	**1.0**	**1.0**
Technological	Dam Failure or Release	**Highest hazard dams are Northwood Lake Dam (H) and Cass Pond Dam (L) Little Suncook River**, 2 houses could be impacted, but all dams have a high probability of flooding and potential to break. Several other dams have potential to fail. Route 107, Route 4. Below the area of the 2006 avulsion, the Suncook River is filled with sand and debris which will continue to cause potential dam breach and failure. This is an on-going concern for the Town of Epsom. Upriver, a Pittsfield Mill Dam failure would affect Epsom.	**1.0**	1	3	3	**2.3**	**2.3**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Technological	**Power/ Utility Failure**	**Entire Town, Traffic Circle,** utilities and vulnerable populations. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. Epsom depends on power from Eversource, Unitil and NH Electric Co-op. Power outages may last for several days before service is restored in a large event. Power outages to isolated areas of Town are particularly vulnerable to outages and the resulting effects. Eversource & NH Electric Co-op serve outlying parts of Epsom. Primary electrical source is Unitil, whose response is quick and prioritized because of the Traffic Circle, the Town center of Epsom and its numerous vulnerable populations.	not rated	not rated	not rated	not rated	not rated	not rated
Technological	**Communications Systems Failure**	**Entire Town, Telecommunications Towers**, Telephone and electrical lines. Communications are detailed in the Community Vulnerability Assessment tables. Communications failure would be worse if it occurred at the Fire and Police Depts, Highway Department or Town Offices, especially during a holiday, or inhibited emergency dispatch and EOC operations. Most Town radios are interoperable, and they are used in more than one location. The Police Department has a repeater in a secondary location and is kept up to date. The Fire Department has mobile and land radios, with repeaters in locations in other towns. The Town is serviced by the Capital Area Mutual Aid Compact, which does all the emergency medical service and Fire dispatching. They have redundant capabilities and are currently upgrading their systems. Vulnerable areas previously identified are at highest risk.	not rated	not rated	not rated	not rated	not rated	not rated

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Technological	**Debris Impacted Infrastructure**	**Most dams and bridges** could experience debris impacted infrastructure. Debris generated by Suncook River erosion will continue for many years. Culverts that are failing due to low capacity and debris include Leighton Brook and the North Road culverts. Box culverts as replacements for failing culverts have been recently installed in many Epsom roads as a result of recurring flooding events.	not rated	not rated	not rated	not rated	not rated	not rated
Tech	**Transportation Accidents**	**Major NH Route intersections and the Epsom Traffic Circle at Route 4/28**. Frequent transportation accidents occur at each intersection with Route 28 (especially between the Jug City Road and Drolet Road intersections) and along Route 4 between the Old Turnpike Road and Route 107's intersections. See Map series for regular accident locations, at certain intersections, curves, straightaways, hills, etc.	not rated	not rated	not rated	not rated	not rated	not rated
Technological	**Fire (Vehicle, Structure, Arson)**	**Epsom Traffic Circle area & Entire Town.** Areas most susceptible include: senior living facilities, vacant buildings, foreclosed homes or seasonal buildings, buildings in densely populated areas or residential manufactured home parks. Vehicle fires could occur anywhere, parking lots, driveways, roadways. Above ground LP storage tanks can also pose a potential hazard.	not rated	not rated	not rated	not rated	not rated	not rated
Technological	**Hazardous/ Radiological Materials Spills**	Epsom Traffic Circle, Route 28 and Route 4 would be the most realistic routes taken where vehicular traffic transports hazardous waste. The largest or most dangerous stationary sites that store and/or handle haz mat on site (fertilizer, pesticides, fuel, etc) are listed in Critical and Community Facility listing. Occupational haz mat sites where spills could occur include: health care facilities, schools, manufacturing, etc.	not rated	not rated	not rated	not rated	not rated	not rated

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Technological	**Public Health Issues**	**Congregate populations.** Epsom Central Elementary School, Epsom Manor, Concord Hospital Medical Office Building, the numerous Manufactured Housing Parks and the senior housing facilities, restaurants, populated areas, large employers, apartments, senior housing, stores and public assembly venues listed in the Critical and Community Facility listing - all of these locations increase the risk of exposure to and transfer of illness. The forests, conservation areas, agriculture, wooded areas, ponds can host ticks (Lyme) and mosquitos (West Nile, EEE, etc).	not rated	not rated	not rated	not rated	not rated	not rated
Human	**Terrorism**	**Unlikely, but possible anywhere in Entire Town**. Most susceptible sites could include: Epsom Traffic Circle, Town Office, Epsom Central School, churches, Library, and Concord Hospital Medical Center, Water Precinct, Town buildings. Also, the Post Office, public events, all governmental facilities, state facilities, political offices or rallies, churches, etc., telecommunication towers, major employers (especially those large quantities of haz materials), grocery or convenience stores, restaurants.	not rated	not rated	not rated	not rated	not rated	not rated
Human	**Sabotage/ Vandalism**	**Town Facilities**. Sabotage would be most likely to occur at electric utilities, Town Offices (computer systems & website), Town buildings, dams, water supplies and pumphouses, cemeteries, vacant buildings, dams, under bridges.	not rated	not rated	not rated	not rated	not rated	not rated
Human	**Hostage Situation**	**Unlikely, isolated events.** Locations where hostages could be taken include: Town Offices and other public buildings, Schools, banks, Post Office, workplaces, grocery and convenience stores, restaurants, high density population areas (Traffic Circle area, manufactured housing parks, apartment buildings), and domestic home situations.	not rated	not rated	not rated	not rated	not rated	not rated

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town *See also Appendix A. Community and Critical Facility Vulnerability Assessment (CCFVA)*	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK (1-16)
Human	Civil Disturbance/ Public Unrest	**Limited, Traffic Circle Area**. Locations where civil disturbance could occur should be limited. Locations include Traffic Circle, Schools, Town Office, stores, restaurants, establishments serving alcohol, high density population areas (Traffic Circle, downtown, manufactured housing parks, neighborhoods), and the Medical Center and other town or state facilities. Occasions include: Town Meetings, voting day, local board meetings, during visits from political candidates, at large events such as Old Home Day, Veteran's Parade, School sports events or graduation.	not rated	not rated	not rated	not rated	not rated	not rated

Source: Epsom Hazard Mitigation Committee 2018

Central NH Region Major Disaster Declarations, 1973-2017

The Central NH region, which encompasses parts of Merrimack County (**18** communities) and Hillsborough County (**2** communities), has been damaged by **21** presidentially-declared major disasters in the last **44** years, between **1973-2017**.

While a natural disaster typically befalls multiple counties in New Hampshire, only those damaging either Merrimack County or Hillsborough County were identified in this section. Over the last **12** years (**2005-2017**), the number of presidentially-declared natural major disasters have increased significantly compared to the first NH declarations from the severe storm and floods of **1973** to the **1998** ice storm (**25** years).

Between **2005-2017**, the most recent round of major disasters afflicting the Central NH Region, **13** natural disasters within **12** years were declared for Merrimack and/or Hillsborough Counties, **5** of which were floods, **5** snow/ice storms, and **3** rain/wind storms.

Emergency declarations (EM-) are often proclaimed for counties in New Hampshire to help communities receive funding for less serious hazard events that may have caused more damage in nearby declared declaration (DR-) counties or states. Neither the **4** Snow Emergency declarations that occurred between **2005-2018** nor **2012** Hurricane Sandy were counted within the **13** declared disasters, although the **2011** Halloween Snow Storm, a declared disaster (DR-) in Hillsborough County but not in Merrimack County (emergency declaration), was counted in this tally.

The last declared disaster in Merrimack County, in which Epsom is located, was the severe wind storm and flooding event in **October 2017** for which Epsom did not request federal Public Assistance funding. Details of disasters since **1973** and federal funding provided to the Town of Epsom are displayed in **Table 9**. Most of these disasters will be described within the following **Recent Disaster Events Summary** section.

Table 9

Central NH Region Major Disaster Declarations, 1973 to 2017

FEMA DR-	Local Disaster Name	Incident Period	FEMA Disaster Name	Includes County*		FEMA Public Assistance Funding to Epsom**
				Merr	Hill	
4355	**2017** October Wind Storm	Oct 28-20, **2017**	Severe Storm and Flooding	M	---	$0
4209	**2015** January Blizzard	Jan 26-28, **2015**	Severe Winter Storm and Snowstorm	---	H	N/A
4105	**2013** Snowstorm NEMO	Feb 8-10, **2013**	Severe Winter Storm and Snowstorm	M	H	**$16,092**
4095 EM-3360	**2012** Hurricane Sandy Emergency	Oct 26-Nov 8, **2012**	Hurricane Sandy	EM- M	EM- H	$0
4049 EM-3344	**2012** Halloween Snow Storm Emergency	Oct 29-30, **2012**	Severe Storm and Snowstorm	EM- M	H	$0
4026	**2012** Tropical Storm Irene	Aug 26-Sep 6, **2012**	Tropical Storm Irene	M	---	**$8,937**
1913	**2010** March Flooding & Winds	Mar 14-31, **2010**	Severe Storms and Flooding	M	H	$0
1892	**2010** Winter Storm	Feb 23-Mar 3, **2010**	High Winds, Rain, Snow	M	H	**$33,912**
1812	**2008** December Ice Storm	Dec 11-23, **2008**	Severe Winter Storm	M	H	**$36,897**
1799	**2008** September Flood	Sep 6-7, **2008**	Heavy Rains and Floods	M	H	**$14,873**
1782	**2008** July Tornado	Jul 24, **2008**	Tornado, Severe Winds, Heavy Rains	M	---	**$16,317**
1695	**2007** April Spring Flood	Apr 15-23, **2007**	Severe Storms and Flooding	M	H	**$859,340**
1643	**2006** Mother's Day Flood	May 12-23, **2006**	Severe Storms and Flooding	M	H	**$76,473**
1610	**2005** Columbus Day Flood	Oct 7-18, **2005**	Severe Storms and Flooding	M	H	**$5,272**
EM-3207	**2005** Snow Emergency	Jan 22-23, **2005**	Snowstorm	M	H	**$10,188**
EM-3193	**2003** Snow Emergency	Dec 6-7, **2003**	Snowstorm	M	H	**$13,521**
EM-3177	**2003** Snow Emergency	Feb 17-18, **2003**	Snowstorm	M	H	**$7,833**
EM-3166	**2001** Snow Emergency	Mar 5-7, **2001**	Snowstorm	M	H	**$10,674**
1231	**1998** Flooding	Jun 12-Jul 2, **1998**	Severe Storms and Flooding	M	H	$0
1199	**1998** December Ice Storm	Jan 7-25, **1998**	Ice Storms	M	H	$0
1144	**1996** Storms and Flooding	Oct 20-23, **1996**	Severe Storms and Flooding	M	H	$0
1077	**1995** Flood	Oct 20-Nov 15, **1995**	Storms and Floods	M	---	$0
917	**1991** Hurricane Bob	Aug 18-20, **1991**	Severe Storm	---	H	N/A
876	**1990** Flooding and Severe Storm	Aug 7-11, **1990**	Flooding and Severe Storm	M	H	No data
789	**1987** Storms and Flooding	Mar 30-Apr 11, **1987**	Severe Storms and Flooding	M	H	No data
771	**1986** Storms and Flooding	Jul 29-Aug 10, **1986**	Severe Storms and Flooding	---	H	N/A
399	**1973** Storms and Flooding	Jul 11, **1973**	Severe Storms and Flooding	M	H	No data
Total Public Assistance (PA) FEMA Funding to Epsom, 1993-2017**						**$1,110,329**

Source: http://www.fema.gov/disasters/grid/state/33?field_disaster_type_term_tid_1=All

*M = Merrimack County (18 towns in CNH region) H = Hillsborough County (2 towns in CNH region)

** *Dollar figures are rounded to the nearest $100 and does not yet include DR-4355 (TBD)*

Recent Disaster Events Summary

The Town of Epsom has been affected by several significant natural disasters within the last decade and applied for and received Public Assistance (PA) funding for many of these events. Severe natural hazard events have been occurring more frequently in Merrimack County than in the past. While these events on occasion disrupted the flow of the community and isolated residents for days, the disaster impacts were relatively mild as few injuries were reported. FEMA provided Public Assistance funding to the Town for tasks such as cleanup, road repairs, tree and brush cutting, and culvert replacement.

The Hazard Mitigation Committee helped provide anecdotal descriptions of how the recently declared natural disasters or emergency declarations for the Central NH Region affected Epsom and its residents. Public Assistance disaster funding opportunities open to communities when a disaster is declared within a county. The Town of Epsom applied for and received this funding for several recently declared disasters. Also identified were numerous hazard events that occurred locally in the community and within the area. The disaster event listing dates from the 1936 floods to present day.

PUBLIC ASSISTANCE GRANT FUNDING

To help reclaim some of the costs these disasters wrought on town property and infrastructure, Epsom applied for and received FEMA Public Assistance (PA) funds, Categories A-G, a 75% grant and 25% match program for several declared Merrimack County disasters. These PA funds have been used for overtime wages for Town employees, equipment rentals, snow removal, washout repair, road reconstruction, bridge repair, debris removal, and more.

The database where the Public Assistance funding information resides is available from **1993** to present (**2017**). The Public Assistance disaster funding was sought for and received by Epsom for **7** of the **15** eligible *Declared* disasters in Merrimack County during this timeframe. *Emergency declaration* funding was sought and received by Epsom for **4** of the **4** eligible snowstorms between **2001-2005**, plus for the **2012** Hurricane Sandy. This data is available through FEMA at https://www.fema.gov/openfema-dataset-public-assistance-funded-projects-details-v1.

The most expensive disaster for Epsom in terms of FEMA Public Assistance (PA) funds received for recovery was the **April 2007 Spring Floods** after which Epsom received **$860k** for **27** projects to help repair the roads and bridges, gravel stockpile, headwalls and guardrails within the community. The last time the Town was awarded PA funding was the **$13,500** for the snow removal and debris removal from the **February 2013 NEMO Snowstorm**. All Public Assistance funding to date, from **1993** to **October 2017** totals **$1.1m**. This detail is rounded to the nearest $100/$1000 in **Table 10** for each disaster and is summarized previously in **Table 9**.

COLOR KEY for Table 10:

Declared Disasters in Merrimack County or Hillsborough County (Central NH Region)	PA Funding $ Received by Epsom	Other Epsom Local Hazard Event	Regional Hazard Event with Epsom Impacts

Table 10

Local and Area Hazard Event and Disaster History

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
ADD NEW EVENT ROWS HERE								Epsom Hazard Mitigation Committee
Epsom Beaver Dam Failure Aug 2018	No	2018	Aug 6	N/A	N/A	The Town received 15" of rain during this a 4-5 week period of multiple rainstorms in July and August. The excess rain caused a beaver dam to fail on a large, 20-acre wetland next to the Highway Department, whose driveway was damaged and could not move vehicles into or out of the complex during the event. The wetland drained in a flash flood during the 5:00-8:00 PM rush hour. When dam failed, US 4/202 experienced high, rapid flow along the ditching which undermined the state highway for about 800' to 1,000'. The water overtopped the beaver dam and drained into Mason Brook, which could not accommodate the water volume. As a result, the excess water flowed north in the opposite direction and flooded part of Granny Howe Road before draining into the ground. Emergency responders had to check the Circle 9 Campground and Windymere Drive communities to monitor additional, potential flooding damage, but the flood did not reach these areas. Although the Town Highway Garage driveway was damaged, no Town roads were damaged from this flash flood.	Flash Flood, Storms, (Beaver) Dam Failure, Debris Impacted Infrastructure	Epsom Hazard Mitigation Committee, CNHRPC
Regional Thunderstorm, Severe Winds,	No	2018	May 4	N/A	All across the northern Central NH region, the evening of May 4 experienced heavy	In Epsom, the storm knocked down trees, blocked roads, caused short power outages. Was not as severe as the	Wind, Downburst Storms,	Epsom Hazard Mitigation Committee,

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Tornado and Debris **May 2018**					downpours along with strong wind gusts, straight line winds (microbursts) and possible tornadic activity. Many communities suffered significant tree and structure damage. The National Weather Service determined an EF-1 tornado blew 36 miles, about 300 yards across, through Warner, Bradford and Webster in the CNHRPC Region after originating in Charlestown (Sullivan County).	western section of the region.	Tornado, Debris	CNHRPC, wmur.com, NH1.com
Contoocook Earthquake 2.4M **Mar 2018**	No	2018	Mar 7	**N/A**	A significant 2.4M earthquake was recorded by the USGS in March 2018. Its epicenter was around the Blackwater River in Hopkinton at a depth of 3.4km. Weak to light shaking was reported by a great number of people in Henniker, Hopkinton, Webster, Salisbury (felt the greatest intensity), Epsom and Concord. The Concord area has experienced 9 earthquakes in the past 365 days (earthquaketrack)	Reports may have been made to the Fire and Police Departments. Contoocook is only 15 miles to the west of Epsom.	Earthquake, Earth	Epsom Hazard Mitigation Committee, Earthquaketrack.com, Earthquake.usgs.gov, CNHRPC
Epsom Traffic Accident **Oct 2017**	**No**	**2017**	**Oct**	**N/A**	N/A, although this wind and rain natural disaster had the potential to cause accidents around the Central NH Region	On Route 107 near Sleepy Hollow Road, a truck ran through barricades that blocked off road damage & trees/power lines down. Injuries & fire resulted. Resulting from severe wind storm.	Traffic Accident, Power Failure, Fire or Wildfire	Epsom Hazard Mitigation Committee, CNHRPC
Severe Wind Storm and Flood **Oct 2017**	**4355**	**2017**	**Oct 28-30**	**$0**	Merrimack and Hillsborough Counties experienced downed trees on powerlines, debris to clean up, and some flooding of drainage catch basins and culverts. The storm impacted northern NH, with 6 counties declared disasters. Power was out for an estimated 270,000 customers.	**Epsom did not apply for or receive federal funds**. Lots of power outages with Mount Delight, Deerfield Road still out 2 days later. New Rye Road & Swamp Road - a mile of fire seen along powerlines - power had not been set to neutral (off). Trees down & poles down, had to wait until high water levels reduced to determine damage. Webster Park, another 30+ trees down (drive-by estimate). Black Hall Road (Cutter) agriculture land banking scoured (lost 1-2 acres) thought to be related to	Wind, Storms, Debris, Flood, Rainstorm	Epsom Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
						Route 4 bridge restoration; trees not stabilized damming up behind the Epsom Central school; Partial Town road washouts- Old Turnpike, Echo Valley Farm Road, Griffin, Sanborn Hill, Martin Hill, Mountain View Spur & Mountain, Baybutt, Locke's Hill off Lord's Mill. Private road washouts - Sleepy Hollow Road (houses protected by Epsom because Sleepy Hollow Bridge is gone in Deerfield - happens every 5" rainstorm), Lakesites Drive (Chestnut Pond) & trees down. Low magnitude of trees down on railroad bed behind Central School, emergency school walking egress partially blocked. New Rye Road - residence had 3 trees that sheared part of a house off. Fort Mountain tower repeater system broken. 9 1/2" of rain reported in Town. When Fort Mountain Tower & repeaters fail, no internet is available to the Town. VOIP does not work for emergency purposes. Life Alerts fail quickly because of failure, have to do the person checks as a result. Lack of landlines are a nightmare in Town. Atlantic Broadband (formerly Metrocast) has a generator at Epsom Circle for Town services & vulnerable populations. All emergency responders have hardlines.		
Severe Storms and Flooding Jul 2017	**4329**	**2017**	**Jul 1-2**	**N/A for Epsom**	The entire State, North Country and Central NH region experienced severe storms with rain, wind, lightning, thunder and flooding. Not a declared disaster in Merrimack or Hillsborough counties.	**Epsom did not apply for or receive federal funds.** Epsom conducted debris clean up along roads but noted the storm was not out of the ordinary in Town.	Severe Winds Rain Storm, Thunder Storm, Lightning, Downburst	Epsom Hazard Mitigation Committee, FEMA CNHRPC, WMUR, NOAA
Epsom Brush Fires, Lightning Strikes, and Other Fires 2017	No	2017	---	N/A	N/A although fires can cross town lines and quickly become large fires during dry conditions. Responders likely arrived from surrounding communities.	Easter 2017 - Granny Howe Road brush & ground litter fire. Aug/Sep 2017- 100x50 brush fire coals off Route 107, almost lost a vehicle from illegal burn. Further details not available to HMC	Possible Lightning, Wildfire, Fire, Thunderstorm	Epsom Hazard Mitigation Committee, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Severe Snowstorm-Town Meeting Blizzard Mar 2017	**4316**	**2017**	**Mar**	**N/A for Epsom**	Many other NH towns had to choose whether to close or not to accommodate the blizzard, which became a legal issue to sort out. Not a declared disaster in Merrimack or Hillsborough counties.	**Epsom did not apply for or receive federal funds.** A state-wide blizzard occurred during Town Meeting, (Election Day Storm). Epsom delayed their Town Meeting.	Winter Weather, Extreme Temp, Snow Storm	Epsom Hazard Mitigation Committee, CNHRPC
Webster Pillsbury Lake Earthquake 1.9M Feb 2017	No	2017	Feb 27	N/A	Residents of Contoocook, Webster and Warner in Central NH communities also felt this earthquake. Since it occurred overnight, there were fewer reports. Its epicenter was at Pillsbury Lake.	Although no known reports were made to USGS from Epsom, local calls would have been made to the Fire and Police Departments. Webster is about 15 miles to the west of Epsom, 3 towns away.	Earthquake, Earth	Epsom Hazard Mitigation Committee, Earthquaketrack.com, Earthquake.usgs.cov
Central NH Region and Epsom Excessive Heat 2016-2017	No	2016	-2017	N/A	NH and the Central NH region experienced high heat records throughout 2016 and 2017.	Many people don't have AC, lots of 90 degree days, humid. Lots of elderly people in assisted living facilities in Epsom to ensure safety during hot days.	Extreme Temperature, Excessive Heat	Epsom Hazard Mitigation Committee, CNHRPC
Epsom/ Merrimack County Drought Severe Emergency 2015-2016	No	2015	-2016	N/A	Severe Drought (D2), Moderate Drought (D1) and Abnormally Dry (D0) intensities were found in communities of Merrimack Country and Hillsborough in 2016. The State's counties had been experiencing levels of drought for over a year. The NH DES issued a series of statements and tips for homeowner water conservation. Residents and municipalities had been requested to voluntarily conserve water. Some communities or water precincts enacted water restrictions or bans for certain water usage.	The Severe Drought (D2) conditions as of 09/16 caused some problems in Epsom. Wells reportedly dried up, Suncook River was a brook, drying of forests, shallow wells gone dry. During this time, all fire ponds went dry, dry hydrants were dry, people came to Fire Station for drinking water, emergency response used fire tanker trucks, crop loss on all farms. After the removal of Buck Street Dam, more wells dry. Dangerous fire conditions	Drought, Extreme Temperature, Increased Wildfire Risk	Epsom Hazard Mitigation Committee, US Drought Monitor NH, NH DES
Epsom Microburst or Severe Winds Sep 2016	No	2016	Sep 11	N/A	N/A although the entire Central NH Region experienced this storm, which brought similar tree fall and power outage impacts to communities.	Webster Park had 100 trees down from a suspected microburst. Eight of 10 acres of the park were damaged. One injury was reported when a tree fell on a vehicle. Church on Black Hall Road, lost about 70-80 trees down.	Wind, Downburst Storms, Debris	Epsom Hazard Mitigation Committee, CNHRPC
Epsom Lightning Strike and Fires Aug & Sep 2016	No	2016	---	N/A	N/A, although these fires could have crossed town boundaries. Emergency response likely came from nearby communities	Aug 2016- Lords Mill Road (house & shed) lightning strike fire. Sep 2016- Old Turnpike Road lightning strike fire. 2016 or 2017- 3-day wildfire due to drought on Swamp Road. Many other historical fires included on	Lightning, Wildfire, Fire, Thunderstorm	Epsom Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
						River Road, Fort Mountain Road, on Bear Island, on Allenstown/Epsom Town line.		
NH Severe Wind Rain & Thunder Storm **Jul 2016**	No	2016	Jul 23	N/A	The entire region and the State experienced a severe storms with rain, wind, lightning and thunder. A possible microburst was reported. As many as 72,000 customers lost electricity. A similar storm earlier in the week brought several confirmed microbursts and also downed trees.	Epsom participated in debris clean up along roads. Lightning strike caused brush fire, 3-4 days fire back side of Chestnut Pond Road (Epsom) and had to access the area from Hills Road in Pittsfield.	Severe Winds Rain Storm, Thunder Storm, Lightning, Downburst, Wildfire	Epsom Hazard Mitigation Committee Concord Patch, CNHRPC, WMUR, NOAA
Earthquake 1.8M Andover Epicenter **Oct 2016**	No	2016	Oct 31	N/A	Epicenter in Andover/ Salisbury 1.8M with a depth of 6.1 km. Two other earthquakes occurred within 10 minutes on this day in the same area.	Although no known reports were made to USGS from Epsom, local calls would have been made to the Fire and Police Departments. Andover is about 30 miles to the north west of Epsom, still in Merrimack County.	Earth, Earthquake	Epsom Hazard Mitigation Committee, Earthquaketrack.com, Earthquake.usgs.cov, CNHRPC
Earthquake 2.8M Warner Epicenter **Mar 2016**	No	2017	21-Mar	N/A	Epicenter in Warner/ Hopkinton area, 2.8 magnitude. Felt in the Central NH Region/most of Merrimack County, light in Hillsborough County. Felt most strongly in Hopkinton, Henniker, Warner, Webster, Salisbury, Franklin, Webster, Concord, and Hillsborough	Although no known reports were made to USGS from Epsom, local calls would have been made to the Fire and Police Departments. Warner is about 25 miles to the west of Epsom.	Earth, Earthquake	Epsom Hazard Mitigation Committee, Earthquaketrack.com, Earthquake.usgs.cov, CNHRPC
Epsom High Winds and Cold Spell **Jan-Feb 2016**	No	2016	Jan-Feb	N/A	N/A, although cold weather events likely impacted the entire Central NH region	The Town did a lot of plowing, wind blowing snow from wrong direction, no storms. 2016- Cold spell lasted 4-5 days.	Extreme Temp, Chill, High Winds	Epsom Hazard Mitigation Committee, CNHRPC
Earthquake 2.2M Epsom Epicenter **Aug 2015**	No	2015	2-Aug	N/A	Epicenter around Epsom in the Central NH Region in Merrimack County, felt in nearby locations including Concord, Hopkinton, Allenstown, Loudon Chichester and Epsom	A 2.2M earthquake occurred near Epsom, a little shaking no sounds reported.	Earth, Earthquake	Epsom Hazard Mitigation Committee, Earthquaketrack.com, Earthquake.usgs.cov, CNHRPC
Epsom Arson Incident **May 2015**	No	2015	May	N/A	N/A	Arson fire on Swamp Road at the swamp. Difficult area to access.	Fire, Wildfire	Epsom Hazard Mitigation Committee, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Earthquake 2.3M Boscawen Epicenter May 2015	No	2015	May 24	N/A	Epicenter in lower Boscawen around Queen Street with 2.3M at a depth of 5km. A lot of reports were made at the USGS.	Although no known reports were made to USGS from Epsom, local calls would have been made to the Fire and Police Departments. Boscawen is about 15 miles to the northwest of Epsom.	Earth, Earthquake	Epsom Hazard Mitigation Committee Earthquaketrack.com, Earthquake.usgs.cov, CNHRPC
Tornado, Severe Thunderstorms Jul 2015	No	2015	31-Jul	N/A	In Warner, NWS confirmed an EF-0 tornado touched down in the evening. It had a maximum wind speed of 75 mph and was 100 yards wide. Town officials said the tornado ripped the roof off a barn, but there were no injuries reported.	Epsom had high winds and some limbs down but no major damage. Warner is located in the Central NH Region, 3 towns to the west of Epsom.	Severe Wind, Tornado, Thunderstorm	Epsom Hazard Mitigation Committee, WMUR, CNHRPC
Severe Winter Storm and Snowstorm - January Blizzard 2015	**4209**	**2015**	**Jan 26-28**	**N/A for Epsom**	Predicted at near blizzard conditions, the end of January, 2015 snowstorm's major declaration ended up having a Hillsborough County wide per capita impact of $3.88, making the storm a fairly expensive one at $3.3 million dollars in Public Assistance over three southern NH counties. Snow approached 30" in some areas with heavy snow and 50 mph whiteout wind conditions. The closest reporting weather station, Concord Airport (CON), had accumulated 29" of heavy snow, 50 mph whiteout wind conditions in the region. Not declared in Merrimack County.	**Epsom could not apply for/receive funding.** The storm was not particularly notable by the Town. No recollections of anything other than a typical winter storm.	Severe Winter Weather, Extreme Temp, Snow, Ice, Power Failure, Severe Winds, Debris Impacted Infrastructure	Epsom Hazard Mitigation Committee, fema.gov, Boston Globe
Thanksgiving Day Snowstorm Nov 2014	No	2014	27-Nov	N/A	Large amount of snowfall fell in a very short period of time ahead of typical seasonal expectations. Power outages were prolific, with a peak of about 200,000 outages, from the Public Service of New Hampshire, Unitil (Concord area), and NH Electric Co-op. Nearby Concord and the towns on the eastern side of the Central NH region accumulated only 6-12" of snow according to PSNH, far less snow than southern and western NH. This was not a	Epsom likely experienced power outages ranging 24-72 hours in most locations in town. This was an unexpected snowstorm.	Extreme Temp, Snow, Power Failure, Severe Wind	Epsom Hazard Mitigation Committee, Concord Monitor, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
					presidentially declared disaster in NH.			
Regional Communications Failure by Lightning 2014	No	2014	Summer	N/A	Regional event- Plausawa Hill (Pembroke) Lightning Strike - affected Capital Area Fire Compact Dispatch. Fairpoint (Webster) went down due to equipment failure so Merrimack County dispatch went down.	Both of these events affected Epsom as the Town uses the Capital Area Fire Dispatch. Locally, when the Fort Mountain Tower and repeaters go down, no internet is available. VOIP does not work for emergency purposes. Life Alerts fail quickly because of failure, have to do the person checks as a result. Lack of landlines are a nightmare in Town. Atlantic Broadband (formerly Metrocast) has a generator at Epsom Circle for Town services & vulnerable populations. All Emergency responders have hardlines.	Lightning, Communications Failure	Epsom Hazard Mitigation Committee, CNHRPC
Earthquake 2.6M Warner Epicenter Oct 2013	No	2013	11-Oct	N/A	Epicenter in Warner, 2.6 magnitude. Felt in the Central NH Region/ northern Merrimack County, most strongly in Hopkinton, Henniker, Warner, Epsom, Concord, Salisbury, Franklin.	Reports were likely made to the USGS from Epsom residents feeling the earthquake as a rumble or loud noise. Warner is about 25 miles to the west of Epsom.	Earthquake, Earth	USGS, CNHRPC
NH Severe Storms, Flooding and Landslide Jun-Jul 2013	**4139**	**2013**	**Jun 26 – Jul 3**	**N/A**	This declared disaster for Grafton, Sullivan and Cheshire Counties included landslides from the heavy rain. Public Assistance (PA) was available for these 3 Counties and Hazard Mitigation Assistance (HMA) became available statewide. Damage per capita was high – Grafton ($39.58), Sullivan ($24.48), and Cheshire ($21.46).Not declared in Merrimack or Hillsborough Counties.	**Epsom was not within the declared disaster area and did not apply for HMA funding**. There were no specific issues in Town noted. Any flooding or other problems were handled as normal business.	Landslide, Severe Storms, Flood, Wind, Rain, Debris Impacted Infrastructure	FEMA, CNHRPC
Severe Winter Storm and Snowstorm - Winter Storm NEMO 2013	**4105**	**2013**	**Feb 8-10**	**$16,092**	Winter Storm "Nemo". FEMA-3360-DR. Blizzard conditions with winds gust of 50-60 MPH and over 20 inches snow hit New Hampshire and the New England area. Disaster declaration received for emergency protective measures in eight counties of the State.	**Epsom received $16,092 in FEMA Public Assistance funding** for protective measures.	Severe Winter Weather, Extreme Temp, Snow, Ice, Wind	FEMA, Epsom Hazard Mitigation Committee, CNHRPC, Epsom Historical Society
Hurricane Sandy Oct 2012	**4095 EM-3360**	**2012**	**Oct 26-Nov 8**	**$0**	Merrimack County and Hillsborough County received a disaster declaration for Emergency Protective Measures. Five	**Epsom did not apply for or receive federal funds.** This storm was reportedly very mild in Epsom. Trees were likely down on power lines	Wind, Flood, Severe Storm, Hurricane,	Epsom Hazard Mitigation Committee, FEMA,

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
					counties experienced severe damage from heavy winds and moderate flooding, 218,000 customers without power. Fallen trees and debris closed roads, building and vehicle damage.	and on roads. Debris clean up and restoring electricity were the main outcomes of the storm.	Debris Impacted Infrastructure	Nashua Telegraph, CNHRPC
Earthquake 4.0M Hollis ME Epicenter Oct 2012	No	2012	16-Oct	N/A	With the epicenter near Hollis Center, Maine, a 4.0 earthquake was measured and felt not only in Central NH, but throughout New England. Reportedly sounding like a jumbo jet and lasting for 10 seconds, calls came in to local Fire Departments inquiring about the event. By two hours later, no calls reporting damages or injuries had been received.	Reports may have been made to the USGS from Epsom with an earthquake of this magnitude as it was felt around the Central NH Region. Hollis is about 40 miles to the southwest of Epsom	Earthquake, Earth	Concord Monitor, Earthquake--track.com, CNHRPC
NH Severe Storm and Flooding May 2012	**4065**	**2012**	**May 29-31**	**N/A**	This declared disaster for Cheshire County. Public Assistance (PA) was available and Hazard Mitigation Assistance (HMA) became available statewide. Damage per capita was high – Cheshire ($26.04). Not declared in Merrimack or Hillsborough Counties.	**Epsom was not within the declared disaster area and did not apply for HMA funding**. There were no specific issues in Town noted. Any flooding, tree fall or other problems were handled as normal business.	Flood, Severe Storms, Wind, Rain	FEMA, CNHRPC
Epsom Public Health Drug Epidemic 2012-2017	No	2012-2017		N/A	N/A, although many NH towns and nearby communities in the Central NH region are experiencing similar calls for service, needles in public places	Town is experiencing high call volumes for people under the influence of drugs, nearly equal that of the regular rescue calls for service	Public Health Epidemic, Opioid Crisis	Epsom Hazard Mitigation Committee, CNHRPC
Halloween Snow Storm Oct 2011	**4049**	**2011**	**Oct 29-30**	**N/A for Epsom**	FEMA-4049-DR. Towns in Central NH were impacted by this shocking, early severe snowstorm, although a major disaster declaration was not declared in Merrimack County. Halloween festivities were cancelled in most communities, to the heartbreak of young children. In Hillsborough County, damages were at the equivalent of $5.11 per capita (400,721 people in 2010). The storm was also declared in Rockingham County.	**Epsom could not apply for/receive funding.** Heavy wet snow. Longer power outages, up to 1 week were a result of this storm.	Extreme Temp, Snow	FEMA, Epsom Hazard Mitigation Committee, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Tropical Storm- Irene Aug-Sep 2011	**4026**	**2011**	**Aug 26-Sep 6**	**$8,937**	Carroll, Coos, Grafton, and Merrimack Counties suffered severe impacts to roads and bridges as a result of flooding from Tropical Storm Irene, which also caused power outages. Merrimack County reimbursement to towns was $4.29 per capita (146,455 people in 2010), a total of $11m was allocated. Disaster was not declared for Hillsborough County.	**Epsom received $8,937 in FEMA Public Assistance funding** for protective measures, debris removal and roads and bridges. Tree blowdowns and limbs falling. Trees were blocking major highways and took down utility wires and chimneys. Three trees fell across one manufactured home. A transformer and live wires exploded near emergency responders. Areas with wires down included Hilltop Drive.	Wind, Flood, Severe Storm, Rainstorm, Tropical Storm, Debris Impacted Infrastructure	FEMA, Epsom Hazard Mitigation Committee, CNHRPC
April Fool's Snowstorm Apr 2011	No	2011	1-Apr	N/A	A Nor'easter snowstorm impacted the State, causing over 30,000 power outages, most by PSNH. Snow fell in depths of up to 8", but stopped by noon. Although dozens of accidents were reported, no serious injuries were reported.	A Nor'easter snowstorm event had been anticipated to hit Epsom and as a result trucks from Quebec Hydro were staged at Fire Department ready for deployment to fix downed wires.	Extreme Temp, Snow, Wind Chill, Power Failure, Debris Impacted Infrastructure	Epsom Hazard Mitigation Committee, wmur.com, CNHRPC
Earthquake 3.4M Webster/ Boscawen Epicenter Sep 2010	No	2010	26-Sep	N/A	"A magnitude 3.4 earthquake rattled buildings and nerves across much of New Hampshire Saturday night. The quake occurred at 11:28 p.m. and was centered about 10 miles north of Concord, according to the U.S. Geological Survey. State police said they received reports from residents across the state who reported what they thought was an explosion. The quake was felt in places like Fremont, Derry, Durham, Henniker, Penacook and Raymond. There were no reports of damage." The quake was in fact felt all over the state, Southern ME and MA, but most reports were received from the Central NH region.	Boscawen is about 15 miles to Epson's northwest. Although the Boscawen earthquake impacted areas to the east like Epsom, no reports or calls were taken by Fire or Police Departments	Earth, Earthquake	Epsom Hazard Mitigation Committee, Union Leader, USGS, CNHRPC
Epsom Brush Fire Circa 2010	No	2010s	Circa	N/A	N/A, although response likely came from nearby communities	Brush fire on Mount Major, details unknown by the Committee.	Lightning, Fire, Wildfire, Thunderstorms	Epsom Hazard Mitigation Committee, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Epsom Lightning Strike and Fire Summer 2010	No	2010	Summer	N/A	N/A, although response likely came from nearby communities	Lightning strike on New Rye Road where damage to the house and roof area was sustained, but the house was saved.	Lightning, Fire, Wildfire, Thunderstorms	Epsom Hazard Mitigation Committee, CNHRPC
Quebec-Ottawa Earthquake 5.0M Jun 2010	No	2010	Jun	23	Earthquake lasted about 30 seconds, epicenter near Buckingham, Quebec 35 north of Ottawa. Ottawa declared this earthquake the most powerful in 65 years. Tremors felt in Central NH.	No known impacts to Epsom specifically, but this large quake was felt regionwide	Earthquake, Earth	Epsom Hazard Mitigation Committee, CNHRPC
Severe Storms and Flooding Mar 2010	**1913**	**2010**	**Mar 14-31**	**$0**	Severe storms and flooding occurred over two weeks and damaged roads and bridges. Merrimack County reimbursement to towns for repair was $0.28 per capita (146,455 people in 2010), and in Hillsborough County reimbursements were $1.80 per capita (400,721 people in 2010)	**Epsom did not apply for/ receive funding.** Much of the damage from the previous storm was still being cleaned up and repaired. The Town did not experience much flooding and high winds during this event.	Severe Winds, Flooding, Power Failure, Debris Impacted Infrastructure	Epsom Hazard Mitigation Committee, FEMA
Severe Winter Storm Feb-March Storm and Flooding 2010	**1892**	**2010**	**Feb 23-Mar 3**	**$33,912**	This severe weather event included high winds, rain, and snow over a week-long period. The primary impact was debris removal and repair reimbursement for fallen trees and powerlines. In Merrimack County, the reimbursement to communities was the equivalent of $10.39 per capita (146,455 people in 2010), with Hillsborough County at $3.68 per capita (400,721 people in 2010). In the Concord area, 21,000 Unitil customers were out of power at the peak outage period.	**Epsom received $33,912 in FEMA Public Assistance funding** for roads & bridges, debris removal, protective measures and recreational/other. This multi-hazard storm which included a snowstorm and high wind event in February and subsequent flooding in March. Epsom did not sustain much damage from flooding and high winds. The snow and ice storm caused extended power outages, and Fire Department personnel went door to door in the retirement manufactured home parks (Kingstown and Kings Grant) to do welfare checks and to ensure for proper generator use. The total Fire Department runs that day were 24. Unitil and tree companies were staged at Fire Department to respond to wires down and for clean up after the storm.	Extreme Temp, Snow, Wind, Flood, Wind Chill,	Epsom Hazard Mitigation Committee, FEMA, Unitil
Severe Winter Storm - Dec 2008 Ice Storm	**1812**	**2008**	**Dec 11-23**	**$36,897**	Accumulating ice, snow, rain, and strong winds caused downed trees and power lines, with power outages and traffic accidents resulting. In	**Epsom received $36,897 in FEMA Public Assistance funding** for debris removal and protective measures.	Extreme Temp, Ice, Wind, Technological, Power Failure,	Epsom Hazard Mitigation Committee, FEMA, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
					Merrimack County, debris removal and repair cost reimbursement FEMA the equivalent of $10.07 per capita (146,455 people in 2010). In Hillsborough County, debris removal costs were $6.35 per capita (400,721 people in 2010). The major disaster was declared in all 10 counties. New England was blanketed with ice and snow during the winter storm. Weight of ice caused branches to snap, and trees to either snap or uproot, bringing down power lines and poles across the region. About 400,000 utility customers lost power during the event, with some customers without power for two weeks. Property damage across northern, central and southeastern NH was estimated at over $5 million. Event was the largest power outage in NH history.	The Ice Storm of 2008 caused severe electrical outages: Unitil had 96,000, PSNH 32,000, and NH Electric Co-op 4,700. There are several elderly mobile home parks in Epsom. One Epsom resident did not receive power for three weeks. Caused between 1 to 15 days loss of power for most utility customers in Town. The ice storm event affected telephone service throughout Town.	Debris Impacted Infrastructure	
Severe Storms and Flooding (Hurricane Hannah) - Sep Flood 2008	**1799**	**2008**	**Sep 6-7**	**$14,873**	Heavy rain from the remnants of tropical storm Hanna resulted in flooding on small rivers and streams in the Central NH area. The remains of tropical storm Hanna moved through eastern New England dumping 3 to 6 inches of rain in New Hampshire in about 8 hours causing rapid rises on area streams. In Merrimack County, damage to road systems totaled the equivalent of $1.48 per capita (146,455 people in 2010) for town reimbursement. Hillsborough County's damage was much higher at $6.90 per capita (400,721 people in 2010)	**Epsom received $859,340 in FEMA Public Assistance funding** for roads & bridges, and protective measures. The town roads sustaining damage included Barton Road, Baybutt Road, Briarwood Road, Cass Road, Drolet Road, Fowler Road, Howard Lane, Jug City Road, Leighton Brook Drive, Locke's Hill Road, Martin Hill Road, Mill House Road, Mountain Road, Munroe Road, Nash Lane, New Orchard Road, New Rye Road, North Road, Range Road, River Road, Sanborn Hill North and South, Tarleton Road and Wing Road. Several locations have since been upgraded & repaired and no longer have problems.	Flood, Debris Impacted Infrastructure	Epsom Hazard Mitigation Committee, FEMA
Severe Winds, Heavy Rains July Tornado 2008	**1782**	**2008**	**Jul 24**	**$16,317**	An EF3 tornado touched down in Rockingham County then proceeded into another county. Then in Merrimack County, the tornado was rated up to an	**Epsom received $16,317 in FEMA Public Assistance funding** for roads & bridges, and protective measures. Jul 24, 2008- An EF3 tornado cut across Northwood Lake,	Wind, Tornado, Downburst, Severe Storm, Debris	FEMA, Epsom Hazard Mitigation Committee, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
					F-3 and killed a woman in Deerfield trapped in a collapsed house. In the county, there was substantial damage totaled the equivalent of $1.12 per capita (146,455 people in 2010) for the towns' debris removal reimbursement costs. A total of 123 residences statewide were affected, with 17 destroyed and another 37 suffering major damage. Damage was estimated to exceed $10 million. Hillsborough County	destroying 84,000 acres and caused significant damage to personal property, destroying or damaging 9 homes, and causing 1 fatality. Epson on the other side of Northwood Lake sustained enormous tree damage. The tornado events affected telephone service throughout Town.	Impacted Infrastructure	
Epsom Hazardous Materials Incidents Jul 2008	No	2008	-	N/A	N/A although response likely came from nearby communities	Cumberland Farms propane explosion of July 2008 resulted in the closure of Rte 4. Also, At Huckins Barn, a domestic disturbance incident resulted in the apprehension of an arsonist.	Haz Mat, Fire	Epsom Hazard Mitigation Committee, CNHRPC
Epsom Household Hazardous Chemical Incidents Summer 2008	**No**	**2008**	**Summer**	**N/A**	N/A, although likely shared response from Central NH Regional Hazardous Materials Team occurred	Mixing of pool chemicals occurred, creating chlorine vapors at Ridgewood Circle and at Black Hall Road in two separate incidents during summer 2008	Hazardous Materials	Epsom Hazard Mitigation Committee, CNHRPC
Severe Storms and Flooding - April Spring Flood 2007	**1695**	**2007**	**Apr 15-23**	**$859,340**	Extensive flooding caused by severe storms impacted seven counties. Indirect peak discharge measurements on stream gages on the Suncook River at Short Falls Road in Webster were 14,100 ft3, which was determined to be greater than 100-year flood discharge levels. The heavy rain combined with snow melt to cause small rivers and streams in much of New Hampshire to flood. Over land, the strong winds downed numerous trees. The downed trees caused widespread power outages, especially near the coast, and numerous road closures. The storm also brought heavy rain to the region which, when combined with snow melt, produced widespread flooding across much of the region.	**Epsom received $859,340 in FEMA Public Assistance funding** for roads & bridges, protective measures and recreational/other. The snow pack melt of April 2007 created a direct impact for flooding. Areas that were still damaged from the previous year's flood sustained further damage. The Suncook River could not contain water levels. April 16-18, 2007- Indirect peak discharge measurements on stream gages on the Suncook River at Short Falls Road were 14,100 ft3, which was determined to be greater than 100-year flood discharge levels. Apr 13-27, 2007- Flooding damage to the following areas: Towle Pasture and Black Hall Roads was flooded, Rte 107 was closed, Echo Valley Farm Road, River Road, New Orchard and Locke Hill Road,	Flood, Wind, Debris Impacted Infrastructure, Rapid Snow Pack Melt	FEMA, USGS Flood of 2007, Epsom Hazard Mitigation Committee, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
						Range Road, Short Falls Road, Mill House Road, Jug City Road, Drolet Road, Sleepy Hollow Lane, Kingstowne Mobile Home Park, Webster Park, Rte 28 by the Police Department and Rte 107. Town water pump house, Center Hill Road, Rte 107 and Echo Valley Hill Road sustained damage.		
Epsom Suncook River Bank Scouring and Erosion 2006 to Present	No	2006 to	Present	N/A	N/A, although the Suncook River's erosion as a result of the 2006 avulsion event do impact other Central NH Region communities and those to the south	Epsom has fought a long battle with eroding banks of the Suncook River after its avulsion (channel movement) in 2006. Land acres are falling into the river, with the sediment filling up the channel, making the river shallower and carrying the gravel downstream.	Scouring and Erosion, Debris, Flooding, Mass Failure, Avulsion	Epsom Hazard Mitigation Committee, CNHRPC
Epsom Suncook River Avulsion- Mother's Day Flood 2006	**1643**	**2006**	**May 12-23**	**Yes, see below**	N/A, although this event had far-reaching effects in downstream communities (Pembroke, Allenstown) and sedimentation of the Merrimack River to its exit at Newburyport, MA.	May 2006- Suncook River avulsion where the new channel cut through an area outside the documented 100- and 500-year floodplains. Scouring behind the Elementary School and near Short Falls Bridge. Post 2006- Scouring behind the Elementary School athletic fields has occurred since the 2006 avulsion. Debris flows down the Suncook River and silt changes regularly occur.	Flood, Channel Movement, Erosion, Landslide, Mass Failure	Epsom Hazard Mitigation Committee, CNHRPC
Severe Storms and Flooding – Mother's Day Flood 2006	**1643**	**2006**	**May 12-23**	**$76,473**	Extensive flooding caused by severe storms impacted seven counties including Merrimack and Hillsborough Counties. The USGS recorded the highest flows on record for several rivers including the Contoocook River in Davisville village, Soucook in Concord, and Piscataquog in Goffstown.	**Epsom received $76,473 in FEMA Public Assistance funding** for roads and bridges, debris removal, protective measures, and recreational/other. Nine bridges / culverts washed out and dams were breached. Flooding damage occurred at: Northwood Lake Dam overtopped, damage to the Old Mill Dam (until the river changed direction), River Road culvert, Kingstowne Mobile Home Park flooded, Webster Park Lane was underwater, Millhouse Road was flooded, North Road culvert, Black Hall Road flooded, Epsom Elementary School athletic fields flooded and the equipment hut was lost due	Flood, Wind, Debris Impacted Infrastructure, Erosion, Landslide	Epsom Hazard Mitigation Committee, FEMA, USGS, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
						to flooding, Blakes Brook culvert, Mountain Road culvert, Center Hill Bridge washed out, Echo Valley Road culvert, Griffin Road culvert, Rte 107 culvert, Old Richie Road culvert, Baker Road flooded, Mt Delight culvert, Swamp Road was under water, as well as Leighton Brook culvert.		
Epsom Beaver Dam Failure Apr 2006	No	2006	Apr	No	N/A, although dam breaches often have watershed impacts	Beaver dam failures by Locke's Hill, New Orchard, Mountain Road by campground, had to move fire apparatus to the other side for access.	Flood, Debris Impacted Infrastructure, Erosion, Dam Failure	Epsom Hazard Mitigation Committee, CNHRPC
Epsom Hazardous Materials Incidents 2006	No	2006	-	N/A	N/A, although response likely came from nearby communities	On Goboro Road, during a domestic disturbance incident, an arsonist was apprehended and prosecuted.	Haz Mat, Fire	Epsom Hazard Mitigation Committee, CNHRPC
Severe Storms and Flooding - Columbus Day Flood 2005	**1610**	**2005**	**Oct 7-18**	**$5,272**	Extensive flooding caused by severe storms impacted five counties, including Merrimack and Hillsborough. Alstead experienced several fatalities as the result of dam failure.	**Epsom received $5,272 in FEMA Public Assistance funding** for roads & bridges. See the Mother's Day Flood for details. The Town sustained damage where the riverbanks were weakened.	Flood, Wind, Debris Impacted Infrastructure, Erosion, Scouring, Mass Failure	Epsom Hazard Mitigation Committee, FEMA
Regional Thunder-storms and Lightning Jun 2005	No	2005	12-Jun	N/A	During a thunderstorm, lightning struck and severely damaged the historic Loudon Town Hall on Clough Hill Road. Winds from severe thunderstorm knocked down trees and power lines down in the towns of Warner, Hopkinton, Concord, Bow, Loudon, and Webster in Merrimack County.	Epsom likely experienced the thunderstorm and lightning event, but none notable by the Haz Mit Committee.	Thunderstorm, Lightning, Severe Winds	Epsom Hazard Mitigation Committee, CNHRPC, Area Hazard Mitigation Committees
Snow Emergency Jan 2005	**EM-3207**	**2005**	**Jan 22-23**	**$10,188**	Record and near record snowstorm for 8 NH counties including Merrimack and Hillsborough. Emergency protective measures declared for reimbursement.	**Epsom received $10,188 in FEMA Public Assistance funding** for protective measures, including snow removal.	Extreme Temp, Snow	FEMA, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Earthquake 2.2M Henniker-Hopkinton Epicenter Jan 2004	No	2004	20-Jan	N/A	An earthquake measuring 2.2 on the Richter Scale was centered in the Henniker- Hopkinton area. Shaking and noise were reported, but no damage occurred.	Reports were likely made to the USGS by Epsom residents feeling the earthquake as a rumble or loud noise. The epicenter was within 20 miles of Epsom, 3 towns to the west.	Earth, Earthquake	Concord Monitor, January 2004, USGS, Earthquake Monitor, CNHRPC
Epsom Beaver Dam Failures Summer 2003/2004	No	2003 -	2004	No	N/A, although dam breaches often have watershed impacts	Summer 2003/2004- North Road lost to beaver dam failure. Generally beaver dams - cause lots of dollar damage for roads than other types of dam damage.	Flood, Debris Impacted Infrastructure, Erosion, Dam Failure	Epsom Hazard Mitigation Committee, CNHRPC
Snow Emergency Dec 2003	**EM-3193**	**2003**	**Dec 6-7**	**$13,521**	Record snow fall event impacting much of New England. In NH, 8 counties received emergency protective measures, including Merrimack and Hillsborough.	**Epsom received $13,521 in FEMA Public Assistance funding** for protective measures, including snow removal.	Extreme Temp, Snow	FEMA, CNHRPC
Snow Emergency Feb 2003	**EM-3177**	**2003**	**Feb 17-18**	**$7,833**	Record and near record snowstorm for 5 NH counties including Merrimack and Hillsborough. Emergency protective measures declared for reimbursement.	**Epsom received $7,833 in FEMA Public Assistance funding** for protective measures, including snow removal.	Extreme Temp, Snow	FEMA, CNHRPC
NH Drought Emergency 2002	No	2002	Aug	N/A	All counties in the State of NH except Coos County. One of the hottest Augusts on record in Concord along with drought conditions since March made for a high fire danger in New Hampshire. Numerous forest fires were reported, including a 30-acre blaze in New Durham.	N/A, although Epsom was likely affected by dug wells going dry	Drought, Extreme Temperatures, Earth, Fire	Concord Monitor 8/20/02, NHDES, CNHRPC
Snow Emergency Mar 2001	**EM-3166**	**2001**	**Mar 5-7**	**$10,674**	Record and near-record snowfall from late winter storm, emergency declaration was issued for protective measures. Merrimack, Hillsborough and 5 other counties declared eligible.	**Epsom received $10,674 in FEMA Public Assistance funding** for protective measures, including snow removal.	Extreme Temp, Snow	FEMA, CNHRPC
Regional Downbursts and Severe Winds Jul 1999	No	1999	6-Jul	N/A	Severe storms in July 1999 bring strong damaging winds and 3 downbursts. Two deaths occurred. The roof of the Pill building in Concord is blown off during a storm. The downburst was designated a macroburst (at least 2.5 miles in diameter). Other	Epsom likely experienced some heavy winds as it is located in the region. Heavy winds caused a tree to fall on a house on Old Mountain Road.	Severe Wind, Downburst	Concord Monitor, NH HSEM, CNHRPC, Epsom Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
					communities in the Central NH Region experienced damages			
Severe Storms and Flooding Summer 1998	**1231**	**1998**	**Jun 12-Jul 2**	**No**	Heavy flooding in six counties, including Merrimack and Hillsborough Counties. Damages of $3.4m for all counties.	**Epsom did not apply for/receive funding.** As Epsom is within Merrimack County, it is likely experienced heavy rains and possibly some flooding.	Flood, Wind, Debris Impacted Infrastructure	FEMA, CNHRPC
Ice Storm of Jan 1998	**1199**	**1998**	**Jan 7-25**	**$0**	This ice storm was the first to test our statewide and local emergency management systems and utility providers. Tree and infrastructure damage was extensive and power failures lasted up to two weeks in some parts of the state. In The Central NH Region, many lost power for over a week. This ice storm had severe impacts throughout most of the State, with 52 communities impacted. FEMA Disaster Declaration #1199, Six injuries and one death resulted. Damage totaled $12,446,202. In addition, there were 20 major road closures, 67,586 people left without electricity, and 2,310 people without phone service.	**Epsom did not apply for/receive funding**. The Town functioned as it normally does during ice storms and power outages. The ice storm broke of most of the tops of coniferous trees throughout the Town.	Extreme Temp, Ice Storm, Power Failure, Communications Failure	FEMA, US Army Corps of Engineers NH Storms database, Epsom Hazard Mitigation Committee, Bow Times
Severe Storms and Flooding Oct 1996	**1144**	**1996**	**Oct 20-23**	**$0**	Heavy rains caused flooding in six counties, including Merrimack and Hillsborough Counties. Damage totaled $2.3m for all counties.	**Epsom did not apply for/receive funding.** As Epsom is within Merrimack County, it is likely experienced heavy rains and possibly some flooding.	Flood	FEMA, NH HSEM, CNHRPC
Epsom Terrorism Incident Aug 1997	No	1997	Aug 24	N/A	N/A.	Officer Jeremy Charron, Epsom public servant, lost his life conducting a routine traffic check.	Terrorism	Epsom Hazard Mitigation Committee,
Storms and Floods Oct-Nov 1995	**1077**	**1995**	**Oct 20-Nov 15**	**$0**	Four NH counties were damaged by excessive rain, high winds and flooding, including Merrimack (not Hillsborough).	**Epsom did not apply for/receive funding**. As Epsom is within Merrimack County, it is likely experienced heavy rains, trees down and power outages.	Flood, Severe Winds	FEMA, Federal Register, CNHRPC
Epsom Drought 1995	No	1995	---	N/A	N/A, although it is likely other Merrimack County communities experienced drought during this time	Jul 1995- Droughts have affected well water for both residential and public water supplies, agricultural, as well as increased the potential for fire.	Drought, Extreme Temperature, Increased Wildfire Risk	Epsom Hazard Mitigation Committee, US Drought Monitor NH, NH DES

