

For City Council Adoption

04-08-24

Hazard Mitigation Plan Update 2024



City of Concord New Hampshire

Adopted by the Concord

City Council

April 8, 2024

Approved by NH HSEM/FEMA

Mon xx, 2024



City of Concord, NH

Hazard Mitigation Plan Update 2024

City Adopted **April 8, 2024**

NH HSEM/FEMA Approved **Month xx, 2024**



City of Concord, New Hampshire

Fire Department

24 Horseshoe Pond Lane

Concord, New Hampshire 03301

Fire Department Phone: (603) 225-8650

www.concordnh.gov/fire



Concord City Hall | 41 Green Street

www.concordnh.gov

City Administration Phone: (603) 225-8610

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

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1 PLANNING PROCESS

The City'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 City's newest information since **2017**. This Planning Process Chapter contains information previously available in the Introduction Chapter of the **Plan Update 2024**. Expanded public participation steps were taken and a new plan development procedure was used as documented in the Methodology section.

City Council Adoption Resolution 2024

City of Concord, NH
City Council
37 Green Street
Concord, New Hampshire 03301

Resolution No. **xxxx**
CITY OF CONCORD

In the year of our Lord two thousand and twenty three

RESOLUTION ADOPTING THE CITY OF CONCORD HAZARD MITIGATION PLAN AS REVISED IN 2024
TOGETHER WITH ALL ASSOCIATED APPENDICES AND MAPS

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The City of Concord resolves as follows:

WHEREAS, Title 44 Section 201.1 of the Code of Federal Regulations requires "State, local and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources, and

WHEREAS, the City Council adopted the first Hazard Mitigation Plan in 2006, adopted the updated Hazard Mitigation Plan in 2011, and adopted the prior updated Hazard Mitigation Plan in 2017, and

WHEREAS, Title 44 Section 201.3 of the Code of Federal Regulations requires that plans be updated every five years and

Resolution No. XXXX

CITY OF CONCORD

In the year of our Lord two thousand and seventeen

RESOLUTION ADOPTING THE CITY OF CONCORD HAZARD MITIGATION PLAN AS REVISED IN 2024 TOGETHER WITH ALL ASSOCIATED APPENDICES AND MAPS

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WHEREAS, a current Hazard Mitigation Plan is required for eligibility to receive funding under the Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities Grant Program project grant, Hazard Mitigation Assistance Grant Program, Flood Mitigation Assistance project grant, High Hazard Potential Dam (HHPD) Grant Program, and other grant programs as specified by the Federal Emergency Management Agency, and

WHEREAS, the revised Hazard Mitigation Plan has been completely updated and has been offered for public review, and

WHEREAS, the revised Hazard Mitigation Plan has been reviewed and approved by the NH Homeland Security and Emergency Management on behalf of the Federal Emergency Management Agency,

NOW, THEREFORE BE IT RESOLVED by the City Council of the City of Concord that:

1. The updated Hazard Mitigation Plan is officially adopted by the City of Concord.
2. This Resolution shall take effect upon its passage.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the City of Concord this XXth day of Month, 2024.

ATTEST

In City Council
Day, Month, 2024
Passed

APPLY SEAL

Janice Bonenfant, City Clerk

Plan Process Acknowledgments

The City Council -appointed Hazard Mitigation Committee was comprised of these individuals on behalf of their respective Departments, Boards or Committees who met between **April 2022 to December 2022** and again in **July 2023** to develop the **Concord Hazard Mitigation Plan Update 2024**:

- **Carlos Baia**, Concord Deputy City Manager (former)
- **Rob Buelte**, Concord Police Department Lieutenant
- **Chip Chesley**, Concord General Services Director
- **John Chisholm**, Concord Fire Chief, Emergency Management Coordinator, and Hazard Mitigation Committee Staff Coordinator
- **Martha Drukker**, Concord Community Development- Engineering Division City Engineer
- **Todd Fabian**, Concord Library Director
- **Elisa Folsom**, Concord Fire Department Deputy Chief
- **Heather Shank**, Concord Community Development – Planning Division City Planner
- **Jonathan Smullen**, Concord Information Technology Director
- **Charles Wroblewski**, Concord Police Department Lieutenant
- **Ying Zhou**, Concord Community Development- Engineering Division GIS Coordinator

The following Central NH Regional Planning Commission (CNHRPC) staff facilitated and prepared the Hazard Mitigation Plan Update:

- **Stephanie Alexander**, CNHRPC Senior Planner
- **Matthew Baronas**, CNHRPC Regional Planner

PARTICIPATION FROM NON-HAZARD MITIGATION COMMITTEE MEMBERS

Several other City staff, non-City-affiliated individuals or other agency representatives attended one or more Committee meetings and/or contributed information to the content of the Plan. Over a dozen members of the public* participated as fully as appointed members in the Hazard Mitigation Committee meetings during the meetings they attended.