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Epsom Suncook River Ice Jam and Flooding Mar 1992	No	1992	Mar	N/A	N/A, although localized ice jams may have occurred on other rivers in the Central NH Region	Mar 1992- The ice jam on Suncook River was about 1 acre in size and formed at the change in the water slope approaching the floodplain. Agricultural and other minor damage occurred	Flood, River Ice Jam, Debris Impacted Infrastructure	Epsom Town Historian, Epsom Hazard Mitigation Committee, CNHRPC
Severe Storm- Hurricane Bob Aug 1991	**917**	**1991**	**Aug 18-20**	**N/A for Epsom**	Public assistance was available for Hillsborough County and 2 other counties (not declared in Merrimack County) as a result of damages caused by Hurricane Bob. The 2 seacoast counties fared the worst.	As Epsom is within Merrimack County, it likely experienced heavy rains, wind gusts, tree debris, power outages and possibly some flooding.	Severe Winds, Hurricane	FEMA, CNHRPC
Flooding and Severe Storm Aug 1990	**876**	**1990**	**Aug 7-11**	**No data available**	Moderate to heavy rains caused flooding in eight counties, including Merrimack and Hillsborough Counties. Damage totaled $2.3m for all counties	As Epsom is within Merrimack County, it likely experienced heavy rains, tree debris, power outages and possibly some flooding.	Flood, Severe Winds	FEMA, NH HSEM
Epsom Plane Crash Circa 1990	No	1990	Circ	N/A	N/A, although what supporting weather event may have occurred in the region is unknown	A plane crash in 1990 on Martin Hill Road killed two people.	Transportation Accident, Perhaps High Winds	Epsom Town Historian, Epsom Hazard Mitigation Committee, CNHRPC
Epsom Brush Fire Circa 1990s	No	1990	Circa	N/A	N/A, although response likely came from nearby communities	Brush fire burned for 3 days, location and source unknown by the Committee.	Lightning, Fire, Wildfire, Thunderstorms	Epsom Hazard Mitigation Committee, CNHRPC
Severe Storms and Flooding Mar-Apr 1987	**789**	**1987**	**Mar 30-Apr 11**	**No data available**	Flooding caused by snowmelt and intense rain was felt in seven counties, including Merrimack and Hillsborough Counties. Nearly $5m in damages.	As Epsom is within Merrimack County, it likely experienced heavy rains, tree debris, power outages and possibly some flooding.	Flood, Rapid Snow Pack Melt, Debris Impacted Infrastructure	FEMA, NH HSEM, US Army Corps of Engineers
Severe Storms and Flooding Jul-Aug 1986	**771**	**1986**	**Jul 29-Aug 10**	**N/A for Epsom**	Severe summer storms with heavy rains, tornadoes, flash floods, and severe winds, damaged the road network statewide. Disaster declared in Cheshire, Sullivan and Hillsborough Counties (not declared in Merrimack County).	Epsom likely experienced heavy rains and possibly some flooding.	Flood, Wind	FEMA, NH HSEM, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Earthquake 4.5M Sanbornton Jan 1982	No	1982	18-Jan-82	N/A	An earthquake originating near in Sanbornton in Belknap County measured 4.5M and was felt in various locations throughout the State. The area it was felt includes all of northern Merrimack County including the Concord area communities in Central NH.	A Sanbornton-centered earthquake caused little physical damage in Merrimack County. Sanbornton is about 25 miles to the north of Epsom.	Earth, Earthquake	CNHRPC, Earthquake-track.com
Concord Beaver Meadow Tornado Jul 1979	No	1979	Jul 27	N/A	In Concord, a small twister was sighted at Beaver Meadow, where 13 trees were toppled, including a 100-foot tall pine. The duration was about 15-20 seconds.	N/A, although Concord is two towns west of Epsom	Wind, Tornado	Concord Monitor, CNHRPC
NH Blizzard of Feb 1978	No	1978	Feb 5-7	N/A	RSI Index of Category 5 (Extreme). This snowstorm is described as "a natural disaster of major proportions" and stunned all of New England. The storm was caused by an intense coastal Nor'easter that produced winds in excess of hurricane force and very high snow totals. Most of southern New England received more than three feet of snow, 25-33" in NH and higher throughout New England. Abandoned cars along roadways immobilized infrastructure and blocked major interstates. For over a week, New England remained paralyzed by the storm. All of New Hampshire was impacted. Governor Meldrim Thomson Jr. declared a state of emergency.	Although it is unknown what Epsom experienced, it is likely many of the same depths and effects occurred across the Town.	Extreme Temperatures, Severe Snow Storms, Windchill, Power Failure	American Meteorological Society, Northeast States Emergency Consortium, CNHRPC
Epsom Hazardous Materials Facility Explosion 1975	No	1975	-	N/A	N/A, although response likely came from nearby communities	Huckins fuel storage facility explosion of 1975 resulted in one death and two severely burned.	Haz Mat, Fire	Epsom Hazard Mitigation Committee, CNHRPC
Quebec Earthquake 4.8M Jun 1973	No	1973	15-Jun	N/A	An earthquake originating near the Quebec border at a scale of 4.8 was felt in various locations throughout NH.	N/A, although some Epsom residents may have felt the effects.	Earth, Earthquake	Northeast States Emergency Consortium, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
Severe Storms and Flooding Jul 1973	**399**	**1973**	**Jul 11**	**No data available**	All counties in the State of NH experienced storm damage and were declared disaster areas, including Merrimack and Hillsborough Counties.	No information available for Epsom.	Flood, Wind	FEMA, CNHRPC
Epsom Suncook River Ice Jam and Flooding Feb 1970	No	1970	Feb 12	N/A	N/A, although localized ice jams occurred on other rivers in the Central NH Region during this year including the Contoocook River in Boscawen	Feb 12, 1970- the Suncook River flooded as a result of ice break-up. Water at Short Falls dam in Epsom was the highest in many years.	Flood, River Ice Jam, Debris Impacted Infrastructure	Epsom Hazard Mitigation Committee, CNHRPC
Epsom Lightning Strike and Fire Early 1960s	No	1916	---	N/A	N/A, although it is likely lightning and thunder storms struck other parts of the Central NH region	A house was struck by lightning that caused a fire and burned down on Sanborn Hill Road.	Lightning, Fire, Wildfire, Thunderstorms	Epsom Hazard Mitigation Committee, CNHRPC
Epsom Snowstorms Circa 1961	No	1961	Circa	N/A	N/A, although snowstorms likely impacted other Central NH region communities	Several heavy snowstorms impacted Epsom in the beginning of the 1960s, including the storm of January 18-20, 1961 and the storm of January 11-14, 1961. Details unknown.	Extreme Temperatures, Severe Snow Storms, Windchill	Epsom Hazard Mitigation Committee, Epsom Town Historian, CNHRPC
Epsom Tornado Early 1960s or Late 1950s	No	1950 -	1950	N/A	N/A, although heavy winds were likely experienced around the Central NH region	A small tornado occurred in Epsom. One town historian saw and heard the tornado from his home on Black Hall Road. No damage was caused except to some trees in the woods. Another observer said that the tornado damaged a good portion of the trees at Circle 9 Campground.	Wind, Tornado, Downburst, Severe Storm, Debris Impacted Infrastructure	Epsom Town Historian, Epsom Hazard Mitigation Committee, CNHRPC
Older Hurricanes 1954-1991	No	1954	to 1991	N/A	Many older hurricanes have impacted New Hampshire including the 1954 – 1991 Hurricanes: Carol on August 31, 1954 (tree and crop damage), Edna on September 11, 1954, Donna on April 12, 1960 (heavy flooding), Dora on August 28, 1971, Bell on August 10, 1976, Gloria on September 27, 1985, and Bob in 1991.	Downed trees, wind damage, and flooding were likely experienced in Epsom during many of these hurricanes.	Wind, Flood, Hurricane, Tropical Storm, Debris Impacted Infrastructure	NH Homeland Security and Emergency Management, CNHRPC
10 Severe Snowstorms 1940-1978	No	1940	to 1978	N/A	Ten severe snowstorms are documented in south-central NH during this time span, Feb 14-15, 1940 (depths over 30" and high winds), Feb 14-17, 1958 (20-33"), Mar 18-21, 1958 (22-24"), Mar 2-5, 1960 (up to 25"), Jan 18-20, 1961	Although it is unknown what Epsom experienced, it is likely many of the same snow depths occurred.	Extreme Temperatures, Severe Snow Storms, Ice, Windchill, Power Failure	American Meteorological Society, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
					(up to 25", blizzard conditions), Jan 11-14, 1964 (up to 12"), Jan 29-31, 1966 (up to 10"), Feb 22-28, 1969 (24-98", slow-moving storm), Dec 25-28, 1969 (12-18"), Jan 19-21, 1978 (up to 16").			
Regional Snow Storm and Rapid Snow Pack Melt **Mar 1953**	No	1953	Mar	N/A	N/A, although similar rain or snow storms and rapid snow pack melt likely impacted the region. The highest level of water in the Blackwater Dam was measured, with the capacity at 93%. No flooding was reported. Uncertain as to exactly what type of storm caused this effect. A total of nearly 8" of precipitation in March 1953.	The storm was not particularly notable by the Town, although the rapid snow pack melt probably caused flooding effects in Epsom along the roads, Suncook River, Little Suncook River, and main brooks.	Flood, Rapid Snow Pack Melt, Debris Impacted Infrastructure	FEMA, NH HSEM, US Army Corps of Engineers, CNHRPC
Epsom Blizzard **Early 1940s**	No	1940s	Circa	N/A	N/A, although snowstorms likely impacted other Central NH region communities	People in Epsom were snowed in for days. During this storm the plows needed human assistance to break up heavily packed snow. People walked ahead of the plows and broke up the snow with shovels.	Extreme Temperatures, Severe Snow Storms, Windchill	Epsom Hazard Mitigation Committee, Epsom Town Historian, CNHRPC
Regional & Epsom Hurricane of **Sep 1938**	No	1938	Sep 21	N/A	Hurricane made landfall as a 3 on the Saffir-Simpson Scale, killed about 682 people and damaged or destroyed over 57,000 homes. Most deadly New England hurricane. Central New Hampshire was inundated with water. Downed trees caused extensive damage to homes, businesses and community infrastructure. President Roosevelt ordered emergency aid be sent to NH, including Merrimack County.	Wind had a particularly devastating impact, including very high tree damage. According to one town historian, "it looked like someone had played pick-up sticks with the trees." A large stand of pine trees on Short Falls Road was heavily damaged and downed trees blocked the road. Old large poplar trees were taken down on Black Hall Road. Severe tree damage also occurred on Sammy Bickford's property on Route 4. Damage to buildings in Epsom also occurred as a result of heavy winds. Wind knocked a tree down on Windymire Drive (called Route 28 at the time). A barn roof was blown off on Route 28, just north of the Epsom Traffic Circle. To salvage timber, felled trees all over Epsom were stored in Deer Meadow Pond and the Suncook River. In the early to mid-1940s, Deer Meadow	Wind, Hurricane, Flood, Debris Impacted Infrastructure	Concord Monitor, Epsom Town Historian, CNHRPC

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Epsom	Local Effects Occurring in Epsom	Hazard Category	Source
						Pond was drained and the logs removed. The logs were sawed at Bickford and Huckins Mill. Later in 1962, the pond was drained again and a new dam was built.		
Regional & Epsom Flood of Mar 1936	No	1936	Mar 11-21	N/A	Simultaneous high snowfall totals, heavy rains, and warm weather combined to hit all of New England. Floods killed 24 people, caused $133,000,000 in damage, and made 77,000 people homeless in New England. The great flooding of 1936 resulted from heavy rains and rapid snow pack melt. Snow north of Concord contributed to the higher waters in the Winnipesaukee, Contoocook and Pemigewassett rivers that were largely responsible for the destruction in Concord and the surrounding area. NH issued boil water warnings to everyone.	Low roads near the Suncook River were flooded; water came up over the railroad tracks and train service could not reach Town. It took 5-7 days for the floodwaters to completely recede; one of the worst natural disasters to ever strike Epsom. An ice jam flooded the bridge on Short Falls Road in Epsom. Ice blocks were seen floating on the bridge floor, and the bridge had to be chained down to prevent wash-out. Flooding took out a dam located near the Town Offices on Route 4. Dam flooding destroyed both the bridge over Route 4 and the water main, resulting in loss of water service for approximately 40 families. The dam at Bickford and Huckins Mill was taken out, resulting in additional flooding.	Flood, Ice Jams, Rapid Snow Pack Melt	Concord Monitor, Union Leader, Army Corps of Engineers Ice Jam Database, Epsom Town Historian, Epsom Hazard Mitigation Committee, CNHRPC
Epsom Lightning Strike and Fire 1916	No	1916	---	N/A	N/A, although it is likely lightning and thunder storms struck other parts of the Central NH region	A house on Center Hill Road was struck by lightning which caused a fire and burned the house down.	Lightning, Fire, Wildfire, Thunderstorms	Epsom Hazard Mitigation Committee, CNHRPC
Epsom Blizzard 1888	No	1888	Mar 11-14	N/A	N/A, although snowstorms likely impacted other Central NH region communities	Mar 11-14, 1888- Blizzard during a year of snowstorms. A difficult year for residents.	Extreme Temperatures, Severe Snow Storms, Windchill	Epsom Hazard Mitigation Committee, Epsom Town Historian, CNHRPC

Source: Compilation of Events by Epsom Hazard Mitigation Committee; CNHRPC

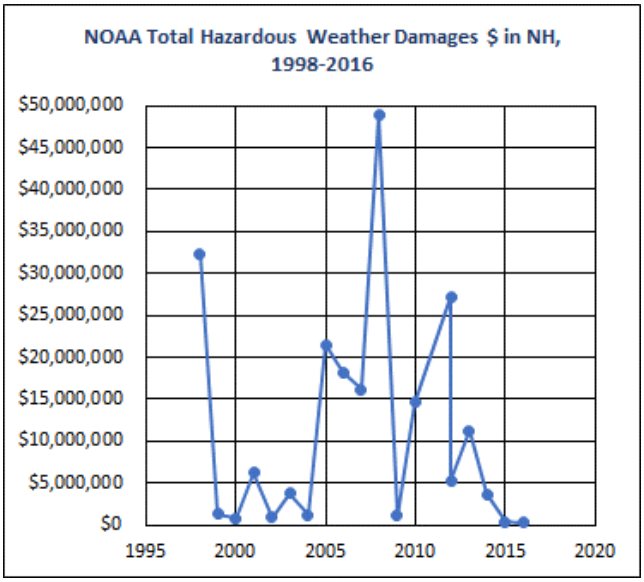
Local Climate Changes and Extreme Weather

In the State and the Central NH Region, like any other areas, exist our own "micro-climate" areas that can be analyzed for future susceptibility to disasters and hazard events. New Hampshire has obtained high costs of damage over time due to hazardous weather and declared disasters. A review of the state and area history can provide a perspective on what Epsom can expect to see in terms of extreme weather in the future.

Table 11

Summary of Hazardous Weather Fatalities, Injuries, and Damage Costs in NH, 1998-2016

Year	Fatalities	Injuries	Total Damages $
2016	1	1	**$270,000**
2015	2	34	**$370,000**
2014	0	2	**$3,700,000**
2013	0	30	**$11,250,000**
2012	1	4	**$5,280,000**
2012	1	2	**$27,280,000**
2010	1	6	**$14,630,000**
2009	1	0	**$1,130,000**
2008	2	5	**$48,890,000**
2007	0	3	**$16,150,000**
2006	1	9	**$18,200,000**
2005	4	9	**$21,500,000**
2004	0	11	**$1,200,000**
2003	2	29	**$3,800,000**
2002	0	7	**$900,000**
2001	0	2	**$6,200,000**
2000	2	6	**$800,000**
1999	3	17	**$1,300,000**
1998	1	23	**$32,400,000**



Source: National Oceanic and Atmospheric Administration, last accessed 03/18
http://www.nws.noaa.gov/om/hazstats.shtml

Injuries to people and the costs of damages in New Hampshire have increased as a result of hazardous weather. These increases of injuries and damages can be generally applied to the major disasters declared in the State. As displayed in **Table 11**, the highest numbers of damage costs correlate to the **1998** (**$32m**) and **2008** (**$49m**) ice storms between **1998** and **2016**.

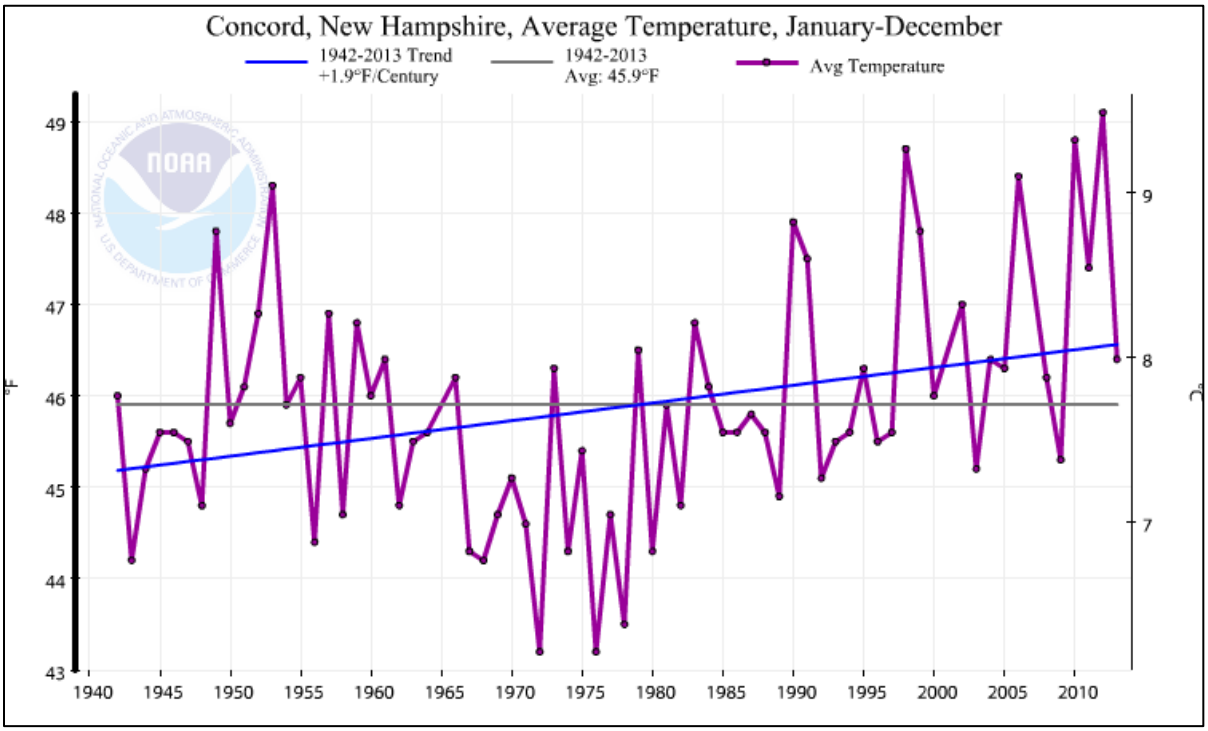
The number of injuries and fatalities have a less distinct association, with the highest numbers shown in **2013** (**30**) and **2003** (**31**). However, the greatest number of fatalities during this time period occurred in **2005** (**4**), likely during the time of the Columbus Day floods that hit the southwestern section of the State very hard.

Much of the rest of the discussion in this section has been directly excerpted or paraphrased from the ***Central NH Regional Plan 2015***. The Central NH Region's weather history is summarized to provide a view of the trends around the Concord area where the weather measurements have taken since **1939** at the Concord Airport. Although Epsom is geographically close to the City of Concord (within **15** miles) and these measurements should have some reasonable basis in Epsom, the Town more closely identifies with Manchester weather systems. For CNHRPC region continuity, the Concord measurements will be used for Epsom.

Figure 4 displays Concord's average annual temperature between **1942** (**46.0°F**) and **2013** (**46.4°F**). Earlier data was not available. As with typical New Hampshire weather, the seasonal temperatures can vary year after year and without obtaining an average, changes are difficult to see. The displayed trend line allows a definitive way of averaging all of the temperatures and illustrates a **+2.8°F** increase in average annual temperature during this 70-year time period.

Figure 4

Average Annual Temperature for Concord, 1942-2013

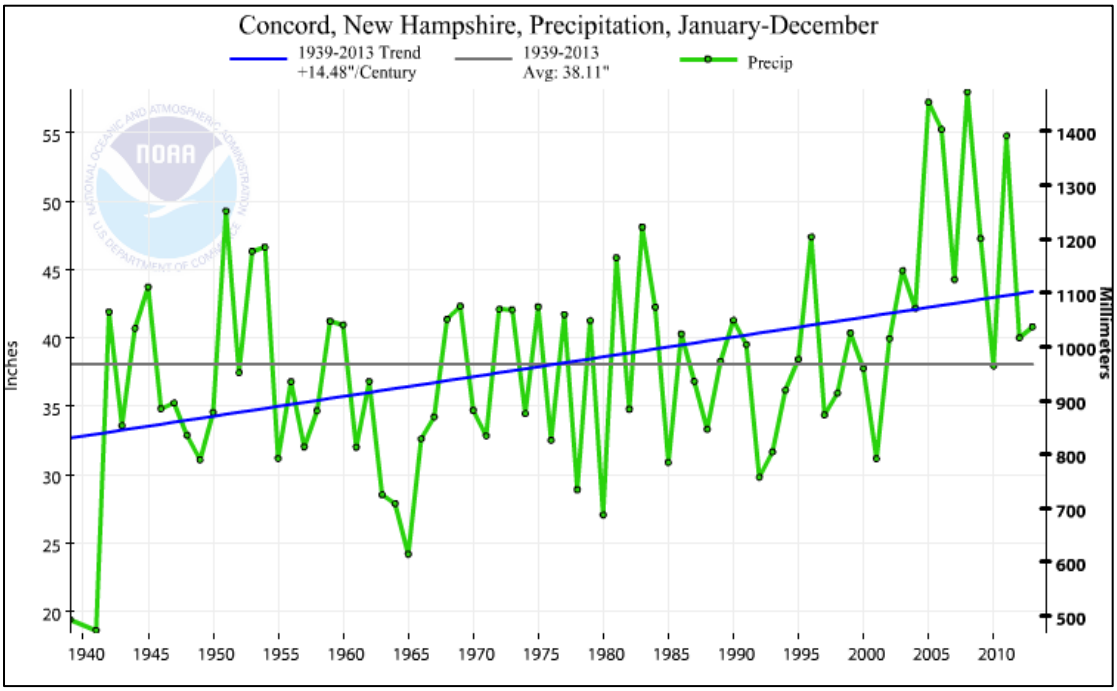


Source: National Oceanic and Atmospheric Administration

For precipitation changes, **Figure 5** displays Concord's average annual precipitation rates between **1939** and **2013**. Varying seasonal rainfall amounts continue over the decades. The trend line serves the same purpose to illustrate an overall increase of **+14.48"** in precipitation over the **74**-year time period from **1939** to **2013**.

Figure 5

Average Annual Precipitation for Concord, 1939-2013

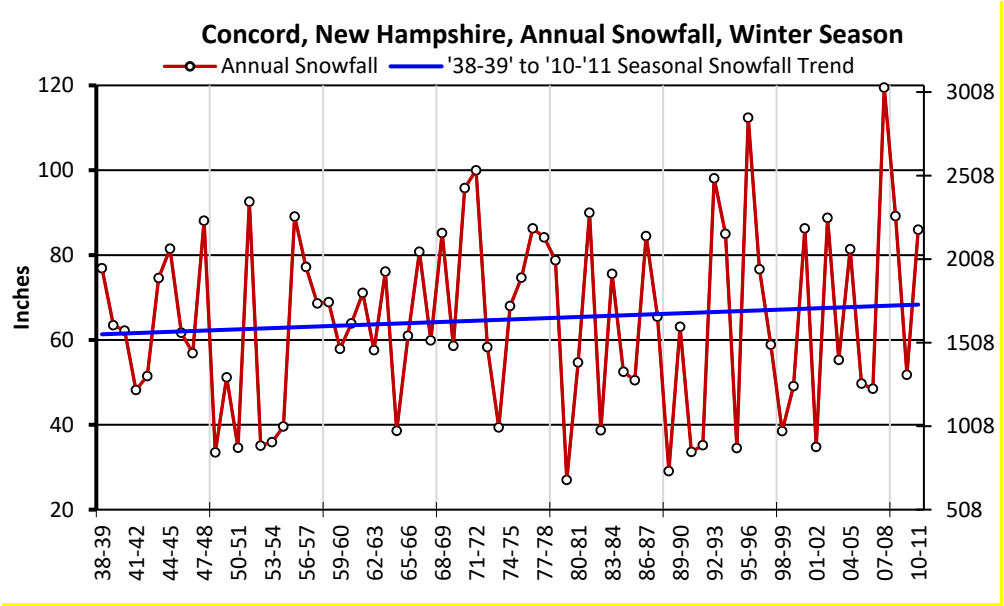


Source: National Oceanic and Atmospheric Administration

Similar to temperature and precipitation, annual snowfall amounts as reported by NOAA were observed for Concord starting in the **1938-1939** winter season through the **2010-2012** winter season. Snowfall data from **2012-2013** was not available. As displayed in **Figure 6**, the amount annual of snowfall has varied greatly over the past century. Overall, the trend line indicates a slight increase in annual snowfall inches, from about **60"** in the **1938-1939** season to about **68"** in **2010-2011**, totaling an increase of **+8"** of snowfall over the **72**-year time span.

Figure 6

Average Annual Snowfall for Concord, Winter Seasons 1938/39 - 2010/11



Source: NOAA Compiled by: CNHRPC

This climate data may certainly be relevant to the entire Central NH Region which includes the Town. The Central NH region climate summation is that the temperature is getting warmer, the precipitation is increasing, and the snowfall is slightly increasing according to the National Oceanic and Atmospheric Administration's data collection at the Concord airport. There are no indications to see these trend lines reverse although the snowfall varies greatly from one season to the next, almost in an alternating pattern.

The Southern NH Climate Change Assessment, formally entitled ***Climate Change in Southern New Hampshire: Past, Present, and Future, 2014*** by the University of New Hampshire, reviewed current climate conditions and projected future conditions of Southern New Hampshire under potential low and high emission scenarios. Their past and future climate overview is illustrated in **Figure 7**.

Figure 7

Southern NH Climate Assessment Projections

Past Data and Future Climate Overview

SOUTHERN NH CLIMATE ASSESSMENT Projections

TEMPERATURE

What have we seen since 1970?

- → Average maximum temperatures have warmed by 2.0°F (spring, fall and summer)) and 2.9°F (winter)
- → Average minimum temperatures have warmed by 3.2°F (spring, fall and summer) and 6.1°F (winter)

What can we expect?

- → Summers will be hotter: 16-47 days above 90°F
- → Winters will be warmer: 20-45 fewer days below

RAINFALL

What have we seen since 1970?

- → Annual precipitation has increased by 8-22%
- → Frequency and magnitude of extreme events

What can we expect?

- → Precipitation annual average will increase: 15-20%
- → More frequent and severe flooding

SNOW

What have we seen since 1970?

- → Fewer days with snow cover
- → Lake ice-out dates occurring earlier

What can we expect?

- → Significant decrease of 20-50% in number of snow covered days

Source: Climate Solutions of New England, 2014

As a result of anticipated extreme weather continuing and climate changes in Central NH and Epsom, consideration should be given for potential impacts to the community. A few new issues are considered, although the list is not detailed. For more information on these topics, refer to the ***Central NH Regional Plan 2015***.

More Human Health Emergency Events

- ☞ Illnesses such as heatstroke, fainting, and heat exhaustion.
- ☞ Excess heat especially dangerous for the aging population and residents without air conditioning.
- ☞ Increase in greenhouse gas emission, energy demand, and air conditioning use and cost.
- ☞ More favorable conditions for insects carrying viruses and diseases, such as West Nile Virus.
- ☞ Increases risk of waterborne illnesses caused by pollutants entering the town's water supply, commonly through stormwater runoff and sewage overflow.
- ☞ Infrastructure failure by adding additional stress, leading to potential injury or loss of life.
- ☞ More air pollution, leading to asthma and breathing disorders.
- ☞ Vulnerable populations require more assistance.

Natural Environment Disruption

- ☞ Too much water and/or lack of water can disrupt trees and plants natural growing cycle, potential leading the tree, plant, and surrounding area to die.
- ☞ Additional water and drought conditions affect wetland discharge, stream flow, and water quality, affecting the habitat's quality of life and species' health within the area.
- ☞ Debris will be a result of harsh flooding, including trash and downed trees, polluting waters, harming habitats, and damaging property and infrastructure.

Declining Forest Health

- ☞ Large weather events such as heat stress, drought, and periods of winter thaw followed by intense cold can lead to loss of trees.
- ☞ Become susceptible to invasive species and diseases, such as the Hemlock Wooly Adelgid.
- ☞ Loss of trees can have a direct impact on portions of the region's economic components, including declining tourism.

Fewer Recreation Opportunities

- ☞ Weather Impacts on Recreational Trails such as debris, flooding and erosion.
- ☞ Snowmobiling, ice fishing, snow shoeing, skiing and snowboarding provide numerous sources of winter recreation and winter tourism, enhancing the quality of life and economy, will be affected with shorter seasons.

Risks to the Built Environment

- ☞ Critical infrastructure such as roads, bridges, culverts, stormwater drainage systems, water and wastewater treatment facilities, natural gas lines, electric lines and poles might be at risk of severe damage or failure if the anticipated extreme weather events occur.
- ☞ Damaged infrastructure cannot provide services to homes and businesses, disrupting the economy and may endanger public health.
- ☞ Culverts are at risk to extreme precipitation events, including rain, snow, and ice.
- ☞ Residents who experience damage with flooding to their homes and personal belonging may lack proper flooding insurance, placing the resident in financial hardship.
- ☞ Dams with High Hazard and Significant Hazard classifications are the most likely to cause the largest amount of damage or loss of life.

Increasing Municipal Transportation Systems Maintenance Needs

- ☞ Volume of flooding is expected to increase, potentially closing roads and increasing the travel time for drivers and increasing the cost and energy use.
- ☞ Flooding can also cause damage to pavement and embankments, increasing maintenance, repair, and replacement costs to municipalities.
- ☞ Extreme precipitation will also increase erosion, decreasing certain infrastructure components design life span.

Aging and Inadequate Stormwater Infrastructure

- ☞ Stormwater infrastructure such as catch basins, pipes, discharge points, and culverts that redirect stormwater runoff can impacted by flooding and cannot perform their function.
- ☞ Blocking of water can lead to flooding of the area and roadways, potential leading to the closure of nearby roads.
- ☞ Components of stormwater infrastructure are outdated, and increased flows are added stress to the system, more money to maintain and higher replacement costs.

☞ Increased development with increased amounts of impervious surface adds the volume of stormwater runoff within more urban area.

Decreasing Water Resources

☞ Water quality and quantity are both threatened by projected changing weather events, with threats of flooding, drought, erosion and stormwater runoff.
☞ By preventing groundwater from replenishing, additional runoff and sediments can lead to intensify flows in rivers and streams with higher contamination levels of unwanted nutrients and pathogens.
☞ Additional water treatment may be necessary, potentially overloading treatment systems.
☞ Contamination can pollute sewage, threatening the performance of wastewater treatment facilities.
☞ Increased occurrences in flooding can also intensify flows, causing overloading of treatment system.
☞ When the ground is frozen, rapid snow melt from warm days or intense rain is not able to infiltrate the ground, leading to drought conditions.

Changing Food and Agriculture Production

☞ Merrimack County is the top county in the State for agriculture sales of higher temperatures will promote a longer growing season for most crops, benefiting a larger number of local crops.
☞ Negative impacts can potentially alter the region to a climate not suitable for growing valuable local crops such as apples and blueberries.
☞ Temperature are expected to slow weight gain and lower the volume of milk produced by dairy cows.
☞ Higher overnight temperatures are anticipated to prevent the dairy cows and cattle from recovering from heat stress.
☞ Warmer temperatures and increase in carbon dioxide in the air creates a more ideal environment for pests and weeds, potentially increasing the use of herbicides and pesticides on crop.

This is a sampling of how changing climate and severe weather impacts can affect communities in New Hampshire, in the Central NH Region and in Epsom. Consideration should be given to applicable items during the development and update of the **Hazard Mitigation Plan**.

Detailed Hazard Events in Epsom

A compilation of hazards that have occurred in Epsom and the Central NH Region area is provided in the prior Table of **Local and Area Hazard Events. Hazard Locations in Town** are areas to watch, areas of particular susceptibility and may be vulnerable to future events. **Potential Future Hazards** are determined based on the past hazard events, possibilities, and existing issues in Town to provide focus to future potential problem areas and to help with mitigation action development.

Each hazard is generally described and then is noted how and where it could occur in Epsom. For all hazards examined in this Plan, a table of the **Hazard Locations in Town** and the **Potential Future Hazards** is provided at the end of this Plan Chapter.

Hazard events were researched using a wide variety of sources for the **original Epsom Hazard Mitigation Plan 2007** which were the basis for many of the past disaster events and updated to the present. The **Hazard Mitigation Plan Update 2012** provided recent information on many of the extreme disasters experienced between **2005-2008**. Sources and techniques included interviewing local townspeople, researching Town Histories and related documents, and collecting information from governmental or non-profit websites. Presidentially declared disasters or other significant hazard events are described for the surrounding area or Merrimack County for the **Hazard Mitigation Plan Update 2018** and some of them may have affected the community. These disasters were also considered by the Committee when determining the risk evaluation.

Committee member experiences, knowledge, and recollections generally comprise the **Local and Area Hazard Events** and **Hazard Locations in Town.** While additional hazards might have occurred in Town, those events in the Plan are what the Committee chose to list, or were familiar with to list, to comprise the hazard events within the in Tables. The same is true for the **Potential Future Hazards** section.

FLOODING

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and/or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges. However, floods can be beneficial to the low lying agricultural areas which are used for active farm lands by enriching the soil.

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

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of year. A sudden thaw during the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to drain. Flooding is the most common natural disaster to affect New Hampshire, a common and costly hazard.

There are several types of **Flooding** hazards examined in the **Hazard Risk Assessment**:

- **Floods and Flash Floods**
- **Rapid Snow Pack Melt**
- **Ice Jams**
- **Riverine Fluvial Hazard Flooding, Erosion, Channel Movement**

Magnitude of Flooding

Flooding magnitude, or how bad flooding could get in Epsom, can be measured by the following SFHA Flood Zone scale in **Table 12**. "Flooding" encompasses all types of flooding including **Floods and Flash Floods**, **Rapid Snow Pack Melt**, **River Ice Jams** and **Fluvial Hazard Erosion and Channel Movement**.

Table 12

Special Flood Hazard Area (SFHA) Zones on 2010 DFIRMS

Special Flood Hazard Areas on Epsom DFIRMs	
Zone A	**1% annual chance of flooding** • **100-year** floodplains *without* Base Flood Elevations (BFE)
Zone AE *(with or without floodways)*	**1% annual chance of flooding** • **100-year** floodplains *with* Base Flood Elevations (BFE) • some identified as **floodways** with stream channel and/or adjacent floodplain areas • areas must be kept free of encroachment so 1% annual chance of flood will not substantially increase flood height
Zone X	**0.2% annual chance of flooding** • **500-year** floodplain *without* Base Flood Elevations (BFE) • sheet flow flooding less than 1-foot deep • stream flooding where the contributing drainage area is less than 1 square mile • areas protected from 100-year floodplains by levees • OR areas determined to be outside the 0.2% annual chance of flood (see DFIRMs)

Sources: FEMA and NH Geographically Referenced Analysis and Transfer System (NH GRANIT) websites

Epsom DFIRMs can be viewed online at and downloaded from the NH Geographically Referenced Analysis and Transfer System (NH GRANIT) website. Alternatively, the DFIRMs' respective paper FEMA 2009 Floodplain Maps in the Town Office could be consulted. Should the **Zone A** or **Zone X** or **Zone AE** flood to either the **100**-year or **500**-year level, the DFIRM areas will help **measure the location of the floodplain and potential magnitude of the flood.**

Flooding in Epsom

Epsom has many areas particularly susceptible to flooding. Rapid pack snow melt affecting roadways and drainage, old waterline infrastructure breaking and washing out roads, culvert debris, Suncook River flooding of Town and School facilities, and manufactured housing park drainage systems are just a few of the most likely locations to be damaged by flood events. There are many hilly roads in Town that could washout during flash flooding and heavy rain events. Some key culvert need to be up-sized to address the increased water load and these are listed as Actions in **8 MITIGATION ACTION PLAN**. The Town has been communicating with the State to upgrade some of their culverts.

These small brooks, ponds and wetlands in Epsom contribute to flooding these and other areas in Town:

- **Watercourses:** Suncook River, Little Suncook River, West Channel Suncook River; Ames Brook, Blake Brook, Burnham Brook, Deer Meadow Brook, Flat Meadow Brook, Fowler Brook, Griffin Brook, Gulf Brook, Leighton Brook, Little Bear Brook, Lockes Brook, Marden Brook and Mason Brook; tributaries of the Suncook River and Little Suncook River; and several unnamed brooks.

- **Waterbodies:** Northwood Lake; Bixby Pond, Cass Pond, Chestnut Pond, Deer Meadow Pond, Mill Pond, Odiorne Pond, Round Pond, Tarleton Mill Pond; several Farm Ponds and fire ponds; and several unnamed ponds and wetlands.

Road and Drainage System Washouts

Roads in Epsom are vulnerable to washouts and floods and may washout during flash flooding and heavy rain events. A listing of past and future potential road washouts is shown on ***Map 1 Potential Hazards*** and ***Map 2 Past Hazards***. A **Table** of undersized Town-owned culverts to be upgraded to ensure their carrying capacity can be found in **5 COMMUNITY VULNERABILITY ASSESSMENT**. These roads are either most common, regular locations of **road washouts** or water flooding over the roadways, are locations which could be washed out during a flood event, or have been flooded and repaired:

- Main Routes: US 4/202 areas in floodplain (including Gulf Brook), NH Route 107, NH 28 (town line).
- Local Roads: Short Falls Road, Mill House Road, Jug City Road, Black Hall Road, Baker Road, Swamp Road (underwater), Olde Town Extension onto Prospect Road (runoff).
- Susceptible regular, partial road washouts: Old Turnpike Road, Echo Valley Farm Road, Griffin Road, Sanborn Hill Road, Martin Hill Road, Mountain View Spur & Mountain Road, Baybutt Road, Locke's Hill off Lord's Mill Road. Private (not Town maintained): Sleepy Hollow Lane (private, undersized) and Lakeside Drive (private, Chestnut Pond).
- Manufactured Housing Parks: Kingstowne MHP, King's Grant MHP.
- Bridges: Center Hill Bridge, Cass Road Bridge.

- Public Facilities: Epsom Central Elementary School athletic fields and equipment hut, Village District water pump house, Webster Park.
- Culverts: Blakes Brook culvert, NH Route 107 culvert (Griffin Brook), Old Richie Road culvert, Leighton Brook culvert.
- Drainage System Replacement: Little Suncook River (Cass Road), Center Hill Road.

Dam Failure

There are a few dams in Epsom with potential for immense flooding damage *if* breached. One (**1**) **High Hazard** dam, the **Northwood Lake** Dam, could have severe consequences if a failure occurs. The dam is located to the eastern edge of the community along US Routes 4/202 and NH Route 9, a major commuter route with commercial and residential properties. The **Little Suncook River** flows west from the Dam to join the **Suncook River** at the Epsom Traffic Circle. This **13'** high dam impounds **688** acres of water. One (**1**) **Low Hazard** dam is located at Cass Pond (Little Suncook River) while **6 Non-Menace** dams are located throughout the community. The following is a listing of the dams, downstream of which would be immediately susceptible to the impacts of dam failure or release **flooding.**

- Northwood Lake Dam, High Hazard (H)
- Cass Pond Dam, Low Hazard (L)

Special Flood Hazard Areas (SFHAs)

Base Flood Elevations (BFEs) are abundant within Central NH along the Merrimack River, Contoocook River, Blackwater River, Warner River, Soucook River, and Suncook River on the DFIRMs of 2010. In Epsom (**330112**) New Hampshire (**D33013C**), there are multiple DFIRMs identifying floodplains. DFIRM panels are not printed when floodplains are not present in an area.

There are **19** DFIRMs in Epsom, of which **5** panels contain floodplains of the **Suncook River**: **#0388**, **#0559**, **#0567**, **#0576**, and **#0578**. The **Little Suncook River** floodplains are displayed in **#0577** and **#0581** as it flows west to join the **Suncook** in **#0576**. The **Northwood Lake** floodplains are depicted in **#0581**, **#0582**, **#0583**, and **#0584**. Other brooks and waterbodies are included in these floodplains too. These DFIRMs include **Zone AE** floodways (1% annual risk of flooding), **Zone AE** floodplains with **BFEs** (1% annual risk of flooding) or **Zone X** (0.2% annual risk of flooding) locations in Town. A total of **10** DFIRMs out of the **19** in Epsom contain **Base Flood Elevations**. These are highlighted gray in **Table 13**.

Four (**4**) DFIRMs, **#0389**, **#0557**, **#0566**, and **#0590**, display no Special Flood Hazard Area (SFHA) **Zone A** (1% annual risk of flooding) and/or **Zone X** (0.2% annual risk of flooding) in Epsom, although they may be present in neighboring communities. These are the white rows in **Table 13**. An additional **5** DFIRMs, **#0393**, **#0394**, **#0558**, **#0579**, and **#0595** do not have printed panels. This situation occurs when there are no available floodplains to display in the DFIRM area.

Table 13

Locations of Epsom Special Flood Hazard Areas (SFHA) on 2010 DFIRMS

Panel NH (D33013C)	Flood Zones in Epsom (330112)	Base Flood Elevations (BFEs)	Water Body Areas in Floodplains	Community of Epsom Geographic Location
#0388	AE with floodway, AE, X	349, 343	**Suncook River**	Northwest corner of Epsom bordering Pittsfield to the north and Chichester to west. Goboro Road, Bartlett Lane
#0576	AE with floodway, AE, X	**Suncook**: 343, 342, 341, 340, 339 (US 4 Bridge), 338, 335, 331 (Huckins Mills Dam), 325. **West Channel**: 335, 323, 322, 321, 320. **Little Suncook**: 347, 342, 339, 338, 339.	**Suncook River, West Channel Suncook River, Little Suncook River**	Western central section of Town surrounding the Epsom Traffic Circle. NH 28 and US 4/202 (Dover Road), Goboro Road, Black Hall Road, Windymere Drive, Bear Island. Mason Brook
#0559	AE with floodway, AE, X	310, 309, 308 (Short Falls Road Bridge), 307, 307, 306	**Suncook River, Burnham Brook, Deer Brook, Marden Brook**	Southwest section of Town, still abutting Chichester. NH 28, Webster Park Lane, Webster Park Road, Short Falls Road and Bridge, Mill House Road, River Road, Elkins Road. Fowler Brook.
#0578	AE with floodway, AE, X	**Suncook**: 320, 315, 312, 310. **West Channel**: 320, 319, 317, 315, 313, 312, 311.	**Suncook River, West Channel Suncook River**	Southwestern central section of Town around Black Hall Road, NH 28, Old Town Extension, Rhodora Drive, Water Street, Short Falls Road, River Road. Round Pond.
#0567	AE with floodway, AE, X	306	**Suncook River, Fowler Brook**	Southwestern edge of Epsom abutting Allenstown. NH 28, Fowler Road, Jug City Road, River Road, Buck Street Extension. Deer Brook.
#0577	AE with floodway, AE, X	438, 437, 426, 415, 410, 408, 405, 397, 365, 360, 355, 349.	**Little Suncook River, Blake Brook, Bixby Pond**	Northern central section of town with Dover Road (US 4/202), Ridgewood Circle, New Orchard Road, Center Hill Road. Lockes Brook.
#0581	AE with floodway, AE, X	**Northwood Lake**: 518, 516 (Dam). **Little Suncook**: (bridge) 507, 502, 492, 477, 472, 466, 458, 452, 448, 443, 442, 439, 441, 438.	**Little Suncook River, Northwood Lake (Dam), Bixby Pond**	Northeastern quadrant of Epsom. North Road, Lords Mills Road, Dover Road, Old Turnpike Road. Little Bear Brook.
#0583	AE with floodway, AE	518 (floodway)	**Northwood Lake, Griffin Brook**	Center eastern edge bordering Northwood. Very small section of southern Northwood Lake. Center Hill Road, Echo Valley Road, Cato Seavey Road, Mountain Road, Tarleton Road. Griffin Brook, Blake Brook (& Dam).

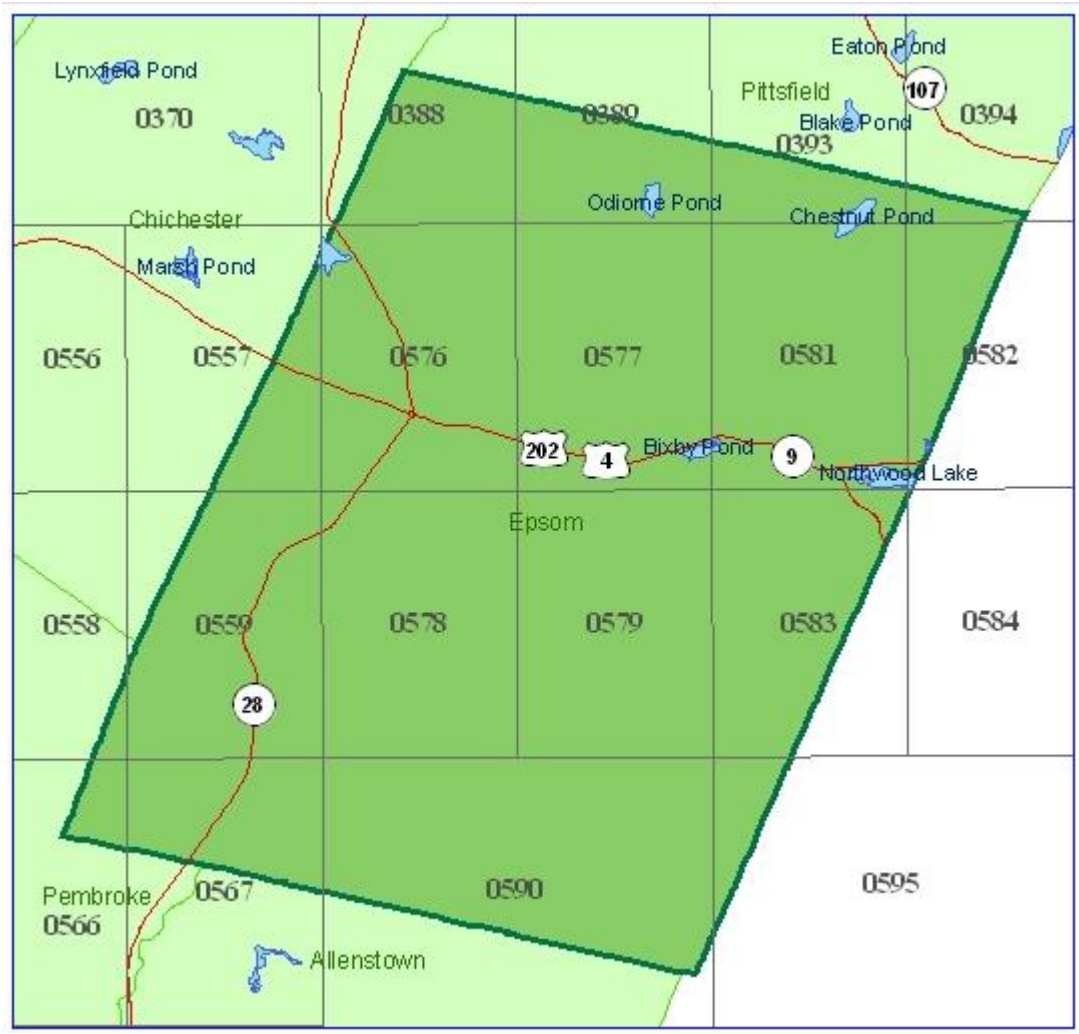
Panel NH (D33013C)	Flood Zones in Epsom (330112)	Base Flood Elevations (BFEs)	Water Body Areas in Floodplains	Community of Epsom Geographic Location
#0582	AE with floodway, AE	519, 518 (floodway)	**Northwood Lake**	Central eastern edge of the community bordering Northwood. Dover Road (US 4/202) across Northwood Lake, Old Turnpike Road, Hoit Road. Flat Meadow Brook.
#0584	AE	518	**Northwood Lake**	Tiny southeast corner of Northwood Lake, bordering Northwood.
#0389	N/A	N/A	**None**	Northcentral edge of Epsom bordering Pittsfield. New Orchard Road, Lockes Hill Road, Odiorne Pond, Range Road/ Barton Road.
#0557	N/A	N/A	**None**	Western edge abutting Chichester. Dover Road, Saturley Road, Mason Brook, unnamed wetlands and brooks.
#0566	N/A	N/A	**None**	Southwest corner at Pembroke. Spring Street, Lena Lane, North Pembroke Road. Ames Brook, Unnamed Brook.
#0590	N/A	N/A	**None**	Southeastern corner of Town, bordering Allenstown and Northwood. New Rye Road, Old Mountain Road, Kettle Rock Road, Swamp Road. Deer Brook
#0393	No panel printed	N/A	**None**	Northeast edge of Epsom bordering Pittsfield. Chestnut Pond
#0394	No panel printed	N/A	**None**	Northeast corner of Epsom bordering Pittsfield and Northwood.
#0558	No panel printed	N/A	**None**	Southwestern edge abutting Chichester. Small triangle of land.
#0579	No panel printed	N/A	**None**	Geographic south east center of the community.
#0595	No panel printed	N/A	**None**	Southeastern edge abutting Northwood.

Sources: FEMA and NH Geographically Referenced Analysis and Transfer System (NH GRANIT) websites

Figure 8 displays the relative location of each of the DFIRM panels in the community used in **Table 13**. This set of DFIRMs is excerpted from the ***Merrimack County Flood Insurance Study (FIS) of 2010***. The graphic illustrates the numbering system of the DFIRMs, how they are not always consecutive.

Figure 8

DFIRM Panel Locations (330112), 2010

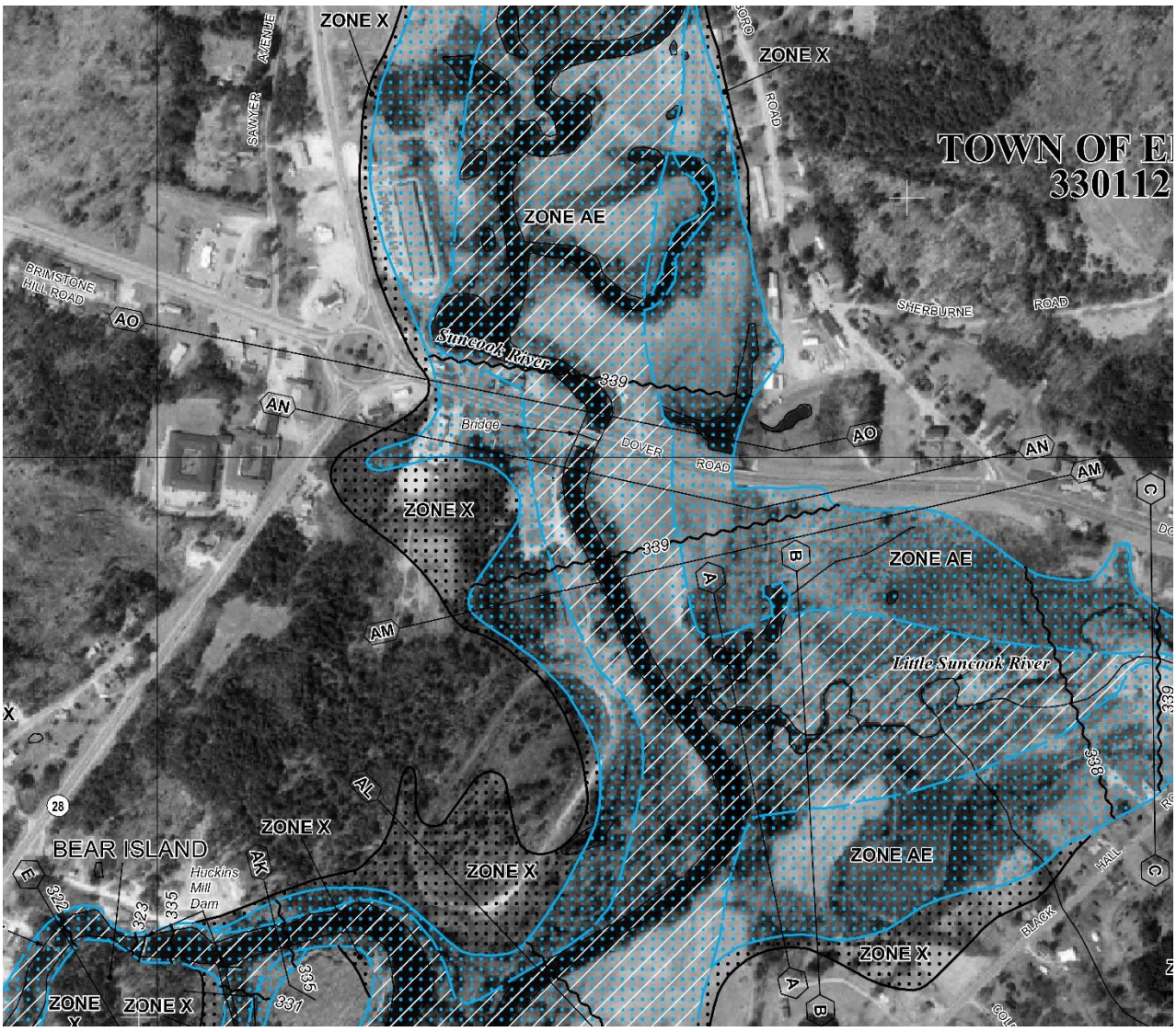


Source: Epsom DFIRMS can be downloaded at http://www.granit.unh.edu/dfirms/d-DFIRMzips/Epsom.zip, last accessed 06-20-18

Figure 9 displays an example of a DFIRM's zoomed-in view of the Suncook River and Little Suncook River's confluence south of US Routes 4/202 and west of Black Hall Road. The Suncook River travels in a north-south direction through the entire western side of Epsom while the Little Suncook River flows from Northwood Lake at the eastern edge of Town in a westerly direction to join with the Suncook River south of the Epsom Traffic Circle. The floodplains at the busy Traffic Circle and US Routes 4/202 bridge are depicted in Figure 9.

Figure 9

Zoom View of Epsom DFIRM Panel Location #0576



Source: FEMA DFIRM 2010 for Epsom NH #0576

DFIRMs illustrate the location of floodplains as a significant upgrade from the previous series of outdated paper maps, known as FIRMs. These new 2010 maps are now set on an aerial photography background that displays roads, buildings, forested areas, waterbodies and watercourses. Epsom's Zoning Ordinance contains the new maps as the official Special Hazard Flood Areas (SFHAs).

Rapid Snow Pack Melt

Warm temperatures and heavy rains cause rapid snowmelt. The water cannot seep into the frozen ground in early spring and so it runs off into streets and waterways. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

There is the possibility of damages from the rapid snow pack melt because of the flooding from the **Suncook River**, **Little Suncook River** and the various brooks along the roads, roadside wetlands, and from the culverts of the watercourses. Locations in Epsom that may be vulnerable to rapid snow pack melt include undersized or unmaintained culverts, roads, driveways, slopes, yards or fields, or any of the Town's fast moving brooks or drainage areas. Damage to roads is expected.

Magnitude of Rapid Snow Pack Melt

Rapid snow pack melt is a type of flooding. On its own, it has no known magnitude measurement. However, the hazard can share **Flooding's** Special Flood Hazard Areas (SFHAs) table.

Rapid Snow Pack Melt in Epsom

Melt runoff from impervious surfaces and roadways or from tree cover and fields can cause floods over the Entire Town. Road washouts and/or culvert failure locations or other areas flooded have included over the years: Short Falls Road, Mill House Road, Jug City Road, Black Hall Road, Baker Road, Swamp Road (underwater), Olde Town Extension onto Prospect Road (runoff), Old Turnpike Road, Echo Valley Farm Road, Griffin Road, Sanborn Hill Road, Martin Hill Road, Mountain View Spur & Mountain Road, Baybutt Road, Locke's Hill off Lord's Mill Road and Webster Park. Roads and areas not the responsibility of the Town include private (not Town maintained) roads: Sleepy Hollow Lane (private, undersized) and Lakeside Drive (private, Chestnut Pond) as well as State highways: US 4/202 areas in floodplain (including Gulf Brook), NH Route 107, NH 28 (town line), Center Hill Bridge, Cass Road Bridge; or other non-municipal property: Epsom Central Elementary School athletic fields and equipment hut, Village District water pump house. Several of these roads have closed multiple times for repairs since the 2006 floods. Continuing channel movement and sedimentation of the **Suncook River** means a greater likelihood for further rapid snow pack melt damages.

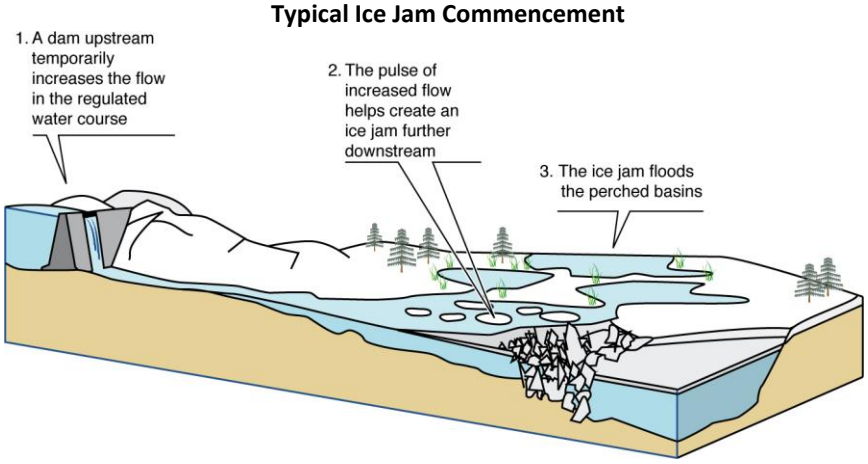
These are examples of flooding locations in Epsom. On these and other gravel roads, the road beds may be washed away, preventing traffic from passing. All areas of Town could be susceptible to rapid snow pack melt, particularly those near wetlands and brooks and within the floodplains.

River Ice Jams

Rising waters in early spring often break ice into chunks, which float downstream, pile up and cause flooding. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice in riverbeds and against structures presents significant flooding threats to bridges, roads, and the surrounding lands. A visual of how ice jams often form is displayed in **Figure 10**.

Figure 10

Typical Ice Jam Commencement



Source: USGS, Internet Accessed May 2014

Magnitude of River Ice Jams

There is no known widely-used magnitude scale for **river ice jams**. River ice jams can cause debris impacted infrastructure when they apply pressure to bridges and dams.

River Ice Jams in Epsom

The **Suncook River** has hosted **ice jams** in the community. These specific locations are capable of **ice jam** conditions include Short Falls Road, on Route 28 at Kingstowne or King's Grant MHP, where nearby homes or property could be at risk of **flooding** in the case of river **ice jams**. Roads in general are always susceptible to the effects of winter ice conditions, and this could include the **Little Suncook River** that runs along US 4/202. The US 4/202 Bridge at the Epsom Traffic Circle in the floodplains where the two rivers join could be susceptible to ice floes.

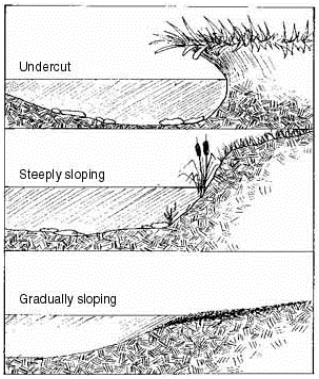
River **ice jams** could in these locations or along other bends in the Suncook River could particularly during high water and heavy **rain/snow melt** conditions. Bridges and dams are identified in **APPENDIX A Critical and Community Facility Vulnerability Assessment**.

Riverine Fluvial Erosion, Bed Scouring and Channel Movement

Fluvial erosion is the wearing away of the river/stream bank and floodway. Bed scouring is the wearing away of the bed of the river or stream, typically shown as a pool type formation at downstream culvert outflows. Watercourses with high elevation change (stream gradient) are particularly prone to flash-flooding conditions and most vulnerable to erosion and scouring. During flooding or even high flow events, rivers can erode their banks and migrate into their floodplains. A migrating river, when channel movement is occurring, has the potential to impact nearby structures (berms, dams, buildings, etc.) or infrastructure such as river or stream crossings (culverts and bridges) or transportation features (roads, drainage structures, rail, etc.) in its migration path.

Fluvial geomorphology is the study of how processes of flowing water in rivers work to shape river channels and the land around them. Fluvial assessments are a collection of field data undertaken within designated river reaches. A **river reach** is a length of stream that has characteristics similar enough that condition data collected within that length is representative of the entire reach. Figure 11 displays visual bank erosion characteristics.

Figure 11
Bank Erosion Characteristics

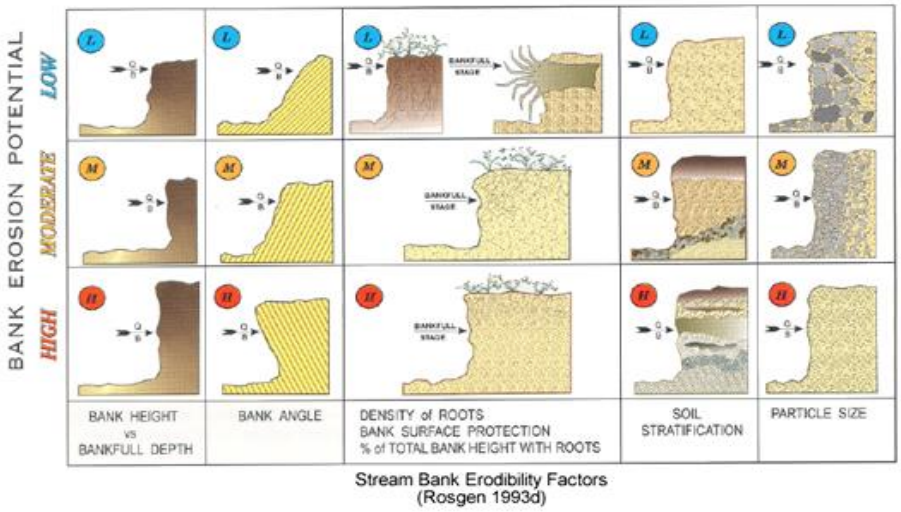


Source: US Geological Survey (USGS)

Magnitude of (Fluvial) River Bank Erosion

River and streambank erosion magnitude can be measured by the US EPA Bank Erosion Prediction Index (BEHI), which is used with the Near Bank Stress (NBS) quantification. Taken into consideration for the BEHI are the bank height versus bankfull depth, bank angle, density of roots, soil stratification, and particle size at a river reach. Figure 12 displays the visual version of the index.

Figure 12
Bank Erosion Prediction Index (BEHI)



Source: US Environmental Protection Agency (US EPA)

Riverine Fluvial Erosion, Bed Scouring and Channel Movement in Epsom

To identify areas of river and stream erosion that could impact public health and safety in the Suncook River watershed, the New Hampshire Geological Survey (NHGS) at the NH Department of Environmental Services (NHDES) coordinated a **fluvial geomorphology assessment** (FGA) conducted by Field Geology Services who collected field data along the **Suncook River** in 2013.

Data collection included line geomorphic features (artificially straightened channel, encroachments, riverside development, vegetated buffer less than 25' in length, bank erosion, bank armoring, and mass failure). Data collection also included point geomorphology features such as channel migration areas, beaver dams, bridges/culverts, large woody material jams, flood chutes, steep riffles, etc.). New ***Maps*** of ***Fluvial Geomorphic Features*** and ***Fluvial Erosion Hazard Meander Belts*** were developed to display this important river data and were incorporated into the **Suncook River Fluvial Geomorphic Features 2015 Addendum** to the **2012 Epsom Hazard Mitigation Plan.**

Floodplains of **Suncook River** and **Little Suncook River** have the greatest potential for erosion, scouring or channel movement. These two water courses run through the entire north-south of Epsom while the **Little Suncook River** follows Dover Road (US Routes 4/202) until its confluence with the **Suncook** south of the Epsom Traffic Circle. These rivers run through heavily populated and rural locations alike, including by the Epsom Central (Elementary) School, Epsom Village Water Precinct facilities, multiple manufactured housing parks, the Epsom Traffic Circle, and agricultural fields. The new **Suncook River** flow patterns, partly because of its avulsion event in 2006, has significantly eroded its banking, continues to change its

course slightly each year, and is carrying sandy sediment through multiple communities into the **Merrimack River**. The **Suncook River** is becoming shallower as a result, with less capacity.

Since the **2012 Plan**, the State of New Hampshire performed work projects to channelize **Leighton Brook**, a feeder stream of the **Suncook River**, to ensure abutting homes did not fall into the watercourse and to stop headcutting. The State of NH as of summer **2018** is completing a **$4m** stabilization project of the Suncook River south of the US 4 bridge. The stabilized channel runs from the bridge to a bit south of the avulsion area. The stabilized banking of the **Suncook River** ensures the newly rehabilitated Route 4 bridge remains safe for travel, with secure footings on hard surface.

The Town reports, as a result of the **Suncook River**'s stabilization, the flow is funneled in places and new artificial embankments are causing water to erode previously stable shoreland. Acres of agricultural land is reportedly being lost south of the avulsion area. In Epsom, it seems every stabilization project has caused additional problems downstream.

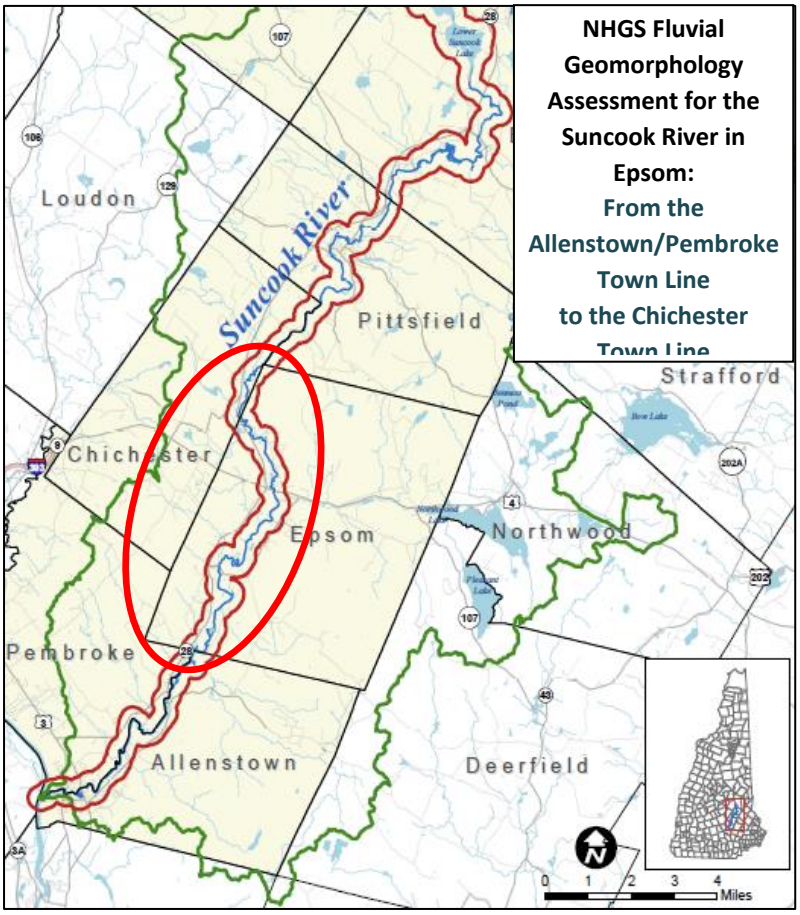
Suncook River

The aforementioned **Fluvial Geomorphic Feature Addendum** enabled data collection and study along many sections of the **Suncook River** in 2013. The data features collected during the fluvial geomorphology assessment are displayed on series **Maps 5A, 5B,** and **5C Fluvial Geomorphic Features** and **Maps 6A, 6B,** and **6C Fluvial Erosion Hazard Meander Belts**.

The entire lower Suncook River channel is **15.9** miles, of which **15.4** miles were assessed. Data were collected along the entire **8.9** miles of Epsom's river channel span of the **Suncook River**. An additional **6.5** miles were assessed for the downstream **Suncook River** in Allenstown/Pembroke, out of **7.0** river channel miles delineated in these two communities. **Figure 13** displays the locations of the river reaches described within the assessment.

Figure 13

Suncook River Reaches Location in Epsom



Source: Map developed by Central NH Regional Planning Commission (CNHRPC), 2015, from data provided by the NH Geological Survey (NHGS)

Seven (**7**) river reaches of geomorphically similar material were delineated in Epsom, totaling **8.9** river channel miles (**46,816** feet). From south to north in Epsom, Reach 6B begins at the Allenstown town line for **2.8** miles just before intersecting with Short Falls Road. Reach 7A begins at Short Falls Roads to Reach 7B for **1.8** miles, then Reach 8 extends **0.6** miles north. Reach 9 and Reach 10 encompass a total of **1.2** miles reaching the junction of US Routes 4/202, where Reach 11 extends the last **2.6** miles to the Chichester town line.

Of Epsom's **8.9** miles of Suncook River channel, **18%** (**8,840'**) of its banks had been artificially straightened, **25%** (**22,986'**) of banks were eroding, **12%** (**11,622'**) of the banks had little protective vegetative buffers, **10%** (**9,618'**) of banks had encroachments, **10%** (**9,211'**) of the banks has riverside development, **5%** (**4,700'**) of the banks were stabilized (armored), and over 1% (**1,175'**) of the bank was in a mass failure state. This evaluation was conducted in **2013**, so at present time, these figures have very likely changed. These areas were mapped in the **Map 5** series.

Geomorphic features such as flood chutes (7), large woody material jams, stormwater inputs, head cuts, bridges, channel migration, gullies, steep riffles, avulsion, and alluvial fan features were identified and mapped in the **Map 5** series.

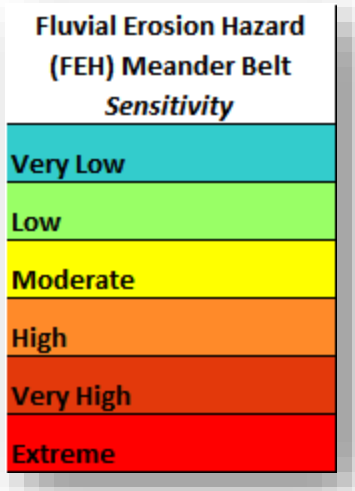
The full **2015 Addendum** with its data and findings discussed in detail is included as **APPENDIX E** to the **Epsom Hazard Mitigation Plan 2018** and its maps have been incorporated as well.

Suncook River Fluvial Erosion Hazard (FEH) Meander Belts

Fluvial erosion hazard areas, or *meander belt*, data is derived from assessed river reaches. A *meander belt* is that area of land on either side of a river or stream channel that a river can potentially access over time as a river naturally migrates across its floodplain

For identified river reaches, including those for the Suncook River, the suite of river geomorphology (condition) data was collected to provide an understanding of the river channel's sensitivity to future change (inclusive of bed and bank erosion) within the meander belt (or fluvial erosion hazard zone) as a result of high flow events. **Sensitivity for a reach can be in any one of six categories, based on its condition, ranging from Very Low to Extreme, with the categories of Low, Moderate, High and Very High in between.**

The **7** assessed **Suncook River** reaches in Epsom were delineated by the NH Geological Survey (NHGS) using scientific techniques to define fluvial erosion hazard (FEH) meander belt locations and their relative sensitivity to future change. Future reach change could include channel migration, bank erosion, and other fluvial geomorphic changes during high flow or flooding conditions.



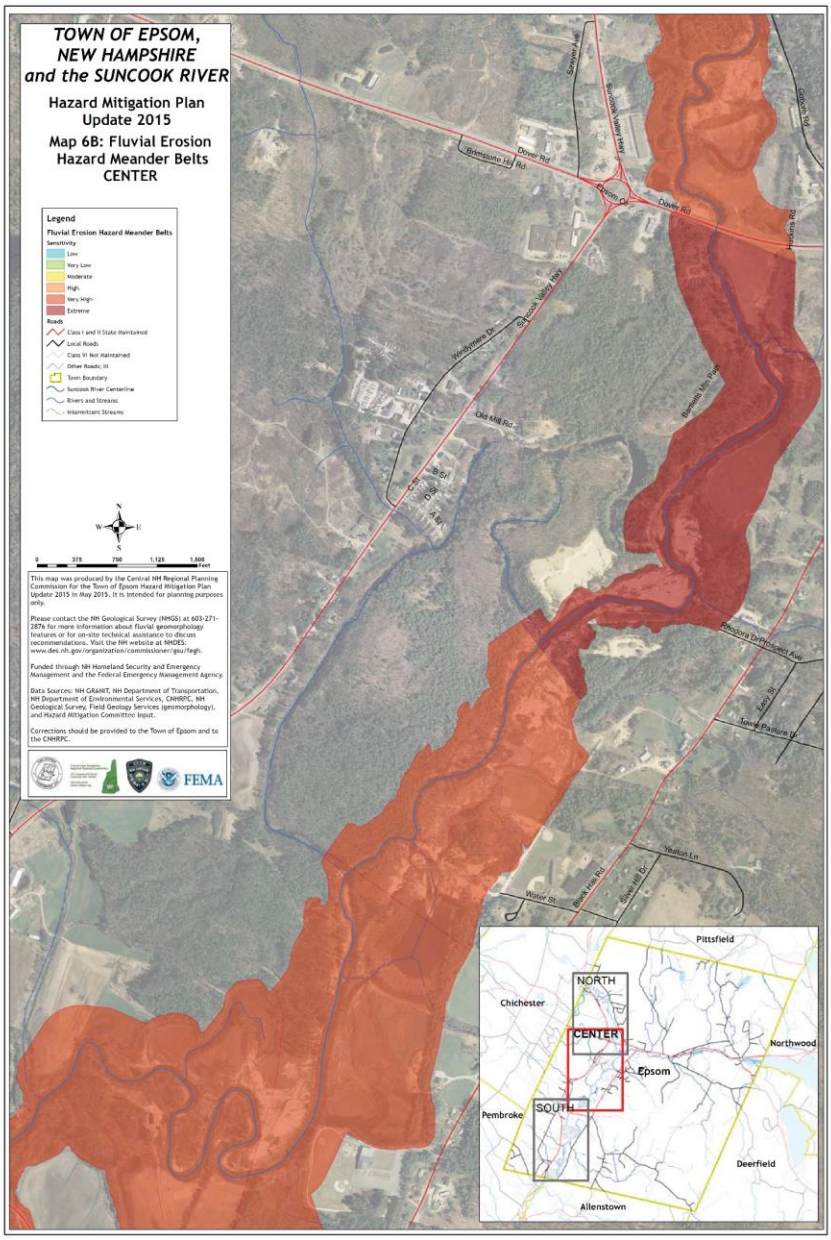
The fluvial geomorphology data collected about the river allows for delineation of meander belts, also known as fluvial erosion hazard areas. Fluvial erosion hazard mapping can display these reach sensitivities to channel changes, ranging from the highest **Extreme** to the lowest **Very Low** sensitivity rankings. Broadly, assignment of an **Extreme** category means a reach that is experiencing considerable erosion of its beds and banks, and typically has flood chutes and meander cutoffs that increase the potential for changing flow paths and further erosion during a large flood. Conversely, a rating of **Very Low** is typically found in a bedrock gorge, where the flow path will not change on time scales of concern to people.

On the relative scale of the six FEH sensitivity categories ranging from **Very Low** to **Extreme**, **5 Suncook River** reaches were rated as **Very High** and **2** reaches were rated as **Extreme**. Epsom is very susceptible to further **Suncook River** changes.

These are displayed on the **Fluvial Erosion Hazard (FEH) Meander Belt Map 6 Series** which depict the meander belt sensitivity for Epsom's **Suncook River** segment. See **APPENDIX D** for the **Fluvial Geomorphic Addendum 2015** for more information. **Map 6B** is provided here in **Figure 14** as a visual representation of Reach 7B (**Very High**), Reach 8 (**Very High**), Reach 9 (**Extreme**), Reach 10 (**Extreme**), and Reach 11 (**Very High**) fluvial erosion hazard meander belt sensitivity.

Figure 14

Map 6B Soucook River Fluvial Erosion Hazard (FEH) South of Epsom Traffic Circle



Source: Map developed by Central NH Regional Planning Commission, 2015, from data provided by the NH Geological Survey (NHGS)

Erosion occurs at many locations along the **Suncook River** banks according to the **Map 5** series which can be used as a tool to help understand and respond to erosion and scouring situations. The Town should remain alert for the progress of existing erosion sites and locations of new bank erosion.

From discussions with the Hazard Mitigation Committee and the **Map 5** series, existing or potential future hazard locations of **Suncook River bank erosion and scouring** could include:

- Floodplains of the Suncook River
- Behind the Epsom Central (Elementary) School
- Near Short Falls Bridge
- Location of Suncook River avulsion (May 2006), where the new channel cut through an area outside the documented 100- and 500-year floodplains

The **Suncook River** is now shallower and more spread out because of siltation. **Stream bank erosion** will continue until the **Suncook River** finds a new natural course or engineering solutions are implemented in problem spots. As noted from **2006-2012** flooding experiences, a **2"-4"** rain storm could cause River **scouring and erosion**. Debris flows down the **Suncook River** and silt changes regularly occur. The water is cloudy and no longer clear in many locations. **Scouring** behind the Epsom Central School athletic fields has occurred regularly since the avulsion and erosion is removing acres of active agricultural farming fields.

Suncook River Large Woody Material Assessment

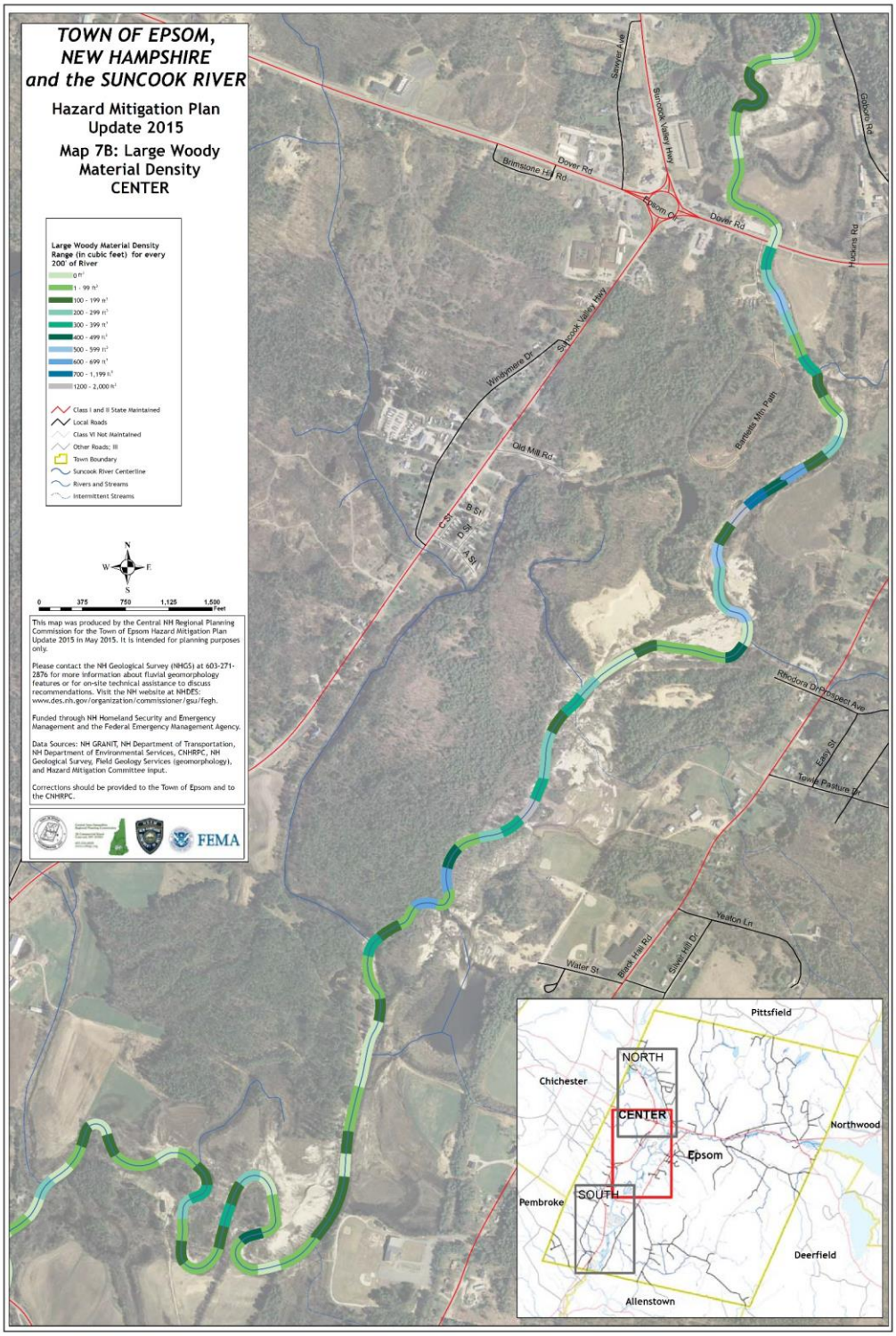
A unique inventory of **large woody material** in the **Suncook River**, often referred to as debris, was undertaken with the **Fluvial Geomorphic Addendum 2015** by the NH Geological Survey. Interesting results are displayed in the **Map 7 Large Woody Material** series.

Each of the main river reaches were divided into **200'** segments to enable more accurate counting of debris. Reach 6 (A&B) has about **74** of these **200'** segments surveyed, Reach 7 (A&B) had **49 200'** segments surveyed, Reach 8 had **17**, Reach 9 had **12**, Reach 10 had **19**, and Reach 11 had **68 200'** segments surveyed. Reach 6 (**2.8** miles long) had **231** individual pieces of large woody material with a total of **7,123** cubic feet (**ft^3**) of density. Reach 11 (**2.6** miles) had **218** pieces with **6,045 ft^3** of material. Nearer the Epsom Traffic Circle, at Reach 10 (**0.7** miles) **161** pieces were identified south of the US Routes 4/202 bridge with **7,307 ft^3** of material. In total, **946** individual pieces were inventoried with **33,520 ft^3** within Epsom's **9.8** miles of the **Suncook River**.

Although there are many ways to examine this data, the greatest large woody material density was located in two non-consecutive segments (**400'**) of river channel, totaling **59** trees with **3,600 ft^3** density inventoried. **Figure 15** displays **Map 7B** to illustrate the woody material in the **Suncook River**. This map displays the two highest woody material density locations in a gray color. Particularly around meanders, this woody material may obstruct water flow or cause **debris impacted infrastructure** on dams, bridges or in culverts.

Figure 15

Map 7B Soucook River Large Woody Material South of Traffic Circle



Source: Map developed by Central NH Regional Planning Commission, 2015, from data provided by the NH Geological Survey (NHGS)

This woody material has the potential to move with the river's currents. Storms, floods, and ice chunks can help move material. As **erosion** or bank failures occur, more trees will fall into the **Suncook** to lodge, float or cause **debris impacted infrastructure**. Since this **2013** inventory, many of these large woody material locations are known to have changed. However, the Town can inspect problem locations and evaluate the best methods of resolving large woody material areas. In many cases, the best solution is to leave the woody material as found.

Leighton Brook Stabilization Efforts, 2015-2016

One of the tributaries to the **Suncook River** is **Leighton Brook**, which was shortened **1,600'** during the **2006** avulsion event. The brook flows within feet of many homes and threatened to undermine the Black Hall Road bridge because of the advancing **headcut**. As a collaborative project, the NHDES stabilized **Leighton Brook** excavating a new channel and adding over **4,000** tons of imported rock. The new design protects against **Suncook River** migration and provides stability against upstream **erosion**. Over time, natural vegetation will establish and the stream corridor will once again become healthy habitat. **Figure 16** displays a photo of the new **Leighton Brook** channel and an excerpt from a NHDES article.

Figure 16
Leighton Brook Channel Stablization Photo

Collaborative Effort Brings Stability to Leighton Brook

If you've attended a fluvial geomorphology course, the message is always, "rivers don't like fast change." Need proof? Just east of the Epsom traffic circle on the Route 4 bridge you can look south at the Suncook River. This is a river reacting to fast changes that occurred ten years ago. What you can't see is the collateral damage downstream on Leighton Brook because of the Suncook River cutting down its channel bed elevation by up to twenty feet since 2006.

The Suncook River's path was shortened by about a half-mile in May 2006 after seventeen inches of rainfall, triggering an avulsion—a rapid abandonment of the river channel into a new valley—that forced dozens of nearby residents permanently out of their homes and threatened to undermine US Route 4 and Black Hall Road in Epsom. With the Suncook River now occupying a sand-dominated valley, the erosive forces of the river continue to deepen the channel and carve upstream. Leighton Brook was shortened by 1,600 feet in the process. The continued, easterly migration of the Suncook River channel and the advancing headcut on Leighton Brook threatened to undermine the Black Hall Road crossing and homes situated less than ten feet away from the banks of Leighton Brook.

River restoration, stabilization and infrastructure protec-

was compounded by having homes less than ten feet from the top of banks, an abandoned underground fuel storage tank and a multiple use recreational corridor trail bridge, all within the project area. Creating additional channel capacity in the lower reach of Leighton Brook was required

Source: NHDES Environmental News March-April 2016

Suncook River Stabilization Efforts 2017-2018

The **Suncook River** also underwent **a $4m** river channel stabilization south of the Route 4/202 bridge to help prepare for the rehabilitated bridge construction in fall **2017** and winter/spring/summer **2018**. Riprap and boulders were placed downstream of the bridge to reduce the chance of erosion and channel movement and to ensure the pilings were secured. Figure 17a and Figure 17b display Suncook River stabilization progress.

Figure 17a

Suncook Channel Stablization Project

GEOFF FORESTER/ Monitor staff

Progress on the Suncook River update project is seen from Route 4 in Epsom on Thursday.

Figure 17b

Source: Concord Monitor October 2017

With these erosion potential descriptions, large woody material information, and stabilization projects incorporated into the **Hazard Mitigation Plan 2018**, the Town has additional opportunity to consider areas of identified **Suncook River** potential **flooding**, **erosion and scouring**, and **debris impacted infrastructure** risk in future planning efforts. The river assessment data could also be utilized to develop regulated **fluvial erosion** hazard maps, but this is a step not yet taken in New Hampshire. If a community elected to do so, they could use the maps to pursue development limitations

through the zoning ordinance amendment process to protect infrastructure and people from future river movement within the meander belts.

WIND HAZARDS

Hurricane season begins on June 1 and continues through the end of November. August and September are the most active hurricane months. It is not uncommon for New England to be impacted by a hurricane more than once in a season. River and flooding due to heavy rains is a risk to Epsom during hurricanes. Numerous hurricane events in recent history have occurred in the State, region, and the local area surrounding Epsom that may have also had an impact on the Town.

Wind is also found in severe winter snow and ice storms, making this hazard likely to occur during the entire year. Significantly high winds occur especially during hurricanes, tornadoes, winter storms, and thunderstorms any time of the year. Falling objects and downed power lines are dangerous risks associated with high winds. Property damage and downed trees are common during high wind occurrences. All utilities, including power lines, are at risk and their damage or destruction would create a hazard to the Town. A communications interruption or failure resulting from damage to telecommunications towers could affect the capabilities of emergency personnel to respond to the hazard event.

There are several types of **Wind** hazards examined in the **Hazard Risk Assessment**:

- **Tornadoes**
- **Downbursts**
- **Hurricanes and Tropical Storms**
- **Severe Wind, Rain Storms and Thunderstorms**

Tornadoes

Significantly high winds that occur especially during hurricanes, winter storms, and thunderstorms, but can also exist independent of other storms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during high wind occurrences.

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

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

Magnitude of Tornadoes

A tornado occurring in Epsom would cause considerable damage. Roofs could be torn off frame houses; dams could be damaged; large trees snapped or uprooted; and light object missiles would be generated by an EF-2 Tornado. Tornado magnitude is measured by the Enhanced Fujita (EF) Scale, a 2007 update from the original F-scale (Fujita Scale), which are provided in **Table 14**.

Table 14

Enhanced Fujita (EF) Scale

Enhanced Fujita (EF) Scale 2007 – Present	Old Fujita (F) Scale *replaced*
F Number with 3-Second Gust mph	**F Number with 3-Second Gust mph**
EF0 65-85 mph	**F0** 45-78 mph
EF1 86-110 mph	**F1** 79-117 mph
EF2 111-135 mph	**F2** 118-161 mph
EF3 136-165 mph	**F3** 162-209 mph
EF4 166-200 mph	**F4** 210-261 mph
EF5 over 200 mph	**F5** 262-317 mph

Source: National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center

Tornadoes in Epsom

The entire area of Town is vulnerable to a **tornado**, but this event would do more damage in highly populated areas. High density populated areas include the Epsom Central School (~433 students + ~85 staff), Cornerstone Christian Academy (~35 students + ~10 staff), Northwood Lake, Concord Hospital Family Medicine Facility, Epsom HealthCare Center (aka Epsom Manor or Heartland Place Assisted Living, ~108 beds), the Epsom Traffic Circle, senior housing facilities (Meadow Brook Apartments [subsidized housing], ~50 units; Morgan Farm Estates Elderly Condominiums, ~20 units; Sunrise Meadows Senior Living [55+ Housing], ~24 units), other schools and childcare facilities, multi-family housing Caraway Multi Families, ~4-5 units; Lakeview Apartments, ~6 units; The Barn Arvanitis, ~5 units; The Brown Apartments, ~4 units), Webster Park, Town facilities, manufactured housing parks (Bartlett's MHP ~8 homes; Breezy Acres MHP Cooperative, ~15 homes; Colby Brook Estates MHP, ~27 homes; Family Estates MHP

Cooperative, Inc., ~15 homes; King's Grant MHP [55+ Senior], ~50 homes; Kingstowne MHP [Senior], ~134 homes; Presidential MHP, ~30 homes); and seasonal campgrounds: Get Away Tiny Houses. formerly Blake's Brook Campground (~35 tiny houses); The Big Easy (formerly Circle 9 Ranch) Campground, ~150 sites; Epsom Valley Campground, ~70 sites; Lazy River Campground, ~109 sites). A secondary effect of quick, severe hazard events with **power failure** include alarms in the elderly resident homes. Alarms turn on, scaring residents, and can cause medical emergencies due to shock and heart problems. Emergency responders report it is impossible to move the residents during these circumstances. All of these populated areas carry greater risk because of higher density (see **APPENDIX A Critical and Community Facility Vulnerability Assessment** for a complete list of sites).

Forested sections of Town run a risk of isolation through debris impacted infrastructure (trees down on roads and powerlines) resulting in power failure with little emergency access until the way is cleared. Wooded and forested sections of Town are vulnerable to tree fall, including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, as well as US 4/202, NH 28, and virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads.

A **tornado** occurring in Epsom would cause considerable damage to this rural community, perhaps similar to the EF-3 **tornado** in July 2008 which moved across Northwood Lake. Roofs could be torn off frame houses; mobile homes can be demolished; large trees are snapped or uprooted; and light object missiles would be generated as a result of an EF-2 **Tornado**. Communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower, and other utilities could also be affected by **tornadoes**.

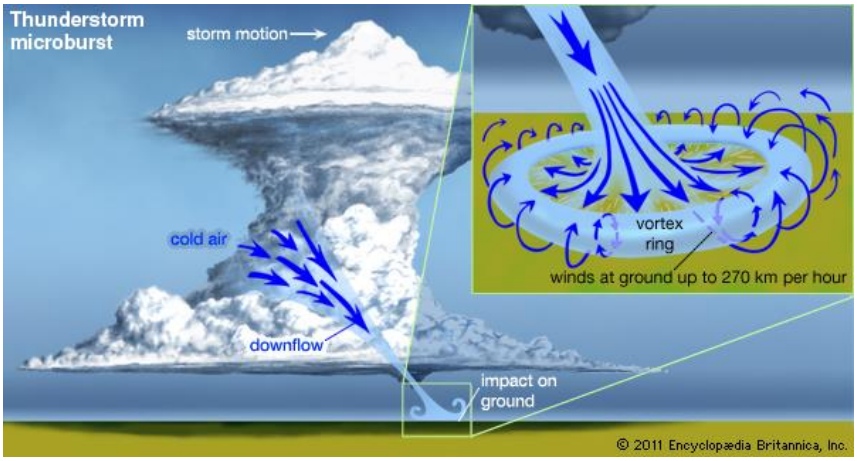
Downbursts

A downburst is a severe localized wind blasting down from a thunderstorm. These "straight line" winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts are capable of producing winds of up to 175 mph and are life threatening. Downbursts are quite common during Central NH's hot weather months. Microbursts and macrobursts have been known to occur here in the region.

Downbursts of both sizes can produce strong wind shear - or large changes in wind speed and direction over a short distance. Trees are regularly snapped off in a singular direction by a macroburst or microburst. Downbursts typically originate from thunderstorm clouds, with air moving in a downward motion until it hits the ground level and then spreads outward in all directions. In fact, the wind pattern of a downburst is the opposite of a tornado's wind pattern, shown in **Figure 18**.

Figure 18

Microburst Forming from Thunderstorm Clouds



Source: Internet (Encyclopedia Brittanica)

Magnitude of Downbursts

Downburst magnitude is rated on the same NOAA Enhanced Fujita (EF) scale as tornadoes. In addition, downbursts fall into two categories:

- microburst, which covers an area less than 2.5 miles in diameter and
- macroburst, which covers an area equal to or greater than 2.5 miles in diameter.

Downbursts in Epsom

Downbursts are considered a strong threat in Epsom. The likelihood of future wind events in Town seems high. **High winds** are unpredictable, and are often more prevalent at higher elevations. The Epsom Traffic Circle corridor serves as the Town Center of Epsom, through which US Routes 4/202 and NH 28 travel and lined with businesses and homes. The US 4/202 is a regular commuter route for thousands of cars during each morning and evening commute block.

Like a tornado, the highest populated locations could have the greatest potential for injury and property damage from **downbursts**. These include the Epsom Central School, Northwood Lake, Concord Hospital Medical Facility, the Epsom Traffic Circle, assisted living facilities, other schools, Webster Park, Town facilities, manufactured housing parks and campgrounds. A secondary effect of quick, severe hazard events with **power failure** include alarms in the elderly resident homes. Alarms turn on, scaring residents, and can cause medical emergencies due to shock and heart problems. Emergency responders report it is impossible to move the residents during these circumstances. All of these populated areas carry greater risk because of higher density (see **APPENDIX A Critical and Community Facility Vulnerability Assessment** for a complete list of sites).

Nearly the entire Town of Epsom is forested outside of the US 4/202 and NH 28 corridors. The highest elevation, forested or mostly densely populated sections of Town run a risk of isolation through **debris impacted infrastructure** (trees down on roads and powerlines) resulting in power failure with little emergency access until the way is cleared. Wooded and forested sections of Town are vulnerable to tree fall, including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, as well as US 4/202, NH 28, and virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. Unitil, Eversource and NH Electric Cooperative all have electrical systems in Town. Atlantic Broadband (formerly Metrocast) is a provider of voice over internet protocol (VOIP) phone lines which go down with every storm.

Communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower, and other utilities could also be affected by **downbursts**.

Agricultural farms and orchards run the risk of high damage from **downbursts** which also brings economic consequences. Some farms are homestead farms which provide food and income for owners. Crop and livestock loss are consequences of **downbursts** in these locations. In Epsom, agricultural operations include Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), Yeaton Dairy Farm. Many households keep farm animals.

Hurricanes and Tropical Storms

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. Flooding is often caused from the coastal storm surge of the ocean and torrential rains, both of which accompany the storm. The floods and high winds can result in loss of life and property. Hurricanes, high wind and rain events, and thunderstorms can damage Epsom just like any other community in Central New Hampshire. Forested lands and trees along the transportation infrastructure can be blown down across roads; the above-ground powerlines along the sides of the road can be snapped either by trees or high winds and fall onto the roads or nearby objects; and runoff flooding and stream/brook and river flooding can occur because of hurricanes and severe storms.

Magnitude of Hurricanes and Tropical Storms

The Saffir-Simpson Hurricane Wind Scale **measures the magnitude of wind event** on a 1 through 5 rating basis. The definitions of Category 1 through 5 sustained wind miles per hour and their respective threats to people, different types of homes, shopping centers, trees, power lines, water, and more are displayed in **Table 15**.

Table 15

Saffir-Simpson Hurricane Wind Scale

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

Source: National Oceanic and Atmospheric Administration (NOAA)

Hurricanes and Tropical Storms in Epsom

Hurricane Sandy, which was not a declared disaster in Epsom, caused many roads to temporarily close while the Highway Department cleared them of debris. Trees and limbs fell onto the roadways and onto powerlines. If vehicles had been traveling on these roads while the hurricane was in progress, they would have been in danger. Many of the same sites vulnerable to high wind events in previous sections are also vulnerable to **hurricanes and tropical storms**.

When **hurricanes or tropical storms** occur in Epsom, the Towns electrical utilities of Eversource (formerly Public Service of NH or PSNH), Unitil and NH Electric Cooperative will continue to be prone to power outages. Atlantic Broadband (formerly Metrocast) is a provider of voice over internet protocol (VOIP) phone lines which go down with every storm. The response time to these outages could be several days in the more remote or densely populated areas of Town, depending on where debris has fallen onto roads.

Areas particularly vulnerable to the combination of **flooding**, **wind**, **tree debris** and **power failure** include forested and highly traveled sections of Town, including the Epsom Traffic Circle, Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, as well as US 4/202 and NH 28. Communications towers (Elkins Drive, Epsom

Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower, and other utilities could also be affected by **hurricanes**. Several sections of Town would be difficult to access with trees and power lines down on these residential roads, resulting in possible isolation. Radio operability for emergency communications could be adversely affected. Land line and VOIP telephone are at risk of failure during severe storm weather.

Severe Wind, Rainstorms and Thunder Storms

More commonly experienced are **severe wind storms**, **rainstorms** and **thunderstorms**. The severe wind storms occur during all months of the year while the thunder storms tend to erupt during periods of humidity. On occasion, precipitation in the form of rain or hail is experienced during these storms. Rainstorms bring can flooding and high winds. **Thunderstorms** can also bring lightning hazards in addition to high winds and flooding.

Magnitude of Severe Wind and Thunder Storms

Many of the severe wind storms Epsom experiences are not hurricanes but are severe wind storms or thunderstorms. Thunderstorms are common in New Hampshire, particularly during the hot weather months. The Thunderstorm Category Criteria scale in **Table 16** measures the magnitude of thunderstorms with their various weather components, including rain, wind, hail, tornado, and lightning.

Table 16

Thunderstorm Criteria Scale

Thunderstorm Categories	Rainfall Inches per hour	Wind Gust max mph	Hail Size in	Tornado Potential Highest Category	Lightning Frequency per 5 minutes	Darkness Aspect	Overall Thunderstorm Impact
T-1 Weak Thunderstorms or **Thundershowers**	0.03" to 0.10"	< 25 mph	None	None	Few strikes during entire storm	**Slightly Dark** Sunlight may be seen after storm	1. No damage. 2. Gusty winds at times.
T-2 Moderate Thunderstorms	0.10" to 0.25"	25-40 mph	None	None	Occasional 1 to 10	**Moderately Dark** Heavy downpours might cause the need for car headlights	1. Heavy downpours. 2. Occasional lightning. 3. Gusty winds. 4. Very little damage. 5. Small tree branches might break. 6. Lawn furniture moved around. 7. Power outages are possible.

Thunderstorm Categories	Rainfall Inches per hour	Wind Gust max mph	Hail Size in	Tornado Potential Highest Category	Lightning Frequency per 5 minutes	Darkness Aspect	Overall Thunderstorm Impact
T-3 **Heavy Thunderstorms** 1. Singular or lines of storms	0.25" to 0.55"	40-57 mph	1/4" to 3/4"	EF0	Occasional to Frequent 10 to 20	**Dark** Car headlights used. Visibility low in heavy rains. Cars might pull off the road.	1. Minor damage. 2. Downpours produce some flooding on streets. 3. Frequent lightning could cause house fires. 4. Hail occurs with the downpours. 5. Small tree branches are broken. 6. Shingles are blown off roofs. 7. Power outages are likely.
T-4 **Intense Thunderstorms** 1.Weaker supercells 2. Bow echoes or lines of storms	0.55" to 1.25"	58-70 mph	1" to 1.5"	EF0 to EF2	Frequent 20 to 30	**Very Dark** Car headlights used. Some streetlights come on.	1. Moderate damage. 2. Heavy rains can cause flooding to streams and roadway flooding occurs. 3. Hail can cause dents on cars and cause crop damage. 4. Tornado damage. 5. Power outages will occur.
T-5 **Extreme Thunderstorms** 1. Supercells with family of tornadoes 2. Derecho Windstorms	1.25" to 4"	> 70 mph	1.5" to 4"	EF3 to EF5	Frequent to Continuous > 30	**Pitch Black** Street lights come on. House lights might be used.	1. Severe damage to trees and property. Damage is widespread. 2. Flooding rains. 3. Damaging hail. 4. Damaging wind gusts to trees and buildings. 5. Tornadoes EF3 to EF5 or family of tornadoes can occur. Tornadoes cause total devastation. 6. Widespread power outages.

Source: Adapted from Accuweather.com, Henry Margusity, Senior Meteorologist

Incidentally, hail can accompany thunderstorms, hurricanes, or severe wind events. The Hail Size Description Chart describes the potential size of hail during a hurricane or severe storm event, which could occur anywhere in Epsom. The chart is shown below along with a **Hail Size Comparison Chart** which is a visual representation of some of the relative sizes of hail (note this chart image is not shown to scale). The **Table 17** hail size description and **Figure 19** size comparison scales measure the magnitude of hailstones that could fall on Epsom during severe storm events.

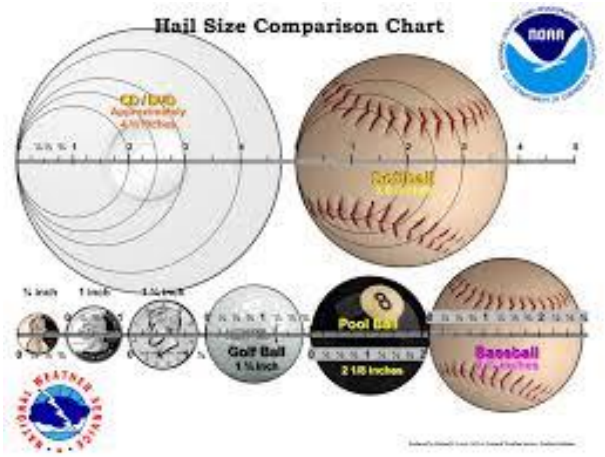
Table 17

Hail Size Description

Hailstone Diameter (inches)	Size Description
< 1/4	bb
1/4	**Pea Size**
1/2	Mothball Size
3/4	Penny Size
7/8	Nickel Size
Severe Criteria 1	**Quarter Size**
1 1/4	Half Dollar Size
1 1/2	Walnut or Ping Pong Ball
1 3/4	Golf Ball Size
2	**Hen Egg Size**
2 1/2	Tennis Ball Size
2 3/4	Baseball Size
3	**Teacup Size**
3 4/5	Softball Size
4	**Grapefruit Size**

Figure 19

Hail Size Comparison



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

Severe Wind, Rainstorms and Thunder Storms in Epsom

All of Epsom has experienced **severe wind**, **rainstorms**, and **thunderstorms**. The Town's electrical utilities of Eversource (formerly Public Service of NH or PSNH), Unitil and NH Electric Cooperative will continue to be prone to power outages. The response time to these outages could be several days in the more remote or densely populated areas of Town, depending on where debris has fallen onto roads.

Traffic flow, whether on the main routes or on back roads, is a primary main concern for **high wind** events. Roadways become vulnerable to falling trees and limbs, and those that fall on utility lines. Although this situation can eliminate evacuation routes out of Town, the larger problem is the necessity for traffic rerouting. There are few options available for circumventing US Routes 4/202, NH 28 and the Epsom Traffic Circle. When rerouting is conducted, drivers (even residents) do not know the back roads well enough and the detour can be quite confusing to drivers The Town uses radio stations to convey alternate route information. Emergency management has observed some impatient travelers trying to drive under fallen utility wires or run over them, which poses extreme danger to vehicle occupants and potential rescuers..

Areas particularly vulnerable to the combination of **flooding**, **wind**, **tree debris** and **power failure** include forested and highly traveled sections of Town, such as the US Routes 4/202, NH 28, Epsom Traffic Circle, Short Falls Road and Bridge. Several sections of Town would be difficult to access with trees and power

lines down on residential roads, resulting in possible isolation. The Fort Mountain Tower and repeater supplies emergency communications, and it has the potential to be disrupted, resulting in adversely affected radio operability for emergency communications. Atlantic Broadband (formerly Metrocast) internet, especially with its VOIP telephone feature, and the other land line utilities are at risk of failure during **severe storm weather**.

The same vulnerable populations as listed previously can be susceptible to **severe storm** events because of their shared infrastructure and high density.

FIRE HAZARDS

Fire can be caused by several agents and can spread rapidly to consume property and endanger lives. This **2018 Plan** examines **lightning**, and **wildfire** (natural) fire sources and places other **fires (vehicles, structure, arson, explosions**) with **Technological Hazards**.

Wildfire is a significant concern and can quickly get out of control without good infrastructure, easily accessible forested backlots and practiced procedures. Lightning or human folly can cause wildfire. Locations of older narrow graveled roads or densely packed residential areas and other sections of Town or roads with only 1 access/egress are among the most vulnerable locations for fire and wildfire hazards. Rural, forested areas of the community or recreation and conservation areas are often the most vulnerable to both wildfire and lightning.

There are two types of natural **Fire** hazards examined in the **Hazard Risk Assessment**:

- **Lightning**
- **Wildfire**

Lightning

All thunderstorms contain lightning. During a lightning discharge, the sudden heating of the air causes it to expand rapidly. After the discharge, the air contracts quickly as it cools back to ambient temperatures. This rapid expansion and contraction of the air causes a shock wave that we hear as thunder, a shock wave that can damage building walls and break glass. Lightning strikes can cause death, injury, and property damage. Lightning is often referred to as the “underrated killer”.

Magnitude of Lightning

Lightning can be measured to determine how likely it may be for starting fires. Using a Level system of **1** to **6** corresponding with storm development and the number of lightning strikes, the Lightning Activity Level (LAL) measures the magnitude of lightning strikes as displayed in **Table 18**.

Table 18

Lightning Activity Level (LAL)

Level	LAL Cloud and Storm Development	Cloud to Ground Strikes per 5 Minutes	Cloud to Ground Strikes per 15 Minutes
LAL 1	No thunderstorms	n/a	n/a
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a 5- minute period.	1 to 5	1 to 8
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5-minute period.	6 to 10	9 to 15
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced Lightning is frequent, 11 to 15 cloud to ground strikes in a 5-minute period.	11 to 15	16 to 25
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5-minute period.	> 15	> 25
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.	6 to 10	9 to 15

Source: National Weather Service

Lightning in Epsom

Lightning regularly strikes in Town and can strike at any time at any given location. Specific sites which would cause the greatest impact if struck by **lightning** include the communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower. The towers in Town are frequently struck by **lightning**.

The vulnerable populations listed previously, including the Epsom Central School, Northwood Lake community, Concord Hospital Medical Facility, the Epsom Traffic Circle, assisted living facilities, other schools, Webster Park, Town facilities, manufactured housing parks and campgrounds, churches and tall or historical buildings could be particularly vulnerable to **lightning**.

Forested areas, parks, conservation areas or open recreation fields can be dangerous to people and property. These include remote areas which could not be easily accessed by emergency vehicles, the Baptist Hill Meetinghouse, Webster Park, Town Forest trails, points of higher elevation than surrounding area. Wooded and forested sections of Town are vulnerable to **lightning**, including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitively struck), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, US 4/202/202, NH 28, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. There is a lot of wood slash remaining in the woodland interior due to the **July 2008 Tornado** and the **December 2008 Ice Storm** which with **drought** conditions, contributes to an increased overall hazard

potential for **wildfires**. The Town Forest on Tarleton Road is remote and used recreationally for illegal camping and other activities, including use by teens.

Wildfire

Wildfire is defined as any unwanted and unplanned fire burning in forest, shrub or grass. Wildfires are frequently referred to as forest fires, brush fires, shrub fires or grass fires, depending on their location and size. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. The threat of wildfires is greatest where vegetation patterns have been altered by past land-use practices, fire suppression and fire exclusion. Because fire is a natural process, fire suppression can lead to more severe wildfires due to vegetation buildup.

Increased severity over recent years has decreased capability to extinguish wildfires. Wildfires are unpredictable and usually destructive, causing both personal property damage and damage to community infrastructure and cultural and economic resources.

Magnitude of Wildfire

The standard of measuring wildfire magnitude is by the National Wildfire Coordinating Group (NWCG)'s wildfire classification scale. **Table 19** displays the wildfire classification size per the number of acres burned.

Table 19
National Wildfire Coordinating Group Wildfire Classification Scale

Fire Class	Sizes in Acres
Class A	1/4 acre or less
Class B	> 1/4 acre to < 10 acres
Class C	10 acres to < 100 acres
Class D	100 acres to < 300 acres
Class E	300 acres to < 1,000 acres
Class F	1,000 acres to < 5,000 acres
Class G	5,000 acres or more

Source: National Wildfire Coordinating Group

Wildfire in Epsom

Although **wildfire** damage has been kept to a minimum to date, the potential for losing an immense acreage of Epsom to this natural hazard is possible, particularly with the abnormal, severe **drought** conditions currently occurring in **2015-2016**. The heavily forested woodlands of Town are often remote locations and difficult to access by emergency vehicles. The forested, dead-end residential neighborhoods

would be difficult to evacuate. Any **debris** left over from **flooding**, **winter storms**, or **wind events** are a **wildfire hazard**. When **droughts** or drier conditions occur, the dry vegetation becomes a significant hazard to the Town Fire Department. See the list of **lightning** strike sites for details.

All areas of Epsom could be impacted by wildfire. Some neighborhoods are more vulnerable than others because of high density, such as the manufactured housing parks and multi-family developments identified in **APPENDIX A Critical and Community Facility Vulnerability Assessment**. Unmaintained Class VI roads and the transmission lines corridor, and Epsom's mountains and backcountry are challenging to access because of the potential lack of emergency vehicle access and the number of people who use these areas for recreational purposes. **Wildfires** can also be caused by campfires and other human activity.

EXTREME TEMPERATURE (COLD-HOT) HAZARDS

Extreme temperature hazards include diverse hazards such as severe cold and snowstorms, excessive heat, drought, and public health. The snow and ice component often results in communications & power failure for a large segment of the Town. This category is meant to encompass all the hazards which can be influenced by the extreme weather temperatures and climate changes that New England, New Hampshire, the Central NH Region, and Epsom are experiencing.

There are several types of **Extreme Temperature** (**cold-hot**) hazards examined in the **Hazard Risk Assessment**:

- **Severe Winter Weather, Cold, and Ice Storms**
- **Drought**
- **Excessive Heat**
- **Public Health (Epidemics)**

The National Weather Service (NWS) in Gray, Maine which covers New Hampshire collects and reports climate data in addition to issuing warning and advisories. Winter **2015-2016** was one of the warmest and one of the least snowy on record in Concord, their most local reporting station. The average temperature this season since **1868** was **30.9** degrees, topping the previous record of **30.4** degrees in the season of **1879-1880**. Precipitation was **2.01** inches above normal this winter, totaling **10.53** inches. Total snowfall was **24.7** inches, **20.2** inches below normal. Warmest temperature records were also set during **2015**.

Severe Winter Weather, Cold, and Ice Storms

Ice and snow events typically occur during the winter months and can cause loss of life, property damage, and tree damage. Severe winter storms, including Nor'easters, typically occur during January and February. However, winter storms can occur from late September through late May.

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

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

A Nor'easter is a large weather system traveling from South to North, passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a Northeasterly direction. In the winter months, oftentimes blizzard conditions accompany these events. The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods.

Extreme cold temperatures are associated with continental Arctic air masses. The actual temperatures reached depend specifically on the nature of the cold air mass and where it originated. In general, those from the Arctic regions are the coldest. Though cold temperatures are dangerous, they become more so in conjunction with strong winds. The combination produces a wind-chill factor – heat loss measured in Watts per meter squared (Wm-2). A wind-chill factor of 1400 Wm-2 is equivalent to a temperature of -40 degrees F. At 2700 Wm-2, exposed flesh freezes within a half-minute.

Numerous severe winter events in recent history have occurred in the State, region, and the local area surrounding Epsom that may have also had an impact on the Town. Unlike the relatively infrequent hurricane, New Hampshire generally experiences at least several Nor'easters each year with varying degrees of severity. They form along the East coast as warm air from the Atlantic Ocean collides with cold arctic winds to the north and west. A hurricane, the nor'easter's warm-weather counterpart, differs in that it has a narrow range of strong winds around a warm, low-pressure core—nor'easter winds are more dispersed around a cold, low-pressure center.

Recent Severe Winter Weather in New Hampshire

In March **2018**, New Hampshire was hit by 4 cyclonic Nor'easters in a row over a 2- week period because of the changing climate, in a recurring snow-and-melt cycle. These storms have the potential to inflict more damage than many hurricanes because the high storm surge and high winds can last from 12 hours to 3 days, while the duration of hurricanes ranges from 6 to 12 hours.

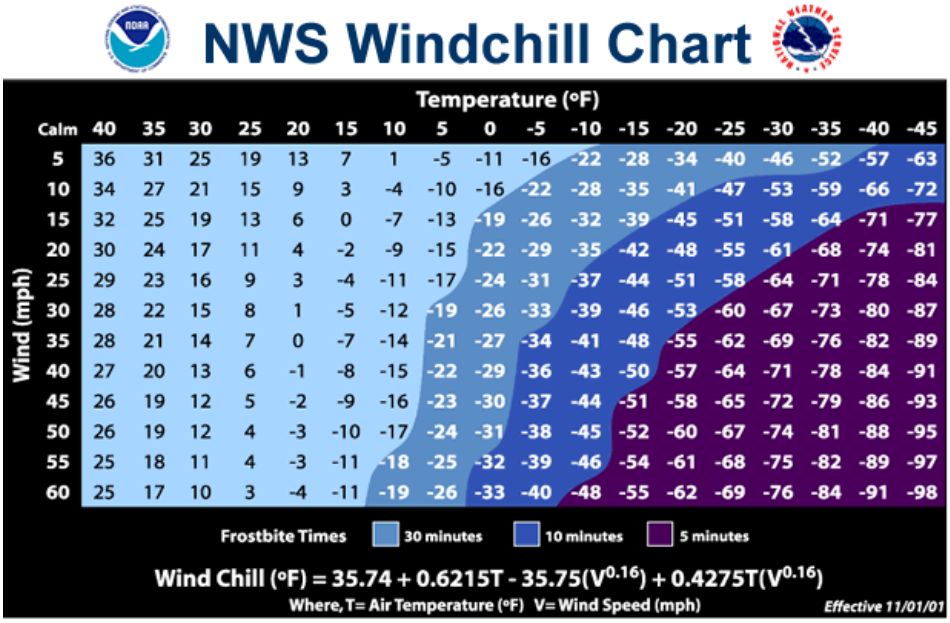
- March 2-3, 2018 (Winter Storm Riley) – Seacoast flooding, Concord wind gusts 36mph, about 1"
- March 7-8, 2018 (Winter Storm Quinn) – Concord 11"
- March 12-14, 2018 (Winter Storm Skylar) – Concord 11", Epsom 23"
- March 22, 2018 (Winter Storm Toby) – Concord 3"

All winter storms make walking and driving extremely dangerous. The elderly and very young are at high risk during winter storms and may be affected by hypothermia and isolation. During winter storms, there is an increased risk of **fire** because people experience **power failure** and use candles, portable gas stoves, generators, and flammable sources of heat and light.

Magnitude of Severe Winter Weather

Severe Winter Weather magnitude in can be measured for windchill, ice accumulation and snowfall using several different scales and indices including the NWS Windchill Chart, Sperry-Piltz Ice Accumulation Index (SPIA) and NCDC Regional Snowfall Index (RSI) for the Northeast. **Figure 20** displays the Windchill Temperature Index which measures the wind and temperature leading to how quickly frostbite can occur.

Figure 20
Windchill Temperature Index



Source: National Weather Service

Table 20 displays the Sperry-Piltz Ice Accumulation Index (SPIA) which measure the magnitude of ice damage from severe winter weather. The index is compared to the tornado and hurricane scales note above. Storm total rainfall converted to ice accumulation, wind, and temperatures during the storm period are used to develop SPIA.

Table 20

Sperry-Piltz Ice Accumulation Index (SPIA)

Ice Damage Index	Average NWS Ice Amount *in Inches*	Wind Speed *mph*	Ice Damage and Impact Descriptions
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems. No alerts or advisories needed for crews, few outages.
1	0.10 to 0.25	15 to 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges might become slick and hazardous.
	0.25 to 0.50	> 15	
2	0.10 to 0.25	25-35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions might be extremely hazardous due to ice accumulation.
	0.25 to 0.50	15-25	
	0.50 to 0.75	< 15	
3	0.10 to 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days. Warming sites needed.
	0.25 to 0.50	25 - 35	
	0.50 to 0.75	15 - 25	
	0.75 to 1.00	< 15	
4	0.25 to 0.50	> = 35	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures. Outages lasting 5-10 days. Shelters or warming sites needed.
	0.50 to 0.75	25 - 35	
	0.75 to 1.00	15 - 25	
	1.00 to 1.50	< 15	
5	0.50 to 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 to 1.00	> = 25	
	1.00 to 1.50	> = 15	
	> 1.50	Any	

Source: www.spia-index.com (adapted by CNHRPC)

The Regional Snowfall Index (RSI) for the Northeast is used to categorize significant snowstorms. The RSI ranks snowstorm effects on a scale from **1** to **5**, similar to the Enhanced Fujita Scale for tornadoes or the Saffir-Simpson Hurricane Wind Scale for hurricanes. The RSI differs from these other indices because it includes population, a social component. The RSI is based on the spatial extent of the storm, the amount of snowfall, and the juxtaposition of these elements with population. The Regional Snowfall Index (RSI) displayed in **Table 21** is a measurement of the magnitude of a snowstorm in the Northeast, which includes New Hampshire.

Table 21
Regional Snowfall Index (RSI) for the Northeast

Storm Category	RSI Value	Snow Description
1	1–3	Notable
2	3–6	Significant
3	6–10	Major
4	10–18	Crippling
5	18.0+	Extreme

Source: www.ncdc.noaa.gov/snow-and-ice/rsi/ (adapted by CNHRPC)

Severe Winter Weather in Epsom

Winter weather events are as common in Epsom as they are in the other areas of Central New Hampshire. The most recent worst winter storm on record was the **December 2008 Ice Storm** with wide-spread power outages lasting from **1** week (**7** days) up to **3** weeks (**21** days) in the most remote areas. Since then, Unitil, Eversource and NH Cooperative have adopted **5**-year hazardous road tree trimming policies. Road icing (**transportation accidents**) can occur when **ice and snow storm** events hit. **Communications failure**, **power failure**, **extreme cold** and local road impassibility (trees and/or power lines down) occur as well. Areas above 800 feet in elevation are particularly vulnerable to the effects of severe winter weather.

Areas of particular concern during **severe winter weather** include the Epsom Traffic Circle (US Routes 4/202 & NH 28), Webster Park, Town Office, Police, Fire, Highway facilities, and Northwood Lake community; schools: Epsom Central School, Cornerstone Christian Academy; healthcare facilities: Concord Hospital Family Medicine Facility, Epsom HealthCare [Senior] Center (aka Epsom Manor or Heartland Place Assisted Living; senior housing: Meadow Brook Apartments, Morgan Farm Estates Elderly Condominiums, Sunrise Meadows Senior Living; multi-family housing: Caraway Multi Family, Lakeview Apartments, The Barn Arvanitis, The Brown Apartments; manufactured housing parks: Bartlett's MHP, Breezy Acres MHP Cooperative, Colby Brook Estates MHP, Family Estates MHP Cooperative, King's Grant MHP [55+ Senior], Kingstowne MHP [Senior], Presidential MHP; seasonal campgrounds: Get Away Tiny Houses (formerly Blake's Brook Campground), The Big Easy (formerly Circle 9 Ranch) Campground, Epsom Valley Campground, and Lazy River Campground. All residential developments are vulnerable to the **winter weather** impacts noted above.

Epsom's dispersed residential population, located in wooded and forested sections of Town are vulnerable to loss of power and debris on roads: including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive **power failure**), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, US 4/202/202, NH 28, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. People may be subject to **cold temperature**, snow isolation, **transportation accidents**, **power failure** and **communications failure** during

winter storm events. These sections of Town and others not mentioned would be difficult to access with trees and power lines down on these residential roads, resulting in possible isolation for weeks. Communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower and older or historic (Baptist Hill Meetinghouse) or temporary buildings subject to roof collapse are at risk from **severe winter weather conditions**. See complete list in **APPENDIX A Critical and Community Facility Vulnerability Assessment**.

Drought

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

In the case of drought, residential (dug wells especially) and Town water supplies would be threatened. Most homes in Town rely on well water which is not easily replenished during periods of drought. During the **2015-2016** drought, many residences notified the Town of their dug wells going dry. The residents either made private arrangements for potable water or they dug new bedrock wells. All farms, orchards, tree farms, and conservation areas in town would be affected by drought. Additionally, wildfires have the potential of being more severe and commonplace during periods of drought, more difficult to contain.

Magnitude of Drought

Table 22 displays overall drought magnitude, measured by the Palmer Hydrological Drought Index (PHDI) the extent of hydrological drought in the form of long-term, cumulative monthly moisture conditions. The indices are developed by algorithms taking into consideration precipitation, temperature data, and the local Available Water Content (AWC) of the soil.

Table 22

Palmer Drought Conditions

Hydrological Drought Classification	
Extremely Moist	+4 and above
Very Moist	+3 to +3.99
Moderately Moist	+2 to +2.99
Mid-Range	-1.99 to +1.99
Moderate Drought	-2 to -2.99
Severe Drought	-3 to -3.99
Extreme Drought	-4 and below

Source: www.ncdc.noaa.gov/sotc/drought (as compiled by CNHRPC)

Drought in Epsom

Periods of **drought** in Epsom would occur Town-wide and could cause property damage and economic losses. The lack of water would become a community problem to keep people hydrated and the failure of agricultural crops, products and farm animals can occur. Failure of tree farms to thrive can result in economic losses. Increased likelihood of wide-spread **brush fire** and **wildfire** will occur with drier vegetation. **Lightning** strikes could contribute to wildfire risk during droughts. Dug wells can dry up during droughts and interrupt personal water supplies, so few homes remain with dug wells in Town. Property damage and personal injuries or death could occur from drought-related fires or dry wells. The Town's primary community water supply, Epsom Village Water District with its Water Pump Station and Water Tower, could enact water saving measures for their customers to assist with keeping the groundwater table higher, as could the Northwood Lake community. Overall, Epsom residents should be encouraged to voluntarily undertake water conservation.

Agricultural farms and orchards run the risk of high damage from **drought** which also brings economic consequences. In Epsom, these areas include Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), and the Yeaton Dairy Farm. Tree farms in Town are also susceptible to loss during **drought** conditions.

Epsom has a lot of livestock and the Town would have to find ways of watering them during certain weather events, including drought. During emergencies, with agreements in place the Town can assist people getting their large animals to shelter at locations such as large horse farms or fairgrounds and small animals to the Suncook River Veterinary Clinic.

Excessive Heat

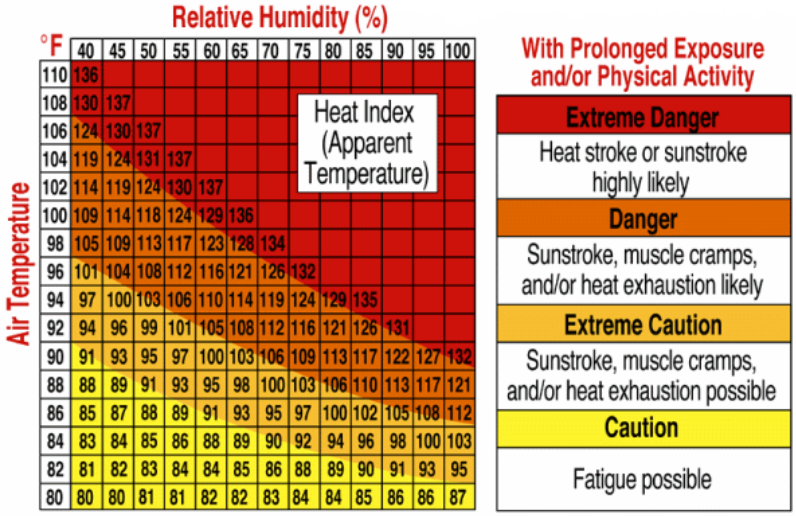
A heat wave is a period of abnormally and uncomfortably hot and unusually humid weather that typically lasts two or more days. The National Weather Services' Heat Index is used to measure humidity against temperature to develop a "real feel" temperature. Heat disorders on the body are quick and can be deadly. These now normal hot temperatures in the summer are commonly known as **excessive heat**.

Magnitude of Excessive Heat

Excessive heat is measured by the NWS Heat Index and the NWS Excessive Heat Warning Classifications. As both the air temperature and the humidity rise, so will the danger level to people. Heat disorders will become more likely with prolonged exposure or strenuous activity as shown in **Figure 21**.

Figure 21

Heat Index (Temperature and Humidity)



Source: weather.gov

Excessive Heat in Epsom

Epsom has experienced **heat waves** where temperatures exceeded 90 degrees for several days. During these times, many specific population sites in Town particularly susceptible to excessive heat, including Epsom HealthCare [Senior] Center (aka Epsom Manor or Heartland Place Assisted Living; schools: Epsom Central School, Cornerstone Christian Academy; senior housing: Meadow Brook Apartments, Morgan Farm Estates Elderly Condominiums, Sunrise Meadows Senior Living; manufactured housing parks: King's Grant MHP [55+ Senior], Kingstowne MHP [Senior].

The aged 55+ residences, tiny houses, and campgrounds should have access to either air conditioning or cooling facilities. Older manufactured homes may lack air conditioning. **Excessive heat** can cause dehydration, heat exhaustion and more serious illnesses. The Epsom Public Library (capacity **~100**) or one of the Town's churches could open during these times as a Cooling Center. Other vulnerable facilities are indicated in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**.

EARTH HAZARDS

Earth hazards include geologic events such as the small earthquake NH residents experience. The Central NH area is seismically active and small earthquakes (less than 2.5 magnitude on the Richter Scale) occur about 1-2 times per year. Landslides can occur as a result of earthquakes, rain, flooding and result in erosion along roadways and watercourses.

Radon is a naturally occurring radioactive gas with carcinogenic properties. The gas is a common problem in many states, including New Hampshire, seeping into homes from basements. Radon may also enter homes dissolved in drinking water from drilled wells. High levels of radon in water from individual drilled wells is a common occurrence in New Hampshire. Radon is no longer being addressed by the ***State of New Hampshire Hazard Mitigation Plan*** as no new studies have made specific data available. It is generally known that radon exists throughout in the State and in communities, including the Central NH Region. Arsenic is a new concern that often co-occurs with radon. Radon is known to be present throughout New Hampshire and is addressed on an individual basis, no longer addressed in the **Hazard Mitigation Plan** because of the lack of State monitoring and available action.

There are two types of **Earth** hazards examined in the **Hazard Risk Assessment**:

- **Earthquake**
- **Landslide**

Earthquake

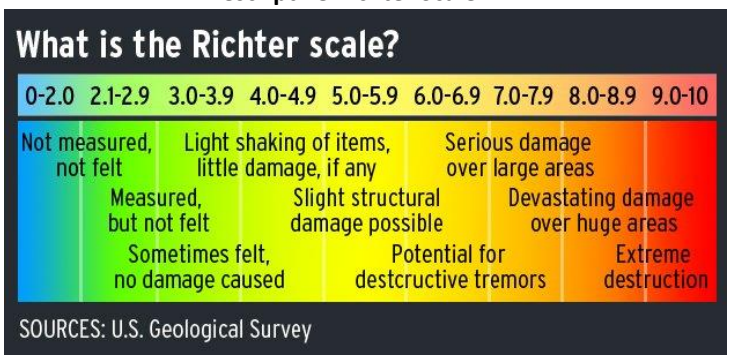
An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. **Earthquakes** can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause **landslides**, **flash floods**, **fires**, and avalanches. Larger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

Magnitude of Earthquake Hazards

Earthquake hazard magnitude can be measured by the Richter Scale as shown in **Figure 22**. To better place the Richter Scale magnitude in perspective, the Mercalli Scale describes the *intensity* felt at different magnitudes in **Figure 23**. The **M** refers to magnitude of the earthquake.

Figure 22

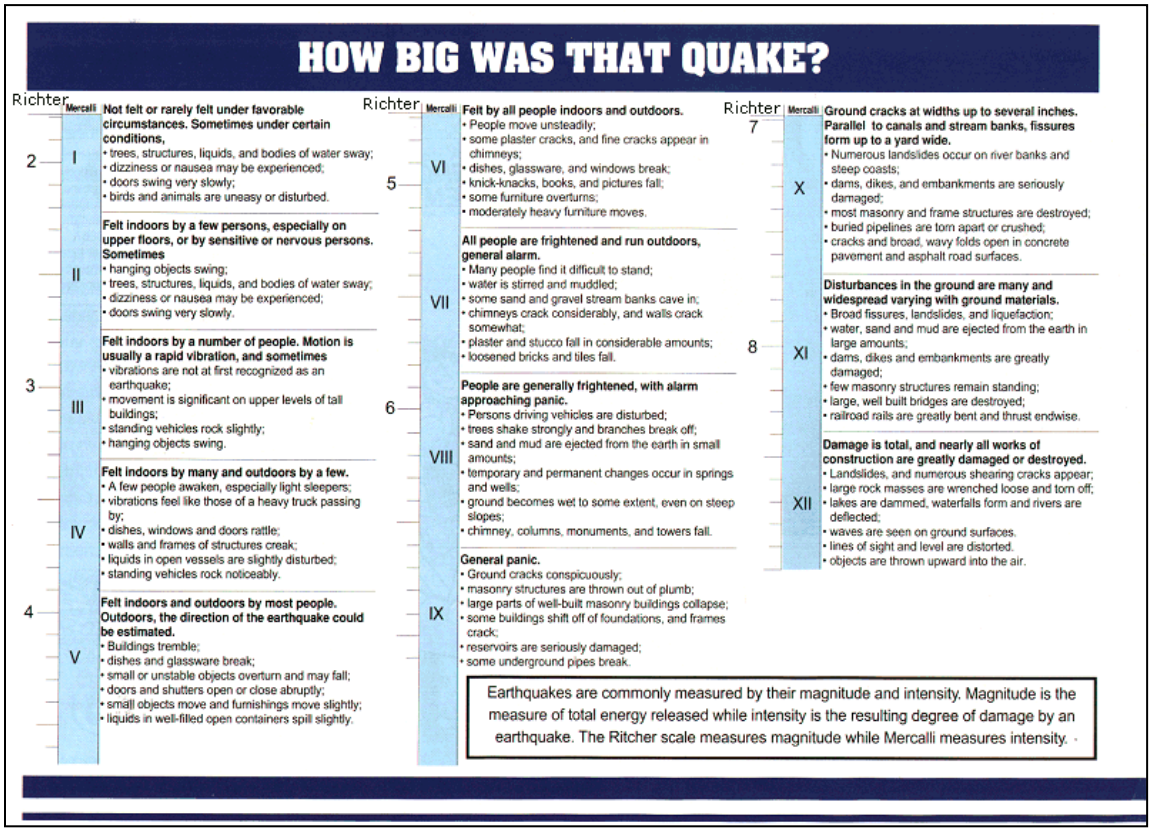
Descriptive Richter Scale



Source: US Geological Survey (USGS)

Figure 23

Earthquake Impacts on the Richter and Modified Mercalli Scales



Source: National Oceanic and Atmospheric Administration (NOAA)

Earthquakes in Epsom

Multiple small scale **earthquakes**, about **1-2** quake every year, have been felt by Epsom residents, with their epicenters occurring within the Epsom, Webster, Hopkinton (Contoocook), Hillsborough, Henniker, Warner or Franklin or Sanbornton area in Central NH or otherwise within **25** miles of Epsom since **2002** to present day. The Central NH Region is an active seismic area with mild earthquakes. No significant damages or injuries have been reported from these events, mainly because they are so deep underground in bedrock, from 3-6 kilometers from the surface. Nearby earthquakes with a magnitude greater than **2.5M**, or that are closer to the earth's surface, would be more concerning to the Town.

While It is likely Epsom residents will continue to feel **earthquakes** in the future, it continues to be likely that no major damage will result from these small earthquakes. Damage to utility poles and wires, roadways (Epsom Traffic Circle and its communication tower) and infrastructure (Northwood Lake Dam, Epsom Village Water District) could be significant should a large earthquake (**>3M**) occur.

Areas with underground utilities, community water systems, and the old/historic buildings, Old Town Halll, Meetinghouse, Old Library, historic old Schools, Odd Fellows Hall, Epsom Baptist Church, New Rye Union Congregational Church, Merrimack Valley Church, Town of Epsom facilities (Office, Police, Fire, Highway) and the Epsom Central School are particularly at risk because of building size and their large populations. The Epsom Village Water District water delivery pipes, pump house and water tower may be more prone to damage because of age and structural integrity. Epsom is downstream of the large Northwood Lake Dam from which the **Little Suncook River** flows along US Routes 4/202, which if breached could be disastrous to Epsom and the Traffic Circle. Loss of these or other community buildings could result in fewer services available to residents.

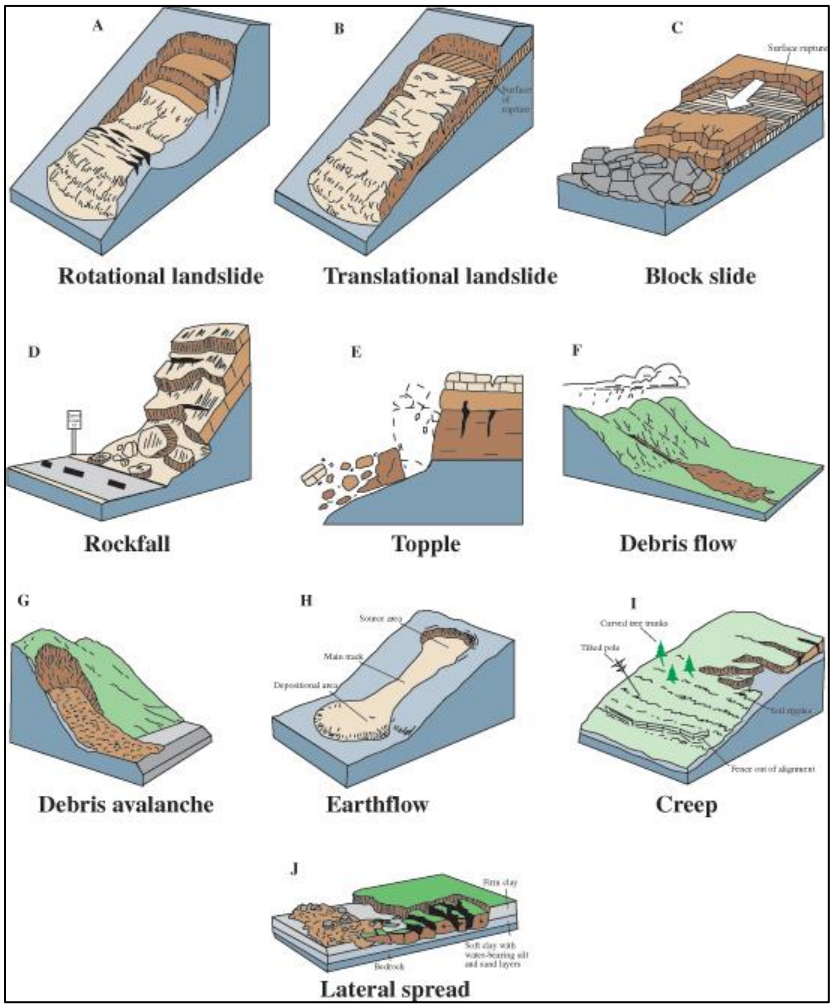
Older buildings (stone foundations) in Town could be susceptible to earthquake damage. Stone walls, other dams, bridges, cemeteries, and telecommunications towers could also be susceptible to damage.

Landslide

A landslide is the downward or outward movement of slope-forming materials reacting under the force of gravity including: mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides, and earth flows. Erosion of soil may also contribute to landslides. **Landslides** have damaged or destroyed roads, electrical and telephone lines, buildings, sewers, bridges, dams, forests, parks, and farms. A display of different types of landslides is shown in **Figure 24**.

Figure 24

Basic Types of Landslides



Source: US Geological Survey (USGS)

Magnitude of Landslide Hazards

There is no known standardized measurement of landslide magnitude available.

Landslides in Epsom

Landslide is a possibility in limited areas of Epsom where certain topological conditions are met. Development in proximity to areas of steep slopes (greater than 15% or 25%) could present a risk to residents. Most potential **landslides** will be in conjunction with another hazard event, such as **flooding**, a severe rain event, **earthquake**, or from the construction of buildings or infrastructure in a topologically vulnerable area. Most roads are gravel roads which already experience washout during heavy rain events, flooding, or rapid snow pack melt. Some of the steeper roads could experience landslide or rockslide erosion during heavy rain events. Although a large-scale road landslide would damage few structures, road (infrastructure) closures are costly and can last for months.

The **Suncook River's** river banks and brook banks could **erode** or **scour** be subject to **mass failure**, which is the water version of **landslide**.

Generally, vegetation in Epsom is good at preventing **landslides**, except for the gravel pits in Town. Roads with steep ditching or embankments are most vulnerable to **landslide**. Areas of concern for potential **landslide** include US Routes 4/202 along the **Little Suncook River**. Road washouts and flash-flooding could cause **landslides**, especially along Goboro Road and Echo Valley Road, but otherwise the Town is not particularly susceptible.

TECHNOLOGICAL HAZARD EVENTS

Many technological hazards could be construed as secondary hazards, as they often occur as the result of a primary (natural) hazard. For example, **power failure** or **transportation accidents** (technological) can result from severe winter weather (natural). Scientific measures of magnitude are generally not available for individual technological hazards, but they are provided for **debris impacted infrastructure** and **dam failure** which are closely related to **flooding** and for **hazardous materials spills** and **radiological incident**.

There are several types of **Technological** hazards examined in the **Hazard Risk Assessment**:

- **Dam Failure**
- **Power/Utility Failure**
- **Communications Systems Failure**
- **Debris Impacted Infrastructure**
- **Transportation Accidents**
- **Fire (Vehicle, Structure, Arson)**
- **Hazardous Materials Spills**
- **Public Health Issues**

Magnitude of Technological Events

Magnitude of most technological hazards are not addressed in this Plan. The only exception is **Dam Failure** because of its close relationship with flooding using the NH DES Dam Hazard Classifications.

Dam Failure

Dam breach and the resulting failure cause rapid loss of water that is normally impounded by the dam. These kinds of floods are extremely dangerous and pose a significant threat to both life and property as they are quick, unexpected, and if they occur during a flooding event, dam failures can overload an already burdened water channel.

Magnitude of Dam Failures

Although dam failure is considered a **Technological Hazard**, it is often a secondary hazard caused by flooding conditions. Classifications of dams and their magnitude of failure can be measured by the NH DES Dam Hazard Classifications shown in **Table 23**.

Table 23

New Hampshire Dam Hazard Classifications

NON-MENACE Structure		**Inspection**
NM	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; ❍ Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.	Every 6 years if criteria
LOW Hazard Structure		**Inspection**
LH	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.	Every 6 years
SIGNIFICANT Hazard Structure		**Inspection**
SH	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.	Every 4 years
HIGH Hazard Structure		**Inspection**
HH	Means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as a result of: ❍ Water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure, which is occupied under normal conditions. ❍ Water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to dam failure is greater than one foot. ❍ Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services. ❍ The release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 147-A:2 VII. ❍ Any other circumstance that would more likely than not cause one or more deaths.	Every 2 years

Source: NH Department of Environmental Services (NHDES) Dams Bureau, 2012

Dam Failures in Epsom

Dam failures, or breaches, are a potential danger to people and property within the dam failure inundation area(s). There are **8** active dams in Epsom, all listed in **APPENDIX A**.

One (**1**) dam is of High Hazard (**H**) classification, the Northwood Lake Dam (Little Suncook River), impounding **688** acres of water behind a **13'** high dam. Two (**2**) houses and NH 107 or US 4/202 could be potentially impacted by a Northwood Lake Dam breach. The **Little Suncook River** begins at the Northwood Lake outlet, flowing west along US Routes 4/202 toward the Epsom Traffic Circle where it joins the **Suncook River**. One (**1**) dam is of Low Hazard (**L**) classification, the Cass Pond Dam (Little Suncook River), which impounds about **15** acres of water behind a **10'** high dam.

Six (**6**) dams are of Non-Menace (**NM**) classification, the Huckins Mills Dam 2 (Suncook River), Elkins Farm Pond Dam (Burnham Brook tributary), Branch Marden Brook Dam (Burnham Brook tributary), Sherburn Stream Dam (Lockes Brook tributary), Mason Brook Dam (Mason Brook) and the Ellis Farm Pond Dam (natural swale). Most of these dams are privately owned and maintained, following the NH Department of Environmental Services' (NHDES) regulations for Dam Emergency Action Plans.

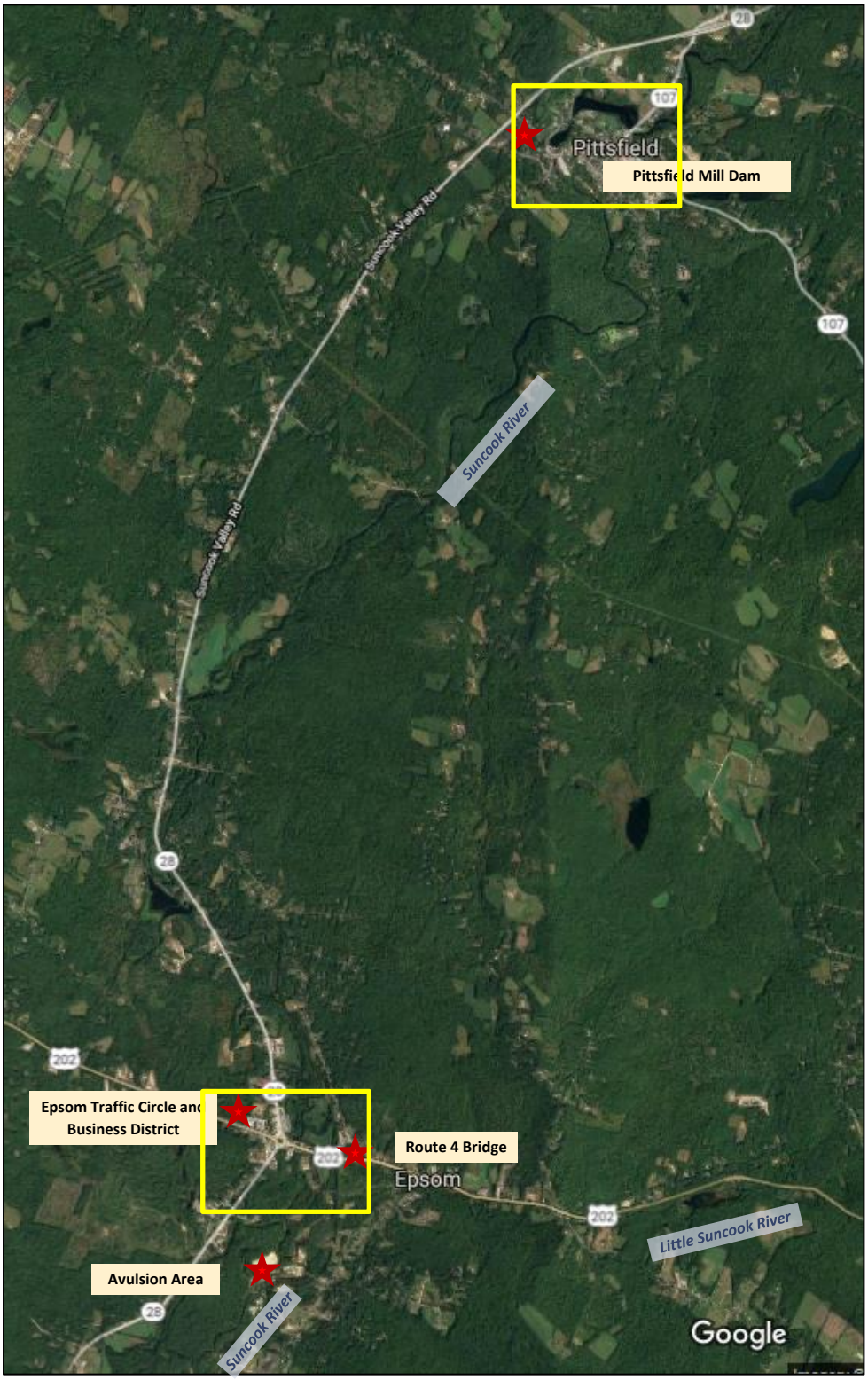
All dams have a high probability of flooding and potential to breach or fail over time.

Several miles north of Epsom in Pittsfield, the High Hazard (**H**) Pittsfield Mill Dam which holds back the **Suncook River** is a large concern to the Town should this dam breach. Epsom's **Suncook River** reaches could be flooded to the Traffic Circle, then once the extra water reaches the **2006 avulsion** area, the flow could cause further **dam failure** and **flooding** damage because the area is now filled with **sand and debris**. This is an ongoing concern for the Town of Epsom.

Figure 25a displays the relationship of the Pittsfield Mill Dam on the **Suncook River** to the location of Epsom's Traffic Circle, Business District, and the **2006 avulsion** at Bear Island. **Figure 25b** is a closeup view of the Pittsfield Mill Dam in Pittsfield while **Figure 25c** displays the Epsom Traffic Circle and Business District.

Figure 25a

Aerial View of Pittsfield Mills Dam on the Suncook River to Epsom Traffic Circle, with Insets



Source: Google Maps, Accessed 06-25-18; CNHRPC

Figure 25b
Inset: Pittsfield Mill Dam with Suncook River Outlet

Source: Google Maps, Accessed 06-25-18; CNHRPC

Figure 25c
Inset: Epsom Traffic Circle and Route 4/202 Bridge with Suncook River

Power/Utility Failure

Utilities systems exist everywhere and are subject to damage from construction work, accidents and extreme weather. Many utilities are protected by back-up generators to prevent failure, whatever the cause may be. Nuclear power plants produce roughly 20% of the nation's power, they exist in nearly all states and 3 million Americans live within 10 miles of a nuclear power plant. The greatest risk to life resulting from a nuclear power plant failure is radiation contamination resulting from radiation release into the environment. People in the immediate vicinity are at greatest risk of radiation contamination. Another common source of energy, coal, can be potentially hazardous because coal power plants emit chemicals such as mercury and sulfur dioxide.

New Hampshire contains nuclear, coal and natural gas power plants. There is only one (**1**) coal power plant in New Hampshire, the Merrimack Station in Bow. The Merrimack Station is the largest coal-fired electrical generating station, currently owned by Granite Shore Power, formerly owned by Eversource and Public Service of New Hampshire, and supplies power to 190,000 households. Coal fuel generated only **7%** of the State's electricity in **2016**. The Merrimack Plant may be decommissioned in the future in favor of other sources. Much of the State's electricity (**56%** in **2016**) is provided by the Seabrook nuclear power reactor.

In the harsh environment that New Hampshire residents are subjected to, power and utility failures on an isolated level are commonplace. During nearly every heavy snow storm, ice storm, or other severe weather event, someone, somewhere, loses power and/or other utilities.

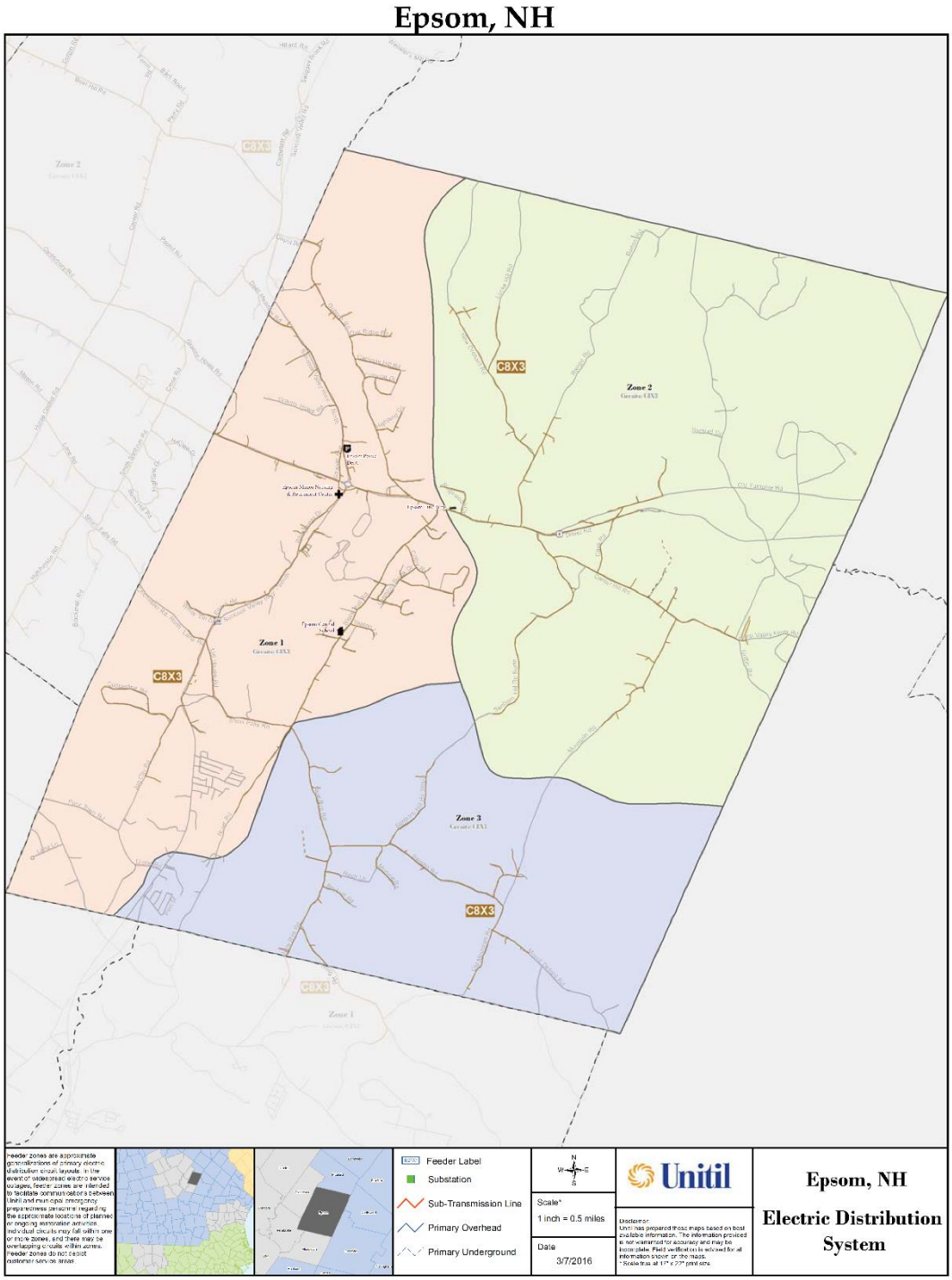
Power Failure in Epsom

Power is disrupted on a regular basis during all seasons, a result of the primary natural hazards occurring. Epsom depends on Unitil, Eversource, and NH Electric Cooperative for most of its power needs. Power outages may last for several days at the Epsom Traffic Circle to over **2** weeks in the mountainous regions before service is restored to residents after a large event. Power outages in the more rural or isolated areas of Town regularly occur during any wind, storm, winter events or hazard events that cause debris impacted infrastructure. These roads include Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive **power failure**), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, US 4/202/202, NH 28, and virtually every other road in Town.

Figure 26 displays the distribution system of Unitil, although the map's sections cover the entire community. Unitil service does not cover the southwestern corner of Epsom, the entire northern section and much of the eastern edge, nor does it cover the much eastern edge of the Town south of US 4/202. Those sections belong to Eversource or NH Electric Cooperative. Because Unitil has three distribution systems and the two other utilities have some coverage, it is often confusing for emergency responders to identify what lines need to be repaired **during power failures**. Unitil's response to power failure is quick and prioritized because of the Traffic Circle.

Figure 26

Unitil Electric Distribution Map



Source: Unitil 2016

The Epsom Central School can serve as the temporary sheltering space available to Epsom residents. Because there is no generator at the facility, people can be bussed to a secondary location if needed. There are many vulnerable populations identified in the community (see **APPENDIX A**). When the powerlines along the Epsom Traffic Circle fail, Atlantic Broadband (formerly Metrocast) Internet is also disrupted, and the area around the Traffic Circle is host to the Town Offices and Epsom Manor, to name a few. The multiple businesses in Town rely on electricity provided by powerlines, and in many cases enterprise comes to a standstill during event.

Vulnerable populations are at greatest risk in rural Epsom for the effects of **power/utility failure**. A few individuals in Town require oxygen and power failure and the likely accompanying communications systems failure would comprise the most vulnerable populations. The Fire Department has a voluntary registration program for people who want to be checked during emergencies, and the Police Department also conducts welfare checks

As a rule of thumb, all residents should be able to shelter in place in their homes for up to three days, gathering needed supplies and water ahead of time. **Power failure** can cause inconvenience, loss of economy, extra Town expenditures and staffing, and could restrict emergency response because the typical power failure is a secondary hazard caused by natural weather event. This problem is applicable to the **Hurricanes and Tropical Storms, Downbursts**, **Tornadoes**, and **Severe Winter Weather, Cold, and Ice Storms** hazard events described earlier as well as **Debris Impacted Infrastructure** and **Transportation Accident** hazard events in the following sections.

Communications Systems Failure

Communications systems, like utilities, are found everywhere and are subject to damage by construction work, severe weather and traffic accidents. Because communications systems depend on electricity, any power outage may cause an interruption in a communications system. In addition, many communications systems have buried cables which are particularly vulnerable to being cut. Communications systems interruptions can negatively impact a region, town, neighborhood or household in the case of a natural disaster, catastrophe or other emergency. Power lines often share cables and poles with communications systems. When power fails, cable, telephone and radio services frequently fail as well.

Communications Systems Failure in Epsom

Any **communications failure** can mean lack of emergency services or delayed emergency services. Police/Fire use digital service and are members of the effective Capital Area Fire Compact Mutual Aid (CAFCMA) Dispatch service. Epsom has several telecommunications towers which provide coverage to some sections the Town, although several towers are vacant (no provider antennas). The Transmission Tower on Old Mountain Road contains important emergency communications and repeaters. Towers on White Birch Lane, Traffic Circle, Elkins Road, and River Road provide limited cellular service. Atlantic

Broadband (formerly Metrocast) internet is available primarily in the center of Epsom in the Traffic Circle vicinity.

Communications failure can result as a secondary effect of a natural disaster such as severe storm or severe winter weather. There has been a steady migration Voice Over Internet Protocol (VOIP) internet telephone connection, with people dropping their landline telephones. Some people use cell phones but rely on service outside of Town. Beyond that, telephone lines provide service to most customers in Epsom. An interruption affects the majority of residents in Town, especially if a break occurs along the Traffic Circle or on any of the previously identified roads.

If the main transmissions tower (Old/Fort Mountain Road) were destroyed by any weather or hazard event, all public safety communications (radios) in Epsom would be jeopardized. Emergency response would need to rely on cell phones which are spotty at best. Most Town radios are interoperable, and they are used in more than one location. The Police Department has a repeater in a secondary location and is maintained. The Fire Department has mobile and land radios, with repeaters in locations in other towns. The Town is serviced by the Capital Area Mutual Aid Compact, which does all the emergency medical service and Fire dispatching. They have redundant capabilities and are currently upgrading their systems. Vulnerable areas previously identified are at highest risk.

Debris Impacted Infrastructure

Debris impacted infrastructure regularly occurs along the Central NH Region's rivers and streams and also along roadways. Rivers or brooks flowing under bridges or through culverts could get clogged or damaged by woody material or leaves in the watercourse. Culvert maintenance is particularly important before and during heavy rainfall and floods. Tree limbs falling onto power lines and onto roadways, disrupting both electricity and the roadway, occur during wind or winter storms.

Debris Impacted Infrastructure in Epsom

Epsom's watercourses, including the **Suncook River**, brooks, and stationary water like ponds and wetlands can **flood** their banks, **overflow culverts**, or **washout roads** during certain conditions. Trees and limbs falling on roads and power lines cause **power failure** or **road blockage**. Infrastructure in Epsom can refer to roadways, powerlines, utility lines, culverts, water towers, bridges or dams. These features inventoried in **APPENDIX A Critical and Community Vulnerability Assessment** are those which should be watched carefully before and after storms and should be checked and maintained regularly to reduce the risk of significant **debris impacted infrastructure** events**. Erosion** along the Suncook River causes sediment and debris to flow downstream and is a hazard to the landowners who have shoreland frontage.

Most dams and bridges could experience debris impacted infrastructure. Debris generated by Suncook River erosion will continue for many years. Culverts that are failing due to low capacity and debris include the Leighton Brook and the North Road culverts. Box culverts as replacements for failing culverts have been recently installed in many Epsom roads as a result of recurring flooding events.

See the previous **RIVERINE FLUVIAL EROSION, BED SCOURING AND CHANNEL MOVEMENT** section to review the ***Large Woody Material Maps*** for the **Suncook River**. Debris in the form of trees is a constant concern, although they are not considered a particular hazard of concern in Epsom. The Town can call the NH Department of Environmental Services for emergency removal or remove the trees themselves and obtain a "retroactive permit" during emergency situations. Bridges are vulnerable to debris dislodged during storm events. The Town has **2** closed redlisted bridges that are structurally deficient, Cass Road over **Little Suncook River** and Old Turnpike Road over Gulf Brook. The Board of Selectmen could consider applying for NH Bridge Aid funding to help rehabilitate these bridges. All outlying roads are susceptible to tree fall and downed powerlines (see **Wind** hazards). Most of the bridges in Epsom are owned by the Town except where the bridges are along US 4/202/202 or NH 107.

Transportation Accidents

Automobile accidents could occur on any roadway in the Central NH region. A major accident would have the greatest impact for travelers on Interstates 93, 393 or 89, on US Route 202, US 4/202 or US Route 3, on NH Route 3A, NH Route 9, NH Route 13, NH 28, NH Route 31 NH Route 49, NH Route 77, NH Route 103, NH Route 106, NH Route 107, NH Route 114, NH Route 127, NH Route 129 and NH Route 132 or on their bypasses, interchanges, Exits and on/off ramps. These are high speed corridors with high traffic volumes. Many local roads allow for residential and commuter vehicles at low speeds.

The railroad lines along the Merrimack River create the potential for a (railcar) transportation accident. Trains could potentially derail, causing injuries or fatalities and hazardous materials spills. In the Central NH Region, the Concord-Lincoln Line runs 73 miles between Concord and Lincoln. The New Hampshire Maine Line runs between Concord, Nashua and Lowell, MA. Several communities through which these lines travel have expressed the concern about hazardous material spills due to transportation accidents or sabotage. Concord Municipal Airport is the major airport in the Central NH Region but Manchester-Boston Regional Airport (MHT) can be accessed via Route 28 in about 45 minutes. Air traffic can also be hazardous to the region's citizens.

Transportation Accidents in Epsom

Traffic accidents may be the most likely future transportation hazard in Epsom on US Routes 4/202, NH 28, NH Route 107 and the Epsom Traffic Circle. Accidents can occur at difficult intersections, hills, curves, or straightaways, particularly in **winter weather**. Traffic accidents occur in several locations along hilly and curvy roads, fast-moving Dover Road, around the US 4 Traffic Circle, and along well-traveled straight NH 28. Intersections such with NH 28, especially between the Jug City Road and Drolet Road intersections, cause frequent accidents. As the local roads become developed with more homes or businesses, more vehicles, pedestrians and bicyclists will find themselves vying for the same space. As vehicular traffic increases or as the weather turns bad, there is the likelihood that **transportation accidents** will occur in more areas.

Fire (Arson, Vehicle, Structure)

Fires which are not natural hazards are often associated with vehicles, structures or hazardous materials spills, or sometimes an explosion. These are considered **Technological Hazards**. Arson, the deliberate setting of a fire as an act of sabotage or mischief, is a **Human Hazard** but is described in this section for convenience. No magnitude scales were defined for these types of non-natural fires.

Fire in Epsom

The Fire Department annually reports all fires to the NH Fire Marshal's office. The National Reporting System (NRS) provides data on municipal fire events. Over a busy five-year period between **2013**-**2017**, a total of **69** fires were reported to the NRS by the Epsom Fire Department. In **2013**, **14** fires were reported (**8** structure, **3** motor vehicle, **1** natural vegetation, **1** outside rubbish, and **1** other outdoor fire). In **2014**, **16** fires were reported (**12** structure, **1** motor vehicle, **3** natural vegetation fires). In **2015, 10** fires were reported (**5** structure, **2** motor vehicle, **3** natural vegetation, **1** special outside fire). In **2016, 16** fires were reported (**5** structure, **2** motor vehicle, **8** natural vegetation, **1** special outside fire). In **2017**, Epsom Fire Department reported **13** fires, (**3** structure, **2** motor vehicle, **5** natural vegetation, **1** outside rubbish, **1** special outside fire) to the NRS.

The Epsom Fire Department (EFD) runs Incident Type Reports that provide much more specific data for the Town Annual Reports. These reports are used with Capital Area Fire Mutual Aid Compact dispatching and recording. This system differs from the National Reporting System (NRS). In **2013**, there were **38** fires; in **2014**, there were **36** fires; in **2015**, there were **37** fires; in **2016**, there were **38** fires; in **2017**, there were **27** fires. The EFD responds to all types of calls for service and participates in mutual aid with the Capital Area Fire Mutual Aid Compact, sharing training, drills, dispatching and assisting other communities. The Capital Area Fire Compact closely tracks the region's data.

Locations in Epsom which are particularly vulnerable to **fire** (from any source – **lightning**, human, **wildfire**, electrical, power lines, **hazardous materials**, etc.) include Town Facilities (Offices, Library, Fire, Police and Highway Department), Epsom Central School, Epsom Manor, the manufactured housing parks in Town, US Routes 4/202 (Dover Road) homes and businesses, multi-family developments and senior living facilities listed previously, and gathering places such as the Meetinghouse, Churches, American Legion, Elks, Odd Fellows, etc. The outdoor Town Forest on Tarleton Road is also at risk of fire. Several large businesses in Town have hazardous materials onsite that render them vulnerable should a fire occur. Additionally, there are dozens of agricultural enterprises in Epsom with fertilizer, old barns and hay fields surrounded by woodlands, a vulnerability to both livestock and people.

A list of hazardous materials facilities which could cause fire or explosions in Town is available in **APPENDIX A Critical and Community Facility Vulnerability Assessment**. Included in these **APPENDIX A** tables is a listing of vulnerable populations that are working or living in close quarters.

Hazardous Materials Spills

Hazardous materials and hazardous wastes contain properties that make them potentially dangerous or harmful to humans. They can be liquids, solids, contained gases or sludge. Hazardous wastes can be the by-product of manufacturing, as well as discarded commercial products. Most households contain cleaning agents that become hazardous waste when disposed of improperly. Chemicals have numerous benefits but can also cause hazards during their production, storage, transportation, use or disposal. Hazardous materials can have adverse health related effects and may even cause death in certain cases. In addition, hazardous materials may damage homes, businesses and other property, as well as natural ecosystems. Chemical accidents in plants or chemical spills during transportation may often release hazardous chemicals.

The risk from hazardous materials spills or releases into groundwater is present if consumers and homeowners make irresponsible decisions regarding the disposal of household chemicals. These household chemicals can contaminate drinking water in wells and cause damage to various ecosystems. Most people contaminate without being aware that they are doing so. Further education may be needed to reduce hazardous waste contamination.

Hazardous Materials Spills in Epsom

Transportation trucking of hazardous materials on US Routes 4/202 (Dover Road), NH 28, NH 107 and through the Epsom Traffic Circle corridor is likely an regular occurrence. These trucks could rollover and spill their contents onto these significant roadways. The ***New Hampshire Hazardous Material Commodity Flow Study 2018*** and its accompanying maps may provide some enlightening data the Town can use to help protect the community from spills. The Central NH Hazardous Materials Team based from the Concord Fire Department is the responding entity in the area.

Dozens of occupational facilities in Town could handle, store, or use hazardous materials. The Town is a large draw to industrial businesses. There is no Transfer Station and Recycling Center in Epsom. Residents drive to BCEP Solid Waste in Pittsfield on 115 Laconia Road (NH 107), a district solid waste management facility. The facility is open Tuesdays through Saturdays 8AM-4PM unless there is a power outage.

Special collection days are held to collect Household Hazardous Waste (HHW), when large volumes of materials that may otherwise be dumped in the woods or in water bodies are collected from residents. Local auto body shops and garages, large businesses, agricultural operations, fuel stations, excavation and asphalt businesses, industries, any school labs, and the Town Salt Shed are stationary site locations which may experience this type of hazard in the future. Any of these facilities could have a spill or an incident at their location. A listing of known facilities which store or could use hazardous materials has been inventoried in **APPENDIX A Critical and Community Vulnerability Assessment**.

Public Health Issues

Public health issues can be measured in many ways. Students and the elderly are vulnerable to seasonal health outbreaks as they tend to congregate in large numbers and in shared environments where physical contact is common. Large groups can make bioterrorism more effective.

It is difficult to predict where an epidemic would occur due to human, mosquito and wildlife mobility. Commonly occurring epidemics following extreme heat or cold can include **influenza**, norovirus, rhinovirus (viruses), Lyme disease, Anaplasmosis and babesiosis (tick-borne diseases), Eastern Equine Encephalitis (EEE), West Nile and Powassan (arboviral or mosquito-borne diseases) and any could occur in Epsom. The Town has swampy areas around its rivers, wetlands and brooks which are prime breeding ground for **mosquitoes**. Large deer herds that roam can carry **deer ticks** in the Town's heavily forested sections and into State Forests. **Water quality degradation** (failing septic systems, flooding, pipes breaking) could sicken residents using the public water supplies (those serving over 25 people), dug wells or bedrock wells, or could cause aquatic and wildlife deaths. Epidemics could result.

Public Health Issues in Epsom

Anecdotal widespread **public health** issues involving Lyme disease indicate tickborne viruses are increasing in Epsom. The Town is a wooded, rural community with the Suncook River, many brooks, ponds, and wet meadows, large acreages of forests, paved State roadways, and a large Town Forest (Tarleton Road). Arboviral (mosquito-borne) viruses may increase.

For indoor contamination, the highest risk facilities for pick-up or transfer of viruses and bacteria can include the Epsom Central School and Cornerstone Christian Academy, Town Library, Epsom Manor, Concord Hospital Medical Facility, Epsom Churches, the aged 55+ older living facilities, as well as the Town's stores, restaurants, recreational facilities and gathering places (see **APPENDIX A**). The Epsom Village Water District operates and maintains their own water system for residents and the old pipes are known to break frequently. The same populations identified as particularly susceptible to **Excessive Heat** would be most vulnerable to public health issues and epidemics.

To help combat local and area public health epidemics, Epsom has a plan to join the nearby regional Point of Dispensing (POD) site at the nearby Northwood Academy, a location where vaccines or other medicines are disseminated to people during an emergency with assistance from the Capital Area Public Health Network (CAPHN).

HUMAN HAZARD EVENTS

Events of human nature include terrorism (ecological, cyber and chemical), sabotage/vandalism, hostage situations, and civil unrest. These are often "behind the scenes" hazards that local Police Departments handle on a regular basis. These events are all caused by direct human action.

There are several types of **Human** hazards examined in the **Hazard Risk Assessment**:

- **Terrorism**
- **Sabotage/Vandalism**
- **Hostage Situation**
- **Civil Disturbance/Public Unrest**

Human Hazards are examined by descriptions of the types of human hazards and in the **Potential Future Hazards**. Scientific measures of magnitude are not available for individual human hazards.

Terrorism

The use of force or violence against people to create fear, cause physical harm and/or intimidation or for reasons of ransom. Terrorists often make threats to create fear and change public opinion. Cyber terrorism consists of hackers who threaten the economy by attacking the intricate computer infrastructure, affecting business and communication. Biological and chemical terrorism refers to those infectious microbes or toxins used to produce illness or death in people or animals. Large groups or close quarters of people can make bioterrorism more effective. Terrorists may contaminate food or water, thus threatening an unprotected civilian population. Eco-terrorism refers to the destruction of property by persons who are generally opposed to the destruction of the environment or to make a visible argument against forms of technology that may be destructive to the environment.

Terrorism in Epsom

It is unlikely that the Town would be the target of any act of international terrorism. Domestic terrorism has occurred within the last 15 years both in Epsom, in the form of hostage situation and cyberattack, and within the Central NH region. There are several local, homegrown groups that may be active in Epsom. Targets are usually public spaces that would do the most damage to send a message. Possible targets could be Town Facilities (Town Office, Library, Police or Fire Department), Epsom Central School, Epsom Manor, Epsom Traffic Circle, and gathering places such as the Churches, restaurants/bars, and all other Town, State or governmental facilities like the Post Office. Although unlikely, there could be a massive impact felt in the community even on a small-scale event.

Sabotage/Vandalism

Sabotage is a deliberate action aimed at someone or some institution in order to weaken that person's or institution's integrity and reputation through subversion, destruction, obstruction or disruption. Sabotage may occur in war, a workplace, in the natural environment, as a crime, in politics or as a direct attack against an individual.

Sabotage /Vandalism in Epsom

Any incident of **sabotage** in Epsom could come from within Epsom or any nearby Town, or outside of the State or country, but some sabotage efforts would require perpetrators to be on site. **Vandalism** can also be present at cemeteries, vacant buildings, under bridges. While a nuisance, vandalism has a lower potential to harm than sabotage. Sabotage would be worrisome at dams, Water Tower, or along the stabilized or eroding channels of the **Suncook River**.

Vandalism could occur at public and private cemeteries, Epsom Central School, or recreational sites such as the Town Forest and Trails. Infrastructure could be vandalized, such as bridges, dams, Pump Stations or the Water Tower (including graffiti). These facilities would be among the most damaging to the community. Vandalism could also occur at vacant buildings in isolated locations. Epsom has many vacant buildings, even along the Traffic Circle.

Technological systems such as computer systems and websites of the Town Office, Police Department, Library, Epsom Central School, Fire Department, Highway Department and other governmental systems could be subject to computer or network sabotage. Utilities or telecommunications towers could be vulnerable to sabotage or vandalism, such as the Epsom Village Water District water supply or the Transmission Tower on Old/Fort Mountain Road. Many other significant facilities in Epsom could be subject to sabotage including the powerlines, transmission lines, transformers and utility substations.

Hostage Situation

A hostage situation is an incident where an innocent civilian is held by someone or some group of persons demanding something from another person or group of persons not related to the person or persons being held hostage. The person or persons held are done so pending the fulfillment of certain terms.

Hostage Situations in Epsom

Hostage situations can occur anywhere, are isolated events and are nearly impossible to predict; none have been reported for this Plan. Hostage situations are not normal events and therefore are nearly impossible to predict. Domestic violence events generally occur in resident homes, perhaps one per year.

Conventional hostage situations would most likely target such locations as the Town Office, Police Department, Library, Epsom Central School, Post Office, Epsom Manor, manufactured housing parks, at

other Town or governmental facilities, or at major, visible businesses such as those along the US Routes 4/202 (Dover Road) corridor and Epsom Traffic Circle.

Civil Disturbance/Public Unrest

This hazard refers to types of disturbances that are caused by a group of people, often in protest against major socio-political problems including sit-ins or protests against wars and any general and public expression of outrage against a political establishment or policy. Many instances of civil disturbance and public unrest are quelled by a use of force from police. Participants may be victims of personal injury in severe cases.

The most probable locations of larger civil disturbance and/or protest in New Hampshire are at the State House in Concord and at the universities and colleges. They have also occurred at political locations, such as feminist health centers or political party headquarters.

Civil Disturbance/Public Unrest in Epsom

Locally, the highest potential for **public unrest** could take place during Town Meetings and School Meetings, on voting day or during visits from political candidates, or at large events such as Old Home Day, Veteran's Parades, or at Elementary School events or school functions.

Large scale incidents of civil disturbance and public unrest such as violent riots are unlikely in Epsom.

Locations where **civil unrest** could occur include the Town Facilities (Offices, Library, Police, Fire, Highway), Epsom Central School and its recreational fields, Epsom Traffic Circle or the numerous manufactured home parks. Generally, restaurants and establishments serving alcohol, and gathering facilities within other high density population areas are more susceptible to **civil disturbance**.

Existing and Potential Future Hazards

After the inventory of hazards types and past hazards in Town, hazards that currently exist or that need to be monitored in Epsom has been completed along with potential future hazards that could occur in other areas. This unique listing of **Existing and Potential Future Hazards** was compiled so the Town can be aware of areas that might need to be watched for recurring hazardous problems or that may experience some of these hazards for the first time. The listing was developed by knowledge of the Hazard Mitigation Committee and past experiences of hazards. Past locations of hazard events, where they exist for each hazard, are listed under the individual hazard narratives in the previous section. The existing and susceptible hazard locations are taken from the **Hazard Risk Assessment**. With this existing and potential future knowledge listed side by side, it becomes easier for a community to plan mitigation measures for the most prominent hazard events in Town.

Included in **Table 24** is the **Overall Risk** score between **1-16** from the **Hazard Risk Assessment** for **16** natural hazards. The name of the magnitude or extent scale of the natural hazard is represented for ease of reference. Technological and human hazards were not rated for their **Overall Risk** to retain the importance of maintaining a natural hazard perspective for the **Hazard Mitigation Plan 2018**. **NR** is the abbreviation for **Not Rated**.

Table 24

Existing and Potential Future Hazards

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Flooding	**Floods and Flash Floods**	9.3	**Floodplains of Suncook River and Little Suncook River**, and **brooks** such as Lockes Brook, Blakes Brook, Leighton Brook, Mason Brook, Burnham Brook, Gulf Brook, Little Bear Brook, Griffin Brook, and Deer Meadow Brook result in expanded flooding. Northwood Lake, Cass Pond, Deer Meadow Pond, Mill Pond, Bixby Pond, Chestnut Pond, Tarleton Mill Pond, and several Farm Ponds can flood. Homes near the Suncook are at risk. Runoff from roadways or heavy rain can cause floods over the Entire Town. Pittsfield Mill Dam in Pittsfield (Suncook River) would be a disaster. Areas of past, repaired, or existing potential for road washout: • Main Routes: Route 4 areas in floodplain (include Gulf Brook), Route 107. • Roads: Short Falls Rd, Mill House Rd, Jug City Rd, Sleepy Hollow Lane (private, undersized), Black Hall Rds, Route 28 (town line), Baker Rd, Swamp Rd (underwater), Olde Town Extension onto Prospect Rd (runoff). • Manufactured housing parks: Kingstowne MHP, King's Grant MHP. • Bridges: Center Hill Bridge, Cass Road Bridge. • Public facilities: Epsom Central Elementary School athletic fields and equipment hut, Village District water pump house, Webster Park. • Culverts: Blakes Brook culvert, Route 107 culvert (Griffin Brook), Old Richie Rd culvert, Leighton Brook culvert. • Drainage System Replacement: Little Suncook (Cass Road), Center Hill Road.	Other than the Suncook and Little Suncook River floodplains, these locations are either the most common, regular locations of **road washouts or water flooding** over the roadways, are locations which could be washed out during a flood event: • Main Routes: US 4/202 areas in floodplain (including Gulf Brook), NH 107, NH 28 (town line). Local Roads: Short Falls Road, Mill House Road, Jug City Road, Black Hall Road, Baker Road, Swamp Road (underwater), Olde Town Extension onto Prospect Road (runoff). • Susceptible regular, partial road washouts: Old Turnpike Road, Echo Valley Farm Road, Griffin Road, Sanborn Hill Road, Martin Hill Road, Mountain View Spur & Mountain Road, Baybutt Road, Locke's Hill off Lord's Mill Road. Private (not Town maintained): Sleepy Hollow Lane (private, undersized) and Lakeside Drive (private, Chestnut Pond). • Manufactured Housing Parks: Kingstowne MHP, King's Grant MHP. Bridges: Center Hill Bridge, Cass Road Bridge, Pittsfield Mill Bridge (Pittsfield). • Public Facilities: Epsom Central Elementary School athletic fields and equipment hut, Village District Water pump house, Webster Park. • Culverts: Blakes Brook culvert, NH 107 culvert (Griffin Brook), Old Richie Road culvert. • Drainage System Replacement: Little Suncook River (Cass Road), Center Hill Road. • High Hazard Northwood Lake Dam is a concern. The dam is located to the eastern edge of the community along US 4/202 and NH 9, a major commuter route with commercial and residential properties. The Little Suncook River flows west from the Dam to join the Suncook River at the Epsom Traffic Circle.	Special Flood Hazard Areas (SFHAs) on 2010 Digital Flood Rate Insurance Maps (Zones A, AE, X)

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Flooding	**Rapid Snow Pack Melt**	**2.7**	Snow melt runoff from **impervious surfaces and roadways or from tree cover and fields** can cause floods over the Entire Town. Susceptible areas include regular road washouts at (partial road washouts) Old Turnpike, Echo Valley Farm Road, Griffin, Sanborn Hill, Martin Hill, Mountain View Spur & Mountain, Baybutt, Locke's Hill off Lord's Mill, and roads previously listed under Flooding. Private road washouts occur on Sleepy Hollow Road, Lakesites Drive (Chestnut Pond)	**Melt runoff** from impervious surfaces and roadways or from tree cover and fields can cause floods over the Entire Town. Road washouts and/or culvert failure locations or other areas flooded have included over the years: Short Falls Road, Mill House Road, Jug City Road, Black Hall Road, Baker Road, Swamp Road (underwater), Olde Town Extension onto Prospect Road (runoff), Old Turnpike Road, Echo Valley Farm Road, Griffin Road, Sanborn Hill Road, Martin Hill Road, Mountain View Spur & Mountain Road, Baybutt Road, Locke's Hill off Lord's Mill Road and Webster Park. Roads and areas not the responsibility of the Town include private (not Town maintained) roads: Sleepy Hollow Lane (private, undersized) and Lakeside Drive (private, Chestnut Pond) as well as State highways: US 4/202 areas in floodplain (including Gulf Brook), NH Route 107, NH 28 (town line), Center Hill Bridge, Cass Road Bridge; or other non-municipal property: Epsom Central Elementary School athletic fields and equipment hut, Village District water pump house. Several of these roads have closed multiple times for repairs since the 2006 floods. Continuing channel movement and sedimentation of the Suncook River means a greater likelihood for further **rapid snow pack melt** damages.	None specific known but can use SFHAs

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Flooding	**River Ice Jams**	**4.0**	**Suncook River** ice jams could endanger the dams and have occurred in the past, especially near Short Falls Road, on Route 28 at Kingstowne or King's Grant MHPs. Due to the close proximity of the Suncook River, the probability of ice jams occurring during winter break-up is high in Epsom, although the potential hazard of the river is reduced due to the avulsion location. School fields and agricultural fields erosion could occur when large ice floes and jams are adjacent on the Suncook River.	Roads in general are always susceptible to the effects of winter ice and snow melts. The Suncook River has hosted **past ice jams**. Homes near the Suncook River, especially in low-lying areas, particularly during **high water and heavy rain/snow melt conditions**. These specific locations are capable of ice jam conditions include Short Falls Road, on Route 28 at Kingstowne or King's Grant MHP, where nearby homes or property could be at risk of flooding in the case of river ice jams. Roads in general are always susceptible to the effects of winter ice conditions, and this could include the Little Suncook River that runs along US 4/202. The US 4/202 Bridge at the Epsom Traffic Circle in the floodplains where the two rivers join could be susceptible to **ice floes.** Bridges and dams are identified in **APPENDIX A**.	No known widely-used scale measuring the magnitude of river ice jams
Flooding	**Riverine Scouring, Erosion, Channel Movement**	**12.0**	**Floodplains of the Suncook River**, behind the Elementary School and near Short Falls Bridge. Suncook River avulsion in May 2006, where the new channel cut through an area outside the documented 100- and 500-year floodplains. Water is shallower and more spread out because of siltation. Stream bank erosion will continue until the Suncook River finds a new natural course or engineering solutions are implemented in problem spots. As noted from 2006-2012 experience, a 2-4" rain storm could cause River scouring and erosion. Debris flows down the Suncook River and silt changes regularly occur. Scouring behind the Elementary School athletic fields has occurred since the 2006 avulsion.	The State of NH as of summer 2018 is completing a $4m stabilization project of the **Suncook River** south of the US 4 bridge. The stabilized channel runs from the bridge to a bit south of the **avulsion** area. Future **erosion and scouring** could occur along the **Suncook River** in other locations in response to the river's new channel: • Several meanders remain south of the avulsion, particularly along agricultural fields. • Floodplains of the Suncook River Behind the Epsom Central (Elementary) School • Near Short Falls Bridge • Location of Suncook River avulsion (May 2006), where the new channel cut through an area outside the documented 100- and 500-year floodplains. • North of the Route 4 bridge **Erosion** could occur along banks when development (roads, homes) or human activities (parks, paths, recreational vehicles) are too close or if stream crossing alignments are not adequate for their locations. The Town should remain alert for potential developing **erosion** sites.	EPA Bank Erosion Risk Index

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Wind	**Tornadoes**	**8.0**	**Entire Town**. An EF3 tornado occurred in Epsom in 2008, cutting across Northwood Lake. Areas of particular concern include high density populations such as nursing homes, the Epsom Traffic Circle, the Elementary School and other schools, manufactured housing, campgrounds, and elderly housing sites. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. A secondary effect of quick, severe hazard events include alarms in the elderly resident homes. Alarms turn on, scaring residents, and can cause medical emergencies due to shock and heart problems. Emergency responders report it is impossible to move the residents during these circumstances.	The entire area of Town is vulnerable to a **tornado**. Highly populated areas include: Epsom Central School, Cornerstone Christian Academy, Northwood Lake, Concord Hospital Family Medicine Facility, Epsom HealthCare Center (aka Epsom Manor or Heartland Place Assisted Living, Epsom Traffic Circle, senior housing facilities (Meadow Brook Apartments [subsidized housing, Morgan Farm Estates Elderly Condominiums, Sunrise Meadows Senior Living [55+ Housing], other schools and childcare facilities, multi-family housing Caraway Multi Families. Lakeview Apartments, The Barn Arvanitis, The Brown Apartments, Webster Park, Town facilities, manufactured housing parks (Bartlett's MHP, Breezy Acres MHP Cooperative, Colby Brook Estates MHP, Family Estates MHP Cooperative, Inc, King's Grant MHP [55+ Senior], Kingstowne MHP [Senior], Presidential MHP); and seasonal campgrounds: Get Away Tiny Houses (formerly Blake's Brook Campground), The Big Easy (formerly Circle 9 Ranch) Campground, Epsom Valley Campground, Lazy River Campground). A secondary effect of quick, severe hazard events with power failure include alarms in the elderly resident homes. Alarms turn on, scaring residents, and can cause medical emergencies due to shock and heart problems. Emergency responders report it is impossible to move the residents during these circumstances. All of these populated areas carry greater risk because of higher density (see **APPENDIX A** for a complete list of sites).	

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Wind	Tornadoes	8.0		Forested sections of Town run a risk of isolation through **debris impacted infrastructure** (trees down on roads and powerlines) resulting in power failure with little emergency access until the way is cleared. Wooded and forested sections of Town are vulnerable to tree fall, including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, as well as US 4/202, NH 28, and virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. Communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower, and other utilities could also be affected by tornadoes. A **tornado** occurring in Epsom would cause considerable damage. Roofs could be torn off frame houses; mobile homes demolished; large trees snapped or uprooted; and light object missiles would be generated as a result of an EF-2 Tornado.	Enhanced Fujita (EF) Tornado Scale

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Wind	**Downbursts**	9.0	**Entire Town.** Areas of particular concern include high density populations such as nursing homes, (09-16- Webster Park, 100 trees down) the Epsom Traffic Circle, the Elementary School and other schools, manufactured housing, campgrounds, and elderly housing sites. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. Agriculture enterprises are vulnerable to wind events: Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), Yeaton Dairy Farm.	Anywhere the Town could be struck by a **straight line wind downburst**. See also **Tornado** vulnerable locations for the higher density population areas. The likelihood of future wind events in Town seems high. **High winds** and **downbursts** are unpredictable, and are often more prevalent at higher elevations, forested sections of Town. They run a risk of isolation through **debris impacted infrastructure** (trees down on roads and powerlines) resulting in power failure with little emergency access until the way is cleared. Wooded and forested sections of Town are vulnerable to tree fall, including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, as well as US 4/202, NH 28, and virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. Unitil, Eversource and NH Electric Cooperative all have electrical systems in Town. Atlantic Broadband (formerly Metrocast) is a provider of voice over internet protocol (VOIP) phone lines which go down with every storm. Agricultural farms and orchards run the risk of high damage from **downbursts** which also brings economic consequences. Some farms are homestead farms which provide food and income for owners. Crop and livestock loss are consequences of downbursts in these locations. Agricultural operations include Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), Yeaton Dairy Farm. Many households keep farm animals.	Enhanced Fujita (EF) Tornado Scale
Wind	**Hurricanes and Tropical Storms**	4.0	**Entire Town.** Areas of particular concern include Short Falls Road and other bridges, the Epsom Traffic Circle area, and the vulnerable populations of the Schools and elderly assisted living facilities. Roadways (fallen trees), electrical power utilities, communications network,	When **hurricanes or tropical storms** occur in Epsom, the Town's electrical utilities of Unitil and Eversource and will continue to be prone to power outages. The response time to these outages could be several days in the more remote or densely populated areas of Town, depending on where debris has fallen onto roads. Areas particularly vulnerable to the combination	Saffir-Simpson Hurricane Wind Scale

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
			telecommunications towers, local government operations are susceptible to damage by debris impacted infrastructure, including the Water Precinct. See also previously listed wind and flood vulnerability sites.	of **flooding**, **wind**, **tree debris** and **power failure** include forested and highly traveled sections of Town, including the Epsom Traffic Circle, Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, as well as US 4/202 and NH 28. Communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower, telephone lines, power lines and other utilities could also be affected by **hurricanes**. Several sections of Town would be difficult to access with trees and power lines down on these residential roads, resulting in possible isolation. Radio operability for emergency communications could be adversely affected. Land line and VOIP telephone utilities would be at risk of failure during **severe storm weather**.	

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Wind	**Severe Winds, Rain Storms and Thunder Storms**	**8.0**	**Entire Town,** although the highest and lowest elevations and rural neighborhoods may be at the greatest risk. Route 4 and Route 28 are main travel ways. Traffic flow, whether on main routes or on back roads, is the main issue for high wind events. Roadways become vulnerable to falling trees and limbs, and those that fall on utility lines. Although this situation can eliminate evacuation routes out of Town, traffic is rerouted as necessary. There are few options to circumventing Route 4 and the Traffic Circle. Rerouting: people (even residents) do not know the back roads during rerouting, and this can be confusing to them. The Town uses radio stations to convey alternate route information. Emergency management has observed some impatient travelers trying to drive under fallen utility wires or run over them, which poses extreme danger to vehicle occupants and potential rescuers. Utility failures are also common in high wind events. Isolation on roads can occur anywhere, from main routes to back roads. Eversource and Unitil have pre-meetings ahead of storm events to plan for action, NH Electric Co-op also serves customers. Communications network, cell towers, local government operations are susceptible to debris impacted infrastructure damage. Many elderly people on oxygen; if power lost for more than a few days, deaths may occur.	Warm weather storms bring wind, flooding, and lightning hazards. All of Epsom will continue to experience **severe wind**, **rainstorms**, and **thunderstorms** in the future. The Town's electrical utilities of Eversource (formerly Public Service of NH or PSNH), Unitil and NH Electric Cooperative will continue to be prone to power outages. The response time to these outages could be several days in the more remote or densely populated areas of Town, depending on where debris has fallen onto roads. Areas particularly vulnerable to the combination of **flooding**, **wind**, **tree debris** and **power failure** include forested and highly traveled sections of Town, such as the US Routes 4/202, NH 28, Epsom Traffic Circle, Short Falls Road and Bridge. Roadways will continue to experience falling trees and limbs, and those that fall on utility lines from **severe wind and rain storms.** Although this situation can eliminate evacuation routes out of Town, the larger problem is the necessity for traffic rerouting. There are few options available for circumventing US Routes 4/202, NH 28 and the Epsom Traffic Circle. When rerouting is conducted, drivers (even residents) do not know the back roads well enough and the detour can be quite confusing to drivers The Town uses radio stations to convey alternate route information. The Fort Mountain Tower and repeater supplies emergency communications, and it has the potential to be disrupted, resulting in adversely affected radio operability for emergency communications. Atlantic Broadband (formerly Metrocast) internet, especially with its VOIP telephone feature, and the other land line utilities are at risk of failure during s**evere storm weather.**	Accuweather Thunderstorm Criteria Scale, Hail Size Scale

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Fire	**Lightning**	**9.3**	**Entire Town.** Areas of concern are remote areas which could not be easily accessed by emergency vehicles, the Baptist Hill Meetinghouse, etc. The cell tower on Elkins Drive receives regularly lightning strikes. In response to the call, the Fire Department responds to nearby buildings purporting to be hit, after which examination proves only the tower itself was struck. Towers are also located at the Epsom Traffic Circle, on River Road, and on White Birch Lane, and all of them are regularly struck by lightning. Other areas most susceptible include forested areas, conservation areas, open recreation fields, points of higher elevation than surrounding area. Buildings without lightning rods would be more susceptible to damage from a strike. Other susceptible structures include aboveground utilities: transformers, water towers, churches and tall buildings.	**Lightning** regularly strikes in Town and can strike in the future at any time at any given location. Specific sites which would cause the greatest impact if struck by **lightning** include the Epsom Central School, Northwood Lake community, Concord Hospital Medical Facility, the Epsom Traffic Circle, assisted living facilities, other schools, Webster Park, Town facilities, manufactured housing parks and campgrounds, churches and tall or historical buildings Forested areas, parks, conservation areas or open recreation fields can be dangerous to people and property. These include remote areas which could not be easily accessed by emergency vehicles, the Baptist Hill Meetinghouse, Webster Park, Town Forest trails, points of higher elevation than surrounding area. Wooded and forested sections of Town are vulnerable to lightning, including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitively struck), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, US 4/202/202, NH 28, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. There is a lot of wood slash remaining in the woodland interior due to the July 2008 Tornado and the December 2008 Ice Storm which with drought conditions, contributes to an increased overall hazard potential for wildfires. The Town Forest on Tarleton Road is remote and used recreationally for illegal camping and other activities, including use by teens. Electrical utilities, generators, transformers and the communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Old/Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water are vulnerable to **lightning**, which does strike the towers regularly.	Lightning Activity Level (LAL)

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Fire	**Wildfire**	**9.0**	**Entire Town.** Areas most susceptible include forested areas, conservation areas, open recreation fields, locations difficult to access by vehicle, points of higher elevation than surrounding area. Susceptible structures include aboveground utilities: transformers, telecommunications towers, water towers; churches, Baptist Hill Meetinghouse and tall buildings. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. There is a lot of wood slash remaining in the woodland interior due to the Tornado of July 2008 and the Ice Storm of December 2008, which contributes to the overall hazard for potential wildfires. The Town Forest on Tarleton Road is remote and used recreationally for illegal camping and other activities, including use by teens. See also lightning for specific areas.	Because of the dry conditions, it takes several times longer to put out fires, and responders have to dig down further with equipment. Although **wildfire** damage has been kept to a minimum to date, the potential for losing an immense acreage of Epsom to this natural hazard is possible, particularly during future drought conditions. The heavily forested woodlands of Town are often remote locations and difficult to access by emergency vehicles. The forested, dead-end residential neighborhoods would be difficult to evacuate. Any **debris** left over from **flooding**, **winter storms**, or **wind events** are a **wildfire hazard**. When **droughts** or drier conditions occur, the dry vegetation becomes a significant hazard to the Town Fire Department. Some neighborhoods would be more vulnerable than others because of high density, such as the manufactured housing parks, multi-family developments and the seasonal campgrounds including manufactured housing parks: Bartlett's MHP, Breezy Acres MHP Cooperative, Colby Brook Estates MHP, Family Estates MHP Cooperative, King's Grant MHP [55+ Senior], Kingstowne MHP [Senior], Presidential MHP; seasonal campgrounds: Get Away Tiny Houses (formerly Blake's Brook Campground), The Big Easy (formerly Circle 9 Ranch) Campground, Epsom Valley Campground, and Lazy River Campground identified in **APPENDIX A**. Remote, forested areas, parks, conservation areas can be dangerous to people and property: Town Forest. Unmaintained Class VI roads and the transmission lines corridor are challenging to access because of the potential lack of emergency vehicle access and the number of people who use them for recreational purposes. **Wildfires** can also be caused by campfires and other human activity.	NWCG Wildfire Classification

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Extreme Temperature	**Severe Winter Weather, Cold, Wind Chill and Ice Storms**	**12.0**	**Entire Town.** Areas of particular concern include Elementary School, elderly housing facilities, manufactured housing (snow load), and Route 4/28 Traffic Circle. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage from debris impacted infrastructure. Epsom's dispersed residential population, located in wooded and forested sections of Town are vulnerable to loss of power and debris on roads: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. People may be subject to cold temperature, snow isolation, transportation accidents, power failure and communications failure during winter storm events.	It is highly likely that Epsom will be impacted by severe winter weather in the future. Damage and serious conditions can result in any location of the community. Areas of particular concern include the include the Epsom Traffic Circle (US Routes 4/202 & NH 28), Webster Park, Town Office, Police, Fire, Highway facilities, and Northwood Lake community; schools: Epsom Central School, Cornerstone Christian Academy; healthcare facilities: Concord Hospital Family Medicine Facility, Epsom HealthCare [Senior] Center (aka Epsom Manor or Heartland Place Assisted Living; The Town has many senior housing complexes vulnerable to winter weather: Meadow Brook Apartments, Morgan Farm Estates Elderly Condominiums, Sunrise Meadows Senior Living. Multi-family housing, Caraway Multi Family, Lakeview Apartments, The Barn Arvanitis, The Brown Apartments, increases population density. Manufactured housing parks, Bartlett's MHP, Breezy Acres MHP Cooperative, Colby Brook Estates MHP, Family Estates MHP Cooperative, King's Grant MHP [55+ Senior], Kingstowne MHP [Senior], Presidential MHP, have less roof stability. Seasonal campgrounds, Get Away Tiny Houses (formerly Blake's Brook Campground), The Big Easy (formerly Circle 9 Ranch) Campground, Epsom Valley Campground, and Lazy River Campground, should not have people living in these facilities, but some do live in them year-round. All residential developments are vulnerable to **winter weather** impacts. During these events, many residents are unwilling to leave their homes although there is no electricity or other utilities. Traveling to Concord or points east to find a warm hotel room is not an option for most people, nor is leaving pets or livestock behind. Historic buildings or large roofs are vulnerable to snow loads and roof collapse.	NWS Windchill Index, Sperry-Piltz Ice Accumulation (SPIA), NCDC Regional Snowfall Index (RSI) for Northeast

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
				Most of the roads in Town have been open during snow storms. People may still have trouble getting out of their homes, may not have power or may be unable to shovel or plow themselves out Epsom's dispersed residential population, located in wooded and forested sections of Town are vulnerable to loss of power and debris on roads: including Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive power failure), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, US 4/202/202, NH 28, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads, resulting in possible isolation. Communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower and older or historic (Baptist Hill Meetinghouse) or temporary buildings subject to roof collapse are at risk from **severe winter weather conditions**. People may be subject to cold temperature, snow isolation, transportation accidents, power failure and communications failure during winter storm events. See complete list in **APPENDIX A**.	

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Extreme Temp	**Drought**	**9.0**	**Entire Town / Region**. Susceptible farms and orchards include: Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), Yeaton Dairy Farm. Residences with private dug wells have gone dry during this latest drought, and Town fire ponds dry up, Epsom Village Water District may become impacted. Drought means increased risk of brush fire with dry vegetation (see Wildfire for areas). Gravel roads affected because can't grade them when water is low. All fire ponds will be low or dry during drought times. Higher elevations and ledgy locations tend to run dry first.	Periods of future **drought** in Epsom would occur Town-wide and could cause property damage and economic losses. The lack of water would become a community problem to keep people hydrated and the failure of agricultural crops, products and farm animals can occur. Failure of tree farms to thrive can result in economic losses. Increased likelihood of wide-spread **brush fire** and **wildfire** will occur with drier vegetation. **Lightning** strikes could contribute to wildfire risk during droughts. Dug wells can dry up during droughts and interrupt personal water supplies, so few homes remain with dug wells in Town. Property damage and personal injuries or death could occur from drought-related fires or dry wells. The main private community water supply, Epsom Village Water District, could enact water saving measures for their customers to assist with keeping the groundwater table higher. So could the multiple residential developments across town. Overall, Epsom residents should be encouraged to voluntarily undertake water conservation. Agricultural farms and orchards run the risk of high damage from **drought** which also brings economic consequences. In Epsom, these areas include Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), and the Yeaton Dairy Farm. Epsom has a lot of livestock and the Town would have to find ways of watering them during certain weather events, including **drought**. During emergencies, with agreements in place the Town can assist people getting their large animals to shelter at locations such as at the Deerfield fairgrounds and small animals to the Suncook River Veterinary Clinic.	Palmer Hydrological Drought Index (PHDI)

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Extreme Temp	**Excessive Heat**	**2.7**	**Entire Town**. Areas of particular concern include high density populations such as Epsom Manor, the Epsom Traffic Circle area, the Elementary School and other schools, the numerous Manufactured Housing Parks, other senior housing facilities, and multiple campgrounds, and apartment buildings. Vulnerable areas most susceptible to extreme heat include farms, orchards. Shelters may need to be opened for cooling centers during extended heat conditions.	Epsom could again experience **heat waves** where temperatures exceeded 90 degrees for several days. During these times, many specific population sites in Town particularly susceptible to excessive heat, including the younger and older residents: Epsom HealthCare [Senior] Center (aka Epsom Manor or Heartland Place Assisted Living; schools: Epsom Central School, Cornerstone Christian Academy; senior housing: Meadow Brook Apartments, Morgan Farm Estates Elderly Condominiums, Sunrise Meadows Senior Living; manufactured housing parks: King's Grant MHP [55+ Senior], Kingstowne MHP [Senior]. All should have access to either air conditioning or cooling facilities. Older manufactured homes may lack air conditioning. **Excessive heat** can cause dehydration, heat exhaustion and more serious illnesses. The Epsom Public Library or one of the churches could open during these times as a Cooling Center. Other vulnerable facilities are indicated in **APPENDIX A.** Vulnerable population groups contain people who might be among the first to need help during extreme heat events. The farms and agriculture operations listed previously are susceptible to effects of extreme heat.	NWS Heat Index
Earth Hazards	**Earthquake**	**2.0**	**Entire Town.** The Central NH Region is seismically active and earthquakes are regularly felt from area epicenters. Damage to utility poles and wires, roadways and infrastructure (dams, water lines, bridges) could be significant. Areas with underground utilities, community water systems, old buildings, Epsom Traffic Circle, Manufactured Housing Parks, Baptist Hill Meetinghouse, and the Elementary School may be particularly susceptible.	Earthquakes are a regular occurrence in Epsom's vicinity, now a couple of times annually with a >2.0M. While It is likely Epsom residents will continue to feel **earthquakes** in the future, it continues to be likely that no major damage will result from these small earthquakes. Damage to utility poles and wires, roadways and infrastructure (Epsom Traffic Circle, Northwood Lake Dam, Epsom Village Water District facilities, communications towers) could be significant should a large earthquake (**>3M**) occur. Areas with underground utilities, community water systems, and the old/historic buildings, Town Buildings, the churches, multi-family buildings, health care facilities, senior facilities, and the Elementary School are particularly at	Richter Magnitude Scale

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
				risk because of building size and their large populations. Epsom Traffic Circle is downstream of the large Northwood Lake Dam or the Pittsfield Mill Dam (Pittsfield), which if breached could be disastrous to Epsom. Loss of these or other community buildings could result in fewer services available to residents.	
Earth	**Landslide**	**1.0**	**Development and areas of steep slopes** (greater than 25%) are at risk for these events. Roads with steep ditching or embankments are most vulnerable to landslide or rockslide of ledges include Route 4 along the Little Suncook River, Goboro Road, Echo Valley Road,	Generally, vegetation in Epsom is good at preventing landslides on hillsides. Development in close proximity to several steep slope areas could be at risk for landslides or rockslides (slopes greater than 15% - 25%). In the future, the Town could experience failing reclamation vegetation at the gravel pits, resulting in **landslides**. Roads with steep ditching or embankments are most vulnerable to landslide. Areas of concern for potential landslide include US Routes 4/202 along the Little Suncook River. Road washouts and flash-flooding could cause landslides, especially along Goboro Road and Echo Valley Road, but otherwise the Town is not particularly susceptible.	No known widely-used scale measuring the magnitude of landslides
Technological	**Dam Failure or Release**	**2.3**	**Highest hazard dams are Northwood Lake Dam (H) and Cass Pond Dam (L) Little Suncook River**, 2 houses could be impacted, but all dams have a high probability of flooding and potential to break. Several other dams have potential to fail. Route 107, Route 4. Below the area of the 2006 avulsion, the Suncook River is filled with sand and debris which will continue to cause potential dam breach and failure. This is an on-going concern for the Town of Epsom. Upriver, a Pittsfield Mill Dam failure would affect Epsom.	Potential future dam **breach or failure** along the Suncook or Little Suncook Rivers could be disastrous. One (1) dam is of High Hazard (H) classification, the Northwood Lake Dam (Little Suncook River), impounding 688 acres of water behind a 13' high dam. Two (2) houses and NH 107 or US 4/202 could be potentially impacted by a Northwood Lake Dam breach. The Little Suncook River begins at the Northwood Lake outlet, flowing west along US Routes 4/202 toward the Epsom Traffic Circle where it joins the Suncook River. One (1) dam is of Low Hazard (L) classification, the Cass Pond Dam (Little Suncook River), which impounds about 15 acres of water behind a 10' high dam. Several Non-Menace (NM) dams and beaver dams contribute to the potential for dam failure during major **flood** events, including **heavy rain from storms or hurricanes**. The greatest concern lies north in Pittsfield, the High Hazard (H) Pittsfield	NHDES Dam Hazard Classification *either/or criteria* **Dam Failure causes flooding and therefore is included as natural in this instance*

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
				Mill Dam which holds back the Suncook River is a large concern to the Town should this dam breach. Epsom's Suncook River reaches could be **flooded** to the Traffic Circle, then once the extra water reaches the 2006 **avulsion** area, the flow could cause further **dam failure** and flooding damage because the area is now filled with **sand and debris**. This is an ongoing concern for the Town of Epsom.	
Technological	**Power/ Utility Failure**	N/A	**Entire Town, Traffic Circle,** utilities and vulnerable populations. Wooded and forested sections of Town are vulnerable: Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, New Orchard, Route 4, Route 28, Webster Park, virtually every road in Town. These sections of Town would be difficult to access with trees and power lines down on the residential roads. Epsom depends on power from Eversource, Unitil and NH Electric Co-op. Power outages may last for several days before service is restored in a large event. Power outages to isolated areas of Town are particularly vulnerable to outages and the resulting effects. Eversource & NH Electric Co-op serve outlying parts of Epsom. Primary electrical source is Unitil, whose response is quick and prioritized because of the Traffic Circle, the Town center of Epsom and its numerous vulnerable populations.	In Epsom, the power is disrupted on a regular basis during all seasons. Although the Unitil trimming schedule has become more regular, it is only once every 5 years unless a disaster looms or has occurred. Expected to continue in the future, **power failure** is a secondary impact of the primary natural hazards occurring. Epsom depends on Unitil, Eversource and NH Electric Cooperative for most of its power needs. Power outages may last for several days before service is restored to residents in a large event. Power outages in the more rural or isolated areas of Town regularly occur during any **wind, storm, winter events** or hazard events that cause **debris impacted infrastructure.** Service areas are confusing to emergency responders because of multiple areas of service by three providers. **Power outages** may last for several days at the Epsom Traffic Circle to over 2 weeks in the mountainous regions. Atlantic Broadband (formerly Metrocast) internet also fails with the power and provides VOIP phone service for many. Because of this and the vulnerable populations, the Traffic Circle area is a priority for fixing outages. The Epsom Central School can serve as the temporary sheltering space available to Epsom residents. Because there is no generator at the facility, people can be bussed to a secondary location if needed (Cornerstone Christian Academy). There are many vulnerable populations identified in the community (see **APPENDIX A**).	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Technological	**Communications Systems Failure**	N/A	**Entire Town, Telecommunications Towers**, Telephone and electrical lines. Communications are detailed in the Community Vulnerability Assessment tables. Communications failure would be worse if it occurred at the Fire and Police Depts, Highway Department or Town Offices, especially during a holiday, or inhibited emergency dispatch and EOC operations. Most Town radios are interoperable, and they are used in more than one location. The Police Department has a repeater in a secondary location and is kept up to date. The Fire Department has mobile and land radios, with repeaters in locations in other towns. The Town is serviced by the Capital Area Mutual Aid Compact, which does all the emergency medical service and Fire dispatching. They have redundant capabilities and are currently upgrading their systems. Vulnerable areas previously identified are at highest risk.	Epsom communications have been disrupted in the past and could again fail. Any **communications failure** can mean lack of emergency services or delayed emergency services. The Town is serviced by the Capital Area Mutual Aid Compact, which does all the emergency medical service and Fire dispatching. There has been a steady migration to Voice Over Internet Protocol (VOIP) internet telephone connection, with people dropping their landline telephones. Some people use cell phones but rely on service outside of Town. Beyond that, telephone lines provide service to most customers in Epsom. An interruption affects the majority of residents in Town, especially if a break occurs along the Traffic Circle or on any of the previously identified roads. If the main transmissions tower (Old/Fort Mountain Road) were destroyed by any weather or hazard event, all public safety communications (radios) in Epsom would be jeopardized. Emergency response would need to rely on cell phones which are spotty at best. Most Town radios are interoperable, and they are used in more than one location. The Police Department has a repeater in a secondary location and is maintained. The Fire Department has mobile and land radios, with repeaters in locations in other towns. The Capital Area Mutual Aid Compact has redundant capabilities and is currently upgrading their systems. Vulnerable areas previously identified are at highest risk of **communications failure**.	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Technological	**Debris Impacted Infrastructure**	NR	**Most dams and bridges** could experience debris impacted infrastructure. Debris generated by Suncook River erosion will continue for many years. Culverts that are failing due to low capacity and debris include Leighton Brook and the North Road culverts. The Leighton Brook channel and outlets have undergone significant improvement and should now function properly. In other locations, box culverts as replacements for failing culverts have been recently installed in many Epsom roads as a result of recurring flooding events. See **APPENDIX A** for a comprehensive list of sites.	Infrastructure in Epsom can refer to roadways, powerlines, utility lines, culverts, water towers, bridges or dams. Debris in the form of trees is a constant concern in rural, forested Epsom. Trees will fall on powerlines or roads, powerlines fall on roads or buildings, causing **power failure** or **road blockage**, despite utility company preparation. Town culverts and drainage structures will catch branches, leaves and debris and could back up and runoff if not regularly cleared by the Highway Department. Epsom's watercourses, including the Suncook River, Little Suncook River, and brooks and wetlands can **flood** their banks, **overflow culverts**, or **washout roads** during certain conditions as a result of debris. **Large woody material** in the Suncook River was inventoried in 2013 and this material can shift and increase with **bank failure**. Excessive **sedimentation** as a form of debris is occurring in the Suncook and transports into the Merrimack River. **Most dams, culverts, and bridges** could experience debris impacted infrastructure. The Town has 2 closed redlisted bridges that are structurally deficient, Cass Road over Little Suncook River and Old Turnpike Road over Gulf Brook. All outlying roads are susceptible to tree fall and downed powerlines (see Wind hazards). Most of the bridges in Epsom are owned by the Town except where the bridges are along US 4/202/202 or NH 107. These features inventoried in **APPENDIX A** are those which should be watched carefully before and after storms and should be checked and maintained regularly to reduce the risk of significant **debris impacted infrastructure** events.	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Technological	**Transportation Accidents**	NR	**Major NH Route intersections and the Epsom Traffic Circle at Route 4/28**. Frequent transportation accidents occur at each intersection with Route 28 (especially between the Jug City Road and Drolet Road intersections) and along Route 4 between the Old Turnpike Road and Route 107's intersections. See Map series for regular accident locations, at certain intersections, curves, straightaways, hills, etc.	**Traffic accidents** at the Traffic Circle, US 4/202 (Dover Road) and NH 28 may be the most likely future transportation hazard in Epsom. Accidents can occur at difficult intersections, hills, curves, or straightaways, particularly in **winter weather**. US 4 through Epsom is a high-traffic commuter route for thousands of cars daily driving west-east from Keene to the coast. Many businesses and local roads access US 4; with high speeds and two lanes in places runs the possibility of accidents. Other local intersections such NH 28 at Jug City Road or Drolet Road cause frequent accidents. NH 107 intersections can also be dangerous. As the local roads become developed with more homes, more vehicles, pedestrians and bicyclists will find themselves vying for the same space. With vehicular traffic increases or as the weather turns bad, there is the likelihood that **transportation accidents** will occur in these and other areas.	N/A
Technological	**Fire (Vehicle, Structure, Arson**	NR	**Epsom Traffic Circle area & Entire Town.** Areas most susceptible include: senior living facilities, vacant buildings, foreclosed homes or seasonal buildings, buildings in densely populated areas or residential manufactured home parks. Vehicle fires could occur anywhere, parking lots, driveways, roadways. Above ground LP storage tanks can also pose a potential hazard.	Epsom is a wooded, rural, agricultural community. The entire Town is vulnerable to all types of fire. Locations in Epsom which are particularly vulnerable to **fire** (from any source – **lightning**, human, **wildfire**, electrical, power lines, **hazardous materials**, etc.) include Town Offices which share a building with businesses. The Epsom Library, Fire Department, Police Department, Epsom Central School, Cornerstone Christian Academy, Epsom Manor, the manufactured housing parks in Town, US Routes 4/202 (Dover Road) homes and businesses, multi-family developments and senior living facilities listed previously, and gathering places such as the Meetinghouse, Churches, American Legion, Elks, Odd Fellows, etc. The outdoor Town Forest on Tarleton Road is also at risk of fire, particularly during **drought conditions**. Several large businesses in Town have **hazardous materials** onsite that render them vulnerable should a fire occur.	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
				Additionally, there are dozens of **agricultural enterprises** in Epsom with fertilizer, old barns and hay fields surrounded by woodlands, a vulnerability to both livestock and people. See **APPENDIX A** for a comprehensive list of sites.	
Technological	**Hazardous Materials Spills/ Radiological Accidents**	NR	Epsom Traffic Circle, Route 28 and Route 4 would be the most realistic routes taken where vehicular traffic transports hazardous waste. The largest or most dangerous stationary sites that store and/or handle haz mat on site (fertilizer, pesticides, fuel, etc) are listed in Critical and Community Facility listing. Occupational haz mat sites where spills could occur include: health care facilities, schools, manufacturing, etc.	Future transportation trucking of **hazardous materials** on US Routes 4/202 (Dover Road), NH 28, NH 107 and through the Epsom Traffic Circle corridor is likely a regular occurrence. These trucks could rollover and spill their contents onto these significant roadways. The ***New Hampshire Hazardous Material Commodity Flow Study 2018*** and its accompanying maps may provide some enlightening data the Town can use to help protect the community from spills. The Town is a large draw to industrial businesses. There is no Transfer Station and Recycling Center in Epsom. Residents drive to BCEP Solid Waste in Pittsfield. Special collection days are held to collect Household Hazardous Waste (HHW), when large volumes of materials that may otherwise be dumped in the woods or in water bodies are collected from residents. Dozens of occupational facilities in Town could handle, store, or use hazardous materials. Local auto body shops and garages, large businesses, agricultural operations, fuel stations, excavation and asphalt businesses, industries, any school labs, and the Town Salt Shed are stationary site locations which may experience this type of hazard in the future. A listing of known facilities which store or could use hazardous materials has been inventoried in **APPENDIX A.**	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
Technological	**Public Health Issues**	NR	**Congregate populations.** Epsom Central Elementary School, Epsom Manor, Concord Hospital Medical Office Building, the numerous Manufactured Housing Parks and the senior housing facilities, restaurants, populated areas, large employers, apartments, senior housing, stores and public assembly venues listed in the Critical and Community Facility listing - all of these locations increase the risk of exposure to and transfer of illness. The forests, conservation areas, agriculture, wooded areas, ponds can host ticks (Lyme) and mosquitos (West Nile, EEE, etc). Epsom has a plan to join the nearby regional Point of Dispensing (POD) site at the nearby Northwood Academy, a location where vaccines or other medicines are disseminated to people during an emergency with assistance from the Capital Area Public Health Network (CAPHN).	The future may bring additional widespread **public health** issues involving Lyme disease, other tickborne diseases and arboviral (mosquito-borne) viruses. The Town is a wooded, rural community hosting the Suncook and Little Suncook Rivers, many brooks, ponds, wet meadows, large acreages of forests, paved State roadways, and a large Town Forest (Tarleton Road). For indoor contamination, the highest risk facilities for communication of viruses and bacteria can include the Epsom Central School and Cornerstone Christian Academy, Town Library, Epsom Manor, Concord Hospital Medical Facility, Epsom Churches, the aged 55+ older living facilities, as well as the Town's stores, restaurants, recreational facilities and gathering places (see **APPENDIX A**). The Epsom Village Water District operates and maintains their own water system for residents and the old pipes are known to break frequently. The same populations identified as particularly susceptible to Excessive Heat would be most vulnerable to public health issues and epidemics.	N/A
Human	**Terrorism**	NR	**Unlikely, but possible anywhere in Entire Town**. Most susceptible sites could include: Epsom Traffic Circle, Town Office, Epsom Central School, churches, Library, and Concord Hospital Medical Center, Water Precinct, Town buildings. Also, the Post Office, public events, all governmental facilities, state facilities, political offices or rallies, churches, etc., telecommunication towers, major employers (especially those large quantities of haz materials), grocery or convenience stores, restaurants.	It is unlikely that the Town would be the target of any act of international **terrorism**, but because there are many forms of terrorism and terrorists, the possibility always exists. Domestic terrorism has occurred within the last 15 years both in Epsom, in the form of hostage situation and cyberattack. Targeted locations are usually public spaces that would do the most damage to send a message. Targets are usually public spaces that would do the most damage to send a message. Possible targets could be Town Facilities (Town Office, Library, Police or Fire Department), Epsom Central School, Cornerstone Christian Academy, Epsom Manor, Epsom Traffic Circle, and gathering places such as the Churches, restaurants/bars, and all other Town, State or governmental facilities like the	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
				Post Office. Although unlikely, there could be a massive impact felt in the community even on a small-scale event.	
Human	**Sabotage/ Vandalism**	NR	**Town Facilities**. Sabotage would be most likely to occur at electric utilities, Town Offices (computer systems & website), Town buildings, dams, water supplies and pumphouses, cemeteries, vacant buildings, dams, under bridges.	**Vandalism** could occur at public and private cemeteries, Epsom Central School, or recreational sites such as the Town Forest and Trails. Infrastructure could be vandalized, such as bridges, dams, Pump Stations or the Water Tower (including graffiti). These facilities would be among the most damaging to the community. Vandalism could also occur at vacant buildings in isolated locations. Epsom has many vacant buildings, even along the Traffic Circle. Technological systems such as computer systems and websites of the Town Office, Police Department, Library, Epsom Central School, Fire Department, Highway Department and other governmental systems could be subject to computer or network sabotage. Crippling the Town's data and communications could bring the community to a standstill. Utilities or telecommunications towers could be vulnerable to **sabotage** or **vandalism**, such as the Epsom Village Water District water supply or the Transmission Tower on Old/Fort Mountain Road. Many other significant facilities in Epsom could be subject to sabotage including the powerlines, transmission lines, transformers and utility substations.	N/A
Human	**Hostage Situation**	NR	**Unlikely, isolated events.** Locations where hostages could be taken include: Town Offices and other public buildings, Schools, banks, Post Office, workplaces, grocery and convenience stores, restaurants, high density population areas (Traffic Circle area, manufactured housing parks, apartment buildings), and domestic home situations.	**Hostage situations** can occur anywhere, are isolated events and are nearly impossible to predict. Hostage situations are not normal events and therefore are nearly impossible to predict. Domestic violence events generally occur in resident homes. Conventional hostage situations would most likely target such locations as the Town Office, Police Department, Library, Epsom Central School, Cornerstone Christian Academy, Post Office, Epsom Manor, manufactured housing parks, at other Town or governmental facilities, or at major, visible businesses such as those	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measure-ment Scale
				along the US Routes 4/202 (Dover Road) corridor and Epsom Traffic Circle.	
Human	**Civil Disturbance/ Public Unrest**	NR	**Unlikely, limited events**. Locations where civil disturbance could occur: Traffic Circle, Town Offices, Library, Central School, stores, restaurants, establishments serving alcohol, and high density population areas. Occasions include: Town Meetings, voting day, local board meetings, visits from political candidates, and large public events such as Old Home Day, Veteran's Parade, School sports events or road races.	Large scale incidents of **civil disturbance, public unrest** or riots are unlikely in Epsom in the future, but certainly possible. Otherwise, **civil disturbance** could occur during Town Meetings and School Meetings, on voting day or during visits from political candidates, or at large events such as Old Home Day, Veteran's Parades, NH Veteran's Cemetery ceremonies, or at Epsom Central School events. Locations where **public unrest** could occur include Town Facilities (Offices, Library, Police, Fire, Highway), Epsom Central School and its recreational fields, Cornerstone Christian Academy, Epsom Traffic Circle or the numerous manufactured home parks. Restaurants and establishments serving alcohol and gathering facilities are also more susceptible to **civil disturbance** activities.	N/A

Source: Epsom Hazard Mitigation Committee

Although there are many potential hazards in Epsom's future, the community is knowledgeable about where some of the worst occurrences might result with this descriptive **Potential Future Hazards** inventory. A comprehensive, specific community facility inventory that indicates each site's ***Primary Hazard Vulnerabilities*** is found next in **5 COMMUNITY VULNERABILITY ASSESSMENT**.

Epsom's Built Environment Changes Since the 2012 Plan

The locations of where people and buildings are concentrated now or where new lands may be developed should be compared to the changing locations of potential natural hazards in order to best mitigate potential property damage, personal injury or loss of life.

The Town's Statement of Vulnerability Change

The overall vulnerability of the Town to natural disasters is believed to have increased over the last 5 years with the development changes (population and housing increases), fewer emergency response services personnel, and at-risk populations who request additional services.

There have been few significant development changes in the last 5 years. Regular natural disasters and hazard events have occurred that risked life, property or infrastructure during this time. The Town Departments handled the impacts of natural disaster events when they occurred and obtained federal Public Assistance funding to help offset some of the costs when necessary. The future may be very different, as temperatures rise and warm weather storms become more violent and commonplace. The maple industry may not persevere.

Facilities and their locations with vulnerabilities to specific natural hazards are listed in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**.

AREAS OF HIGHEST DENSITIES

The population of Epsom is located along NH 28 (Suncook Valley Highway), US 4/202 (Dover Road) and dispersed along the many Class V town roads and private roads in the community. Epsom also has Town unmaintained Class VI roads along which people live and cannot maintain or repair damages to either Class VI or private roads. Most Town Departments are located within this Town center geographical area – Town Offices, Highway Department, Fire and Rescue Department, Police Department, Library, School, Post Office. All of these buildings are in separate locations, most of them across the Traffic Circle from one another.

Epsom is a large, **34.5** square mile highly rural and forested community with an overall Town population density of **136** people per square mile. However, interspersed are many densely populated areas due to the prolific multi-family developments, manufactured housing parks, assisted or senior living facilities and campgrounds. Epsom has clusters of high residential density along NH 28 (Suncook Valley Highway), Black Hall Road, Goboro Road, Windymere Drive, North Road, Short Falls Road. Large concentrations of people are found in the **7** manufactured housing parks, **5** of which are located along NH 28, and in the **3** senior housing facilities along NH 28. **Flooding** remains of concern for the manufactured housing parks since

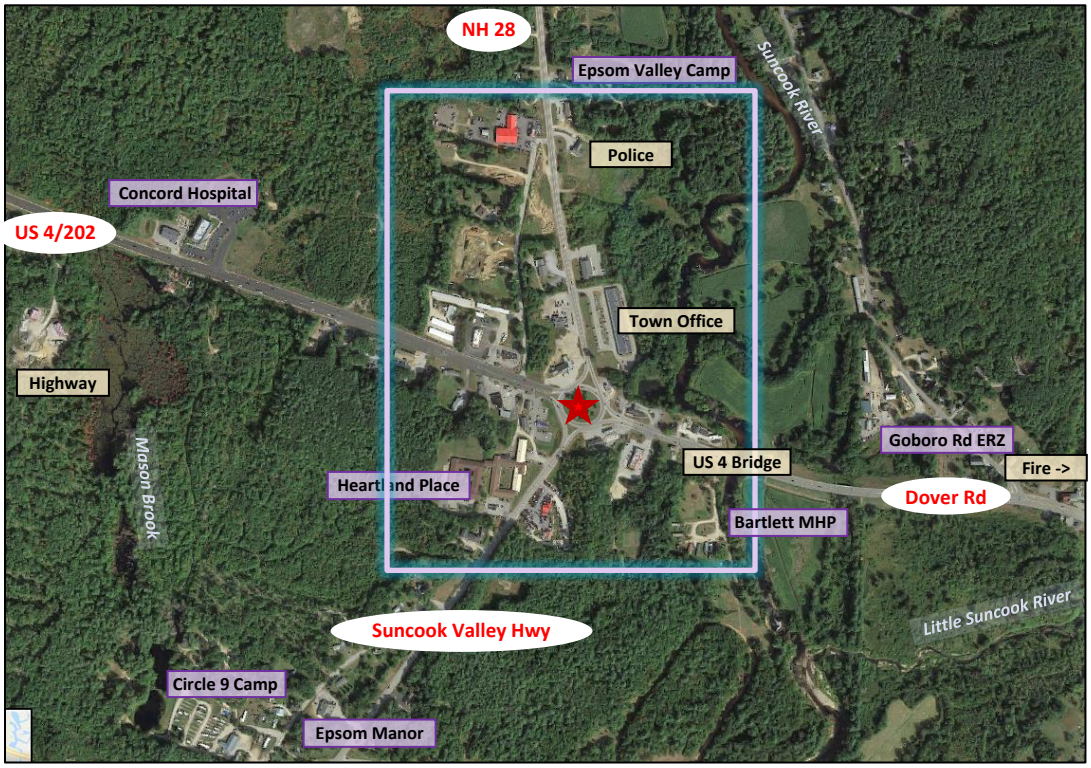
several are next to the **Suncook River** or brooks with undersized culverts. Technological hazards like **transportation accidents** or natural hazards like **severe winter weather** may be the greatest threats to the population living along major transportation routes or local Class V and VI roads.

Facilities in these identified areas include **manufactured housing parks**: Bartlett's MHP (**~8** homes), Breezy Acres MHP Cooperative (**~15** homes), Colby Brook Estates MHP (**~27** homes), Family Estates MHP Cooperative Inc. (**~15** homes), King's Grant MHP [55+ Senior] (**~50** homes), Kingstowne MHP [Senior] (**~134** homes), Presidential MHP (**~30** homes); **campgrounds (seasonal):** Get Away Tiny Houses, formerly Blake's Brook Campground (**~35** tiny houses), The Big Easy (formerly Circle 9 Ranch) Campground (**~150** sites), Epsom Valley Campground (**~70** sites), Lazy River Campground (**~109** sites); **child care facilities**: Circle Childcare (**~40** children), The Learning Tree Daycare (**~60** children); **other senior housing**: Meadow Brook Apartments [subsidized housing] (**~50** units), Morgan Farm Estates Elderly Condominiums (**~20** units), Sunrise Meadows Senior Living 55+ Housing (**~24** units); and **multi-family developments**: Caraway Multi Families **(~4-5** units), Lakeview Apartments (**~6** units), The Barn Arvanitis (**~5** units) and The Brown Apartments (**~4** units). **Fire** from any source in a dense residential neighborhood could be disastrous.

Many of these facilities do not have a secondary egress for **evacuation**, with only one shared access to the main road. Several of these roads and facilities have experienced the effects of **flooding events**, **erosion and scouring**, and **severe wind and winter events** that include downed trees and powerlines on roadways and driveways. **Floodwater runoff** from **rapid snow pack melt**, **debris impacted infrastructure** (culverts) or **severe storms** has occurred in several locations. **Lightning** may pose a threat to buildings and Town infrastructure. **Figure 27** displays the Epsom Traffic Circle and several facilities along the busy US 4/202 and NH 28 highways.

Figure 27

Epsom Traffic Circle Business Area Density Map



Source: Google Maps Accessed by CNHRPC, July 2018

Other than residential density, the center of Epsom is the Traffic Circle at US 4/202 and NH 28. Dozens of **businesses**, **services** and **industry** are located along Dover Road (US 4/202) and Suncook Valley Highway (NH 28). The Traffic Circle is the main travel way for Town residents and is a critical state and regional highway.

Fire from any source (**lightning**, **wildfire**, or **human-generated**) is a concern for these buildings, especially the historic wood frame facilities. These high-risk areas can be **flooded** by rapid snow pack melt or **rainstorms**, but **power and communications failure** by any **natural hazard**), transportation accidents and the potential for **hazardous materials spills** are the greatest problems anywhere along the Traffic Circle. Rerouting traffic would be very difficult, as would an **evacuation** of the corridor. Along these stretches, icy roads and hazardous driving conditions are often present during **severe winter weather** events. **Severe wind events** often impacts every road in the community.

Changes Since 2012 Plan

The Town has grown in the six years since the **2012 Plan** in terms of housing, about according to **2 COMMUNITY PROFILE**. Most of these new homes are interspersed around the community. Some residential development activity includes the renaming of the Get Away Tiny Houses (formerly Blake's

Brook Campground) with removal of its campground sites, and the renaming of The Big Easy (formerly Circle 9 Ranch Campground) to add limited winter camping. Small residential subdivisions occurred on North Road, Cobblestone Drive, and Windsor Drive, Short Falls Road (Sunrise **55+** housing), Wimbledon, Jug City Road. On Gauthier Drive a commercial development was approved. Recent development has enabled the new construction of over **120+** new single family homes, multi-family homes, manufactured homes and non-residential structures since the **2012 Plan**. With these new subdivision come many undeveloped lots. Most of the new development is scattered throughout the Town.

With the main highways built up with businesses and industries, a new Economic Development Committee was established in 2017 with the purpose of shepherding appropriate businesses to planned locations in the community while providing incentives for a successful venture. An Economic Revitalization Zone (ERZ) was approved at the 2018 Town Meeting to provide tax incentives for businesses that locate to the designated zone in the village area, Goboro Road. Improvements to the Epsom Village Water District were studied that should enable better water and sewer for new businesses in the ERZ.

VULNERABLE POPULATIONS

Most of the high density neighborhoods mentioned above are also vulnerable populations located in areas of potential hazards. Additional vulnerable populations at risk include the **schools**, with Epsom Central School (**~433** students + **~85** staff) situated on the eroding banks of the Suncook River and Cornerstone Christian Academy (**~35** students + **~10** staff), both on Black Hall Road. Other vulnerability populations include **medical**, **assisted living facilities** and **gathering places**: Epsom Public Library (**~100** capacity), Epsom Manor Nursing Home, Epsom HealthCare Center / Heartland Place Assisted Living (**~108** beds), Webster Park, Epsom Bible Church (**~300+** capacity), New Rye Union Congregational Church (**~75** capacity), Merrimack Valley Church (**~75** capacity), Old Town Hall, Concord Hospital Epsom Family Medicine, and other historical buildings.

Along Black Hall Road and Short Falls Road is the Epsom Village Water Precinct that supplies drinking water to hundreds of customers in the NH 28 south area. The Water Precinct pump house is situated just outside of the Suncook River floodplain and has flooded in the past before being rebuilt and elevated and reduce the chance of recurrence.

These facilities are located within the same vicinity of the high density areas along US 4/202 Dover Road and NH 28 Suncook Valley Highway. Traffic flow getting from one end of Town to the other, even for emergency services, could become very difficult during **flooding** events, **severe winter weather**, **traffic accidents**, or trees/ power lines down on roads (**debris impacted infrastructure**) because of **severe wind events or storms**.

NH Department of Transportation (NHDOT) traffic counts in **2013** indicated **14,000** vehicles travel daily over the US 4/202 Suncook River bridge. Although these counts may be low in **2018**, to reroute this amount of traffic around the Epsom Traffic Circle during a disaster through other sections of Town would be difficult for Town Departments and emergency services without NHDOT assistance if this necessity

arrives. This is for the regular, daily through traffic. Counting local evacuations of the NH 28 populations may be even more challenging if the traffic pattern is channeled north toward the Traffic Circle and US 4/202, since just one **transportation accident** at the Traffic Circle can inhibit safe passage from all four (north, south, east, west) directions. The **floodplain** follows along NH 28 north-south along the noted **high density areas** and **vulnerable populations** and continues closely along the span of US 4/202 from the Northwood town line to the Traffic Circle, about three miles.

With these **institutionalized populations** and staff in a small geographic area, facilities become especially vulnerable to natural, technological, and human hazards. At the schools, churches and care facilities, these non-natural hazards can include **hostage situation, civic unrest**, **public health outbreaks** from close quarters and **sabotage** (such as computer systems, utility interruption) are of concern. Health care facilities and school labs have some **hazardous materials** onsite. The Epsom Village Water Precinct pump house and storage tank could be **sabotaged**. The potential for domestic **terrorism** or **civil disturbance** at these facilities are also a possibility.

Vulnerable populations could be subject to area hazards such as **downbursts**, **lighting** or **wildfire**, other **severe wind events**, and **snowstorms**. **Power and communications failure** as a result of these events could impact the facilities although emergency generators are onsite at some critical facilities. Extra attention may be required at these locations during any natural disaster event.

Changes Since 2012 Plan

The Town of Epsom, while having most of its governmental, institutional and business facilities spread out along US 4/202 west-east and NH 28 north-south, has not seen much increase with its **vulnerable populations**. The Town has improved emergency communications with Concord and the Capital Area Fire Mutual Aid Compact communication system. The Epsom Central School attempted to obtain an emergency generator for use as an overnight emergency Town Shelter, but School District voters in 2018 did not support the measure. For Central School students, their secondary shelter is located at Cornerstone Christian Academy a mile away. Although not Red Cross certified, both of these schools are important and useful to Epsom residents during disasters. Epsom HealthCare Center has offered a limited number of beds to be used for overnight accommodation of residents most in need.

FUTURE DEVELOPMENT IN EPSOM

The Concord Hospital Epsom Medical Offices constructed around 2010 continues to improve its capabilities. The increasing volume of patients at this facility and subsequent increased transport of patients to Concord Hospital in Concord. In 2018, the Fire and Rescue Department responded to an additional **100+** service calls **per** half-year than they had previous years, and they responded with fewer staff. More **traffic accidents** may also occur at or around this location. The Town's Economic Development Committee worked to establish an Economic Revitalization Zone (ERZ) at Goboro Road to offer tax incentives to new businesses starting out. Funding was made available to study the aging waterline

infrastructure of the Epsom Village Water Precinct to prioritize line replacement and help encourage partnerships to pay for improvements.

The biggest unbuilt residential housing developments in Town (Hoit Road, North Road, Wimbledon, New Rye Road, Poor Town Road) are the same developments approved before the **2012 Plan**. Since the easily developable land in Town has already been built or subdivided, these newest developments will built on **wetlands** or **steep slopes** or at high elevations. To help keep residents safe, cisterns are being required for fire suppression, with sprinklers optional. **Floods**, **landslides**, **erosion**, and **fires** could occur in these residential areas. **Severe winter weather** and **wind events** on these hilly locations will bring trees down on roadways and interrupt **power and communication** services.

Changes Since 2012 Plan

The known developments from the **2012 Plan** will continue to build out in the future. There may be more home-based businesses and more agricultural operations, which are now inventoried in **APPENDIX A**. Real estate conditions and the economy will dictate the markets.

The **2012** traffic light installed at the NH 107 and US 4/202 intersection has seen rear-end type **traffic accidents** decrease as vehicle operators became accustomed to the signal.

Some new **commercial** lots are for sale in the community along US 4/202 Dover Road that have the potential to increase traffic volume and access. Three lots totaling 23 acres near the Concord Hospital facility could bring in a lot of new development. Also along Dover Road, a former condominium development project has been abandoned in favor of 73 acres of commercial land for sale. These parcels alone have the long term potential of transforming the Dover Road corridor depending on what businesses are built. **Severe winter weather** and **wind events** will be expected to impact any new facilities or developments in Epsom.

Housing development is expected to occur in Epsom eventually. Subdivision of legacy parcels, those family-owned large parcels throughout the Town, may occur at any time when these lots are inherited by the next generation. These **6** legacy properties total nearly **1,000** acres and include a large working dairy farm. If developed under existing zoning regulations, large-acre properties could quickly outweigh the ability of Town services to appropriately respond to resident needs. The developments could be vulnerable to **wildfire**, **severe winter weather**, and **lightning**.

When developments come before the Planning Board, potential hazards including **flooding**, **fire**, **traffic accidents**, and **evacuation** are regularly considered. Developers try to solve the problem before a project is approved. The existing roads and bridges experiencing **erosion** and **flooding** will need to be upgraded for additional usage. The Town will continue to grow and develop, and attention should be focused on the hazards any new development could face during the consideration process. At this time, techniques to mitigate identified hazards could be undertaken before the facilities are sited and constructed.

The main natural hazards for this rural, forested community remain **wildfire**, **severe wind events**, **severe winter weather**, **debris impacted infrastructure** (trees down on powerlines and trees/powerlines down on roads), and **power outages**. The Town will need to ensure Town services are not eclipsed by the needs of new development.

Any future development in Town could be vulnerable to the various natural hazards identified previously. The Town is heavily forested, rural, and agricultural and yet highly developed. New (or replacement) buildings and infrastructure and potential future development appear in **APPENDIX A Critical and Community Facility Vulnerability Assessment**.

5 COMMUNITY VULNERABILITY ASSESSMENT AND LOSS ESTIMATION

The Hazard Mitigation Committee developed and/or updated as needed each of the assets tables within this Chapter. Sites were added or removed, and contact information was revised. Modifications were made to the ***Primary Hazard Vulnerability*** column to reflect changes over the last five years. Revisions were made to the future development section, which now includes a clear table. The Plan's maps were also updated from the **Epsom Hazard Mitigation Plan 2012**.

The identification of Critical and Community Facilities within Epsom is integral to determining what facilities may be at risk from a natural disaster. Every Critical and Community Facility can be damaged by multiple hazards listed in **4 HAZARD RISK ASSESSMENT**. A tabular inventory of facilities in Epsom is provided in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**. The ***911 Street Address*** and ***Phone*** number of each facility is supplied, the assessed ***Structure Replacement Value $***, and the ***Primary Hazard Vulnerabilities*** to which the facility is most susceptible are listed. The hazards identified are primarily natural disasters but regularly include the technological (and secondary disasters) such as power failure and communications systems failure as well as human hazards such as vandalism/ sabotage.

Most sites appear on ***Map 3: Critical and Community Facilities*** and ***Map 4: Potential Hazards and Losses*.**

Potential dollar losses for each of the facilities' ***Structure Replacement Value $*** (not land) have been obtained through the January 2018 assessments to provide a starting point of the financial loss possible should these structures become damaged or require replacement. These community facility losses are estimated for the value of structure and does not include land (unless indicated), contents, or infrastructure.

Problem Statements were then generated for each type of facility when issues were identified by the Hazard Mitigation Committee during discussion of the facility characteristics and ***Primary Hazard Vulnerabilities.*** These **Problem Statements** are listed here.

Potential dollar losses to buildings in the Epsom from flooding and other natural hazards are provided using the methods described in the chapter. The Town's participation in the National Flood Insurance Program (NFIP) offers a way for individuals to obtain insurance coverage for flooding. The Town's history with NFIP claims and repetitive losses are examined.

The Chapter provides an inventory of the **Community Facilities** and **Critical Facilities** and the most prevalent hazards to which they are vulnerable. Potential structure damage loss is also provided. The detailed information is available in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**:

Facility Name	Street Address (911)	Phone	Structure Replacement Value* $	Primary Hazard Vulnerabilities

Critical Facilities

Critical Facilities are categorized as those Town or State buildings or services that are first-responders in a disaster or that are required to keep the community running during a disaster. The Town Offices, Fire Department, Police Department, Highway Department, Transfer Station and Penacook-Epsom Water Precinct services are the minimum services necessary for providing and coordinating everyday and emergency services. Other **Critical Facilities** would include educational facilities, clinics and emergency shelters. Utilities or utility features such as cisterns, culverts, dry hydrants, pump stations, water and sewer lines, and electric transmission lines are included because of the essential communication and power /water services provided.

Many such facilities are located in Epsom. The assessed structure/building only value is provided for each facility where available, otherwise estimates are provided to help ascertain the financial impact a disaster can have on the community. To view the detailed **Critical Facilities** sites and tables, see **APPENDIX A**. Most of these facilities appear on ***Map 3: Community and Critical Facilities***.

Essential Facilities include: Fire Department, Police Department, Highway Department, Town Office (Suncook Realty Trust), Post Office. Assessed structure (only) valuation for these essential facilities total **$2.7m**.

Utilities include: Epsom Village Water Precinct Facility, Epsom Village Water Pump Station, Water Pump Station, Water Tower, Transmission Tower - Major, Priority (communications for PD ^ FD, state police, federal, cell tower, paging), Cell Tower (SBA Towers Inc), Cell Tower (SBA Towers Inc), Cell Tower, Cell Tower, Capped Landfill (Highway Garage), NH Electric Cooperative, Eversource Electric, Unitil Electric, and Fairpoint Switching Station. Assessed values for these utility structures in Town total **$7.3m**.

Dams include: **1** High Hazard (**H**) dam- D79.1 Northwood Lake Dam (NHDES @ Little Suncook River); **1** Low Hazard (**L**) dam- D79.5 Cass Pond Dam (NHDES @ Little Suncook River); **6** Non-Menace dams- D79.10 Huckins Mills Dam 2 (WGR LLC @ Suncook River), D79.14 Farm Pond Dam (Elkins @ Burnham Brook Tributary), D79.15 Branch Marden Brook (Town @ Burnham Brook Tributary), D79.16 Sherburn Stream Dam (Abbott @ Lockes Brook Tributary), D79.21 Mason Brook Dam (The Big Easy (formerly Circle 9 Ranch) @ Mason Brook), and D79.23 Farm Pond Dam (Ellis @ natural swale). Estimated structure (only) repair values for these dams total **$4.0m**.

Bridges include: **2** closed Town redlisted bridges- Cass Road over Little Suncook River (128/120 & 121) and Old Turnpike Road over Gulf Brook (134/127); **7** Town bridges- Short Falls Rd over Suncook River (063/093), Center Hill Road over Little Suncook River (117/120), Center Hill Road over Blake Brook (118/116), Mountain Road over Blakes Brook (137/102), North Road over Little Bear Brook (148/127), Griffin Road over Griffin Brook (151/097), Echo Valley Road over Griffin Brook (156/103); **8** State bridges- Route 4/202/9 over Suncook River (086/127), Route 4/202/9 over Suncook River overflow (088/126), Black Hall Rd over Little Suncook River (097/122), Route 4/202/9 over Lockes Brook (104/123), Route

4/202/9 over Gulf Brook (134/125), Route 4/202/9 over Little Bear Brook (145/122), Route 107 over Little Suncook River (153/118 in Deerfield), NH 107 over Griffin Brook @ Deerfield TL (160/111). Estimated structure (only) rehabilitation values for these **17** bridges total **$61.0m**.

Shelters, Schools, and Medical Facilities include: Epsom Central School Grades K-8 (**~433** students + **~ 85** staff) - Town Shelter/Sports Field; Epsom HealthCare Center Nursing Home/ Heartland Place Assisted Living (**~108** beds) - 10 Rooms for Town Shelter available; Suncook River Veterinary Clinic; Concord Hospital: Epsom Family Medicine; Cornerstone Christian Academy (**~35** students + **~10** staff) - secondary evacuation point for Epsom Central School. Assessed structure (only) valuation for these schools, medical facilities and shelters total **$17.8m**. If the Elementary School needed to be rebuilt, its actual cost would be at least **$20m** to **$30m**; the assessed structure valuation does not reflect actual structure replacement cost.

PROBLEM STATEMENTS AND EVALUATION

During discussion of these **Critical Facilities**, the Hazard Mitigation Committee identified specific issues or problems that could be further evaluated. **Problem Statements** were developed after ascertaining the ***Primary Hazard Vulnerabilities*** to the sites and known existing issues. These potential hazards were typically those from the **Hazard Risk Assessment**. The Committee also evaluated these statements to determine whether mitigation actions could be developed.

- Wet heavy snow accumulation on flat town roofs (Town Office, School & Fire Departments) and water leakage (Town Office) could result in the potential for roof collapse if not removed regularly. The Town Office is rented.
- Town Office, Police Department, Post Office, Library, Epsom Central School, Epsom Manor are targets for human threats (active shooter, bombing, powders, etc). Alert Lockdown Inform Counter Evacuate ALICE “train the instructor” training sponsored by the PD for 2 days on April 24-25 at the Epsom Central School, although it has a high cost ($600). PD’s See Something Say Something program has posters at the School, call local PD, on PD Facebook and website.
- If the main transmission towers were destroyed by any weather event or hazard event, all public safety communications would be jeopardized. People panic when internet and power are out, calling emergency facilities. Infrastructure is protected, but the residents lose service. ATT given broadband contract by governor’s office, but it does not cover Pittsfield well. Catamount (Pittsfield), White Birch, River Road, Brimstone, Nudds Hill (Pittsfield) do not have emergency generators. Some of the towers are vacant, have no service.

- With an upstream Northwood Lake dam breach, Epsom's Route 4 at Route 107 intersection would be fully washed out if the Lake drains. A breach would also result in flooding the Cass Pond Dam which may flood Route 4. Northwood Lake dam failure would flood the Suncook River, with detrimental effects experienced along its length. Road damages and diversion of traffic around those areas.
- From the Chichester/Epsom town line on Route 28, the Suncook River experiences erosion beside the road to the blacktop. The State of NH replaced and maintains riprap to stop the area from further erosion. So far, seems to be holding up. State should erect guardrails at Route 28 near Deer Meadow Road (Chichester side).
- Town has had problems with propane tank debris floating down the Suncook River from Kingstowne, Lazy River and Suncook Valley Campground and lodging against bridges during flooding events. Could happen again during extreme events. Some homes have been moved. Campgrounds are more responsive to potential flooding. Solved this issue for the most part, although the river has not yet risen high enough.
- Little Suncook River has the potential to overtop the Route 107 bridge and/or Black Hall Road bridge, Center Hill Bridge. State has taken care of some of the damming concerns. Ice jams would be more problematic. River woody debris above Center Road bridge, which is a newer bridge, had been causing the ice jam, but resolved now.
- Among the biggest potential disasters to the Town are biological hazard events occurring at the Epsom Central School, Epsom Manor, and the Family Medical Center. School tracks symptoms and notifies the State. Town notifies local health officer who then notifies the State. Lyme disease, influenza (POD is in Northwood). State Plan is in 2009 and has not been updated. Town held 1 drill as a result.
- Power failures would severely impact these critical facilities (Epsom Central School, Epsom Nursing Home, or Epsom Family Medical Clinic) that provide medical assistance and sheltering during disasters. Only Epsom Manor has a generator system. Epsom Traffic Circle area is one of the first areas to regain power on a priority basis. Feb 2018 Epsom Medical Center one of the generators failed and pumped smoke into the building. NH Coop looking to improve.
- Epsom Central School does not have a generator and could lose food in its freezers. However, it can serve as a temporary Town shelter and people can be bussed to a secondary location if needed. Can be purchased with grant funding.

Many of these problem statements were developed into Actions discussed later in **7 PRIOR ACTION STATUS** and **8 MITIGATION ACTION PLAN**.

CULVERT UPGRADES

A table of culverts in need of upgrade does not appear with the **Critical and Community Facility Vulnerability Assessment** but is included here within this section. Culverts (including box culverts, often considered "almost bridges") are responsible for carrying large volumes of water safely under roadways, and with the prior severe flooding events it is necessary to keep Town infrastructure in good condition.

Table 25 displays Epsom's listing of culverts in need of upgrade and approximately when the upgrades should occur. Included are a red-listed bridge rehabilitation and a special road reconstruction. The estimated cost for all of these projects reaches nearly **$900k** for materials, permitting, study and design; labor for the smaller projects is performed by Town staff and usually considered an in-kind cost. For the larger projects. Contracted engineering, design and permitting may need to occur and is included in the respective cost estimates. The optimal timeframe for these upgrades to protect the Town from **flooding**, **scouring and erosion** and **debris impacted infrastructure** is between **2018-2023** which is within the span of this **2018 Plan**.

Table 25

Town-Owned Culverts in Need of Upgrade

Location of Culvert(s) to Upgrade	# of Culverts	Intersecting Watercourse	Issue(s) with the Culvert(s)	Upgrade Diameter *Inches*	Estimated Upgrade Year	Total Approx $ Cost for All
Sawyer Road	2	Drainage	Two existing Sawyer Road steel, corrugated galvanized 18" culverts are corroded. Both will be upgraded to 24" plenty of room for upgrade	24" plastic smooth bore PVC	2018-2019	**$3,500**
Lords Mill Road	1	Little Bear Brook Tributary	Bottom of Lords Mills Road galvanized, corrugated steel culvert is gone, 14 feet in the ground.	48" plastic smooth bore PVC	2018-2019	**$15,000**
Hoit Road	1	Little Bear Brook Tributary	Bottom of Hoit Road galvanized, corrugated steel culvert is gone, buried under the road.	48" plastic smooth bore PVC	2018-2019	**$8,000**
Mountain Road	1	Blakes Brook	Existing Mountain Road culvert is deteriorating corrugated, galvanized 15" metal pipe, will be upgraded to 15" PVC smooth bore pipe that will enable more water to pass through unimpeded. This situation is common all Town. In order to keep costs down, no permitting is needed for materials upgrade of the same size pipe.	15" plastic smooth bore PVC	2018-2019	**$1,800**
Colonial Drive	1	Suncook River Tributary	Same as Mountain Road	15" plastic smooth bore PVC	2020-2021	**$3,500**

Location of Culvert(s) to Upgrade	# of Culverts	Intersecting Watercourse	Issue(s) with the Culvert(s)	Upgrade Diameter *Inches*	Estimated Upgrade Year	Total Approx $ Cost for All
Lockes Hill Road	1	Lockes Brook	Same as Mountain Road	15" plastic smooth bore PVC	2020-2021	**$2,200**
Chestnut Pond Road	1	Chestnut Pond & Little Bear Brook	Chestnut Pond Road 18" concrete culvert has a crown, so will need to determine reason for it. Plan is to upgrade with new 18" concrete culvert and fix reason for the crown.	18" concrete culvert	2022-2023	**$12,000**
Webster Park	2	Suncook River	Same as Mountain Road	15" plastic smooth bore PVC	2022-2023	**$4,800**
Leighton Brook ROAD	---	Leighton Brook	Over time, potholes and deteriorating road conditions have resulted in the need to reconstruct Leighton Brook Road. The road is a Class V Town road, accepted from a development about 40 years ago in the 1970s which was not built to current Town standards.	---	2022-2023	**$70,000**
Cass Road BRIDGE	---	Little Suncook River	Closed and redlisted. Cass Road Bridge has two side by side decks which are deteriorating and abutment work needs to be done. The Little Suncook River flows under and is scouring away the foundation.		2022-2023	**$750,000**
Totals						**$870,800**

Source: Highway Department April 2018

This table can help the Town develop a formalized culvert upgrade and maintenance planning document. Mapped drainage facilities permits data to be collected and is easily revised and updated. Instant access to culvert and drainage information can be of valuable assistance during **flooding** events, such as **run-off**, **overtop flooding conditions** and **road washouts**. On an annual basis, a culvert maintenance plan can help guide the Town's decisions of priority replacement, maintenance, and monitoring of culverts and drainage facilities. Budgeting is more clear and may be more successful at Town Meeting with such a plan.

Most of the culverts listed in **Table 25** have been developed into **Mitigation Action Plan** items in **8 MITIGATION ACTION PLAN**.

Community Facilities

The **Community Facilities** inventoried in **APPENDIX A** generally vulnerable to disasters and in need of careful consideration. Some facilities are vulnerable populations, places where people gather, the economic assets of the community, contain the history of the town, or could release hazardous materials during hazard or disaster events. While **Critical Facilities** are strong with emergency preparedness and mitigation measures, **Community Facilities** are typically not as well attuned to these issues and would require more emergency services during a hazard event disaster.

Vulnerable Populations include: **manufactured housing parks**: Bartlett's MHP (**~8** homes), Breezy Acres MHP Cooperative (**~15** homes), Colby Brook Estates MHP (**~27** homes), Family Estates MHP Cooperative Inc. (**~15** homes), King's Grant MHP [55+ Senior] (**~50** homes), Kingstowne MHP [Senior] (**~134** homes), Presidential MHP (**~30** homes); **campgrounds (seasonal):** Get Away Tiny Houses, (formerly Blake's Brook Campground (**~35** tiny houses); The Big Easy (formerly Circle 9 Ranch) Campground (**~150** sites), Epsom Valley Campground (**~70** sites), Lazy River Campground (**~109** sites); **child care facilities**: Circle Childcare (**~40** children), The Learning Tree Daycare (**~60** children); **other senior housing**: Meadow Brook Apartments [subsidized housing] (**~50** units), Morgan Farm Estates Elderly Condominiums (**~20** units), Sunrise Meadows Senior Living 55+ Housing (**~24** units); and **multi-family developments**: Caraway Multi Families **(~4-5** units), Lakeview Apartments (**~6** units), The Barn Arvanitis (**~5** units) and The Brown Apartments (**~4** units). See also Shelters, Schools and Medical Facilities. Assessed structure (only) valuation for these vulnerable population facilities total **$16.2m**.

Economic Assets include those **businesses and services** that employ a large number of people or contribute to the local economy: Ballet North, Battle Cross Fit (& Plaza), Beauchaine and Associates, Bob's Granite Place (& Plaza), Care Pharmacy of Epsom, Dollar General , Dunkin Donuts, Epsom Tool Rental, Get Fit NH, Hilltop Pizzeria (& Plaza), McBride's Water, McDonald's Restaurant, Steven's Insurance Agency Inc, Subway, TD Banknorth, The Copper House, Thompson Real Estate, Wendy's Restaurant; **farms and agriculture**- Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), and Yeaton Dairy Farm. See also Hazardous Materials facilities. Assessed structure (only) valuation for these economic asset facilities total **$7.0m**.

Hazardous Materials Facilities include: (most are also profitable businesses)- Autosmith Car Company, Bartlett Plaza (All American Family Automotive), Beaumac Company, Bickford's Sport Center, Circle Auto Repair Shop, Circle Market/Epsom Mobil, Circle Self-Storage, Cumberland Farms, Davis Fuels of Epsom, Eastern Propane, Epsom Getty (vacant building), Forever Roof Plaza (with George's Carpet) , Gaftek, Gelinas Garage, Goodwin Auto [Epsom Properties], Granite Image (Town Office Plaza) [Suncook Realty Trust], HER & W (Junkyard), Jungle Jim's Excavation, K&K Landscape Supplies LLC, Kitchen Klean, M & M Ford, MacCullams Boathouse, McBride's Water Advantage, MD Brown's Auto Repair, Moshen Auto , Mr Gas (Gas Station), Newstress Inc, Oxy-Gon Industries, Ponderosa Disposal, Raymond Brothers (Vacant building), Route 4 Motors / Steve's Jeeps Country, Still Oaks Funeral & Memorial Home, Tim's Truck Capital, Tim's Truck Capital & Auto Sales, Wayne Enterprises (Machine Shop), Wead's Auto Repair, and

White Mountain Cable Construction LLC. See also Economic Asset facilities. Assessed structure (only) valuation for these hazardous material facilities total **$13.8m**.

Cemeteries and Churches include: Epsom Bible Church, backup for Epsom Central Elementary School shelter (**~300+** capacity), New Rye Union Congregational Church (**~75** capacity), Merrimack Valley Church (**~75** capacity), Bickford Cemetery, Captain Brown Cemetery, Hopkinson Cemetery (Gossville), Johnson Cemetery, Libby Cemetery, McClary Cemetery, Red Schoolhouse Cemetery, Short Falls Cemetery, Syrus Brown Cemetery, Tarleton Cemetery, Tripp Cemetery, and Yeaton Cemetery. As cemeteries do not contain structures, broad estimates of headstone or mausoleum replacement value were provided instead. (A complete listing of 44 cemeteries is available at www.epsomhistory.com). Assessed structure (only) valuation for cemetery and church facilities total **$3.3m**.

Historic Sites and Buildings include: American Legion, Elks Lodge 1210 (Old Mill), Epsom Baptist Church Building, Meetinghouse, Odd Fellows Hall, Old Library, Old Town Hall, Red Schoolhouse (District 3 Mountain School), and Scout Building (Old School). See also Recreational and Gathering Sites. Assessed structure (only) valuation for these historic facilities total **$1.9m**.

Recreational and Gathering Sites of both land and buildings include: Epsom Public Library (**~100** capacity), James Park (aka Blue Star Memorial Highway Rest Area or Epsom Rest Area), Webster Park, Elk Lodge, Merrimack Valley Paintball, and Epsom Town Forest & Trails (Tarleton Road). Some of these sites can be Economic Assets to the Town even if the land is untaxable. Assessed structure valuations for the recreational facilities total **$1.7m**.

Future Development includes mostly residential development potential as most of the land in Epsom is rural. **Approved Planning Board developments** (all residential)- Hoit Road Development, North Road Development, Wimbleton Development, New Rye Development, and Poor Town Development. **Legacy parcels** (large family lots with development potential) include- Heiderman Property (**100** acres), Range Road Property (**100** acres), Yeaton Property for sale Jan 2018 (**375** acres), Bosiak Property (**~200+** acres), Bartlett Property (**100** acres), and Poor Town Property (**100+** acres). There are too many large family legacy parcels to identify without an inventory. **Large-sized lots for sale Jan 2018** include (all commercial)- Commercial Lot near Concord Hospital (**9** acres), Former Condo Development Project (**73** acres), Commercial Lot Near Concord Hospital (**9** acres), Commercial Lot near Concord Hospital (**4** acres). Assessed vacant land valuation for the **5** for sale properties totals **$1.8m**.

PROBLEM STATEMENTS AND EVALUATION

During discussion of these Community Facilities, the Hazard Mitigation Committee identified specific issues or problems that could be further evaluated. **Problem Statements** were developed after ascertaining the ***Primary Hazard Vulnerabilities*** to the sites and known existing issues. These potential hazards were typically those from the **Hazard Risk Assessment**. The Committee also evaluated these statements to determine whether mitigation actions could be developed.

- There exists a probability of future flooding & need of evacuation for Lazy River, Kingstowne MHP and Epsom Valley Campground from the Suncook River and along Route 28. These are all private communities and they've been better with avoiding flooding (home elevation, home moving, etc.). Once a Flood Watch comes in, they have an alert process in place. More aware now than in the past.
- Town receives multiple first responder calls for trees down in seasonal campgrounds, on manufactured homes and town wide during severe wind events and storms. These locations are particularly vulnerable with light structures and heavy trees. During the drought, more trees falling over with roots. Residents are becoming proactive with tree removal. Power companies come in every 5 years. Town can call and request trees removal. HD also removes trees.
- With any accident or casualty at the Epsom Traffic Circle (Routes 4/202 & 28), a traffic backup can occur, possibly for miles in each direction. Evacuation of businesses may be needed, and traffic rerouting (within 1 mile) would be necessary. Epsom Manor would be very difficult would be the last option available, as these are critical care patients. No specific policy, no incident is the same and requires scaling up as needed. Staged response. Communications plan in place, all Departments follow protocol and contact the State when needed.
- After electricity in region goes out, power to the 3 gas stations at the Epsom Circle is restored quickly because of nearby vulnerable populations and Town services. As a result, many, many people are drawn to Epsom to get fuel, causing traffic backups and hampering the local recovery situation. Situation will get worse when Bow Merrimack Plant goes offline, rolling brownouts will become more severe. PD & FD keeps an eye on the situation and would provide more coverage if needed. Gas station reserves run out quickly. Town has a backup list of locations of emergency fuel storage, gas and diesel.
- Four different electric companies make it difficult to communicate & coordinate when power outages occur, NH Electric Coop (Raymond & Alton branches), Eversource and Unitil. It is difficult to know where the power breaks are located and where the service areas are. Atlantic Broadband (formerly Metrocast) (Atlantic Broadband) provides internet for phonelines and is also critical for quick reestablishment. Fairpoint owns all the poles.
- There are a high number of hazardous materials facilities all around Town and along major routes Route 4 & 28. If a fire or incident occurs, evacuations of nearby vulnerable populations must occur. Traffic will need to be rerouted, major traffic

hazards will result. FD is updating contacts at businesses and MSDS sheet and are preplanning for response, inspections and walk through. Have a procedure to follow, bill of lading, Central NH Hazmat,

- Fire suppression becomes difficult when some of the historical sites are beyond the water precinct zones. Most of them are up on the hills. Placed a wet hydrant to the old Meetinghouse. Hoping to extend to 10" pipe. Engineering plans developed by Underwood. Contaminated water at Getty Station (MtBE), Exxon Mobil contributed funding to the State that will benefit Epsom. Town Wells 1 & 2 are located on Dover Road (Route 4). The third well will be voted on at Town Meeting 2018 ($10,000 warrant article).

  Epsom has many remote wooded sections of Town used for recreation. There is a high risk of fire due to the use of and access to remote sites. FD has a budget to keep access to Class VI roads. Upgrading forest fire truck in 2019. FD has hand held GPSing. Town has a forester, regular logging. FD kept up to date on logging. Slash cleared out, less fire. FD conducts controlled burns. Several areas like Fort Mountain are gated.

- Emergency response has difficulty locating and evacuating injured or lost people even in the Town Forest. If the person has a cell phone, PD can ping the phone through 911. NH Fish & Game will assist, as will Town Forester. FD do mapping and GPS training every year. PD can access K-9 units and thermal imaging units. The Town does not have Town Forest & other conservation area maps readily available to all emergency response or the public. Maps are needed and should be available to the public and for emergency response.

- Town services and the School system could not accommodate development of the large lot legacy properties at current Town service levels. Significant upgrades to services, buildings, infrastructure, equipment and staff would need to occur. Some of the lots could be conserved. Bear Paw Regional Greenway recently approached 8 landowners for conservation land, asked town to purchase. Economic development is an important theme in the community right now. An Economic Revitalization Zone (ERZ) ordinance was proposed in March 2018 and passed to cover the Goboro Road (former Gossville) area.

Many of these problem statements were developed into Actions discussed later in **7 PRIOR ACTION STATUS** and **8 MITIGATION ACTION PLAN**.

Potential Losses from Natural Disasters

Natural disasters, including floods, wind events, severe winter storms and ice storms, secondary disasters as a result of the natural disasters (such as power loss) and to a lesser degree, human and technological hazards as documented in **4 HAZARD RISK ASSESSMENT** have occurred in Epsom This section estimates Town-wide structure/building damage in Town from natural hazard events. It is difficult to ascertain the amount of damage caused by a hazard because the damage will depend on the hazard's location and magnitude, making each hazard event somewhat unique. Human and technological hazards are typically even more incalculable. Human loss of life was not included in the potential loss estimates for natural hazards, but could be expected to occur, depending on the severity of the hazard.

While this Plan focuses on being pro-active in those geographic areas of Epsom most prone to recurring hazards (like flooding), some initial estimates of measurable property damage and building damage have been discussed by utilizing simple techniques such as the numbers of structures and assessed valuation. This two-dimensional approach of calculating dollar losses from tangible structures offers a basic yet insightful tool to begin further loss estimation analyses.

TOOLS FOR COMMUNITIES WITH GIS

For gauging more three-dimensional estimation of damages, FEMA has developed a software program entitled HAZUS-MH (for multi-hazard), which is a powerful risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest Geographic Information Systems (GIS) technology to produce estimates of hazard related damage before, or after, a disaster occurs. Developed for ARCGIS which produced the ***Maps*** for this Plan, HAZUS-MH takes into account various effects of a hazard event such as:

- Physical damage: damage to residential and commercial buildings, schools, critical facilities, and infrastructure;
- Economic loss: lost jobs, business interruptions, repair and reconstruction costs; and
- Social impacts: impacts to people, including requirements for shelters and medical aid.

Federal, State and local government agencies and the private sector can order HAZUS-MH free-of-charge from the FEMA Distribution Center. Epsom should first ascertain whether a municipal geographic information system (GIS) of hardware and software is appropriate, and if so, consider training staff to perform models. With many Town existing and under-development infrastructure GIS data layers available, HAZUS-MH could prove very helpful for estimating losses for the community on a disaster-specific basis. However, much staff time is necessary to train staff and maintain a GIS system. Official map generation is typically subcontracted out to other agencies now, including ***the mapping and appraisal company Avitar Associates of New England used by the Town*** and the Central NH Regional Planning Commission who developed the Maps for this **Hazard Mitigation Plan**.

METHODS OF POTENTIAL DOLLAR LOSSES BY NATURAL HAZARDS

A more manageable technique was used for loss estimation for the purposes of this **Hazard Mitigation Plan Update**. Natural hazard losses are calculated based on dollar damage ranges over the entire community, or in the case of flooding, buildings in the Special Flood Hazard Areas (SFHAs) are counted and their value is collected. The number of total parcels in the community as of **January 2018** is **2,512**. Using **February 2018** MS-1 assessment data, **the total assessed value of all residential and non-residential structures ONLY in Epsom $264,957,351) is the basis for loss estimation calculations.**

Potential Building Dollar Losses by SFHA Flooding

Using geographic information system (GIS) technology, parcels within the floodplain were identified using Epsom's 2018 digital online tax maps concurrently with the 2010 FEMA Digital Flood Insurance Rate Maps (DFIRMs). Next, parcels containing buildings were identified using the Town tax assessor's database for the Town. Building type was characterized into one of four categories, single-family homes, multi-family homes, manufactured homes, and non-residential buildings. Building number and value were excerpted from the assessing database. ***Land value, building contents value and infrastructure were not considered in these calculations.*** Table 26 summarizes this data, identifying **293** primary buildings in the SFHA.

Table 26

Building Value in the Special Flood Hazard Areas (SFHAs)

Building Type	Number of Buildings	Total Value of Buildings in SFHA	Average Replacement Value
Single Family Homes	126	$16,115,600	$127,902
Multi-family Homes	16	$2,815,500	$175,969
Manufactured Homes	119	$4,526,200	$38,035
Non-Residential Buildings	22	$9,295,300	$422,514
Totals	**283**	**$32,752,600**	-----

Sources: CNHRPC Digital Parcel Data Intersection with Assessing Data and 2010 DFIRMs

In Table 26, **126** single family residential homes, **16** multi-family homes, **119** manufactured homes, and **22** non-residential buildings were considered to be situated the Special Flood Hazard Areas (SFHAs). The average replacement value is **$128k** for a single-family home or **$16.1m** for all single family homes in the SFHA. The total value of all buildings in the Special Flood Hazard Areas is about **$23.5m** for the **261** structures and **$9.3m** for the **22** non-residential buildings .

There are alternative ways to calculate potential SFHA losses. In the following tables, the average building replacement value was calculated by adding the assessed values of all structures in the special flood hazard areas and dividing by the number of structures. The Federal Emergency Management Agency (FEMA) has developed a process to calculate potential loss for structures during flooding. The potential loss was calculated by multiplying the average replacement value by the percent of damage expected from the hazard event, and then by multiplying that figure by the number of structures.

The costs for repairing or replacing infrastructure such as bridges, railroads, power lines, roads, drainage systems, telephone lines, or natural gas pipelines, and land value and the contents of structures have not been included in these estimates.

Table 27 represents the **worst case scenario of *all*** single-family homes, multi-family homes, manufactured homes, and non-residential buildings within the Special Flood Hazard Area that are damaged by a flood hazard event.

Table 27

Dollar Damage Ranges for Total Buildings in Special Flood Hazard Areas (SFHA)

Building Type	Total Value of Buildings in SFHA	Total Value of Potential Damages in SFHAs by Respective Building Type		
		Eight-Foot Flood 49% Damage	Four-Foot Flood 28% Damage	Two-Foot Flood 20% Damage
Single Family Homes	**$16,115,600**	$7,896,644	$4,512,368	$3,223,120
Multi-Family Homes	**$2,815,500**	$1,379,595	$788,340	$563,100
Manufactured Homes	**$4,526,200**	$2,217,838	$1,267,336	$905,240
Non-Residential Buildings	**$9,295,300**	$4,554,697	$2,602,684	$1,859,060

Sources: See Table 26; FEMA

If all **126** single family homes were damaged by a ***Two-Foot Flood (20% Damage)***, the dollar damage to the buildings *only* could be **$3.1m** while an ***Eight-Foot Flood (49% Damage)*** could cause **$4.5m** in damage. If all **119** non-residential buildings in the SFHA were damaged by a ***Two-Foot Flood***, the dollar damage to the buildings *only* could be **$900k** while an ***Eight-Foot Flood*** could cause **$2.2m** in damage. All **22** non-residential buildings damaged by a ***Two-Foot Flood*** could cause **$1.9m** in dollar damage to the buildings *only* while an ***Eight-Foot Flood*** could cause **$4.5m** in damage. Dollar damage estimations vary according to the standard percentages of damage levels associated with flooding levels set by FEMA.

Table 28 also represents the worst case scenario, but of *individual* single-family homes, multi-family homes, manufactured houses, and non-residential buildings within the Special Flood Hazard Area that are damaged by a flood hazard event.

Table 28

Dollar Damage Ranges for Individual Buildings in Special Flood Hazard Areas (SFHA)

Building Type	Average Value of Individual Buildings in SFHA	Individual Value of Potential Damages in SFHAs by Respective Building Type		
		Eight-Foot Flood 49% Damage	Four-Foot Flood 28% Damage	Two-Foot Flood 20% Damage
Single Family Homes	**$127,902**	$62,672	$35,812	$25,580
Multi-Family Homes	**$175,969**	$86,225	$49,271	$35,194
Manufactured Homes	**$38,035**	$18,637	$10,650	$7,607
Non-Residential Buildings	**$422,514**	$207,032	$118,304	$84,503

Sources: See Table 26; FEMA

One (**1**) single family home averages **$26k** when damaged by a ***Two-Foot Flood*** while an ***Eight-Foot Flood*** could cause **$63k** in damages. One (**1**) manufactured home compares at **$8k** for a Two-Foot Flood damages and at $19k for an Eight-Foot flood. One (**1**) non-residential building averages **$85k** when damaged by a ***Two-Foot Flood*** while the projected dollar damage by an ***Eight-Foot Flood*** could cause **$207k** in damages.

Although not an accurate assessment, these dollar damage ranges for **flooding** in the floodplains (SFHAs) provide a general sense of the scale of potential disaster and financial need in the community during flooding events.

Potential Building Dollar Losses by Other Natural Hazards

Flooding is often associated with heavy rains and flash floods, hurricanes, ice jams, rapid snow melting in the spring, and culvert washouts. These are all types of flooding hazards discussed or evaluated previously but can also occur outside of the SFHA.

Building damage by natural disasters in New Hampshire is not limited to SFHA flooding alone, which is easier to quantify and predict. Simple calculations can be made based upon generalizations of a disaster impacting a certain percentage of the number of buildings in the Town. **The January 2018 assessed value of all residential, commercial, and industrial structures in Epsom is $264,957,351 (no land) on 2,512 parcels.** Disaster damages are often illustrated in the following section utilizing a percentage range of town-wide building damage. At **1,942** housing units in Epsom estimated from the **2016** NH Office of Strategic Initiative (NH OSI) population estimates, any type of disaster impact to **10%** of Epsom housing units would yield **194** damaged homes.

The inventory of Town sites or buildings in **APPENDIX A Critical and Community Facilities Vulnerability Assessment** indicates which hazards each site is most susceptible to and provides its assessed valuation. This dollar value can be used as a damage estimate from the natural hazard events listed below. Yet the potential losses discussed in this section involve all buildings across the community to provide a more distinct portrait of potential losses using the assessed valuation of all town buildings. Damages from natural hazards to anything other than buildings, such as infrastructure, land, humans or building contents, are not examined here. Specific individual studies would be needed to assess more detailed scenarios.

Wind Events

Damage caused by wind events such as **tropical storms & hurricanes**, **downbursts**, **tornadoes** and **severe wind storms** can be both excessive and expensive. Epsom's roadways are wooded, and any event topples trees and often power lines onto the roads. This rural, hilly community is heavily forested with residences spread out throughout the Town. Outside of the developed US 4/202 and NH 28 corridors, a few neighborhoods exist in pockets and homes are easily isolated. The assessed value of all residential, commercial, and industrial structures in Epsom is **$264,957,351** (no land).

With a scenario range of **1%** to **5%** of buildings damaged by wind events throughout the Town, a wind event could potentially cause up to **$2.6m (for more localized downburst, high winds, or tornadoes)** to **$13.2m (for more damaging and widespread tropical storms and hurricanes)** in building-only damage costs, not including contents, infrastructure, or land.

Severe Winter Weather

Heavy **snow loads**, **icy conditions**, **extreme cold**, **wind chill**, and the secondary hazards (including **power failure**, **transportation accidents** and **debris impacted infrastructure**) are result of **winter storms**. Storms with these conditions have been felt in Epsom in the past. These hazards and secondary impacts are a risk to the community, including isolation, more falls and personal injury (especially by the older residents), and the potential for roof collapse. The most remote locations in Epsom, wooded and forested sections vulnerable to tree fall, include Echo Valley Road, Sanborn Hill, New Rye Road (most repetitive), Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, and New Orchard Road. Damage caused by this type of hazard varies according to wind velocity, snow accumulation, tree/limb fall and duration.

With a scenario range of **1%** to **5%** of buildings damaged throughout the Town, **severe winter storms** could potentially cause up to **$2.6m** to **$13.2m** in building-only damage costs.

Rapid Snow Pack Melt

Flooding caused by **rapid snow pack melt** is often found along roadways and from watercourses such as the brooks and wetlands in Town. Those locations which are particularly susceptible include the floodplain, Epsom Central Elementary School athletic fields and equipment hut, Epsom Village District water pump house, US 4/202 (including Gulf Brook), NH 107, NH 28 (town line), Center Hill Bridge, and Cass Road Bridge. Road washouts and/or culvert failure locations or other areas flooded have included over the years: Short Falls Road, Mill House Road, Jug City Road, Black Hall Road, Baker Road, Swamp Road (underwater), Olde Town Extension onto Prospect Road (runoff), Old Turnpike Road, Echo Valley Farm Road, Griffin Road, Sanborn Hill Road, Martin Hill Road, Mountain View Spur & Mountain Road, Baybutt Road, Locke's Hill off Lord's Mill Road and Webster Park. Any hilly gravel roads with limited drainage or anywhere the water cannot yet percolate into the frozen ground could be vulnerable to snow melt.

With a scenario of **0.5%** of buildings flooded throughout the Town, **rapid snow pack melt flooding** could potentially cause **$1.3m** in building-only damage costs alone, not including contents, infrastructure, or land.

River Ice Jams and Debris Impacted Infrastructure

Ice jams on the Suncook River or the local large brooks would be the major causes of **ice jam flooding** which could recur in the future, particularly along Short Falls Road, on NH 28 at Kingstowne or King's Grant MHP, or along the **Little Suncook River** that follows US 4/202. Woody material causing **debris impacted infrastructure** would be more likely to occur to bridges than ice jams, especially along the Cass Road bridge or the US 4/202 bridge (rehabilitated by the State in 2018). Two (**2**) closed red-listed bridges in Epsom are owned by the Town (Cass Road over Little Suncook River) and Old Turnpike Road over Gulf

Brook. Multiple additional small brooks culverts and drainage systems abound. The ***2019-2028 NH Department of Transportation Ten Year Plan (TYP)*** provides many examples of basic cost estimates bridge replacement and rehabilitation.

This average figure of **$700,000** can be used for one (**1**) local bridge *replacement* in Epsom due to the physical damage caused by **river ice jams** or **debris impacted infrastructure**. The same bridge damaged by **ice** or **debris** which only requires *rehabilitation* could cost **$450,000**.

Another way to view potential damages is if half (**23**) of the **126** single family homes in the floodplain were damaged by **Two-Foot Flooding *(20% Damage)*** resulting from **river ice jams** or **debris impacted infrastructure**, there could be up to **$1.6m** in building damage costs.

Earthquake or Landslide

Earthquakes can cause buildings and bridges to collapse, disrupt water supplies, electricity and phone lines and are often associated with **landslides** and **flash floods**. Buildings that are not built to a high seismic design level or are large in size could be susceptible to structural damage. Historic Town Buildings **(**Old Town Hall, Meetinghouse, Old Library, historic old Schools, Odd Fellows Hall, Epsom Baptist Church**)**, New Rye Union Congregational Church, Merrimack Valley Church, newer Town of Epsom facilities (Office, Police, Fire, Highway, Library), Epsom Manor, and the Epsom Central School are particularly at risk because of building sizes and/or their large numbers of people. The Epsom Village Water District water delivery pipes, pump house and water tower may be more prone to earthquake damage because of age and structural integrity. Epsom is downstream of the large Northwood Lake Dam from which the **Little Suncook River** flows along US Routes 4/202, which if breached could be disastrous to Epsom and the Traffic Circle. Loss of these or other community buildings could result in fewer services available to residents. Buildings which are located on or near the sides of river and stream banks or that are located on a hill over **15%** could be subject to **landslide** triggered by rains or **erosion**. The Central NH Region area with Boscawen, Webster, Hopkinton (Contoocook), Henniker, Hillsborough and Warner (Davisville) hosts frequent epicenters of deep earthquakes.

With a scenario of **0.5%** of buildings damaged throughout the Town, an **earthquake** or **landslide** could potentially cause up to **$1.3m** in building-only damage costs alone, not including contents, infrastructure, or land.

Wildfire

The risk of **wildfire** is difficult to predict based on location. Forest fires are more likely to occur during years of **drought**. In addition, areas and structures that are surrounded by dry vegetation that has not been suitably cleared are at high risk. Humans can contribute by accidents in the woods or dry fields, or by the deliberate setting of **fire** in a structure. The heavily forested woodlands of Town are often remote locations and difficult to access by emergency vehicles. The remote homes and woods of Echo Valley Road, Sanborn Hill, New Rye Road, Mountain Road, Swamp Road, Mt Delight, Mountain View, River Road, and New Orchard Road and the Town Forest (Tarleton Road) are particularly vulnerable to **wildfire**

because there may not be people around to report it until the fire is large. The Fire Department displays a Fire Danger sign visible from US 4/202. Dollar damage would depend on the extent of the fire, the number and type of buildings burned, and the amount of contents destroyed within the buildings.

With a scenario of **1.0%** of buildings damaged in the Town, a **wildfire** could potentially cause up to **$2.6m** in building-only damage costs alone, not including contents, infrastructure, or land.

Lightning

Damage caused by **lightning** would not be Town-wide because it typically strikes in smaller areas. Few places in Epsom are at specific risk but lightning strikes can cause fires. Damages will vary according to the value of the structure and home and the contents inside, and dollar amounts would depend on if the hazard hit an area with a high density of buildings. Specific sites which would cause the greatest impact if struck by **lightning** include the communications towers (Elkins Drive, Epsom Traffic Circle, White Birch Lane, River Road), Fort Mountain tower and repeaters, telephone lines, power lines, Atlantic Broadband (formerly Metrocast) internet service, Epsom Village Water District with its Water Pump Station and Water Tower. The towers in Town are frequently struck by **lightning**.

With a scenario of **0.5%** of buildings damaged throughout the Town, a **lightning strike** could potentially cause up to **$1.3m** in building-only damage costs alone, not including contents, infrastructure, land, or through fire spreading.

Drought

Drought is often declared on state-wide or region-wide basis, and sometimes by individual town. Dollar damage caused by drought would be difficult to quantify, but would most likely impact the agricultural and economic base of a community. Although everyone could be charged to conserve water, orchards, farms, and nurseries would be most affected.

As physical damage is usually isolated to specific locations, the effects of potential disasters at certain facilities could be researched utilizing the Town's assessor's database for valuation on targeted land. Agricultural land may be among the most affected by drought. Many farm operations have been inventoried in Epsom. People who rely on well water, which is everyone outside of the Epsom Village Water District, have found their dug wells running dry in **2015-2016** and again in **2018**. Agricultural farms and orchards run the risk of high damage from **drought** which also brings economic consequences. In Epsom, these areas include Bachelder Dairy Farm, Kimball Farm [New Orchard Farms] (Sheep & Goat), McClary Hill Farm (Sheep, Dairy, Eggs, Honey), and the Yeaton Dairy Farm. Tree farms in Town are also susceptible to loss during **drought** conditions.

These lands could be vulnerable to **droughts** and physically and may become economically damaged by these long-term drought. A dollar estimate is incalculable at this time.

Severe Winds, Rainstorms and Thunder Storms

This general **storm** hazard crosses into other hazards previously mentioned, including the **wind events**, **flooding** and **lightning**. When summer **rainstorms** or **thunderstorms** occur, they are often regional in nature, but could just as commonly be localized in some areas, easily identifiable when one section of a roadway is dry and another section of the same road is wet. Sometimes **hail** accompanies these storms. **Thunderstorms** and **rainstorms** are more likely to damage trees, powerlines or crops than buildings. These storms typically cover most of, if not the entire, Town, as **winds** and **rainstorms** are large enough and blow through to impact multiple New Hampshire counties.

When buildings are damaged, any of the separate hazard events (**wind**, **flood**, **hail** or **lightning**) could have debilitated the structures. With a scenario of **0.5%** of buildings damaged throughout the Town, a **rainstorm** or **thunderstorm** could potentially cause up to **$800k** in building-only damage costs alone, not including contents, infrastructure, land or through **fire** spreading from **lightning**.

Extreme Heat

Similar to **drought** cataloged above, **extreme heat** can harm landscaping and agriculture. People will draw more water from their wells to help alleviate these conditions. Extreme heat can sicken people, causing sunstroke, heat exhaustion and dehydration if the environment is not cool enough or water intake is too low. In this manner, extreme heat is not measurable for dollar damage. An inventory of ***Vulnerable Populations*** was undertake which can be used by emergency responders to ensure susceptible people remain healthy.

Critical Facilities Buildings

These dozens of essential facilities, utilities, dams, bridges, and shelters and medical facilities inventoried in **APPENDIX A Critical and Community Facilities Vulnerability Assessment** provide the **Structure Only Value $** from the ***appraisal systems***. Multiple hazards are identified which may damage each inventoried building. Therefore, if the Town wanted to ascertain the damage cost from any natural hazard to an individual critical facility, this dollar value is available for evaluation. In addition to the **APPENDIX**, critical facilities in Epsom are displayed on ***Map 3 Critical and Community Facilities***.

Community Facilities Buildings

Dozens of community facilities such as vulnerable populations, recreation and gathering sites, historic sites, economic assets, hazardous materials facilities, and more are inventoried in **APPENDIX A Critical and Community Facilities Vulnerability Assessment** provide the **Structure Only Value $** from the ***appraisal systems***. Multiple hazards are identified which may damage each inventoried building. Therefore, if the Town wanted to ascertain the damage cost from any natural hazard to an individual critical facility, this dollar value is available for evaluation. In addition to the **APPENDIX**, community facilities in Epsom are displayed on ***Map 3 Critical and Community Facilities***.

National Flood Insurance Program (NFIP)

In 1968, Congress created the National Flood Insurance Program (NFIP) to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities such as Epsom agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding. For more information on the National Flood Insurance Program, visit https://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp.

The initial identification of the Special Flood Hazard Areas (SFHAs) occurred in **March 1974** with the first Flood Hazard Boundary Map on **November 12, 1976** and the first Flood Insurance Study (FIS) in **June 1977**. The first FIRMs were developed **July 13, 1978**. Records indicate Epsom has been a participant in the National Flood Insurance Program (NFIP) since **July 3, 1978**. Unlike many other Central NH region communities, no amended FIS or FIRMs were developed for the Town until almost four decades later.

In the present day, Epsom's effective FIRMs are digital (DFIRMs) dated **April 19, 2010** as is the Merrimack County Flood Insurance Study (FIS) which includes Epsom (community **#330112**); individual community FIS are no longer being developed. These **2010** newest documents were adopted by the Board of Selectmen, supercede all previous NFIP documentation, and are placed into the Town Zoning Ordinance. **Table 29** summarizes the historical background of the Town's NFIP effective dates.

Table 29

NFIP History of Epsom – Effective Dates

Flood Insurance Study (FIS)	Flood Insurance Rate Maps
June 1977	July 3, 1978
April 19, 2010	April 19, 2010

Source: FEMA Merrimack County Flood Insurance Study (FIS) Table 7, 2010

EPSOM'S NFIP STATISTICS

In **Table 30** is a cumulative history of the trends and overall totals of flood insurance policies and losses of those property owners utilizing the NFIP insurance in Town. Four snapshots in time, one from each of Epsom's **Hazard Mitigation Plan** versions, display the number of NFIP policies in force and paid loss statistics between **December 2002 and May 2018**.

Table 30

History of NFIP Policy and Paid Loss Statistics

Report Date	Policies in Force	Insurance in Force	Number of Paid Losses Since 1978	Total Losses Paid Since 1978
December 2002	14	$853,300	7	$10,069
January 2009	49	$6,934,500	19	$504,117
November 2011	39	$6,482,000	22	$507,964
May 2018	20	$4,474,900	22	$507,964

Source: Epsom Hazard Mitigation Plan 2012, FEMA last accessed 07-25-18

From Table 30, in **January 2009** after the **2006 Mother's Day Flood** and succeeding severe flooding events, the highest number of NFIP flood insurance policies in force in the Town totaled **49**. Nine years later, by **May 2018**, only **20** flood insurance policies were active on properties across Epsom, a decline from **39** policies in **November 2011**.

To date, since Epsom joined the NFIP in **1978**, there have been **22** payouts totaling about **$500k** in paid losses to policyholders for insurance claims. There have been no new claims since before **November 2011**. The overall decrease of 30 policies since January 2009 could be influenced by the lack of current flooding events, recent changes in flood insurance regulation, and the higher cost of insurance.

Table 30 also illustrates that while the entire Town of Epsom is eligible to purchase flood insurance, only **20** properties out of the **2,512** total parcels in the entire community are insured against flooding. As described previously, a total of **261** homes and **22** non-residential buildings are approximated to be situated in the Special Flood Hazard Areas (SFHA). Assuming the **20** policies properties are within the SFHA, **7.1%** of buildings in the floodplain are insured against flooding.

Most buildings are uninsured in the SFHA for when the next flooding event occurs in Epsom. However, flooding conditions can occur anywhere in the community due to runoff, debris impacted infrastructure (culverts), drainage overflow, rapid snowpack melt, road washouts, etc which are not limited to the floodplain (SFHAs).

REPETITIVE LOSS PROPERTIES

A specific target group of properties is identified and serviced separately from other NFIP policies when repetitive losses occur on the same properties. The group includes every NFIP-insured property that, since **1979** and regardless of any change(s) of ownership during that period, has experienced four or more paid flood losses of more than $5,000 each or two or more separate claim payments (building payments only) where the total of the exceeds the current value of the property. Two of the claim payments must have occurred within 10 years of each other. The loss history includes all flood claims paid on an insured property, regardless of any changes of ownership, since the building's construction or back to **1978**.

Epsom joined the NFIP in **1978** and has (**4**) repetitive loss properties (RPL) in the community, even after the significant flooding and infrastructure damage sustained over the active **flood** and **storm** disaster period of **2005-2012** (See **4 HAZARD RISK ASSESSMENT**). **Table 31** displays the repetitive loss data:

Table 31
Number of Repetitive Loss Properties

Building Type	Number of Repetitive Loss Properties
Single Family	4
Multi-Family	0
Non-Residential	0
Total Properties	**4**

Source: NH Office of Strategic Initiatives (NH OSI) on behalf of FEMA, April 2018

These RPL data records are confidential for the property-specific information they contain. Repetitive losses are determined by any repetitive damage claims on those properties that hold flood insurance through the NFIP. Epsom participated in a series of voluntary property acquisition buyouts along the Suncook River after the **2006-2008** floods which eliminated the threat to several homes by incorporating newly vacant land into the Town's flood storage capacity.

USGS DELINEATED FLOODPLAINS

As a result of the **2006** Suncook River avulsion and its subsequent recurring flooding, the US Geological Survey (USGS) re-delineated the 100-year and 500-year floodplains of the Town to produce the **Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire 2009**. The Town, along with the communities of Pembroke and Allenstown, is working with the NH Office of Strategic Initiative to have FEMA incorporate the new floodplain delineation into the official FEMA floodplain maps. Begun in **2011** or **2012**, this process was understood by all to take several years.

However as time continues, the actual floodplain area of the **Suncook River** is changing rapidly as banks erode and the river slowly shifts its course. Some Suncook River meanders in Epsom are thought to be in particular peril, and all it would take is one big flood to change the river's configuration within the fluvial erosion meander belt. The official floodplain maps remain the **April 2010** FEMA DFIRMs.

FLOODPLAIN ORDINANCE

A major objective for floodplain management is to continue participation in the National Flood Insurance Program. Communities that agree to manage Special Flood Hazard Areas shown on NFIP maps participate in the NFIP by adopting minimum standards. The minimum requirements are the adoption of the Floodplain Ordinance and Subdivision Regulation / Site Plan Review requirements for land designated as

Special Flood Hazard Areas (SFHAs). Flood insurance is available to any property owner located in a community participating in the NFIP.

Community Assistance Visits in Epsom

A Community Assistance Visit (CAV) is a process required by the National Flood Insurance Program (NFIP) as a way of reviewing a town's compliance with established floodplain regulations to be sure that they meet NFIP requirements. If the Town is not in compliance with regulations in any way, the officials that conduct the CAV provide assistance and guidance to assist with correcting any violations.

Since the NH Office of Strategic Initiatives (NH OSI) identifies Epsom as a repetitive loss community, which is based upon **Table 31** data, a new CAV will be undertaken every five years or if there is a severe flooding event. This classifies Epsom as a Tier 1 community. Otherwise, a telephone call may be made to the community every 5-10 years or otherwise as needed when classified as a Tier 2 community.

On **August 20, 2001**, a Community Assistance Visit (CAV) was held in Epsom to review compliance with NFIP policies and educate staff on the policies. At this time, it was found that there were minor problems with the maps from the Flood Insurance Study, but the report does not specify what these problems entailed. In addition, it was reported that there were minor problems with the community's floodplain management regulations. To be fully compliant with NFIP policies, the Subdivision and Site Plan Regulations needed to be amended. A specific action to meet the goal of continuing participation in the NFIP is to check and see if the necessary amendments were made to be in compliance.

In **2007**, another CAV was conducted in Epsom which reviewed progress from the previous **2001** CAV and considered new NFIP policies. The Town's Zoning Ordinance was found to be not in compliance, and the Town was required to add missing information and/or new conformity into the existing language. At the **March 11, 2008** Voting Session of the annual official ballot referenda (known locally as "SB2"), the Town adopted the Floodplain Ordinance amendment as recommended from the **2007** CAV.

At the **March 2010** annual Voting Session, the Town adopted the new FEMA Digital Flood Insurance Rate (DFIRM) Maps.

Several rounds of changes were made to the Zoning Ordinance and the Planning Board's Site Plan Review and Subdivision Regulations in following years in accordance with FEMA requirements.

Although Epsom is **Tier 1** community, there have been no further floods of note. The last CAV was in 2007. As needed, a follow up phone call should be made by NH OSI to request a review of Zoning Compliance Department procedures and the contents of the Floodplain Ordinance, Subdivision Regulations and Site Plan Review Regulations prior to **2023**, when this **2018 Plan** expires.

Floodplain Ordinance Amendments

The Town of Epsom has a Floodplain Development Ordinance that currently contains the required FEMA regulations to remain eligible for the NFIP. The Town of Epsom approved their first Floodplain Ordinance in **August 1978** along with the FIRMs.

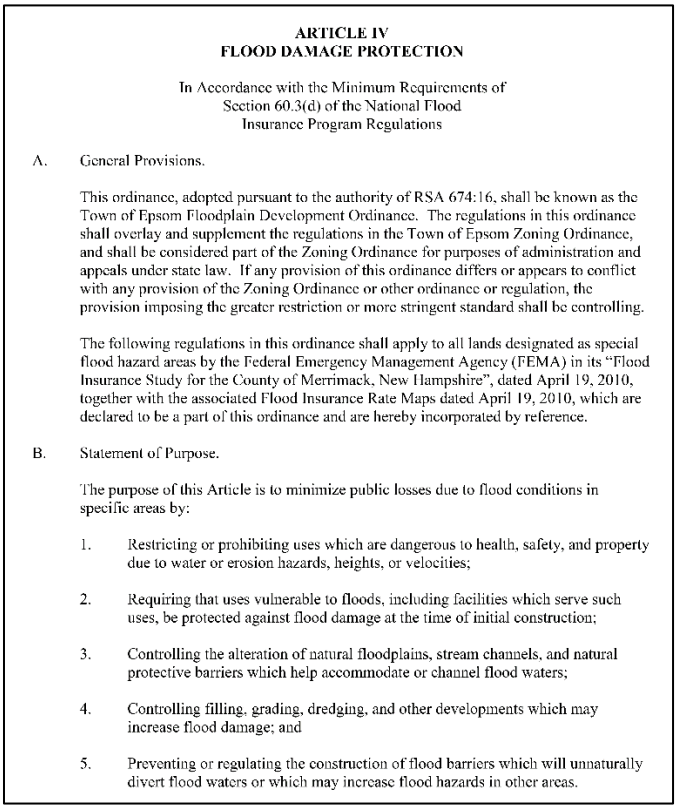
Over time, Epsom voters approved revisions to the Floodplain Ordinance, known locally as the Flood Damage Protection Ordinance. Changes were made to the Ordinance in **1990** (amendment), **2002** (repeal date and add definitions), **2008** (definitions and administration), **2010** (amendment), and **2012** (definitions and administration).

The latest revisions of **March 2010** to corrected and added language and inserted the new, adopted effective **April 19, 2010** Digital Flood Insurance Rate Maps (DFIRMs). IN 2012, further clarification was provided for administration of the ordinance.

The **2018** Epsom Zoning Ordinance contains all the elements to date requested by FEMA and the NH Office of Strategic Initiative's Floodplain Management Program. An excerpt of the Floodplain Ordinance is displayed in **Figure 28**.

Figure 28

Floodplain Development (Flood Damage Protection) Zoning Ordinance



ARTICLE IV
FLOOD DAMAGE PROTECTION

In Accordance with the Minimum Requirements of
Section 60.3(d) of the National Flood
Insurance Program Regulations

A. General Provisions.

This ordinance, adopted pursuant to the authority of RSA 674:16, shall be known as the Town of Epsom Floodplain Development Ordinance. The regulations in this ordinance shall overlay and supplement the regulations in the Town of Epsom Zoning Ordinance, and shall be considered part of the Zoning Ordinance for purposes of administration and appeals under state law. If any provision of this ordinance differs or appears to conflict with any provision of the Zoning Ordinance or other ordinance or regulation, the provision imposing the greater restriction or more stringent standard shall be controlling.

The following regulations in this ordinance shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for the County of Merrimack, New Hampshire", dated April 19, 2010, together with the associated Flood Insurance Rate Maps dated April 19, 2010, which are declared to be a part of this ordinance and are hereby incorporated by reference.

B. Statement of Purpose.

The purpose of this Article is to minimize public losses due to flood conditions in specific areas by:

1. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, heights, or velocities;
2. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
3. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers which help accommodate or channel flood waters;
4. Controlling filling, grading, dredging, and other developments which may increase flood damage; and
5. Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

Source: Section of Epsom Zoning Ordinance 2018

NFIP Familiarity in Epsom

According to NFIP policies, when an applicant files a request for a building permit in the floodplain, the applicant must include an elevation certificate in order to be in compliance. In addition, if an applicant intends to fill onsite, a letter of map of revision must be submitted along with the application. According to NFIP requirements in the Floodplain Ordinance, building permits should be reviewed to assure sites are reasonably safe from flooding and require anchoring to prevent flotation, collapse, or lateral movement and construction out of flood resistant materials.

Ongoing attention and familiarity with the NFIP will keep Town staff and volunteers in top form. In order to reduce flood risks, the Building Inspector, Town Assessor, volunteer Planning Board members, and other Town staff whose duties include review/inspection of development or construction, should be familiar with the Floodplain Ordinance and the NFIP.

Because of their unique position to ensure development conforms with ordinances prior to approval, the Planning Board should be familiar with NFIP policies, especially those regulations that are required to be incorporated into the Subdivision and Site Plan Review regulations. A workshop sponsored by the NH Homeland Security and Emergency Management (NHHSEM) or the NH Office of Strategic Initiatives (NHOEP) would be appropriate to educate current staff and volunteers. New online courses by FEMA for floodplain management, mapping, elevation certificates and more are available at no charge. For online training taken at the convenience of the individual, see the ***FEMA Emergency Management Institute's*** current training course index for flooding: **https://www.training.fema.gov/is/searchis.aspx?search=Flood&all=true.**

An essential step in mitigating flood damage is Town and property owner participation in the NFIP. Epsom should work to consistently enforce NFIP compliant policies to continue its participation in this program. Currently, Town staff are fielding many property owners asking for assistance because their mortgage lenders are requiring proof that the properties in question are not located in a Special Flood Hazard Area to determine whether NFIP flood insurance is required. The only way to rectify this growing problem is to have a survey done of the property to complete a Certificate of Elevation to keep on file at the Town Office. If the property is shown to be located out of the floodplain, a Letter of Map Amendment should be completed by the owner or by the Town to ensure future flood maps are corrected. This time of interaction with property owners is emotional and intense and may therefore not be the best time to advertise the availability of flood insurance.

When possible, Town staff should try promote flood insurance to property owners in Town; only **20** properties out of the **2,512** parcels in Epsom are protected by flood insurance and currently take advantage of the NFIP insurance opportunity. Informational links for the public on flood topics could be located on the Town's website at www.epsomnh.org.

6 CAPABILITY ASSESSMENT

Local mitigation capabilities are existing authorities, plans, ordinances, policies, mutual aid, programs, staffing, technical skills and assets, funding, outreach, public education, and resources that reduce hazard impacts or that could be used to help implement hazard mitigation activities. These capabilities were inventoried for the **Epsom Hazard Mitigation Plan Update 2018**.

The **Capability Assessment** contains an inventory of locally-important existing mitigation support activities, or capabilities, which have a positive impact on the way hazard events are handled within the community. Most capabilities are not hazard mitigation Actions but support the Action Plan and help decrease the community's hazard risk. These community-strengthening capabilities are not STAPLEE-rated (Social Technical Administrative Political Legal Environmental and Economics questions) like the Actions**,** but instead the capabilities serve to sustain and assist the community to maintain and accomplish its hazard mitigation Actions and priorities. Selected ***Future Improvements*** (mitigation-oriented) to some of these capabilities have the potential to be considered as Actions in **7 PRIOR ACTION STATUS** and **8 MITIGATION ACTION PLAN**.

Capability Assessment Types
Planning & Regulatory
Administrative and Technical
Financial Resources
Education and Outreach

There are four overall Capabilities considered for which an inventory of mitigation support items was identified by the Hazard Mitigation Committee, **Planning & Regulatory**, **Administrative and Technical**, **Financial Resources**, and **Education and Outreach**.

Each Capability had inventoried the latest version or adoption Date; a Description of the item; the location of the capability in Town; the Level of Effectiveness of the Capability; which Department, Board or other has Responsibility for the capability; what Changes were made to the capability since the **2012 Hazard Mitigation Plan**; and Future Improvements to the Capability.

Town Capabilities

A summary of the items within the four Capability tables is provided here to offer a portrait of resources Epsom has at hand to assist with mitigation. Careful consideration of each Capability's ***Level of Effectiveness*** helped the Departments to determine any clear ***Future Improvements*** to undertake. Many of the Town's Capabilities involved existing plans, procedures, reports, policies, regulations, and resource documents from individual Departments. These plans and documents were reviewed and incorporated into the **Capability Assessment**. ***Future Improvements*** to these documents were identified and many later became Action items in **8 MITIGATION ACTION PLAN**. Capabilities of all Town Departments and the School District as related to hazard mitigation are detailed within the following tables.

Level of Effectiveness	Description
High	Capability is working well and is regularly followed
Moderate	Capability could use some revisions but is followed
Low	Capability is not working and needs revisions

DEPARTMENT ABBREVIATION KEY:

FD	Fire & Rescue Department
EM	Emergency Management
PD	Police Department
CE/BI	Code Enforcement/Building Inspector
PB	Planning Board
HD	Highway Department
BOS	Board of Selectmen
CC	Conservation Commission
SD	Epsom School District
WW	Epsom Village Water Precinct

PLANNING AND REGULATORY CAPABILITIES

The planning and regulatory capabilities displayed in Table 32 are the plans, policies, codes, and ordinances that reduce the risks or impacts of hazards. There are 3 categories: Plans, Codes, and Regulations. Most of the documents listed below are the Town's documents, but others are School, local, regional, state and federal which support the Town's the hazard mitigation goals, objectives, and/or Actions.

Table 32

Planning and Regulatory Capabilities

Latest Adoption or Version Date	Capability Assessment: Planning and Regulatory Resources	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
PLANS							
2013	**EM Emergency Operations Plan 2013**	Last updated 2013. It is in the HSEM ESF format. The EOP (EMP) describes who's responsible for what actions during an emergency, includes evacuation plan. Includes general warning systems, chain of command, lists of resources.	Entire Town	Moderate	Emergency Management	Changed back-up EOC to Town Office (had been Police Dept)	Update in 2018. Include federal standards for personnel and equipment
April 2012	**EM Hazard Mitigation Plan 2012**	Adopted by Town & FEMA in 2012 and currently being updated Jan 2018	Entire Town	Moderate	Emergency Management	Drainage actions completed	Updating as of Jan 2018. Review & update sections on an annual basis
2015	**EM Suncook River Fluvial Geomorphic Assessment**	NH Geological Survey and contractors developed FGA study and sets of fluvial erosion hazard, fluvial geomorphic sites and woody debris area maps. Erosion sites identified in many areas	Suncook River	High	Emergency Management	Maps are consulted by PB and other Depts. River location constantly changing, eroding with each storm	Continue to use the maps and mitigate bank erosion at specific locations where possible
2010	**PB Master Plan**	Another Planning Board tool, updated every 10 years. CIP stems out of MP. Guiding document for all Depts and Committee, vision for the Town, basis for ordinances and land use regulations.	Entire Town	Moderate	Planning Board	Document used for reference during PB meetings	Update contract in 2018 with CNHRPC
2016	**PB Capital Improvemen**	The PB 2016-2021 CIP is not currently updated annually and is outdated. The Fire &	Entire Town	Moderate	Planning Board	Consulted by the FD and HD	Update contract in 2018 with

Latest Adoption or Version Date	Capability Assessment: Planning and Regulatory Resources	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
	ts Program 2016-2021	Highway Department follow it for equipment and project consultation. The document is used for annual budgeting purposes.					CNHRPC and revise annually
July 2017	**SD School Emergency Managemen t Plan**	The Elementary School Plan includes procedures during emergencies, locations for temporary housing, call back OneCallNow, and contact information. It was updated in summer 2011. The School continues to have administrators trained in emergency management trainings and have taken 100, 200, 700 level courses. Added a Weather Event Plan, and installed a camera and a buzz-in system to the Elementary school.	Epsom Central Elementary School-	**High**	Epsom Central School Principal	Plans are updated annually, Regular training events with PD & FD, fire drills, etc.	Install bollards for gym entry. Continue with annual update
BUILDING	**CODES,**	**PERMITTING, INSPECTIONS**					
April 19, 2010	**PB FEMA Flood Insurance Rate Maps**	Adopted by Town, used for Suncook River, streams, brooks	Floodplains	**High**	Planning Board/ Bldg Dept Staff	FEMA has not provided new maps since then	Continue using maps in Town offices and noting any substantial deviations
2015	**FD NFPA 101 Life Safety Codes Occupancy Inspections**	Contains 15 types of occupancies that may be inspected by Fire Departments **- Places of Assembly** - Mercantile - Business - Health Care - Ambulatory Health Care - Residential Board and Care **- Day Care** **- Educational** - Apartment Buildings - Lodging or Rooming Housing - Hotel or Dormitory - 1 and 2 Family Dwellings - Industrial - Storage - Detention and correctional	Places of Assembly, Day Cares, and Educationa l sites	**High**	Fire Department	Upgraded from 2009, books accessible in FD library to all	Increase training and inspections

Latest Adoption or Version Date	Capability Assessment: Planning and Regulatory Resources	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
2015	**FD NFPA 1 Fire Codes Permitting**	Section 1:12, and Table 1.12.7a specifically outline instances when permits are required	Select Structures	High	Fire Department	Upgraded from 2009, books accessible in FD library to all	Increase training and inspections
LAND USE	PLANNING,	ORDINANCES, REGULATION					
2010 (adopted 1978)	**PB Flood Damage Protection Ordinance (Floodplain Developmen t Ordinance)**	Minimize public losses due to flood conditions in specific areas. Ordinance was updated in March 2010 to FEMA requirements of April 19, 2010 maps and revisions.	Floodplain areas	High	Planning Board	No changes but ordinance used to guide building and developmen t	Continue to use for applications and update as FEMA requires
Between 1969 and 2008	**PB Manufact-ured Housing Ordinance in Zoning**	The Manufactured Housing regulations in Zoning disallows additional units to be placed on individual lots and disallows new manufactured housing subdivisions. State building codes need to be reviewed to ensure regulations are consistent. This project helps mitigate the effects of flood disaster events.	Floodplain areas	Low	Planning Board/ Code Enforcemen t	No changes but ordinance used to guide building and developmen t	Update to limit the seasonal manufactured housing/campg round use (some now used year round, including ("tiny homes")
2011	**PB Flood Hazard Regulations in Subdivision Regulations and Site Plan Review Regulations**	The Subdivision Regulations contains provisions that state land to be subdivided which is subject to periodic flooding or has poor drainage must be proven to be able to sustain development.	Floodplain Hydric Soils areas, Wetlands	Low	Planning Board/ Code Enforcemen t	No changes but ordinance used to guide building and developmen t	Update when undertaking the in 2018 Subdivision Regulation revisions
2002	**PB Industrial Zoning Regulations**	As a recommendation from the Emergency Management Plan, industrial zoning regulations help protect the floodplain.	Floodplain	High	Planning Board/ Code Enforcemen t	Planning Board continued to use these regulations for relevant developmen ts.	Review with ZBA for consideration of land use application, best land management.
2017-SPR 2011-Sub	**PB Cistern Placement Regulations in Subdivision**	Developers of housing or businesses are required to site cisterns on location through Subdivision Regulations and Site Plan	Town-wide	High	Planning Board	Cisterns, dry hydrants and drafting sites have been	Add cistern and dry hydrant maintenance provisions to 2018

Latest Adoption or Version Date	Capability Assessment: Planning and Regulatory Resources	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
	and Site Plan Regulations	Review Regulations so a water source will be available for fire protection.				mapped and are accessible for mutual aid usage	Subdivision Regulation update
2011	**PB Road Design and Construction Standards (Subdivision Regulations)**	PB updated documents recently. Engineer contracted for application to follow the standards for slopes and driveways, new roads.	Entire Town	**High**	Planning Board	Changed some old driveway slope %s for emergency vehicles	Update contract in 2018 with CNHRPC for new construction
2017-SPR 2011-Sub	**PB Stormwater Construction and Maintenance Standards (Subdivision /Site Plan Regulations)**	PB updated documents recently. Engineer contracted for application to follow the standards	Entire Town	**High**	Planning Board	No changes but ordinance used to guide building and development	Update contract in 2018 with CNHRPC for new construction
2006	**PB Zoning Wetlands Setback**	50' setbacks from wetlands help protect against flooding and contamination	Wetlands	**High**	Planning Board	No changes but ordinance used to guide building and development	Continue to use for applications and consider further revision
2011	**BOS Flood Storage Land Obtained- 8 Properties**	Owners of eight mobile homes on Queens Lane in the floodplain applied to FEMA for acquisition and/or relocation in 2011.	Queens Lane @ Kingstown e MHP	**High**	Board of Selectmen	No new properties have been acquired.	Project is complete. Will monitor for potential erosion and flooding issues.

Source: Epsom Hazard Mitigation Committee

ADMINISTRATIVE AND TECHNICAL CAPABILITIES

The administrative and technical capabilities in **Table 33** include staff, volunteers, and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. Smaller jurisdictions without local staff resources often rely on public or shared resources. There are 3 categories: Admin Programs, Staffing, and Technical Capabilities.

Table 33

Administrative and Technical Capabilities

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
ADMINIST	RATIVE	PROGRAMS AND POLICIES					
2016	**PD Mutual Aid Agreement**	The Police Dept Mutual Aid Agreement (MUA) is with nine (9) surrounding towns. The MUAs are updates when a new Department comes on board in any community. Loudon was newest renewal in 2016.	Entire Town and Region	High	Police Department	Department has renewed MUAs with other towns. Change of Loudon's Chief I n2016	Incoming Departments of mutual aid agreement communities will review and renew.
2014	**PD Standard Operating Procedures (SOPs)**	SOPs include pursuit policies, taser, rifle, domestic violence, arrest procedures, homicide, bank procedures, sexual assaults, accidents, psychological problems, and multiple others. Using LCG as a basis and updating to fit Epsom's needs	Entire Town	High	Police Department	Was fully updated in 2014.	Continually review and update policies according to trends in police operational procedures. Currently updating as of 01-18.
2005	**PD General Orders (GOs)**	General orders, currently planned to update after SOPS. To include phone usage, K-9 unit, more.	Entire Town	High	Police Department	No changes but old GOs utilized regularly	Target update completion date of 2019
Oct 2017	**PD Sustained Traffic Enforcement Patrol (STEP) Grant Program**	NH Highway Safety (OHS) offers several grants, Epsom applied and received STEP. 3 different components: Speed grants, Safe Commute grants and Seatbelt grants. After Jan 20, 6-10 AM or 4-8PM patrols for Safe Commute. Seat belt education done in May, with 4-6PM roaming patrols and will go to Elementary School, making	Entire Town	High	Police Department	Applied for & received annual grants for programs since 2006-2007, recurs each year after Oct application submitted.	Continue and consider an Equipment grant (up to $2500), 50/50 for radar units, speed trailer, to go along with the STEP grant

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
		it a public education activity too.					
2013	**PD Traffic Management Procedures**	Traffic management procedures are used to control traffic corridors when an accidents, hazardous materials spills, or natural disasters occur. Invested in emergency traffic management equipment related to procedures. Training has also occurred, Chief's "Train the Trainer" training.	Roadways	High	Police Department	Purchased new equipment, signage, Officer training	Keep up to date on training and equipment purchases. May work on a policy
Oct 2017	**PD DWI Patrols Grant Program**	Epsom applied and received NH Highway Safety (OHS) DWI Patrols grant. Provides funding for 15-20 DWI patrols. Takes the place of a former sobriety checkpoint program which became ineffective because everyone knew where & when checkpoints were.	Entire Town	High	Police Department	Received new grant Oct 2017 through Sep 2018	Intend to annually renew DWI Patrols grant, will set up 15-20 patrols
January 2018	**FD Member of Capital Area Fire Compact Mutual Aid (CAFCMA) and Dispatch**	Participate with the Capital Area Fire Mutual Aid Compact of 23 agencies. All dispatching for the Town goes through the CAFCMA. Member since 1970's.	Entire Town, and resources to other communities	High	Fire Department	New IamResponding used among all members, mapping, regional training monthly with abutting towns	CAFCMA is upgrading its communications center, Epsom continues to participate
January 2018, constantly	**FD Call "Response Cards"**	Call "Response Cards" indicate who responds to which emergencies or disasters within the Mutual Aid (MUA) Compact. Town was rezoned into 6 different fire protection zones for MUA towns coming in.	Entire Town	High	Fire Department	Kept a worksheet maintained with pre-planning scenarios	Continue to maintain Response Cards and worksheet
2012	**FD Standard Operating Guidelines**	Full revision. Added many protocols including sandbags, medical, mayday, Rapid Instructions Team (RIT), 20-minute MARC	Entire Town	High	Fire Department	Amended and added, duty handbook update,	Continue to review and revise

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
		(Member Accountability Report Check)				employee job discipline	
Dec 2010	**HD Winter Operations Policy for Plowing Routes**	Policy defined which roads have priority and in which order roads will be plowed. This will eliminate potential resident confusion and will maintain consistency for Town staff.	Entire Town	High	Highway Department	Continued to use procedures during snow storms	Formalize a written Winter Operations policy and include a written Town Roads Policy
Every spring	**HD Culvert Maintenance Program**	Maintain and upgrade culvert systems to allow for maximum efficiency of culvert use.	Entire Town	High	Highway Department	Applied annually for NHDES permitting for drainage & culvert improvements	Continue upgrading culverts and drainage systems
Every storm	**HD Procedure to Communicate with Utility Companies to Cutback Overgrown Limbs**	Removing overhanging limbs near power-lines will reduce that potential hazard in the Town. Communicate regularly with Unitil & Eversource to make sure that branches are cut back from power lines to reduce the potential hazards from wind.	Roadways	High	Highway Department	Unitil has been diligent in cutting back trees	Continue communications as needed, be proactive to ensure elimination of hazardous limbs before they fall
2015	**EM Shelter Agreement with Allenstown**	Mutual aid sheltering agreement with Allenstown under the Unified Command system (EM, PD, FD)	Epsom, Allenstown	High	Emergency Management	Shelter activation	Pre-vet shelter volunteers, establish CERT
July 2017	**SD Epsom Central School Evacuation Procedures**	Children will relocate to Bible Church 1 mile away via railroad tracks.	Epsom Central Elementary School	High	Epsom Central School Principal	No major changes, annual review and practice, drills	Ensure Bible Church location remains available
July 2017	**SD Epsom Central School Drills**	Drills include active shooter, weather, lock down, shelter in place	Epsom Central Elementary School	High	Epsom Central School Principal	No major changes, annual review and practice, drills	Interest in incorporating Alert Lockdown Inform Counter Evacuate (ALICE) ALICE which is not yet part of the EMP during

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
							next annual update
TECHNICAL SKILLS AND RESOURCES							
5 total Officers & Chief as of 01-18, Have staffing available for 6 officers	**PD Officer Training**	Officers and Chief undertake ICS training through Fire Academy, 3-4 firearms, OC, Taser, baton, munitions, accident reconstruction, and other training as appropriate. Much of training is done yearly or semi-annually. Training is conducted through Police Academy and other Department special trainings, online or in-service.	Entire Town	High	Police Department	Continued yearly certification trainings. Stopped K-9 unit for lack of resources. Conducted individual officer training based on interest. Town increased 2018 training budget	Begin using Police One in house online training. Begin holding monthly training as well as policies & procedures
2 OHRVS purchased in 2005 & 2007	**PD OHRVs and Light Duty Trailer with EMD**	Equipment includes two OHRVs, which have been used for missing persons in remote locations for navigating terrain, and patrolling trails. Having this vehicle provides better access which may not have been possible and a higher level of life safety. The vehicle has a computer and GPS installed. A light duty trailer kept by Emergency Management Dept is available for all Depts to use	Entire Town	High	Police Department, Emergency Management	Obtained NH F&G grants for OHRV patrols of trails, railroad track and Town Forest in winter & summer 2016. Also used for missing persons, FD used for forest fires.	Continue monthly maintenance and checks, seek another NH Fish & Game patrol grant in the future
All PD Officers	**PD American Red Cross Medical Training**	Training to conform with American Red Cross given by FD Paramedic to Town Emergency Personnel, including CPR, tourniquet training. PD officers each have a trauma kit.	Entire Town	High	Police Department	Continued officer in-service trainings	Continue training with FD paramedic. PD to add Narcan application training for accidental exposure
1	**PD Trailer Light Tower**	Purchased in 2012	Entire Town	High	Police Department	Used for sobriety checkpoints, accidents.	Would like to purchase a digital sign board on a

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
						Lends to other communities at request, FD & HD can use	trailer, to help divert traffic
PD – 5 FD & EM & HD	**PD/ FD/EM/ HD ICS & NIMS Training**	Town emergency personnel have been trained in Incident Command System 100, 200, 700, and 800 level courses. The 300 and 400 level courses are 1-2 days long and no longer online, so may require grants or volunteer time. PD officers taught 100 & 200 level in Academy.	Entire Town	High	Emergency Management& Other Depts	Town sought training opportunities for emergency volunteers and personnel.	Get Town Staff & Board of Selectmen certified. Continue to keep up with state and national training requirements.
PD Chief & EM	**EM/PD EOC Training**	Training for ICS to enable National Certification has been taken by Town Emergency Personnel. EOC IS-0075 has also been taken.	Entire Town	High	Emergency Management	Held a tabletop exercise for an ice storm in 2011, full scale exercises	Continue training and exercises
PD Officers FD EMD Town Office staff	**FD/EM/PD American Red Cross Shelter Training**	Training to conform with American Red Cross (ARC) shelter training. Town staff and emergency responders	Entire Town	Low	Emergency Management	Town sought training opportunities for emergency volunteers and personnel.	Begin a new round of shelter training for staff and volunteers
23 communities	**FD/EMS Capital Area Fire Mutual Aid Regional Training**	Continual training in regional incident command and response techniques and skill. Cross trains with the Lakes Region MUA to reduce the loss of communications during a disaster.	Entire Town	High	Fire Department	Upgraded to IAmResponding	Continue regional training with communities
FD- Obsolete Digital 12 mobiles, 20 portables, 1 base station.	**PD/FD/EM Department Radios with Interoperability**	Current Radios allow for this for interoperability. Received grants, now digitally capable on same frequencies to communicate. PD- Every new patrol car gets a new mobile radio. New radios cycled in since 2014, will continue upgrading and get	Entire Town	High	Police Department / Fire Department / Emergency Management	PD updating every year since 2014, all but base radio updated.	PD- Continue to upgrade digital radios and obtain new base station. FD- Need FD funding for all

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
PD- Digital. 5 digital mobiles, 9 portables, 1 base. EM- UHF 0 mobiles, 1 portables, 1 base station, 1 for School		new base station. Can communicate w/FD. Cell phones also used. HD- No radio usage, cell phone communication by choice. FD- All radios are obsolete, about 15 years old, no more parts available to fix them. Cell phone communication is more reliable					radio replacement, all are very old, end of lifespan, aiming for 2019. EM- New radio
PD- 2006 installed FD- 2000 installed	**PD & FD Generators**	Generators in Town Office and Police Department were purchased through a FEMA grant. This will keep emergency operations functioning during a disaster event.	Town Office and Police Depart-ment	High	Emergency Manageme nt	PD Serviced twice per year. FD- required lots of maintenance , problematic	Continued semi-annual maintenance checks on PD generator. Obtain a new FD generator
2017	**FD Water Rescue Capabilities**	The Town has a boat to use for water rescue in response to the extreme flooding Epsom experienced. More equipment was obtained to facilitate rescue during flooding conditions: trailer, ice rescue suits, ropes, personal flotation devices, and water rescue helmets	Suncook River, Water bodies	High	Fire Department	Purchased new sail road, upgrades and undertook training	Continue to locate and take training related to water rescue, which is not easy to find or coordinate with volunteer schedules.
2017	**FD Capital Area Public Health Network Member**	Point of Dispensing (POD) for Epsom is in Northwood at Coe-Brown Academy for distribution of vaccines or pharmaceuticals for communicable disease, human, biological problems, exposure to chemicals, etc.	Entire Town	High	Fire Department	Participated in monthly training	Continue regional training with communities
2017	**FD Explorer Post**	The Explorer Post gives experience of community and volunteering to 15-21 year olds. The Fire Department gets assistance and the teens may one day join the Fire Department, or establish a career, as a	Entire Town	High	Fire Department	Met twice per month, have 5-6 active Explorers	Member recruitment drive every spring

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
		result of their positive experience					
23 FF total 11 EMT. 12 Advanced EMT, 3 Paramedic	**FD Fire Academy Training**	Fire Department staff and volunteers have undergone required training at the Fire Academy.	Entire Town	**High**	Fire Department	Continued Fire & Rescue at same level as 5 years ago.	Obtain funding for 24/7 ambulance coverage
500 regular 200 large	**FD Sandbags**	Stored at Fire Station. Bags are nylon in ton and ½ ton sizes.	Fire Departmen t	**High**	Fire Department	Used for HD ditching work	Lend out large bags to other communities
March 2011	**HD List of Priority Target Buildings for Electrical Power Restoration**	Priority powerlines to the Schools, Village District, Epsom Manor, and others should be fixed first during power outages so the Town emergency services can function and the most vulnerable populations can be served	Town Buildings, Epsom Manor, Traffic Circle	**High**	Highway Department	Used list during Oct 2017 storm to get traffic circle businesses and populations operational	Continue to review and revise
15 barricade s + 30 cones + 2 signs	**EM Barricades and Cones Equipment**	Plastic barricades, some have been vandalized, stolen, run over, ignored. Not enough or authoritative	Fire Departmen t	**High**	Emergency Manageme nt	Currently stored as are not effective	Purchase heavier barricades and more signs
2018 (Future)	**EM EOC Phone Upgrades**	The backup EOC at the Town Office currently uses VOIP. The new phone system will install hardlines	Town Office	**TBD**	Emergency Manageme nt	N/A	Soon to be installed, 2018
2015	**EM Mass Casualty and Evacuation of Vulnerable Populations Drill**	Evacuation of Epsom Manor, included its new director. Emergency response drill with After Action Report (AAR)	Traffic Circle	**High**	Emergency Manageme nt	New evacuation drill in 2015	Obtain funding for a full scale exercise or annual tabletop to ensure safety of vulnerable people
2005	**SD Vehicle Equipment Quonset Storage Shed**	Town and school vehicles are sheltered in the school equipment shed.	Epsom Central School	**High**	School and Emergency Manageme nt	Added electricity and security cameras	Continue securing equipment at this location

Source: Epsom Hazard Mitigation Committee

FINANCIAL CAPABILITIES

The financial resources in **Table 34** available for hazard mitigation projects are those the Town has access to, has used in the past, or may be eligible to use in the future for hazard mitigation projects. These often include FEMA Public Assistance Grants (Disaster Recovery Costs), Warrant Articles, Town Capital Improvements Program (CIP) 2018 Project Funding, Department Operating Budgets, Bonds and FEMA and NH Department of Transportation grants.

Table 34

Financial Capabilities

Latest Adoption or Version Date	Capability Assessment: Financial	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
FINANCIAL	PROGRAM OR	FUNDING RESOURCE FOR	HAZARD	MITIGATION			
2013	**BOS FEMA Public Assistance Grants (Disaster Recovery Costs)**	Public Assistance Categories A-G may become available when disasters are declared if the community has an unexpired approved Haz Mit Plan. Continue to utilize the FEMA funding to help recover from declared disasters.	Entire Town	**High**	Town Administration with EMD	Used for PA-B Protective Measures for NEMO in2013	Continue to utilize the FEMA PA program to help with disaster costs
2017	**BOS NH Department of Transportation (NH DOT) Bridge Program**	The bridge program is an 80/20 funding opportunity, with only 20% required by towns. Using the CIP Capital Reserve Funds, communities can set aside money for the several years it takes for the state to undertake the local bridge project. Kelley Brook Bridge at Shaw Road	Echo Valley Farm Road Bridge	**Moderate**	Town Administration	Echo Valley Farm Road Bridge	Continue using DOT bridge funding
PROGRAMS	WHICH COULD	POTENTIALLY BE USED	BY TOWN	FOR FUTURE	PROJECTS		
Not used yet	**CC Conservation Easement Fund**	The Conservation Easement Fund protects water supplies through purchase of	Priority locations	**High**	Conservation Commission	Deposits to the fund continued when current use land converted to	Consider using fund for water and flood protection by purchasing at-

Latest Adoption or Version Date	Capability Assessment: Financial	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
		conservation easements.				developable land.	risk parcels for conservation
Not used yet	**PB Town Capital Improvements Program (CIP) 2018 Project Funding**	Sets aside funds for large equipment/ projects.	Entire Town	**High**	CIP Committee	CIP is to be modified in 2018	CIP could include expensive or long-term hazard mitigation projects
Not used yet	**EM Emergency Management Operating Budget**	Budget can contain funding for outreach programs, mitigation projects	Entire Town	**High**	Emergency Management	Currently have only $1,000 for equipment and $1 for grant, $2,000 training in 2018	Use Emergency Management Operating Budget to finance future hazard mitigation improvements

Source: Epsom Hazard Mitigation Committee

EDUCATION AND OUTREACH CAPABILITIES

In Table 35, identifying Town Department education and outreach programs and methods already in place or those which could be implemented can supplement or encourage mitigation activities and communicate hazard-related information to residents, businesses and the general public.

Table 35

Education and Outreach Capabilities

Latest Adoption or Version Date	Capability Assessment: Education and Outreach Programs	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
PUBLIC	OUTREACH	PROGRAM					
January 2018	**PD Drug Take Back Box & Drug Day**	People can drop off narcotics or other drugs with immunity and also unused prescription medication. Box came from Bow, need to install at PD waiting room	Police Station	TBD	Police Department	Just obtained Jan 2018	Will advertise publicity on PD Facebook, in Suncook Valley Sun article, on Town website
Future	**PD School Resource Officer/ Education for Students**	Plan to have the 7th officer at the school for 20 hours/week during school year and 20 hours on patrol. Educational tool not only for drugs but safety protocol for children.	Epsom Central School	High when operational	Police Department	Program has been temporarily suspended for lack of staff.	Plan to budget 7th officer in 2019 if 2018 budget passes with 6th officer
Future	**PD Police Explorers and Internships**	Want to get more young people interested in police careers, so they can determine if they want to future their education	Entire Town	TBD	Police Department	N/A	Undertake necessary steps to create Explorer Program and/or internships
2018	**BOS Town Website**	Used by multiple Town Depts, available to residents and visitors, hosts Zoning amendment changes. Have an emergency management page with registration for emergency notification system	Entire Town, General Public	High	Town Administration	Maintained current website with miscellaneous information	Upgrade website to contemporary design and ease of location & update
2017	**FD Fire Prevention Week**	Hold activities with school children, interact w/FD personnel, hold assemblies, education ,	Epsom Central School	High	Fire Department	Ensured classroom visits, field trips	Continue program annually and improve

Latest Adoption or Version Date	Capability Assessment: Education and Outreach Programs	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2012)	Future Improvements to Plans
		show engines & ambulance					
2018	**FD Fire Training Recruitment & Outreach Program**	Recruitment for firefighting, a 2-year volunteer investment $1,500 each paid for by Town	Entire Town	**High**	Fire Department	Annual recruitment	Begin to recruit in January 2018
2017	**SD School District OneCallNow Automated Calling System**	Used only for emergencies. Automated phone, text, email service to parents for alert. Used for snow delays and snow days.	Epsom Central School, Entire Town	**High**	Epsom School District	Changed programs, more effective	Update regularly when parents require notification

Source: Epsom Hazard Mitigation Committee

Review of Existing Plans

As described above, during the Hazard Mitigation process and the identification of existing mitigation **Capabilities**, the Hazard Mitigation Committee used their knowledge of the existing plans, policies, procedures and other documents utilized for their Department duties to develop Capability ***Future Improvements***. However, several additional documents not listed in the **Capability Assessment** are also utilized by the community and have a positive relationship to the **Hazard Mitigation Plan 2018**. Most of the documents below are not the Town's documents, but the hazard mitigation goals, objectives, and/or Actions in this Plan are supported by the **Mitigation Support and Resource Documents** listed below in **Table 36**.

Table 36

Mitigation Support and Resource Documents

Latest Adoption or Version Date	Mitigation Support and Resource Documents Not Listed within Capability Assessment Tables
Feb 2007	NH DHHS NH Influenza Pandemic Public Health Preparedness & Response Plan 2007
2008	VHB Geomorphology-based Restoration Alternatives for the Suncook River, Epsom, NH 2008
2008	USGS Flood of April 2007 in NH
2007	USGS Flood of May 2006 in NH
2009	NFPA 1 Fire Code 2009

Latest Adoption or Version Date	Mitigation Support and Resource Documents Not Listed within Capability Assessment Tables
2010	USGS Flood Study of the Suncook River in Epsom Pembroke and Allenstown 2009
2010	NWS Thunderstorms, Tornadoes, Lightning. Preparedness Guide
2011	USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire after the May 2006 Flood
Apr 2010	FEMA Flood Insurance Study for Merrimack County 2010
Apr 2010	NH Hospital Mutual Aid Network MOU
2011	NH DES Management of Collected Debris Following Severe Storm Events Fact Sheet
Dec 2011	NH DHHS Disaster Behavioral Health Response Plan
Feb 2012	NH DHHS Child Care Center Emergency Preparedness Guide
2012	USGS Flood Inundation Maps for the Suncook River in Epsom, Pembroke, and Allenstown, and Chichester, New Hampshire 2012
Oct 2013	State of NH Multi-Hazard Mitigation Plan Update 2013
Jul 2014	NH DOS Statewide Fire Mobilization Implementation Master Plan 2014
Jul 2014	American Red Cross of NH Strategic Plan – Humanitarian Services FY 2014-2019
Jul 2014	NH DHHS NH Excessive Heat Emergency Response Plan 2014
2015	NFPA 101 Life Safety Code 2015
Feb 2015	Central NH Regional Plan 2015
Mar 2015	NH State of NH Tickborne Disease Plan 2015
Sep 2015	NH DOS Bureau of Emergency Management Services EMS Provider Manual 2015
Jul 2015	NHHSEM NH Recovery Plan with RSFs 2015
Jan 2016	Eversource Energy Electric Operations Response Plan
Sep 2016	Unitil Electric Emergency Response Municipal Information
Oct 2016	CNHREPC Central New Hampshire Regional Emergency Planning Committee Regional Hazardous Materials Emergency Plan 2016
Aug 2016	CAPHN Capital Area Public Health Network Public Health Emergency Preparedness and Response Plan for the Capital Area 2016
Jul 2017	NH DHHS NH Arboviral Illness Surveillance, Prevention and Response Plan & Map 2017
As provided	NHDES Dam Emergency Action Plans for High, Significant & Low Hazard Dams
Mar 2018	NH DOT Recommendations for the Ten-Year Transportation Improvement Plan (Projects) 2019-2028
2018	USGS Preliminary Stage and Streamflow Data at Selected Streamgages for Flood of Oct 2017

Source: Epsom Hazard Mitigation Committee

7 PRIOR ACTION STATUS

The **Hazard Mitigation Plan Update 2012** provided a basis to begin Action development, many of which originated from the previous **2004 Plan** or **2009 Plan** or **2015 Addendum**. A review of the **2012** Actions is provided by the Hazard Mitigation Committee, determining which Actions have been **Completed**, **Deleted**, or **Deferred** to the **2018 Plan**.

Action Status Determination

The status of all Hazard Mitigation Plan Actions varies. Priorities over the previous five years can change, budgets are uncertain, and staff are allocated time for certain tasks. To accommodate the **2012 Plan's 42 total** Actions in addition to the **New** Actions from the **2018 Plan**, there are four designated Action types to describe the detailed Actions following within the **7 PRIOR ACTION STATUS** and/or **8 MITIGATION ACTION PLAN**:

- **Completed**
- **Deleted**
- **Deferred**
- **New**

Actions which were **Completed** from the **2012 Plan** are listed in **Table 37** along with completion dates.

Actions which were **Deleted** from the **2012 Plan** might have been no longer necessary or a priority to the Town, no longer relevant to the Town's situation or objectives, could not realistically be undertaken, were not financially feasible, were modified and incorporated into other existing Actions, or duplicated existing efforts of Epsom's activities. Deleted Actions are listed in **Table 38.**

Actions which were **Deferred** from the **2012 Plan** are still important to the Town but were not completed because they did not have the staff capability or the funding to undertake them, other Actions took higher priority, more time was required for completion, or they may need to be repeated to be effective. These **Deferred** Actions are in **Table 39** and have been re-prioritized with the **New** Actions in the **Mitigation Action Plan.**

Changes in priority of the **Deferred 2012 or 2015** Actions occurred over the last five years. The **2012 Plan** also used the **12-36 Priority Score enhanced STAPLEE** system while the **2018 Plan** included both a ***Ranking Score*** and an ***Action Timeframe*** to determine priorities with a more useful **15-75 Priority Score enhanced STAPLEE** system. Both methods are described.

New Actions are described later in **8 MITIGATION ACTION PLAN**.

DEFINITIONS

The following definitions were used to ascertain which Actions should be considered *mitigation* Actions versus which should be considered *preparedness* Actions more suitable for incorporation into the ***Town Emergency Operations Plan***. The mitigation Actions are those which are carried forth in this **2018 Plan** into the **Mitigation Action Plan**.

Action Type	Duration	Definition or Characteristics
Mitigation	**Long Term**	**Action supports sustained risk prevention or reduces long-term risk to people, property and infrastructure.** ↪ Best suited for *Town Hazard Mitigation Plan*.
Preparedness	**Short Term**	Action assists or supports planning, protective activities, public education, training and exercise. ↪ Best suited for ***Town Emergency Operations Plan***.
Response, Recovery, Other Related	**Short Term**	Action supports preventative, response, recovery-related, repeated or deferred maintenance activities. ↪ Best suited for ***Town Emergency Operations Plan***.

HAZARDS CONSIDERED

With **26** different hazards examined in this Plan, it is not always practical to list each one when describing location vulnerabilities or solutions. Brevity will suffice where possible. In many cases, simply listing the more encompassing main hazard group names taken from **4 HAZARD RISK ASSESSMENT**, such as **Flood**, **Wind**, **Fire**, **Extreme Temperature**, **Earth**, **Technological** and **Human**, will cover most of the situations.

For further detail at a specific location, the addition of specific hazards such as **Scouring & Erosion** from the *Flood* category, **Storm** (applying to the warm weather all-encompassing storms) from the *Wind* category, **Winter** from the *Extreme Temperature* category, or **Dam Failure** from the *Technological* category can provide the necessary amount information needed to understand certain issues in Epsom. These are already used as sub-grouped hazards in the **APPENDIX A Critical and Community Facilities Vulnerability Assessment**.

When the main hazard group names or sub-group hazards names are not precise enough, the exact hazard name from the group of **26** examined will be utilized for accuracy. Where possible however, simply using the main hazard group name (for example, **Flood** or **Wind** instead of each of its sub-hazards), can reduce the need for listing every type of hazard that may impact a certain location and be better accommodated in its broadness.

Review of 2012 and 2015 Actions

The **2012 Hazard Mitigation Plan** was written in a different format and its content had to comply with less specific review guidelines before the ***Local Hazard Mitigation Review Guidebook (FEMA), 2012*** became standardized and tailored by each FEMA Region over the years. In **2015**, the ***Epsom Fluvial Geomorphic Assessment Addendum to the 2012 Hazard Mitigation Plan*** was completed which added more Actions to the **Hazard Mitigation Plan**.

Epsom's current mitigation Actions from the **2012 Plan** and **2015 Addendum**, which included incomplete Actions from the Town's previous Plans, were allocated **Action Numbers** and each **Project**'s status was determined by the Hazard Mitigation Committee as either **Completed**, **Deleted** or **Deferred**.

Nineteen (**19**) Actions were ***newly* Completed** as shown in Table 37, which also contain the previous **2004 Plan** and **2009 Plan** **Completed** Actions. From the latest **2012 Plan** and **2015 Addendum**, **16** Actions were **Deleted** as shown in Table 38 and the remaining **11** were **Deferred** (Table 39) and appear within the **Mitigation Action Plan**.

Table 37

Completed Mitigation Actions

Priority Score (2012)	Action Number	Action	Completed By Date	Who is Responsible	Approx $ Cost	Natural Hazards Addressed
34	#01-2004	School Emergency Management Plan	Prior to 2006	Emergency Management Dir, School Principal	$0	Flood, Scouring & Erosion, Wind, Storms, Winter, Lightning, Human, Technological
34	#02-2004	Cistern Placement	Prior to 2006	Planning Board, Fire Department	$50	Fire, Wildfire
33	#03-2004	Renovate Town Hall	Prior to 2006	Board of Selectmen	$29,500	Flood, Earthquake, Wind, Storms, Winter, Lightning,
28	#04-2004	Detailed Evacuation Plans for Different Parts of Town	Prior to 2006	Emergency Management Dir	$100	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Winter, Traffic Accidents
33	#05-2004	Road Equipment Vendors and Subcontractors List	Dec 2004	Road Agent	$0	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris Earthquake, Traffic Accidents, Landslide, Wildfire
31	#06-2004	Fire Resistant Filing Cabinets	Mar 2010	Town Department Heads	$250,000	Fire, Wildfire, Human, Technological
30	#07-2004	Industrial Zoning Regulations	Mar 2006	Planning Board	$0	Flood, Wind, Power Outage, Human, Technological, Traffic Accidents, Haz Mat Spills

Priority Score (2012)	Action Number	Action	Completed By Date	Who is Responsible	Approx $ Cost	Natural Hazards Addressed
30	#08-2004	Town Roads Policy	Mar 2004 – Mar 2009	Road Agent	$0	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Winter, Traffic Accidents
30	#09-2004	Review and Revise Manufactured Housing Regulations in Zoning	Mar 2006	Planning Board	$0	Flood, Earthquake, Wind, Storms, Winter, Lightning, Fire, Wildfire
28	#10-2004	Establish a Public Works Mutual Aid Compact	Dec 2004	Road Agent	$0	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris Earthquake, Dam Failure or Release, Landslide, Wildfire
30	#11-2004	Upgrade Swamp Road Culvert	Summer 2005	Highway Department	$16,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
26	#12-2004	Grant Writing	Mar 2004 – Mar 2009	Financial Administrator	$0	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris Earthquake, Dam Failure or Release, Landslide, Wildfire
29	#13-2009	Reestablish the Explorer Post	Spring 2009	Fire Chief	$300	Fire, Wildfire, Traffic Accidents
30	#14-2009	Upgrade Drainage System at Leighton Brook Bridge at Railroad Bed, Fire Road, and Trail System (located at the end of Rhodora Drive)	Fall 2009	Highway Department	$21,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
30	#15-2009	Upgrade North Road Culvert	Summer 2010	Highway Department	$86,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
30	#16-2009	Upgrade Drolet Road Culvert	Sep 2010	Highway Department	$86,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
30	#17-2009	Upgrade New Orchard Road Culvert	Sep 2010	Highway Department	$93,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
30	#18-2009	Upgrade Locke's Hill Road Culvert	Sep 2010	Highway Department	$86,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
30	#19-2009	Adopt Town Roads Policy for Snow & Ice	Dec 2010	Highway Department	$0	Winter, Ice, Traffic Accidents
31	#20-2009	Provide a List of Priority Target Buildings to Unitil for Reenergizing	Mar 2011	Highway Department	$0	Flood, Wind, Power Outage, Communications Failure, Human, Technological
30	#21-2009	Upgrade Drainage System at Center Hill Road, Project #2	Summer 2011	Highway Department	$104,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt,

Priority Score (2012)	Action Number	Action	Completed By Date	Who is Responsible	Approx $ Cost	Natural Hazards Addressed
						Storms, Debris, Dam Failure or Release
36	#22-2009	**Develop Tabletop and Field Drills on Relevant Topics**	Sep 2011	Emergency Management Director	$10,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris Earthquake, Dam Failure or Release, Landslide, Wildfire, Human, Tech
31	#23-2009	**Improved Water Quality around Highway Facility and Salt Shed**	Nov 2011	Highway Department	$40,000	Haz Mat Spill
36	#28-2012	**Upgrade Drainage System at Intersection of Easy Street and Prospect Street**	Aug 2013	Highway Dept	$24,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
36	#29-2012	**Upgrade Drainage System at Chestnut Pond Road**	Sep 2013	Highway Dept	$110,830	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
36	#30-2012	**Upgrade Drainage System at Sanborn Hill Road**	Aug 2013	Highway Dept	$130,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
36	#31-2012	**Upgrade Drainage System at Center Hill Road, Project #1**	Jul 2014	Highway Dept	$130,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
36	#32-2012	**Upgrade Multiple Culverts for Severe Weather Events Mitigation**	Jul 2014 & Jul 2015	Highway Dept	$100,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
34	#33-2012	**Upgrade Echo Valley Farm Road Culvert**	Sep 2017	Highway Dept	$400,000 - $500,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
34	#34-2012	**Upgrade Leighton Brook Road Culvert**	Aug 2016	Highway Dept	$76,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
34	#35-2012	**Upgrade River Road Culvert**	Jul 2014 & Jul 2015	Highway Dept	$410,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
30	#37-2012	**Install Dry Hydrant West of Traffic Circle near Medical Center and Dry Hydrant on Mason Brook**	Jul 2017	Fire Dept	$20,000 - $50,000	Fire, Wildfire, Human, Technological
29	#39-2012	**Consider and Act upon Recommendations from Suncook River Study**	Jun 2018	Board of Selectmen	10% matching funds	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release

Priority Score (2012)	Action Number	Action	Completed By Date	Who is Responsible	Approx $ Cost	Natural Hazards Addressed
28	#42-2012	Acquire High Risk Homes in the Floodplain	Last homes 2014/ 2015	Emergency Management / Board of Selectmen	$500,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
28	#43-2012	Upgrade River Road to Protect from Floods and Erosion	Spring 2015	Highway Dept	$420,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
28	#44-2012	Upgrade Goboro Road	Jul 2015	Highway Dept	$700,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
28	#45-2012	Upgrade Echo Valley Farm Road	Nov 2018	Highway Dept	$500,000	Flood, Scouring & Erosion, Wind, Rapid Snow Pack Melt, Storms, Debris, Dam Failure or Release
19	#52-2012	Purchase Prefabricated Equipment Building	2017 & 2018	Highway Dept	$150,000	Flood, Scouring & Erosion, Wind, Earthquake, Storms, Winter, Snow & Ice, Traffic Accidents
36	#56-2012	Undergo Training for Water/Ice Rescue	April 2017	Fire & Rescue Department	$2,500	Flood, Rapid Snow Pack Melt, Storms, Winter, Ice Jam
36	#58-2012	Undertake Mass Casualty and EMS Training with Heartland Place to Retain National Accreditation	Jun 2016	Fire Dept	$1,000	Flood, Scouring & Erosion, Wind, Earthquake, Storms, Winter, Snow & Ice, Traffic Accidents
34	#59-2012	Train Mutual Aid Compact Units on Where Epsom's Cisterns are Located and How They are Used (Mapped "Iam Responding")	Aug 2017	Fire Dept	$100	Fire, Wildfire
33	#64-2012	Review and Revise Flood Hazard Regulations in Subdivision Regulations	Mar 2015	Planning Board	$200	Landslide, Scouring & Erosion, Rapid Snow Pack Melt, Storms, Earthquake, Fire, Wildfire

Source: Epsom Hazard Mitigation Committee

The pink highlighted rows indicate the **16** total **Deleted** Actions in **Table 38** that originate as far back as the **2009 Plan**. Many of the recent Actions were deleted because they were preparedness, response or recovery items and more appropriately belonged in the Town's ***Emergency Operations Plan***.

Table 38

Deleted Mitigation Actions

Priority Score (2012)	Action Number	Action	Deleted Date	Who is Responsible	Approx $ Cost	Why Deleted? The Action…
31	#24- 2009	Enact a "Adopt a Dam" Program	December 2011	Conservation Commission	$0	Was not relevant to the Town's situation or was contrary to objectives
29	#25- 2009	Upgrade Culverts and Bridges	December 2011	Highway Department	$2 million	Was incorporated into another Town activity
26	#26- 2009	Purchase Property to Build Highway Department	January 2012	Highway Department	$120,000	Was no longer a priority or necessary to the Town
30	#27- 2009	Upgrade Gravel and Paved Roads	January 2012	Highway Department	$9 million	Was incorporated into another activity
36	#66- 2015	Seek Funding for Fire Suppression Around Route 4 Bridge (FGA)	Mar 2018	Fire Dept	$30,000	Was incorporated into another activity
30	#49- 2012	Improve ISO Ratings for Community	Mar 2018	Fire Dept	$0 - $20,000	Was a preparedness, response or recovery activity
27	#50- 2012	Purchase Generator for Town Shelter at the Epsom Central School	Mar 2018	Emergency Management Director	$110,000	Was a preparedness, response or recovery activity
22	#51- 2012	Acquire Emergency Service Supplies	Mar 2018	Emergency Management Director	$60,000	Was a preparedness, response or recovery activity
25	#53- 2012	Promote Resident Education on Hazard Response through Various Media	Mar 2018	Emergency Management Director	$5,000 each year shared by Depts	Was a preparedness, response or recovery activity
36	#55- 2012	Plan and Participate in Point of Distribution (POD) Center Exercise	Mar 2018	Emergency Management Director	$5,000	Was a preparedness, response or recovery activity
36	#57- 2012	Require Police & Fire Department Officers to Take Advanced ICS Training	Mar 2018	Police Department and Fire Department	$10,000	Was a preparedness, response or recovery activity
32	#6x- 2012 *(misnumbered #65-2012)*	Encourage Revision of FEMA Floodplain Maps	Mar 2018	Emergency Management Director	$0	Was incorporated into another Action & duplicates existing efforts
32	#60- 2012	Participate in NFIP Training	Mar 2018	Zoning Compliance Officer	$100	Was a preparedness, response or recovery activity
35	#65- 2015	Hold a Tabletop Exercise for Evacuation of Kings Towne Manufactured Home Park (FGA)	Mar 2018	Emergency Management Director	$0	Was a preparedness, response or recovery activity

Priority Score (2012)	Action Number	Action	Deleted Date	Who is Responsible	Approx $ Cost	Why Deleted? The Action…
36	#61- 2012	Develop Site-Specific Emergency Plans for Hazardous Materials, Dams, etc.	Mar 2018	Emergency Management Director	$500	Was a preparedness, response or recovery activity
36	#62- 2012	Continue to Review the 2005 Emergency Management Plan (EMP) and Update to Current Emergency Operations Plan (EOP) Standards	Mar 2018	Emergency Management Director	$0	Was a preparedness, response or recovery activity

Source: Epsom Hazard Mitigation Committee

The tan highlighted rows in Table 39 indicate the **11 Deferred** mitigation Actions from the **2012 Plan** which also appear in the forthcoming **Mitigation Action Plan** for **2018**. Many Action titles will be revised to reflect the new focus on mitigation although the principle for each remains the same. They will all be reevaluated to accommodate **2018** needs.

Table 39

Deferred Mitigation Actions

Priority Score (2012)	Action Number	Action	Deferred Date	Who is Responsible	Approx $ Cost	Why Deferred? Because…	Hazards Addressed
30	#36-2012	Examine Options for Bank Stabilization of Suncook River Banks at the School Athletic Fields	Mar 2018	Emergency Management / Board of Selectmen	Unknown	More time is required for completion	Flood, Ice Jam, Scouring & Erosion, Channel Movement, Wind, Storms, Debris
29	#38-2012	Install Hydrant East of the Epsom Traffic Circle on the Suncook River While Water Line is Extended	Mar 2018	Emergency Management / Board of Selectmen	$30,000	More time. MTBE project underway. Hydrant will be included with the water line extension, possibly 2019	Lightning, Wildfire, Drought, Hazardous Materials, Fire
29	#40-2012	Encourage Tree Trimming by Public Utilities	Mar 2018	Highway Dept	$0	Needs to be repeated to be effective	Wind, Storms, Lightning, Wildfire, Winter, Drought
28	#41-2012	Equip Public Buildings with Sprinkler Systems	Mar 2018	Fire Dept	$150,000 ($50,000 each)	Town did not have the funding capability	Lightning, Wildfire, Drought, Hazardous Materials, Fire
26	#46-2012	Upgrade Cass Road Bridge	Mar 2018	Highway Dept	$700,000	Town did not have the funding capability	Flood, Ice Jam, Scouring & Erosion, Landslide, Debris

Priority Score (2012)	Action Number	Action	Deferred Date	Who is Responsible	Approx $ Cost	Why Deferred? Because…	Hazards Addressed
21	#47-2012	**Improve Class VI Fire Roads**	Mar 2018	Fire Dept	$5,000 per year	Town did not have the funding capability & Other activities took higher priority	Flood, Ice Jam, Scouring & Erosion, Landslide, Debris, Wildfire
25	#67-2015	**Continue to Work with NHDES and NH Geological Survey to Combine Hazard Mitigation Projects (FGA)**	Mar 2018	Board of Selectmen	$0 - Unknown	Needs to be repeated to be effective	Flood, Ice Jam, Scouring & Erosion, Dam Failure, Debris
35	#48-2012	**Raise the Village District Well House**	Mar 2018	Village District	$30,000	Town did not have the funding capability	Flood, Ice Jam, Scouring & Erosion, Storms, Debris
21	#54-2012	**Educate the Public on the Effects and Impacts of Dams**	Mar 2018	Conservation Commission	$500 each year	More time is required for completion	Flood, Ice Jam, Scouring & Erosion, Wind, Storms, Dam Failure or Release, Debris
35	#63-2012	**Update the Zoning Ordinance to Comply with NFIP Requirements**	Mar 2018	Planning Board	$0	Needs to be repeated to be effective	Flood, Scouring & Erosion, Rapid Snow Pack Melt, Storms
36	#68-2015	**Develop a Monitoring Program for the Large Woody Material Damming the Suncook River (FGA)**	Mar 2018	Fire Dept	$0	Needs to be repeated to be effective	Flood, Ice Jam, Scouring & Erosion, Channel Movement, Wind, Storms, Dam Failure or Release, Debris

Source: Epsom Hazard Mitigation Committee

8 MITIGATION ACTION PLAN

The Chapter provides a summary discussion of the Actions the community can consider completing to help mitigate the effects of hazard events.

The **Mitigation Action Plan** is the culmination of the work of the previous Assessments, inventories, and evaluations from the previous Chapters. Actions to help Epsom mitigate the damages caused by disasters have been developed and prioritized by Hazard Mitigation Committee consensus in consideration of both existing and new development.

SOURCES OF ACTIONS

After determining the status of the existing Actions, **New** Actions can be determined. **New** Actions were evaluated by Hazard Mitigation Committee the using the **Problem Statements** determined during discussion of critical facility and community facility sites' potential vulnerability to hazards in the **Critical Facility and Community Vulnerability Assessment**. Many of these problems were further evaluated and developed into **New** mitigation Actions.

The **Capability Assessment** yielded a wealth of information from the ***Future Improvements*** of the plans, programs, ordinances, policies, agreements, technical skills, financial resources, and other resources the Town Departments, School District, and Stakeholders had available. These activities are important to the community. They assist Departments with the procedures, training, regional coordination, mutual aid, planning and purchases needed to perform their duties effectively. These activities in turn increase the capability for mitigating hazard events. For the **2018 Plan**, most of the **Capability Assessment's *Future Improvements*** activities were not utilized as Actions since they are more appropriate for the Town's ***Emergency Operations Plan*** recommendations.

Other community ideas were introduced to or by the Hazard Mitigation Committee as a result of Department, Board, Commission or Town discussions. Where appropriate, supported activities were introduced as New mitigation Actions.

Mitigation Actions developed emphasize both new and existing buildings and infrastructure to better protect populations of Epsom.

Several uncompleted **Deferred** (2012) Epsom mitigation Actions have been carried forward into the **2018 Plan** with the updates to the evaluation, cost, prioritization, etc.

ACTION MATRIX

A listing of **10 Deferred** mitigation Actions from **2012** and **10 New** mitigation Actions from **2018** important to the Town of Epsom was developed for evaluation. Each Action identifies at least one ***Hazard Mitigated*** which correlates to **3 GOALS AND OBJECTIVES**, describing how it can mitigate these identified natural hazard objectives. A short ***Description and Evaluation*** is provided and the ***Affected Location*** is listed to ensure easier understanding and reassessment of the Actions in the future during implementation.

The Actions are numbered for easier tracking over the years, although this practice began after the **2009 Plan**. The **2012** Actions received the designations of **#28- 2012** through **#65- 2012**. The **2015** Actions from the Addendum were **#65- 2015** through **#68- 2015**. The **2018** Actions picked up where the prior Actions left off, beginning with **#69- 2018** through **#92- 2018**. Over time, the Actions can be tracked to see which have been **Deferred** and to organize the **Completed** or **Deleted** Actions. For those with funding needs, the ability to reference an Action within the Capital Improvements Program or in a Warrant Article can alleviate confusion and further support the mitigation Actions.

Each Action is sorted into one of these four mitigation Action categories, although it might identify with several:

Local Planning and Regulation
Structure and Infrastructure Projects
Natural Systems Protection
Education and Awareness

Within the **Mitigation Action Plan**, the **Deferred 2012** Actions and the **New 2018** Actions are evaluated by the relative ease of completion using a numeric ***Ranking Score*** generated by the enhanced STAPLEE prioritization, by the ***Action Timeframe*** by which the Hazard Mitigation Committee would like to see the Action implemented, and by a basic **Cost to Benefit Analysis** as contained within the STAPLEE.

The ***Responsible Department*** is indicated for each Action as the party who will ensure the Action gets completed. An ***Approximate Cost*** is provided, although no definitive cost estimates or quotes have been obtained now. Ways the Action can be ***Funded*** is identified and offered as an avenue to explore during implementation. The purpose is to offer an idea of how much funding is provided for each Action and how it may be paid for.

Epsom's Mitigation Action Plan 2018

At the meetings, the Hazard Mitigation Committee identified by consensus these mitigation Actions from the various **Assessments** and evaluations conducted. The process for Action development has been described in previous Chapters and sections. Combined with the visual Maps of the **Hazard Mitigation Plan 2018**, the **Mitigation Action Plan** shown in **Table 40**, **Table 41**, **Table 42** and **Table 43** should be able to guide future hazard mitigation efforts in the Town through an annual implementation process.

Eleven (**11**) **Deferred** Actions from **2012** and **24** **New** Actions from **2018** combine to develop the **35** Actions of the **2018** **Mitigation Action Plan**. The **Deferred** Actions' cells are highlighted in tan and those Actions related to the **2015** **Addendum** (**Fluvial Geomorphic Assessment** or **FGA** abbreviated) are in blue.

Table 40

Local Planning and Regulation Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
#63-2012	**Update the Zoning Ordinance to Comply with NFIP Requirements Regulate Building in the Floodplain**	**Short Term then Ongoing**	**69**	Planning Board	$0	The Zoning Ordinance needs to be updated as new requirements to the National Flood Insurance Program are necessary for retention of NFIP participation. The Floodplain Ordinance protects life and property by regulating distance of structures to flood hazard areas, regulating elevation, clarifying definitions, regulating new structures and encroachments, stating duties of the Code Enforcement Officer, etc. In 2008 and 2010, the Town adopted the recommended updates to the ordinance. The existing ordinance is amended with federal updates on an ongoing basis. Last update in 2012 to allow sheds in the FP with conditions.	Flood, Ice Jam, Scouring & Erosion	Floodplains	Cost is for in-kind staff and volunteer labor.	N/A
#69-2018	**Regulate New Underground Utilities in Subdivision and Site Plan Review Regulations to Reduce the Impact of Storms, Wind and Winter Events**	**Long Term 4-5 Years**	**58**	Planning Board	$0	If the main transmission towers were destroyed by any weather event or hazard event, all public safety communications would be jeopardized. People panic when internet and power are out, calling emergency facilities. Infrastructure is protected, but the residents lose service. ATT given broadband contract by governor's office, but it does not cover Pittsfield well.	Wind, Storms, Lightning, Wildfire, Winter, Earthquake, Debris, Sabotage, Vandalism	New developments	Cost is for in-kind staff and volunteer labor.	N/A
#70-2018	**Revise Zoning Ordinance to Require Emergency Generators on All New**	**Short Term 1-2 Years**	**56**	Planning Board	$0	If the main transmission towers were destroyed by any weather event or hazard event, all public safety communications would be jeopardized. People panic when	Wind, Storms, Lightning, Wildfire, Winter,	New telecommunications towers	Cost is for in-kind staff and volunteer labor.	N/A

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
	Telecommunications Towers to Reduce the Impact of Storms, Wind, Fire and Winter Events					internet and power are out, calling emergency facilities. Infrastructure is protected, but the residents lose service. Catamount (Pittsfield), White Birch, River Road, Brimstone, Nudds Hill (Pittsfield) do not have emergency generators. One tower is vacant on Elkins Lane and would be considered "new" and subject to this regulation. 1-2 of preexisting towers do have propane generators (White Birch Lane and Brimstone Hill).	Earthquake, Sabotage, Vandalism			
#71-2018	**Continue Efforts to Incorporate 2009 USGS Flood Mapping into Epsom's FIRMs**	**Long Term 4-5 Years**	**61**	Board of Selectmen	$0	With assistance from the NH DES and NH Office of Strategic Initiative, in 2012, efforts were initiated to incorporate the 2009 USGS Suncook River Flood Study into the current FEMA maps. However, due to the number of map panels that were impacted, the effort was placed on hold until FEMA could designate funds towards the project. There is currently a FEMA mapping project for the Merrimack River watershed being led by the USGS. This project, which kicked off in 2015, will include their 2009 study of the Suncook River that will result in new FEMA FIRM mapping.	Flood, Ice Jam, Scouring & Erosion, Storms, Dam Failure or Release, Debris	Suncook River floodplains	Cost is for in-kind staff and volunteer labor.	N/A

Source: Epsom Hazard Mitigation Committee

Table 41

Structure and Infrastructure Projects

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
#38-2012	**Install a Hydrant East of the Epsom Traffic Circle on the Suncook River to Provide Fire Suppression for the Neighborhood as Part of Water Line Extension (See #72)**	**Short Term 1-2 Years**	**73**	Water Precinct	$12,000	Install Dry Hydrant east of the Epsom Traffic Circle on the Suncook River using Emergency Management Performance Grant (EMPG) funds after the grade control structures are installed by NH DES. The dry hydrant also cannot be installed until after the NH DES fluvial erosion hazard (FEH) feasibility study of the Suncook River has been completed.	Lightning, Wildfire, Drought, Hazardous Materials, Fire	East of Traffic Circle	Cost is for excavation, installation, ($40/foot estimated) hydrant. Not including paving.	MTBE Grant from Exxon Class Action Suit, Warrant Article
#41-2012	**Equip Public Buildings with Sprinkler Systems to Provide Fire Suppression**	**Long Term 4-5 Years**	**58**	Fire Department	$30k per building, $250k for School	Public buildings should be equipped with sprinklers for fire safety, including future construction. Many historic buildings, like the Meetinghouse (dry system upstairs), Old Town Hall, and Old Library are already designated on the National Register of Historic Places and would need to be retrofitted. The Town Hall should be among the first to have them installed. The Epsom Central School also needs to be sprinklered, built in the 1950s.	Lightning, Wildfire, Drought, Hazardous Materials, Fire	Meetinghouse, Old Town Hall, and Old Library	Cost is for installation of wet and/or dry fire suppression systems.	Warrant Article for both
#46-2012	**Study and Rehabilitate Cass Road Bridge to Reduce Effects of Floods, Ice Jams, Erosion and Scouring**	**Long Term 4-5 Years**	**46**	Highway Department	$250k to $750k	The bridge is red-listed and closed. Cass Road Bridge has two side by side decks which are deteriorating and abutment work needs to be done. The Little Suncook River flows under and is scouring away the foundation. Necessary for emergency vehicle access. When Center Hill Road is washed out, this is another way in to the Mountain Road, Echo Valley Farm Road are etc.	Flood, Ice Jam, Scouring & Erosion, Landslide, Debris	Cass Road Bridge	Cost is for an engineering study and design, NHDES permitting, contracted road reconstruction labor	Warrant Article or Highway Department Operating Budget (Town) funded OR Town and NH

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
									and materials.	DOT Bridge Aid 80/20 reimbursement
#47-2012	**Improve Class VI Fire Roads to Provide a Means of Access for Fire Suppression**	**Short Term then Ongoing**	**68**	Fire Department	$2,500 annually	Remove debris from storms that have made Class VI fire roads impassable. The FD should complete brush clearing on the fire roads to permit access into rural lands for wildfires and lightning strikes. Mountain Road, Old Mountain Road, Sanborn Hill, Granny Howe Road, Lane Road, Kettle Rock spur are primary Class VI roads Epsom over mountains.	Flood, Ice Jam, Scouring & Erosion, Landslide, Debris, Wildfire	Class VI Fire Roads	Cost is for brush cutting and water bars.	Fire Department Fire Road Maintenance Budget
#48-2012	**Raise the Village District Well House to Prevent Flooding of the Facility**	**Long Term 4-5 Years**	**36**	Epsom Village Water District	$50,000	The Well House building regularly is flooded when the Suncook River floods and water service gets suspended to Village District residents. Although the Well House was fenced in and slightly elevated in 2017, the Village Water Precinct still wants to move the entire Well House safely out of the floodplain. No budget is available however for this project.	Flood, Ice Jam, Scouring & Erosion, Storms, Debris	Village Water District Well House on Short Falls Road	Cost is for contracted labor to move and upgrade well house, including new water lines. Possibility that new land would be needed which would raise the estimated cost of just moving the building itself.	Epsom Village Water District User Fees, hope to locate grants

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
#67-2015	**Continue to Work with NHDES and NH Geological Survey to Combine Hazard Mitigation Projects to Reduce Flood and Erosion Impacts (FGA)**	**Long Term then Ongoing**	**42**	Board of Selectmen	$0	Leighton Brook (projected summer 2015 finish) and Route 4 bridge stabilization (streambank stabilization projects downstream of the Route 4 bridge) are continuing with the State of NH. Suncook River is still changing so it is difficult to perform the projects as discussed. Other projects may make themselves known during this work for which funding will be sought.	Flood, Ice Jam, Scouring & Erosion, Dam Failure, Debris	Route 4 bridge, Suncook River	Cost is for in-kind staff and volunteer labor.	N/A
#72-2018	**Retrofit the Epsom Central School with Sprinkler Systems to Provide Fire Suppression**	**Long Term 4-5 Years**	**61**	School District	$150k	Estimates are about $2.00 to $7.00 per square foot to retrofit existing buildings. The Epsom Central School was built in the 1950s with cinderblock construction and did not include sprinklers. Although the walls and floors would not burn a fire, the contents would.	Fire, Hazardous Materials	Epsom Central School	Cost is for retrofitting a sprinkler system in the school.	School District Warrant Article
#73-2018	**Extend the Water Lines from Goboro Road (Route 4) to the End of the Traffic Circle to Reach the Town Office for Fire Suppression (See #38)**	**Short Term 1-2 Years**	**73**	Epsom Village Water District	$0	Fire suppression becomes difficult when some of the historical sites are beyond the water precinct zones. Most of them are up on the hills. Placed a wet hydrant to the old Meetinghouse. Hoping to extend to 10" pipe. Engineering plans developed by Underwood. Contaminated water at Getty Station (MtBE), Exxon Mobil contributed funding to the State that will benefit Epsom. Town Wells 1 & 2 are located on Dover Road (Route 4).	Flood, Ice Jam, Scouring & Erosion, Wind, Storms, Lightning, Wildfire, Winter, Drought, Earthquake, Landslide, Dam Failure or Release, Debris, Hazardous Materials, Public Health,	Goboro Road (Route 4) to Town Office	Cost is for engineering survey ($25,000), water line per foot, installation. Town does not have a $ figure because it is paid for entirely by NHDES grant.	NHDES Grant MtBE (See #38)

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
							Sabotage, Vandalism			
#74-2018	**Produce an Engineering Study of a Third Well for Epsom Village Water District for Future Fire Suppression Needs**	**Long Term 4-5 Years**	**74**	Board of Selectmen	$25,000	An engineering study for the third well was voted on at Town Meeting 2018 ($10,000 warrant article). A third well will provide additional capacity to the existing lines, water for fire suppression. This study is considering long range issues, such as enabling businesses to occupy lots further from the Traffic Circle which helps with traffic movement, a real concerns during natural hazard events or disasters, and will provide fire suppression.	Flood, Ice Jam, Scouring & Erosion, Wind, Storms, Lightning, Wildfire, Winter, Drought, Earthquake, Landslide, Dam Failure or Release, Debris, Hazardous Materials, Public Health, Sabotage, Vandalism	North Route 28	Cost is for $25,000 engineering study.	Engineering Study of Third Well for Epsom Village Water Capital Reserve Fund
#75-2018	**Install a Cistern on Gauthier Way for Fire Suppression**	**Long Term 4-5 Years**	**58**	Planning Board, with Fire Department assistance	$0	The Town would like to continue the water line to this development, but it is too far. New economic development will occur on Gauthier Way, so a cistern will be necessary. Regulations require cisterns to be installed prior to receiving the occupancy permits.	Lightning, Wildfire, Drought, Hazardous Materials, Fire	Gauthier Way	Cost is for the developer to install and maintain a cistern onsite.	N/A
#84-2018	**Upgrade Sawyer Road Culverts (2) to Protect from Floods and Erosion**	**Short Term 1-2 Years**	**61**	Highway Department	$3,500	Two existing Sawyer Road steel, corrugated galvanized 18" culverts are corroded. Both will be upgraded to 24"plastic smooth bore, plenty of room for upgrade in this space.	Flood, Scouring & Erosion, Storms, Rapid Snow	Sawyer Road	Cost is for culvert materials and road patch materials,	Highway Maintenance Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
							Pack Melt, Debris		any equipment rentals. Staff labor is in-kind.	
#85-2018	**Upgrade Lords Mill Road Culvert to Protect from Floods and Erosion**	**Short Term 1-2 Years**	**61**	Highway Department	$15,000	Bottom of Lords Mills Road galvanized, corrugated steel culvert is gone, 14 feet in the ground. The upgrade size will be 48" plastic smooth bore PVC.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Lords Mill Road, Little Bear Brook Tributary	Cost is for culvert materials and road patch materials, any equipment rentals. Staff labor is in-kind.	Highway Maintenance Budget
#86-2018	**Upgrade Hoit Road Culvert to Protect from Floods and Erosion**	**Short Term 1-2 Years**	**61**	Highway Department	$8,000	Bottom of Hoit Road galvanized, corrugated steel culvert is gone, buried under the road. The upgrade size will be 48" plastic smooth bore PVC.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Hoit Road, Little Bear Brook Tributary	Cost is for culvert materials and road patch materials, any equipment rentals. Staff labor is in-kind.	Highway Maintenance Budget
#87-2018	**Upgrade Mountain Road Culvert to Protect from Floods and Erosion**	**Short Term 1-2 Years**	**61**	Highway Department	$1,800	Existing Mountain Road culvert is deteriorating corrugated, galvanized 15" metal pipe, will be upgraded to 15" PVC smooth bore pipe that will enable more water to pass through unimpeded. This situation is common all Town. In order to keep costs down, no permitting is needed for materials upgrade of the same size pipe.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Mountain Road, Blakes Brook	Cost is for culvert materials and road patch materials, any equipment rentals.	Highway Maintenance Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
									Staff labor is in-kind.	
#88-2018	**Upgrade Colonial Drive Culvert to Protect from Floods and Erosion**	**Medium Term 3-4 Years**	**61**	Highway Department	$3,500	Existing Colonial Road culvert is deteriorating corrugated, galvanized 15" metal pipe, will be upgraded to 15" PVC smooth bore pipe that will enable more water to pass through unimpeded. This situation is common all Town. In order to keep costs down, no permitting is needed for materials upgrade of the same size pipe.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Colonial Drive, Suncook River Tributary	Cost is for culvert materials and road patch materials, any equipment rentals. Staff labor is in-kind.	Highway Maintenance Budget
#89-2018	**Upgrade Lockes Hill Road Culvert to Protect from Floods and Erosion**	**Medium Term 3-4 Years**	**61**	Highway Department	$2,200	Existing Lockes Hill Road culvert is deteriorating corrugated, galvanized 15" metal pipe, will be upgraded to 15" PVC smooth bore pipe that will enable more water to pass through unimpeded. This situation is common all Town. In order to keep costs down, no permitting is needed for materials upgrade of the same size pipe.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Lockes Hill Road, Lockes Brook	Cost is for culvert materials and road patch materials, any equipment rentals. Staff labor is in-kind.	Highway Maintenance Budget
#90-2018	**Upgrade Chestnut Pond Road Culvert to Protect from Floods and Erosion**	**Long Term 4-5 Years**	**61**	Highway Department	$12,000	Chestnut Pond Road 18" concrete culvert has a crown, so will need to determine reason for it. Plan is to upgrade with new 18" concrete culvert and fix reason for the crown.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Chestnut Pond Road, Chestnut Pond & Little Bear Brook	Cost is for culvert materials and road patch materials, any equipment rentals. Staff labor is in-kind.	Highway Maintenance Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
#91-2018	**Upgrade Webster Park Culvert to Protect from Floods and Erosion**	**Long Term 4-5 Years**	**61**	Highway Department	$4,800	Existing 2 Webster Park culverts are deteriorating corrugated, galvanized 15" metal pipes, will be upgraded to 15" PVC smooth bore pipes that will enable more water to pass through unimpeded. This situation is common all over Town. In order to keep costs down, no permitting is needed for materials upgrade of the same size pipe.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Webster Park, Suncook River	Cost is for culvert materials and road patch materials, any equipment rentals. Staff labor in-kind.	Highway Maintenance Budget
#92-2018	**Reconstruct Leighton Brook Road to Protect from Floods and Erosion**	**Short Term 1-2 Years**	**75**	Highway Department	$70k	Over time, potholes and deteriorating road conditions have resulted in the need to reconstruct Leighton Brook Road. The road is a Class V Town road, accepted from a development about 40 years ago in the 1970s which was not built to current Town standards.	Flood, Scouring & Erosion, Storms, Rapid Snow Pack Melt, Debris	Leighton Brook	Cost is for contracting and materials and in-kind time.	Highway Department Capital Reserve Fund

Source: Epsom Hazard Mitigation Committee

Table 42

Natural Systems Protection Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
#36-2012	**Examine Options for Bank Stabilization of Suncook River Banks at the School Athletic Fields**	**Long Term 4-5 Years**	**53**	Emergency Management / Board of Selectmen with Epsom School Admin	$5m (study) + $3m (stabilization)	The Suncook River is eroding away the athletic fields, and the building on site will soon be washed away if the bank is not stabilized. Options for bank stabilization should be considered in an engineering study before action is taken.	Flood, Ice Jam, Scouring & Erosion, Wind, Storms, Debris	Epsom Central Elementary School and Suncook River	Cost would be for a consultant to prepare a stabilization study, then labor and materials for bank stabilization	FEMA EMPG or Flood Mitigation Assistance (FMA) Grants
#68-2015	**Continue Program to Monitor the Large Woody Material Damming the Suncook River (FGA) to Reduce the Impact of Floods and Erosion**	**Long Term then Ongoing**	**47**	Fire Department	$0	Town regularly needs to monitor the extensive trees inventoried in the Suncook River during high flows, storm events, and spring rains and snow melt. Calls come in to FD or PD from the public about migrating trees in the river.	Flood, Ice Jam, Scouring & Erosion, Wind, Storms, Dam Failure or Release, Debris	Suncook River	Cost is for in-kind staff and volunteer labor.	N/A
#76-2018	**Purchase and Conserve Large Lots on Sanborn Hill and Center Hill as Identified by Bear Paw Regional Greenway to Enable Trails for Fire and Tree Debris Access**	**Medium Term 3-4 Years**	**51**	Conservation Commission, approval from Board of Selectmen needed	$100k to $300k	Town services and the School system could not accommodate development of the large lot legacy properties at current Town service levels. Significant upgrades to services, buildings, infrastructure, equipment and staff would need to occur. Some of the lots could be conserved. Bear Paw Regional Greenway recently approached 8 landowners for conservation land, asked town to purchase. Easements for Center Hill and Bear Hill, proposed to Board of Selectmen 2017	Wind, Storms, Lightning, Wildfire, Winter, Drought	Sanborn Hill and Center Hill	Cost is for legal & titles, BearPaw management, development rights.	Conservation Commission Fund

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
#77-2018	**Produce a Study on the Brownfields Sites (Getty Station and Gossville Hotel) to Reduce Environmental Contamination of the Traffic Circle**	**Medium Term 3-4 Years**	**54**	Board of Selectmen	$0	Contaminated water at Getty Station (MtBE), Exxon Mobil, Gossville Hotel) contributed funding to the State that will benefit Epsom. Economic development is an important theme in the community right now and this is the right time to pursue such a project. NHDES and Economy Devt Committee looking into brownfield sites, formerly Huckins and L Doone, gas stations with unlined tanks.	Flood, Scouring & Erosion, Wildfire, Hazardous Materials, Public Health, Vandalism	Brownfields Sites along Traffic Circle	Cost is for in-kind. Assistance from NHDES and CNHRPC.	Brownfields funding, NHDES, US EPA
#78-2018	**Continue the Stabilization of the Suncook River Banks to Help Protect Against Erosion and Scour, Floods, Tree Debris, and Storms**	**Long Term then Ongoing**	**75**	Highway Department	$10m	Continuing erosion issue is ongoing, will continue to change the floodplains. After the State's river stabilization project to protect the newly rehabilitated Route 4 bridge from scour, the Suncook bank eroded more quickly downstream as a result. Reclamation and stabilization of 15 acres was estimated at $90,000. Town owns about 3,000 feet on the river and the School District owns 1,000 feet, and the Water Precinct owns another 1,000 feet. The local government has responsibility to ensure banks are safe. This problem may take a generation to solve.	Flood, Ice Jam, Scouring & Erosion, Wind, Storms, Dam Failure or Release, Debris	Suncook River	Cost is for engineering, eventual removal of trees in river, bank stabilization, dredging, and replanting.	Town share, NHDES grants, possible FEMA, US Army Corps, or EPA federal funding

Source: Epsom Hazard Mitigation Committee

Table 43

Education and Awareness Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
#54-2012	**Educate the Public on the Effects and Impacts of Dams Which Can Alleviate Flooding Conditions**	Short Term then Ongoing	54	Town Administration, with help from Economic Development Committee	$0	Developing pamphlets, publicity notices on the cable channel, using "reverse 911" technology with the School, website, and writing articles for newspapers will better help inform the public about the effects and impacts of dams. The Town will partner with the NH DES. The Allenstown/ Pembroke Buck Street Dam was removed by NH DES in 2011. NHDES should be able to provide information for the pamphlet. The targeted audience would be those who are dam owners or those who live along dams.	Flood, Ice Jam, Scouring & Erosion, Wind, Storms, Dam Failure or Release, Debris	Suncook River floodplain, other dams	Cost is for in-kind staff and volunteer labor.	N/A
#40-2012	**Encourage Advance Tree Trimming of Hazardous Trees by Utility Companies to Reduce Storm Damage**	Short Term then Ongoing	69	Highway Department	$0	The Town will notify public utilities of trees and limbs too close to utility wires. The project will ensure maintenance of vital utility services to residents and businesses. Power outages and disruptions will become less common during a disaster event if regular tree trimming within the right-of-way occurs. Unitil every 5 years, Eversource every 6 years, try not to contact them unless necessary.	Wind, Storms, Lightning, Wildfire, Winter, Drought	Entire Town	Cost is for in-kind staff and volunteer labor.	N/A
#79-2018	**Educate the Adult Public, Town Staff and Volunteers on Instructor-Level ALICE to Reduce Impacts of Human Hazards in Buildings**	Short Term 1-2 Years	65	Police Department	$6,000	Town Office, Police Department, Post Office, Library, Epsom Central School, Epsom Manor are targets for human threats (active shooter, bombing, powders, etc). Alert Lockdown Inform Counter Evacuate ALICE "train the instructor" training sponsored by the PD for 2 days on April 24-25 at the	Hazardous Materials, Public Health, Sabotage, Vandalism, Human	Public buildings	Cost is for 2 School, 2 Hwy, 1 Fire, 1 TA Town,4 PD to attend training.	Individual Department Budgets for Training

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
						Epsom Central School, although it has a high cost ($600).				
#80-2018	**Educate the Public on the See Something Say Something Campaign to Reduce Impacts of Human Hazards**	**Short Term then Ongoing**	**68**	Police Department	$0	Police Department's (PD) See Something Say Something program has posters at the School, call local PD, on PD Facebook and website to report suspicious activities.	Hazardous Materials, Public Health, Sabotage, Vandalism, Human	Entire Town	Cost is for in-kind staff and volunteer labor.	N/A
#81-2018	**Educate Homeowners About Options on Hazardous Tree Removal to Reduce Storm Damage**	**Short Term then Ongoing**	**57**	Highway Department	$0	Town receives multiple first responder calls for trees down in seasonal campgrounds, on manufactured homes and town wide during severe wind events and storms. These locations are particularly vulnerable with light structures and heavy trees. During the drought, more trees falling over with roots. Residents are becoming proactive with tree removal. Power companies come in every 5 years. Town can call and request trees removal. HD also removes trees. Homeowners are often reluctant to cut their trees, Town warns when trees are hazardous.	Wind, Storms, Lightning, Wildfire, Winter, Drought	Entire Town	Cost is for in-kind staff and volunteer labor.	N/A
#82-2018	**Upgrade the Rail Trail Between the Route 4 to Short Falls Road to Reduce Erosion and Washouts**	**Medium Term 3-4 Years**	**57**	Conservation Commission	$5,000	Conservation Commission discussed upgrading the rail trail from approximately the washed out bridge over the Little Suncook on the north end down to Short Falls Rd on the south end. Part of this plan included at least one kiosk as well as some signs, gates and other obstructions to reduce the illegal OHRV traffic. Upgrades to the trail itself would include repair of some culverts and the addition of some stone dust or	Flood, Scouring & Erosion, Wind, Storms, Human	Rail Trail between Little Suncook River and Short Falls Road	Cost is for in-kind volunteer labor, culvert materials, kiosk materials, trail base materials and signage,	Conservation Commission Budget Equipment and Supplies, Grants to be sought

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to Town	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in Town	What Cost Will Pay For	How Funded
						other hard pack material. The rail trail will be made safer from flooding, erosion, and from human injury with these upgrades.			and for contracted labor.	
#83-2018	**Collect GPS Mapping Data and Develop Maps of Town Trails in the Town Forest and Conservation Areas to Reduce Human Injury Potential from All Hazards**	**Medium Term 3-4 Years**	**52**	Conservation Commission	$1,000	Accurate maps of the Town Forest & other conservation area maps are needed. Although the Conservation Commission could ask the Town Forester for an updated map, GPSing trails is more flexible and easier to update and use. The public needs the maps to understand the location of trails and how to use the trails responsibly. Very large areas abut private land and there are no indications people are no longer on Town property when hiking through. Emergency response sometimes has difficulty locating and evacuating injured or lost people even in the Town Forest. GPSing the trails will result in updated, versatile trails maps and data available to all.	Wind, Storms, Lightning, Wildfire, Winter, Human	Town Forest and other conservation lands	Cost is for in-kind volunteer labor, borrowed equipment for GPSing, Town Forester assistance, and printing the maps.	Conservation Commission Budget, Donated Time

Source: Epsom Hazard Mitigation Committee

Great Projects… And the Realities of Project Implementation in New Hampshire

These important but costly and/or time consuming mitigation projects identified in the **Mitigation Action Plan** represent the best case scenarios (or to some, "wish-list" items) for completion. There are many barriers to successful implementation of any project which is outside the typical duties of a Town staff member or volunteer. The annual struggle to obtain municipal funding at Town Meetings and the uncertainty of political & local support needed for hazard mitigation projects, the limited staff time available to administer and complete the projects, and dwindling volunteer support to help locate grants and work on the Action Plan items all reduce the Town's ability to complete successful hazard mitigation projects within the Plan's **5**-year lifespan. Town staff and volunteers are usually required to be reactive to their numerous daily duties or annual processes and have little availability to be proactive. This is especially true for the Central NH region's smaller communities that rely on voter support for staff hiring and/or hazard mitigation project budget funding, which is 19 out of 20 municipalities.

Therefore, mitigation and other projects are generally completed on an "as-needed basis" or on an "as-available basis" despite the different ways of evaluation and prioritization shown within the **Hazard Mitigation Plan 2018**. Small New Hampshire communities do the best they can with the resources available to them to make ends meet, particularly in times of economic duress or hardship and our State's aging population. Town Meeting voters decide whether to approve new zoning ordinances which can help mitigate hazards, vote to approve Department Budgets which usually are sustainable and do not allow enough flexibility to plan ahead, and vote to approve Warrant Articles for a hazard mitigation project. Town volunteers are relied upon to do much of the hazard mitigation work as Town staff are already engaged in real-time, constant public engagement issues and have little additional time available for planning. Few younger people are stepping up to the plate of community volunteering when our existing volunteers are retiring. Indeed, many staff or volunteers have dual or triple roles in the community to fill vacancies, such as a Town Administrator serving as Health Officer and Human Services Officer and a volunteer Fire Chief serving as volunteer Emergency Management Director.

NH communities are used to "toughing it out" and will try to accomplish all they can with the time, funding, and resources available to them. However, many of these **2018** Actions may end up **Deferred** to **2023** simply because of the unique nature of our independent State and community culture.

Action Evaluation and Prioritization Methods

A variety of methods were utilized to evaluate and prioritize the Actions. These methods include the enhanced STAPLEE (Social Technical Administrative Political Legal Environmental and Economics) criteria, designating the Action to be completed within a certain timeframe, and completing a basic **Cost to Benefits Analysis**, a later section. These prioritization methods are meant to enable the community to better identify which Actions are more important and are more feasible than others.

ENHANCED STAPLEE METHOD

An enhanced provided a better methodology for prioritization the Actions against one another. The Hazard Mitigation Committee ranked each of the mitigation Actions derived from the evaluation process. The total ***Ranking Score*** serves as a guide to the **relative** ease of Action completion by scoring numerous **societal and ethical impact questions** and does not represent the Town's Action *importance* priority. Instead, the STAPLEE process evaluates each Action and attempts to identify some potential barriers to its success. As revised in **2018**, a score of **75** would indicate that the mitigation strategy, or Action, would be relatively among the easiest Actions to complete from a social and ethical standpoint.

The previous Plans including the **2012 Plan** had answered the same questions, except the three new questions regarding funding, staffing, and historic preservation, on a scale of **1-3**, with "**1**" indicating a **NO** response, "**2**" indicating a **MAYBE** response, and "**3**" indicating a **YES** response, for a grand total score of **36**.

There is more latitude in the **2018 Plan**'s enhanced STAPLEE scores to more easily identify the relatively easiest Action projects for completion. All enhanced STAPLEE answers are subjective and depend on the opinions of the Committee members discussing them. The Committee answered these **15** questions with a numeric score of "**1**" indicating a **NO** response, "**2**" indicating an **UNCERTAIN** response, "**3**" indicating a **MAYBE** response, "**4**" indicating a **LIKELY** response or "**5**" indicating a **YES** response, about whether the Action can fulfill the criteria:

- Does the action reduce damage and human losses?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures?
- Can the action be implemented quickly?
- Is the action socially acceptable?
- Is the action technically feasible?
- Is the action administratively possible?
- Is the action politically acceptable?

Action Completion	
RANKING	SCORE
Excellent	75 - 60
Good	45 - 59
Fair	44 - 30
Poor	29 - 15

- Does the action offer reasonable benefits compared to its cost in implementing?
- Is the action legal?
- Is the action support or protect the environment?
- Have the funding necessary for completion?
- Have the necessary staff or volunteers to undertake?
- Support historic preservation?

The STAPLEE scores can range from a low of **15** to a high **75**. Epsom's **Mitigation Action Plan** STAPLEE rating is shown in **Figure 29**.

Figure 29

Enhanced STAPLEE Ranking of Mitigation Actions

Action Number	Does the Action..... or Is the Action..... ACTION	Reduce Damage?	Contribute to Town Objectives ? (Supported by Master Plan or current thinking?)	Meet Regulations ? (If there are any)	Protect Sensitive Structures? (Buildings, roads, culverts, human-made things?)	Implemented Quickly? (See also Action Plan for Timeframe)	Socially Acceptable ? (People like it)	Politically Acceptable ? (Public Officials like it)	Administratively Realistic? (Have admin skills or time for paperwork)	Technically Feasible? (Have tech skills or special equipment)	Have a Reasonable Cost to Benefits Gained?	Legal? (Or will be legal upon completion)	Support or Protect the Environment ?	Have the Funding?	Have Necessary Staff or Volunteers ?	Support Historic Preservation ?	Ranking Score 15-75
#78- 2018	Continue the Stabilization of the Suncook River Banks to Help Protect Against Erosion and Scour, Floods, Tree Debris, and Storms	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	75
#92- 2018	Reconstruct Leighton Brook Road to Protect from Floods and Erosion	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	75
#74- 2018	Produce an Engineering Study of a Third Well for Epsom Village Water District for Future Fire Suppression Needs	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	74
#38- 2012	Install a Hydrant East of the Epsom Traffic Circle on the Suncook River to Provide Fire Suppression for the Neighborhood as Part of Water Line Extension (See #72)	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	73
#73- 2018	Extend the Water Lines from Goboro Road (Route 4) to the End of the Traffic Circle to Reach the Town Office for Fire Suppression (See #38)	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	73
#40- 2012	Encourage Advance Tree Trimming of Hazardous Trees by Utility Companies to Reduce Storm Damage	5	5	5	5	3	5	5	4	4	4	5	5	4	5	5	69
#63- 2012	Update the Zoning Ordinance to Comply with NFIP Requirements Regulate Building in the Floodplain	5	5	5	5	5	4	4	5	5	4	5	5	4	4	4	69
#47- 2012	Improve Class VI Fire Roads to Provide a Means of Access for Fire Suppression	5	3	4	5	5	5	5	5	5	4	5	5	3	4	5	68
#80- 2018	Educate the Public on the See Something Say Something Campaign to Reduce Impacts of Human Hazards	5	4	5	4	4	5	5	5	5	4	5	3	5	5	4	68

Action Number	Does the Action..... or Is the Action..... ACTION	Reduce Damage?	Contribute to Town Objectives ? (Supported by Master Plan or current thinking?)	Meet Regulations ? (If there are any)	Protect Sensitive Structures? (Buildings, roads, culverts, human-made things?)	Implemented Quickly? (See also Action Plan for Timeframe)	Socially Acceptable ? (People like it)	Politically Acceptable ? (Public Officials like it)	Administratively Realistic? (Have admin skills or time for paperwork)	Technically Feasible? (Have tech skills or special equipment)	Have a Reasonable Cost to Benefits Gained?	Legal? (Or will be legal upon completion)	Support or Protect the Environment ?	Have the Funding?	Have Necessary Staff or Volunteers ?	Support Historic Preservation ?	Ranking Score 15-75
#79- 2018	Educate the Adult Public, Town Staff and Volunteers on Instructor-Level ALICE to Reduce Impacts of Human Hazards in Buildings	5	4	5	4	3	5	5	5	5	4	5	3	5	5	2	65
#71- 2018	Continue Efforts to Incorporate 2009 USGS Flood Mapping into Epsom's FIRMs	4	4	4	4	4	4	4	4	4	4	5	4	4	4	4	61
#72- 2018	Retrofit the Epsom Central School with Sprinkler Systems to Provide Fire Suppression	5	5	5	5	2	4	3	5	5	4	5	2	1	5	5	61
#84- 2018	Upgrade Sawyer Road Culverts (2) to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#85- 2018	Upgrade Lords Mill Road Culvert to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#86- 2018	Upgrade Hoit Road Culvert to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#87- 2018	Upgrade Mountain Road Culvert to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#88- 2018	Upgrade Colonial Drive Culvert to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#89- 2018	Upgrade Lockes Hill Road Culvert to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#90- 2018	Upgrade Chestnut Pond Road Culvert to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#91- 2018	Upgrade Webster Park Culvert to Protect from Floods and Erosion	5	5	5	2	3	5	3	5	5	4	5	3	3	3	5	61
#41- 2012	Equip Public Buildings with Sprinkler Systems to Provide Fire Suppression	5	3	5	5	3	3	3	4	5	3	5	3	2	5	4	58
#69- 2018	Regulate New Underground Utilities in Subdivision and Site Plan Review Regulations to Reduce the Impact of Storms, Wind and Winter Events	5	4	2	4	3	3	3	5	4	4	5	4	5	4	3	58
#75- 2018	Install a Cistern on Gauthier Way for Fire Suppression	5	5	5	4	4	4	3	4	5	4	5	3	2	4	1	58
#81- 2018	Educate Homeowners About Options on Hazardous Tree Removal to Reduce Storm Damage	4	4	3	4	4	3	3	4	5	4	5	4	2	4	4	57
#82- 2018	Upgrade the Rail Trail Between the Route 4 to Short Falls Road to Reduce Erosion and Washouts	4	4	5	4	3	5	5	3	5	2	5	4	1	3	4	57
#70- 2018	Revise Zoning Ordinance to Require Emergency Generators on All New Telecommunications Towers to Reduce the Impact of Storms, Wind, Fire and Winter Events	4	4	3	4	3	4	4	4	4	3	5	4	3	4	3	56
#54- 2012	Educate the Public on the Effects and Impacts of Dams Which Can Alleviate Flooding Conditions	4	4	4	4	4	5	5	3	3	3	5	4	2	2	2	54
#77- 2018	Produce a Study on the Brownfields Sites (Getty Station and Gossville Hotel) to Reduce Environmental Contamination of the Traffic Circle	4	3	4	4	3	4	4	4	4	4	5	5	2	2	2	54
#83- 2018	Collect GPS Mapping Data and Develop Maps of Town Trails in the Town Forest and Conservation Areas to Reduce Human Injury Potential from All Hazards	4	3	3	1	3	4	3	4	5	4	5	4	1	4	4	52
#76- 2018	Purchase and Conserve Large Lots on Sanborn Hill and Center Hill as Identified by Bear Paw Regional Greenway to Enable Trails for Fire and Tree Debris Access	5	3	3	3	3	3	3	4	4	3	5	4	2	3	3	51
#68- 2015	Continue Program to Monitor the Large Woody Material Damming the Suncook River (FGA) to Reduce the Impact of Floods and Erosion	4	3	1	3	4	3	2	3	5	3	5	2	3	3	3	47
#46- 2012	Study and Rehabilitate Cass Road Bridge to Reduce Effects of Floods, Ice Jams, Erosion and Scouring	5	4	3	4	1	3	3	4	5	3	5	1	1	1	3	46
#67- 2015	Continue to Work with NHDES and NH Geological Survey to Combine Hazard Mitigation Projects (FGA) to Reduce Flood and Erosion Impacts	4	3	4	1	1	3	3	4	4	1	5	1	1	4	3	42
#48- 2012	Raise the Village District Well House	3	1	3	3	3	2	1	1	5	2	5	2	2	1	2	36
																	0

Source: Epsom Hazard Mitigation Committee

ACTION TIMEFRAMES

The Actions are also prioritized by an estimated ***Action Timeframe*** for completion based upon the other Town activities (hazard mitigation-related or not), funding potential for the Action, the need for the Action project, and possible staff time and volunteers available to complete the Action. This **relative** Action importance priority is measured by the **time indicated for project completion**. All Action projects within the **Mitigation Action Plan** have been assigned an ***Action Timeframe***.

Those projects which are designated as **Ongoing** mean the Action should be undertaken on a regular basis throughout the five-year lifespan of the Plan. Actions that could qualify as **Ongoing** include public education, zoning ordinance or regulation revisions, essential mitigation maintenance and more. However, even **Ongoing** Actions are completed once before repetition. As a result, those Actions with an **Ongoing** ***Action Timeframe*** also include a duration (**Short**, **Medium** or **Long Term**) included.

Action Timeframe	Description of Timeframe
Ongoing	Action undertaken throughout the life of the 5-year Plan
Short Term	Action should be undertaken during Years 1-2 of the Plan
Medium Term	Action should be undertaken during Years 3-4 of the Plan
Long Term	Action should be undertaken during Years 4-5 of the Plan

Short Term projects are those which are the more important Actions and should be undertaken during **Years 1-2** of the Plan's lifespan if possible. **Medium Term** Actions are recommended by the Hazard Mitigation Committee to be undertaken during **Years 3-4** of the Plan's lifespan, while **Long Term** Actions are those which should wait until last, with suggested implementation undertaken during Plan **Years 4-5**. It is important to remember the ***Action Timeframes*** are relative to each other and are another an indication of Action importance. If an Action cannot be completed within the ***Action Timeframe***, it may still be a higher priority than other Actions but was unable to be implemented for some reason.

Both the ***Action Timeframe*** and the ***Ranking Score*** are incorporated into the **Mitigation Action Plan** to assist the Town with implementing the hazard mitigation Actions. The Actions can be sorted within their Action Category by either priority for easy display of the desired characteristic; Actions can also be sorted by **Responsible Department** to keep them all together for ease of completion.

COST TO BENEFIT ANALYSIS

A simple **Cost to Benefit Analysis** ranking is contained within the enhanced STAPLEE criteria.

Natural Hazards Evaluated for Which Specific Actions Were Not Identified

The Hazard Mitigation Committee assessed each of hazards and made determinations whether to specifically develop mitigation Actions for all natural hazards. Nearly all the potential Actions can be applied to multiple natural or other hazards based upon the generality of the Action's effect. Still, there could be no solutions or mitigation Actions developed for some of the more difficult to mitigate natural hazards. Many possible reasons are considered such as feasibility, prohibitive cost, jurisdiction, staff availability to develop and administer the project, lack of local support, unrealistic favorable outcome for the effort and more, all resulting in the point that for some natural hazards, potential Actions would not have worked for the Town.

Many Actions are general in nature and have the capacity to mitigate multiple types of natural hazards. Those hazards for which no specific or feasible Action was identified are displayed in **Table 44**.

Table 44

Committee Assessment of Natural Hazards with No Mitigation Actions

Natural Hazard	Committee Assessment
Excessive Heat	The Committee believes Excessive Heat issues may be better addressed at the public education level than by mitigation projects. The Fire and Rescue and Police Departments publicize excessive heat events, have lists of vulnerable residents to check on and the assisted living and 55+ facilities. Along with Heat comes the potential for more severe arboviral and tick-borne diseases. The Epsom Pubic Library (~100 capacity) offers a Cooling Center and with notice, the air-conditioned Epsom Central School library and former lab classroom (~60 capacity) can open. The Committee did not feel additional mitigation Actions could be proposed for Excessive Heat beyond those which generally cover public health education undertaken regularly by emergency responders.
Tornadoes	The Committee felt Tornadoes specifically would be a difficult, unpredictable hazard event to mitigate. Although if another Tornado were to occur in Epsom, existing activities such as the State Building Code, current practices of Highway or utility company hazardous tree removal, and generators are in place to help mitigate effects. The Town monitors storms aggressively, establishes central command and uses mutual aid. Several of the Severe Wind or Storm-related Actions could also apply to Tornadoes. The Committee felt no specific Actions were within the scope of their jurisdiction.
Downbursts	The Committee's assessment of Downbursts is the same as Tornadoes. They felt Downbursts could be mitigated by those Actions that addressed Wind or Storm events. The Committee did not feel specific mitigation Actions for Downbursts could be pursued.
Hurricane	The Committee feels Hurricane forces could appear in the community. The Actions designed to mitigate general Severe Wind or Storm-related events are applicable to Hurricane as well. These include Actions that address hazardous trees, proactive forest purchase, regulation of underground utilities, generators for telecommunications towers, water line extension and more. The Committee felt Hurricanes are addressed within the same Severe Wind or Storm-related Actions.

Source: Epsom Hazard Mitigation Committee

9 ANNUAL IMPLEMENTATION AND EVALUATION

The Town received FEMA approval for the prior **Hazard Mitigation Plan** in **December 2012.** The completion of a planning document is merely the first step in its life as an evolving tool. The **Hazard Mitigation Plan Update** is a dynamic document that should be considered by all Town Departments, Boards, and Committees within their normal working environments. While evaluating the effectiveness of Actions in its everyday implementation, everyone should be able to contribute to the relevancy and usefulness of the Plan and to communicate with the Hazard Mitigation Committee where changes should be made. An annual effort will be undertaken to complete Actions and add new Actions as old tasks are completed and new situations arise. This Chapter will discuss the methods by which the Town of Epsom will review, monitor, and update its new **Epsom Hazard Mitigation Plan Update 2018**.

Annual Monitoring and Update of the Mitigation Action Plan

The Board of Selectmen should vote to establish a permanent Hazard Mitigation Committee within **3 months** of receiving the FEMA **Letter of Formal Approval** as indicated in **1 PLANNING PROCESS**. The purpose is to meet on a regular basis to ensure the **Hazard Mitigation Plan's** Actions are being actively worked on and the Plan is evaluated and revised to fit the changing priorities of the Town.

The Emergency Management Director or Board of Selectmen designee should continue to serve as Chair of the Committee for Hazard Mitigation meetings, and should be appointed to such a capacity by the Board of Selectmen. Current Hazard Mitigation Committee members can be appointed to continue to participate as members of the permanent Committee. More information is provided in **APPENDIX B**.

Committee membership should include:

- ✓ Emergency Management Director
- ✓ Town Administration
- ✓ Fire Chief
- ✓ Police Chief
- ✓ Highway Department Director
- ✓ Building Inspector/ Zoning Compliance Officer
- ✓ Land Use Coordinator or equivalent
- ✓ 1 Board of Selectmen member
- ✓ 1 Planning Board member
- ✓ 1 Conservation Commission member
- ✓ 1 Parks and Recreation Committee member
- ✓ 1 Economic Development Committee member
- ✓ 1 School District Representative
- ✓ 1 Epsom Village Water District Representative
- ✓ Members at Large (Stakeholders)

Stakeholders who should be solicited to attend meetings and to participate equitably in the Plan development process include representatives from the Epsom Public Library (**~100** capacity), Historical Society, Cornerstone Christian Academy, Concord Hospital: Epsom Family Medicine, Epsom Bible Church (**~300** capacity), Epsom Manor/Heartland Place, manufactured home parks, campgrounds, senior housing, agricultural/farms, business community members, non-profits, and local, State or Federal agency representatives and members of the public. This composition provides a wide spectrum of potential interests and opportunities for partnership to develop and accomplish Actions.

This Committee will **aim to meet up to 4-6 times per year** with the following potential future meeting activities to update the **Mitigation Action Plan** and complete the Plan's annual evaluation as displayed in **Table 45**.

Table 45

Hazard Mitigation Committee Preliminary Annual Future Meeting Activities

Meeting Month	Preliminary HMC Interim Meeting Agenda Items
February	HMC sends **Progress Reports #3** to Departments for completion by beginning of March. HMC continues update to the **Mitigation Action Plan** using **Department Mitigation Action Progress Reports** and an updated **Action Status Tracking sheet.** HMC provides revised copies to Department Heads, keeps original Word and Excel files accessible on Town computer system.
MARCH HMC Meeting *$ available*	**Annual funding is received from Town Meeting.** HMC completes annual update of the **Mitigation Action Plan and the associated Plan Chapter and sections (CHAPTER 8)** with **Progress Reports #3**. HMC determines Action Plan items to pursue for this year, including $0 cost items.
March – June	**HMC ensures Department Heads are provided with information to work on their Actions.** HMC meets with Department Heads to inform about the Action priorities and requests attention to **Short Term (1-2 Years)** Actions. Departments begin working on Actions.
JUNE HMC Meeting *Infrastructure projects underway*	**Infrastructure projects will be underway.** HMC provides a **Progress Report #1** for all Actions to responsible Depts/Boards for response by beginning of July. HMC reviews **Annual Evaluation of the Plan (CHAPTER 9)**. HMC works with the CIP Committee to get certain projects placed into CIP. Depts to begin placement of next year's high-cost Action Plan items into the CIP.
August	HMC to assist Department Heads with their budget requests to include **Action Plan** items, and to determine which Actions should have warrant articles. HMC continues assistance to Departments for **Action Plan** items. HMC begins to update the **Action Status Tracking Sheet.** HMC ensures Haz Mit Actions are added into the CIP.
SEPTEMBER HMC Meeting	HMC will identify projects to accomplish (including $0) for the upcoming year. HMC provides a **Progress Report #2** for all Actions to responsible parties for response by beginning of October. The **Action Status Tracking Sheet** is sent to Department/ Boards to display Action progress and request updates. HMC attends Board of Selectmen budget meetings and suggests warrant articles for Action Plan items. HMC attends Budget Committee meetings scheduled through January to champion Action item funding.

DECEMBER **HMC Meeting** *Budget determined*	**Town operating budgets are determined for the next year.** HMC assists Board of Selectmen and Budget HMC with getting their mitigation projects funded and written into budgets. Action implementation continues. HMC continues update to the **Action Status Tracking Sheet** using the **Department Mitigation Action Progress Reports #2 from October.**

Sources: Epsom Hazard Mitigation Committee

Annually and independent of the Town's budget cycle, a simpler listing of the Hazard Mitigation Committee's tasks should include:

- **Document New Hazard Events that Occurred in Town**
  - Hazard Risk Assessment (**CHAPTER 4** table)
  - Local and Area History of Disaster and Hazard Events (**CHAPTER 4** table)
- **Coordinate Completion of Annual Mitigation Actions by Assigning to Departments**
  - Appendix B Mitigation Action **Progress Report**
- **Seek and Help Departments Acquire Funding for Actions & Fill in Tracking File**
  - Appendix B Mitigation **Action/Project Status Tracking**
- **Evaluate Effectiveness of the Plan and Its Actions Yearly**
  - Appendix B Plan **Evaluation Worksheet**
- **Obtain Semi-Annual Progress Reports from Departments & Update Tracking File**
  - Appendix B Mitigation **Action/Project Status Tracking**
- **Update & Reprioritize Mitigation Action Plan and Update Supporting Plan Document Sections**
  - Mitigation Action Plan (**CHAPTER 8** table)
  - Enhanced STAPLEE Prioritization (**CHAPTER 8** table)
  - **Hazard Mitigation Plan Update 2018** sections as needed
  - Make note of the new information added/changed for the **2023 Plan** update!
  - Remember to invite the Stakeholders and public to all meetings and take minutes
- **Repeat**

For each of the Hazard Mitigation Committee meetings, the Emergency Management Director (or Staff Coordinator) will invite other Department members, Board and Committee members, Town Staff, Epsom School District representatives, and other participants of the **2018 Plan** Committee meetings. Identified and general members of the public will also be invited as indicated previously. Their purpose is to attend and participate in the meetings as full participants, providing input and assisting with decision making. Public notice will be given as press releases in local papers, will be posted in the public places in Epsom, and will be posted on the Town of Epsom website at www.epsomnh.org

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The **Hazard Mitigation Plan's Mitigation Action Plan** will be updated and evaluated annually generally following the suggestions outlined within the Chapter. All publicity information, Agendas, and Attendance Sheets, should be retained and compiled for inclusion into **APPENDIX C**.

The Emergency Management Director and Department heads will work with the Board of Selectmen to discuss the funding of Action projects as part of the budget process cycle in the fall of each year. The projects identified will be placed into the following fiscal year's budget request if needed, including the Capital Improvements Program (CIP), Town Operating Budgets, and other funding methods.

The Federal Emergency Management Agency (FEMA) encourages communities to upload their Hazard Mitigation Plan Actions into an online database. The **Mitigation Action Tracker** follows municipal Actions through their completion. This added attention to the Town's Actions could enable additional support for grant opportunities when it is shown the Town can complete its mitigation projects. The Town would need to set up an account to enter their Actions into the **FEMA Mitigation Action Tracker** at https://mat.msc.fema.gov.

Tasks of the Plan Update

A number of tasks will be accomplished for the complete (five-year, FEMA approved) update to the Hazard Mitigation Plan. Note that information from many Chapters will be used or referenced by other Chapters. The annual **Mitigation Action Plan** update tasks for the Hazard Mitigation Committee are indicated in bulleted list above and are noted below under the brief instructions for chapter updates.

1 PLANNING PROCESS

Add the new Hazard Mitigation Committee members, contributors, and the public who participated in meetings. Add any new Agendas to the Table. Retain all meeting, attendance, publicity and invitation documents in updated **APPENDIX C Meeting Information**.

2 COMMUNITY PROFILE

Revise the Tables with new demographic and housing information as it becomes available. Update the building permit figures. Revise land use data from the Avitar Appraisal System and compare to previous years' data. Update any zoning changes. The text analysis will need to be revised to reflect all changes.

3 GOALS AND OBJECTIVES

Review and update the general and hazard-specific objectives (Flood, Wind, Fire, Extreme Temperature, Human, Technological) to ensure their continued relevance.

4 HAZARD RISK ASSESSMENT - ANNUAL UPDATE (3 TABLES)

Review and update the **Hazard Risk Assessment**. Add new disasters, new Public Assistance funding received, and significant new hazard events since the last Plan into the Tables and Appendices**.** Determine the magnitude of new declared disasters. Add any specific narrative dialogue about new hazard events occurring in Epsom. Update **Local and Area Hazard Event History** with new disasters or hazard events and review the **Hazard Risk Assessment** for necessary changes. Update **Potential Future Hazards** to document the possible new hazards that could occur in Town based on historic or current evidence.

5 COMMUNITY VULNERABILITY AND LOSS ESTIMATION

Review and update the **APPENDIX A Critical and Community Facility Vulnerability Assessment** Tables to ensure accuracy. Update the Structure Valuation cost when new Avitar assessing data becomes available. Generate additional **Problem Statements** that arise because of issues with facilities. Update the Culvert Upgrade Table. Revise the number and type of buildings in the Special Flood Hazard Areas (floodplains) including new structure valuation and recalculate the discussion values. Once the new structure assessments are available, recalculate the building dollar losses by the other natural hazards. Update the NFIP Tables and changes to the Floodplain Development Ordinance.

6 CAPABILITY ASSESSMENT

Each Department and Board are to review and update the **Capability Assessment** for adoption date revisions, changes since the last plan, or future improvements. List additional example capabilities in the Chapter. Add additional mitigation support resource documents to the Table.

7 PRIOR ACTION STATUS

Review **Mitigation Action Plan** Actions for validity and revise as needed to place them in different categories: Completed, Deferred or Deleted. Explain why each Action was Deleted or Deferred and indicate when each Action was Completed.

8 MITIGATION ACTION PLAN - ANNUAL UPDATE (4 TABLES)

Remove Completed and Deleted Actions and move to **7 PRIOR ACTION STATUS.** Add New Actions to the **Mitigation Action Plan 2018** and ensure they are reviewed in the previous Chapter, listed above. Reevaluate Actions not yet completed, remove the Deleted, and evaluate any New Actions utilizing the enhanced **STAPLEE Mitigation Action Prioritization** matrix. Modify the approximate cost, date for completion, and funding changes as needed.

9 ANNUAL IMPLEMENTATION AND EVALUATION - ANNUAL ACTIVITY

The Hazard Mitigation Committee (HMC) should be permanently appointed by the Board of Selectmen to hold up to **4-6** meetings yearly to review, implement, and evaluate the Plan. Updates any procedures or processes in the Chapter. Use the **APPENDIX B Annual Plan Evaluation and Implementation Worksheets** to guide the annual update of **8 MITIGATION ACTION PLAN**. Keep track of publicity, Department Reports, and all progress made towards the identified Actions. Add progress since the last Plan for implementation programs. Review continued public involvement for accuracy. Add other new information to the Chapter or revise as needed if new information becomes available.

10 APPENDICES

Revise the **APPENDICES A-F** as needed to update the data and documentation for Epsom. Ensure all the publicity documents, Agendas, Attendance Sheets, revised files and more are available for transfer to CNHRPC when the **5-year** Plan update is due. These interim files will be placed into an updated **APPENDIX C Meeting Information.**

11 MAPS

Update ***Map 1***, ***Map 2***, ***Map 3***, and ***Map 4*** of the Plan as needed to reflect the changes of the hazard event locations and site locations. Mapping assistance may be sought elsewhere, such as with the Central NH Regional Planning Commission (CNHRPC). The remaining map series, ***Map 5*** (Fluvial Geomorphic Features), ***Map 6*** (Fluvial Erosion Meander Belts) and ***Map 7*** (Large Woody Material), were developed through special, one-time project funding and there are no future plans to update these maps.

Implementing the Plan through Existing Programs

In addition to work by the Hazard Mitigation Committee and Town Departments, several other mechanisms exist which will ensure that the **Epsom Hazard Mitigation Plan Update 2018** receives the attention it requires for optimum benefit. Incorporating Actions from the Plan is often the most common way the Hazard Mitigation Plan can be integrated into other existing municipal programs, as described below.

MASTER PLAN

The latest **Epsom Master Plan** was adopted in **2010**, developed by the Planning Board with assistance from the CNHRPC, as an update to the comprehensive **2001 Master Plan**. The Master Plan is being updated again in **2018**, with the goal of rotating Chapter review and revision annually. Chapters updated include Housing and Demographics, Economic Development; Natural Resources, Community and Recreational Facilities, Natural Hazards, Utilities and Public Services, Transportation, Regional Concerns, Future Land Use, and Implementation. The Planning Board is currently working with the CNHRPC to update the Master Plan Chapters for an updated **2020** Master Plan.

The Planning Board should consider adopting the Hazard Mitigation Plan Update as a separate Chapter to its Master Plan in accordance with **RSA 674:2.II(e)**. The **Hazard Mitigation Plan** should be presented to the Planning Board after FEMA's **Formal Approval**. The Plan can be considered for adoption after a duly noticed public hearing, just as any typical Chapter of a Master Plan.

Process to Incorporate Actions

The Hazard Mitigation Committee will present the approved **Hazard Mitigation Plan** to the Planning Board within **6** months after FEMA's **Letter of Formal Approval** is received for consideration and adoption into the Master Plan after a duly noticed public hearing. This is the same process used to adopt other components of the Master Plan. The NH State law supporting the development of a natural hazard mitigation plan as a component of a community Master Plan is **RSA 674:2-III(e).** The Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to ensure that the relevant **Hazard Mitigation Plan** Actions are incorporated into the Master Plan.

Implementation Progress through the Master Plan Since the 2012 Plan

The existing **2010 Master Plan** developed by the Planning Board does not contain the **Hazard Mitigation Plan 2012** (or the **2015 Addendum**) as an Appendix.

How Was This or Will This Be Accomplished?

The **2010 Master Plan** will be updated by the Planning Board within the **5-year** Plan cycle. This is an opportune time to integrate the **Hazard Mitigation Plan 2018**. The Planning Board will be given a copy of the **2018 Plan** and can choose to incorporate several Action items that pertain to the Planning Board or incorporate the entire Plan by reference. Several Actions include revisions to Board regulations and to Capital Improvements, Zoning Amendments, or Subdivision and Site Plan Review regulations. The Emergency Management Director or designee will recommend that the Board incorporate the identified Planning Board-responsibility Actions as appropriate into the Future Land Use, Natural Resources, and Community Facilities and Services Chapters and include the **Hazard Mitigation Plan** into the **Master Plan** Appendix whenever the Planning Board updates the Master Plan.

CAPITAL IMPROVEMENTS PROGRAM

Epsom's latest **Capital Improvements Program (CIP)** is a **6**-year plan for **2016-2021** with the intention of a **6**-year update. The Planning Board will soon be working in **2018** with CNHRPC to update the CIP to **2019-2024** with an anticipated annual update. The HMC would like to ensure Actions requiring capital improvements funding from the **Hazard Mitigation Plan Update** will be inserted into the Capital Improvements Program for funding during the CIP's next update. Depending on the Town's funding needs, a Capital Reserve Fund for Hazard Mitigation Program Projects may be established to set aside funding for the many projects identified in the Hazard Mitigation Plan Update.

Process to Incorporate Actions

The Hazard Mitigation Committee will oversee the process to begin working with the Planning Board's CIP Committee to incorporate the various Hazard Mitigation Plan projects into the updated CIP. As the CIP is amended, a representative from the Hazard Mitigation Committee could request to sit on the CIP Committee or submit a CIP Project Application to ensure the mitigation projects are added, especially if the CIP is not updated as frequently as intended.

Implementation Progress through the CIP Since the 2012 Plan

Many of the **Completed** mitigation Actions could be finalized because of their placement into and purchase out of the Town's Capital Improvements Program (CIP). The **2016-2021** CIP contained specific mitigation Action projects related to repeater communications, vehicle replacements, and building upgrades, but the listing of CIP projects did not contain hazard mitigation actions identified within the **2012 Plan** (or the **2015 Addendum**).

How Was This or Will This Be Accomplished?

The Town Departments, Emergency Management, and Town Administration will work together with Planning Board's **CIP Committee** to identify the items needed to be included within the updated **2019-2014 CIP** for the **Hazard Mitigation Plan** Action implementation. The Actions identified will be requested to be added to the next CIP or any of its interim updates.

ZONING ORDINANCE AND REGULATIONS

Several of the implementation strategies proposed involve revisions to the Zoning Ordinance, Subdivision Regulations, and/or the Site Plan Review Regulations. The Town Staff and/or Planning Board annually draft Zoning Ordinance amendments for Town Meeting approval. The Zoning Compliance Officer and Board may be requested to draft zoning amendments in order to accommodate Actions. The Land Use Regulations (Subdivision Regulations and Site Plan Review Regulations) are updated by the Planning Board as needed.

Process to Incorporate Actions

A Hazard Mitigation Committee member, perhaps the Town Administration or Zoning Compliance Officer, will work with Planning Board to develop appropriate language for modifications to the **Zoning Ordinanc**e and the **Subdivision and Site Plan Review Regulations** as they deem appropriate as appropriate to accommodate Actions in the **Hazard Mitigation Plan**. Other Committee members, if requested, could help Town staff draft language for respective changes to the Regulations or the Zoning Ordinance, and assist Town staff with presenting the language to the Planning Board for consideration.

The Hazard Mitigation Committee representative will request from the Planning Board a copy of future required language for any FEMA Zoning Ordinance Updates for incorporation into the Plan.

Implementation Progress through Zoning Since the 2012 Plan

The Town adopted the **April 19, 2010 NFIP** DFIRM Maps and respective updates to the **Zoning Ordinance** via the Board of Selectmen, a very special power granted by the NH Statutes **RSA 674:57**. Other Zoning Ordinance changes must be voted on at the Epsom Town Meeting held annually in March. Revisions to Subdivision Regulations and Site Plan Review Regulations do not require Town Meeting approval, but occur after duly noticed Planning Board public hearings.

How Was This or Will This Be Accomplished?

The Planning Board directly obtains the required NFIP Floodplain Ordinance revision information from the NH Office of Strategic Initiatives and provides it to the Board of Selectmen for approval, a legislative power granted to the Selectmen. For any future updates to the **Floodplain Development Ordinance** (locally named the **Flood Damage Protection Ordinance**) not required by FEMA, the changes will have to

be approved at Town Meeting. Other Zoning Ordinances can be proposed to the Planning Board by the Hazard Mitigation Committee members for Board incorporation into annual Ordinance public hearings.

TOWN MEETING

In Epsom, the annual Town Meeting is held in March where the voters of the Town vote to raise money for capital projects and approve the annual operating budget of the Town. This is a good, revolving opportunity to fund some of the mitigation Actions of the **2018 Plan**.

Process to Incorporate Actions

The Hazard Mitigation Committee (HMC) members will work with the Budget Committee and Board of Selectmen to develop warrant article language for appropriate Actions for **Town Meeting vote**. The HMC members may also request deposits to appropriate Capital Reserve Funds for some of the larger projects. A representative from the Hazard Mitigation Committee will provide a copy of the current **Mitigation Action Plan** to both the Budget Committee and Board of Selectmen annually and validate the need for funding at the annual Town Meeting to accomplish the projects. The representative will work with Town Administration to write warrant article language for approval Action items if needed or to get the items placed into Department Operating Budgets.

Implementation Progress through Town Meeting Since the 2012 Plan

Town Meetings are used to accomplish many of the Action purchases. **Mitigation Actions Completed** could be implemented through various local funding sources: separate warrant articles, warrant articles to remove funds from the Capital Reserve Funds, or through adoption of Department Operating Budgets and the General Fund.

How Was This or Will This Be Accomplished?

The Emergency Management Director or designee, a member of the Hazard Mitigation Committee, brings Action items to be purchased to the Board of Selectmen and Budget Committee for consideration. The CIP should contain many of the Actions, as discussed previously. The Board of Selectmen and Budget Committee bring Actions to the **Town Meeting** via warrant articles, as well as the Operating Budgets, additional warrant articles which may include Action items in the CIP, and warrant articles to add funding into the capital reserve funds. Many of the Action items are funded in this manner.

OPERATING BUDGETS

Many of the Actions will not require specific funding but are identified as requiring in-kind Staff labor to perform the work required to undertake the Actions. Town Departments and Staff have rigorous job functions that demand their undivided attention to the tasks required to run their respective

Departments. Additions to the work load to accommodate the Actions can put a strain on their ability to serve the public during performance of their normal job duties. When possible, Epsom Departments and Staff will be able to prioritize their tasks to work on **Hazard Mitigation Plan Update 2018** Actions. The in-kind work performed comes out of the Operating Budget for that particular Department.

Process to Incorporate Actions

With obtaining assistance from the HMC, the Department or Board is given the responsibility to ensure their Actions are completed, either by working on the Actions allocated to him/her when their normal job duties permit or by delegating the Action to another person. The funding for the Actions comes out of the Department's operating budget as work is undertaken by the Staff person on an as-time-permits basis unless the Action is a component of the Town staff members' normal work duties. Staff or volunteers will attempt to follow the **Action Timeframe** as a guideline for completion. A yearly review of the **Mitigation Action Plan** by the Hazard Mitigation Committee will reprioritize the Actions, and the members can report on their progress, asking for assistance or more time as needed.

Implementation Progress through Operating Since the 2012 Plan

The **Operating Budgets** of the Town Departments typically served to implement many of the Actions displayed in **Mitigation Action Plan**. Most of the Completed projects required small amounts of funding from the respective Department Operating Budget or were completed in-kind using staff or volunteer time. In small New Hampshire communities like Epsom, many mitigation projects are completed with the existing staff and materials within the Operating Budget or are completed by volunteers. In either case, Action completion may take longer to implement to help reduce taxpayer costs.

How Was This or Will This Be Accomplished?

Department heads who participated in the Hazard Mitigation Committee submitted their Action items to Board of Selectmen and Budget Committee for consideration. Individual Department needs are recognized as part of their respective **Operating Budgets** and are proposed to the Board of Selectmen and Budget Committee. All Operating Budgets are approved (and often amended) by voters at the annual March Town Meeting. Adding mitigation Actions to Department Budgets is a good way to obtain funding for some projects when the Operating Budgets are approved.

Continued Public Involvement

On behalf of the Hazard Mitigation Committee, the Emergency Management Director and the Staff Coordinator, under direction of the Town Administration, will be responsible for ensuring that Town Departments and the public have adequate opportunity to participate in the planning process. Administrative staff may be utilized to assist with the public involvement process.

For each interim meeting in the annual update process, and for the **5**-year update process procedures that will be utilized for public involvement include:

- Provide personal invitations to Town volunteer Board and Committee Chairs, and Budget Committee members;
- Provide personal invitations to Town Department heads;
- Provide personal invitations to the following entities listed below;
- Post public meeting notice flyers on the Town's website at www.epsomnh.org and in the Town Offices, Town Library, Post Office, and/or local business(es);
- Submit media releases to the Concord Monitor (a paid, regional daily newspaper serving over **40** communities around the Concord area) and the Union Leader (a paid, statewide daily newspaper) and The Suncook Valley Sun (a mailed weekly, local free newspaper serving **6** communities).

Agencies and businesses to invite to future **Hazard Mitigation Plan Update** meetings include the from the Epsom Public Library (**~100** capacity), Historical Society, Cornerstone Christian Academy, Concord Hospital: Epsom Family Medicine, Epsom Bible Church (**~300** capacity), Epsom Manor/Heartland Place, manufactured home parks, campgrounds, senior housing, agricultural/farms, business community members, and representatives from business and non-profit communities (see **APPENDIX A Critical and Community Facilities Vulnerability Assessment** Tables: Vulnerable Populations, Economic Assets and Recreational and Gathering Sites). The Emergency Management Directors of the neighboring communities will be invited as will the NH Homeland Security and Emergency Management Field Representative for Merrimack County. The Town will provide the Central NH Regional Planning Commission with Agendas, Minutes and other materials for archiving, to be used when the **5-year** update again becomes necessary (email to salexander@cnhrpc.org). Any State, regional or federal interest in Epsom should be considered for direct invitation.

All meetings should be posted to the Town's Calendar and announced on the Town's website home page at www.epsomnh.org. The Town Administration and the HMC should consider developing a new section of the Town website dedicated to Hazard Mitigation Committee activities and the **2018 Plan**. This webpage should be kept updated with meeting notices and materials used by the Hazard Mitigation Committee. A new section would be an optimal location to place the final **2018 Plan** and its ***Maps*** and

Appendices and to continue adding materials for annual Plan updates. A number of Action Plan items which will be undertaken relate to public education and involvement and this website would be an exemplary method of getting the word out.

Implementation and Evaluation of the Plan

During the Committee's annual review of the **Mitigation Action Plan,** the Actions are evaluated as to whether they have been **Completed, Deleted**, or **Deferred.** Those Action types are placed into their respective Tables. Any **New** Actions will be added as necessary. Each of the Actions within the updated **Mitigation Action Plan** will undergo the enhanced STAPLEE ranking as discussed in **8 MITIGATION ACTION PLAN.**

A set of comprehensive **Annual Interim Plan Evaluation and Implementation Worksheets** is available to assist the community with Plan implementation in **APPENDIX B**. These worksheets are to be used during the Hazard Mitigation Committee basic meeting schedule outlined previously in **Table 45**.

The worksheets include administrative and organizational documents, those that are used with the Appendices spreadsheets developed, and two Agendas to get started with HMC Interim Update meetings:

- **Permanent Hazard Mitigation Committee Establishment**
- **Organization of Public Invitees to Join Meetings**
- **HMC Interim Meeting (IM) Publicity Tracking 2018-2023**
- **Annual Interim Plan Update Evaluation Worksheet 2018-2023**
- **Hazard Mitigation Actions Status Tracking 2018-2023**
- **Department Mitigation Action Progress Report 2018-2023**
- **Attendance Sheet Example**
- **Agenda IM1 Example**
- **Agenda IM2 Example**

The **5-year** full Plan update will evaluate the Actions in the same manner in addition to fulfilling all of the **TASKS OF THE PLAN UPDATE** earlier in this Chapter.

10 APPENDICES

The following **APPENDICES A-F** are included under a separate electronic or paper document to maintain the relative brevity of this **Hazard Mitigation Plan Update**.

Listing of Epsom Hazard Mitigation Plan Update 2018 Appendices

Some of these documents should be updated annually as part of the interim Action implementation and Plan evaluation process*. The remaining **APPENDICES** could be amended as a result of the new or revised annual information, but they are optional. It is necessary to establish a location for placing any new or updated hazard, Action, meeting or Plan data over the **5-year** interim until the Plan is fully updated again.

- **A Critical and Community Facility Vulnerability Assessment**
- **B Annual Plan Evaluation and Implementation Worksheets ***
- **C Meeting Information ***
- **D Plan Approval Documentation**
- **E Suncook River Fluvial Geomorphic Assessment Addendum 2015**
- **F Photographic History of Epsom's Hazard Events**

11 MAPS

Four detailed Maps were created during the development of the **Epsom Hazard Mitigation Plan 2018**. Data from the previous Plan maps were used, new standardized data layers were available, and Hazard Mitigation Committee members added their own knowledge of sites and hazard events.

Plan Update 2018 Maps

Map 1 - Potential Hazards illustrates potential hazard event locations in Epsom that have the possibility of damaging the community in the future. The ***Map 1*** legend includes (technology) infrastructure hazards such as dams, bridges, electric transmission lines and evacuation routes. Natural hazards are displayed such as Special Flood Hazard Areas (SFHAs), locations of potential flooding/ washout, fire/wildfire, bridge washout, ice and snow, steep slopes (>15%) and more.

Map 2 - Past Hazards illustrates the locations of where hazard events have occurred in Epsom in the past, including areas of SFHA, flooding/washout, snowmelt, dam breach, fire/wildfire, wind damage, ice damage, vehicle crash locations, and more.

Map 3 - Critical and Community Facilities includes the infrastructure included in ***Map 1 Potential Hazards*** on a background of aerial photography and the SFHAs to give viewers a better, real world perspective. The locations of all critical facilities and community facilities as recorded in the **APPENDIX A Critical and Community Facilities Vulnerability Assessment** are displayed on the Map. Each of these sites is numbered on a key listing the names of each facility.

Map 4 - Potential Hazards and Losses utilizes all the features of ***Map 3*** on an aerial photography background and includes the ***Map 1 Potential Hazards*** and any realistic ***Map 2 Past Hazards*** locations where hazard events can occur again in Epsom.

- **Map 1 - Potential Hazards**
- **Map 2 - Past Hazards**
- **Map 3 - Critical and Community Facilities**
- **Map 4 - Potential Hazards and Losses**

The special map series ***Map 5 - Fluvial Geomorphic Features South (5A)***, ***Center (5B)***, and ***North (5C)*** display fluvial geomorphic features identified in Epsom's field and research data collection for development of the **Suncook River Fluvial Geomorphic Features Addendum 2015**.

- **Map 5A- Fluvial Geomorphic Features Suncook River South 2015**
- **Map 5B- Fluvial Geomorphic Features Suncook River Center 2015**
- **Map 5C- Fluvial Geomorphic Features Suncook River North 2015**

The special series ***Map 6 - Fluvial Erosion Hazard Meander Belts South (6A)***, ***Center (6B)***, and ***North (6C)*** display where the Suncook River is projected to meander in the future and its relative sensitivity to meander during high flow and flooding conditions. These maps are a component of the **Suncook River Fluvial Geomorphic Features Addendum 2015**.

- **Map 6A- Fluvial Erosion Hazard Meander Belts Suncook River South 2015**
- **Map 6B- Fluvial Erosion Hazard Meander Belts Suncook River Center 2015**
- **Map 6C- Fluvial Erosion Hazard Meander Belts Suncook River North 2015**

The special series ***Map 7- Large Woody Material Density South (7A)***, ***Center (7B)***, and ***North (7C)*** contains data obtained by the NH Geological Survey (NHGS) field survey of large wood material density in the Suncook River. Details are described in a separate document, ***Appendix A*** of the ***Suncook River Fluvial Geomorphology Assessment Explanation Guide, Spring 2015***. These maps are a component of the **Suncook River Fluvial Geomorphic Features Addendum 2015**.

- **Map 7A- Large Woody Material Suncook River South 2015**
- **Map 7B- Large Woody Material Suncook River Center 2015**
- **Map 7A- Large Woody Material Suncook River North 2015**