- **Rob Ackerson**, Concord Fire Department Fire Fighter
- **Crayton Brubaker**, Concord Community Development- Planning Division Specialist
- **Matt Cashman**, Concord School District Facilities Director
- **Jamie Costa**, Concord Monitor Staff Writer*
- **Sam Dove**, Resident*
- **John Duncan**, Resident and Representative of Concord Heights District*
- **Amy Duquesnoy**, Concord Community Development- Engineering Division GIS Analyst

- **John Gaudet**, Resident and Representative of Hot Hole Pond*
- **Daniel Hussein**, Overcomers Refugee Services*
- **Clement Kigugu**, Overcomers Refugee Services*
- **Christine Miller**, Penacook Village Association Board Member*
- **John Marcel**, NH Homeland Security and Emergency Management State Hazard Mitigation Planner (former)
- **Jessica Martin**, InTown Concord Executive Director*
- **Tim McGinley**, St. Paul's School, Director of Environmental Health & School Safety
- **Michael Melody**, Concord Hospital, Director of Safety & Emergency Management*
- **Mike O'Meara**, City Liaison for Concord TV*
- **Fred Reagan**, Merrimack Valley School District, Facilities Director
- **Zach Reed**, Nobis Engineering Health & Safety Manager*
- **Angela Spinney**, Concord Coalition to End Homelessness Director of Programs*
- **Jason Wovkanech**, NH Technical Institute (University System of NH) NHTI Director of Campus Safety*

PARTICIPATION FROM SOCIALLY VULNERABLE AND UNDERREPRESENTED COMMUNITIES

All non-Committee members were invited to participate fully in the meeting discussions and activities. Aside from the general meeting postings and notifications on the City website, the Concord Hazard Mitigation and Severe Weather Survey, and other methods of promotion, the Concord Hazard Mitigation Committee reached out by personal contact to several organizations that represent and support socially vulnerable people and traditionally underrepresented communities within the City. These identified individuals and groups were placed onto the Committee's agenda and meeting notification distribution email lists for all meetings.

Members of the Overcomers Refugee Services, a community organization that provides newly resettled refugees with the support services and cultural orientation necessary to become fully integrated and contributing members of the local community, and the Concord Coalition to End Homelessness attended and participated in some of the HMC meetings. Because of minimal staffing resources available to these organizations, both groups decided their time was better allocated to their respective missions instead of to Hazard Mitigation meeting participation. The organizations later asked to be removed from the email distribution lists and the Committee complied.

The Concord School District, Merrimack Valley School District, and NH Technical Institute (University System of NH) representatives were included on the Committee email distribution list and often attended and participated in the meetings, discussing issues and working on tasks with Committee members.

Who is a Member of the Public?

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

Anyone who is not a City of Concord, School District, County, State, or federal government employee; anyone who is not paid for services by property tax dollars; anyone who is not a volunteer of the City; and anyone who does not represent non-profit agencies and other Committees of which the City is a member.

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 City of Concord 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 approved [State of New Hampshire Hazard Mitigation Plan 2023](#) in **September 2023**. 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 **2020** Building Resilient Infrastructure and Communities (BRIC) 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 **Concord Hazard Mitigation Plan Update 2024** has been developed in accordance with the Disaster Mitigation Act of **2000** and the [FEMA Local Mitigation Planning Policy Guide FP 206-21-2, eff April 19, 2023](#) 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 City is a regular process and this Plan is considered a "living document."

The new Concord Hazard Mitigation Committee was established by the City Council to begin meeting in **April 2022** and guided the development of the Plan. The committee consisted of staff from multiple departments including City Administration, Fire Department, General Services Department, Police Department, Planning Department, Engineering Department, Library, Community Development, Information Technology, and the Concord School District. Multiple public participants were active with Committee activities through direct invitation, advertising and word of mouth.

The attendees of the meeting process are noted in the **Acknowledgements**. The Central NH Regional Planning Commission, of which Concord 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 HSEM and FEMA.

Methodology

The **Concord Hazard Mitigation Plan Update 2024** was developed over a ninth-month period with a group of City staff members and volunteers, open to public participants, and the CNHRPC comprising the Hazard Mitigation Committee. The **2022-2024** methodology for Plan development is summarized in this section. The **Hazard Mitigation Plan** is designed differently from the **2017 Plan** with the intent to better conform to the current approvable Central NH Region format and incorporating the new **2023 State Hazard Mitigation Plan** items, with the purpose of easier updating and implementation while meeting FEMA's requirements. The Plan roughly follows the **FEMA Local Mitigation Planning Policy Guide, eff April 19, 2023** by using its terminology and some of its tasks, ensuring **Concord's Plan Update 2024** begins to follow a standardized approach to Plan construction and content endorsed by FEMA. Many of the vital sections of the **2024 Plan Update** will be contained in the chapter **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 constraints and additional information to process. All meetings were publicly accessible by Zoom.

Table 1
Meeting Schedule and Agenda Activities

Meeting	Date	Agenda Activities – See APPENDIX C	Attended by Public and Stakeholders
Meeting 1 <i>Remotely held via Zoom Webinar</i>	04-18-22	Discuss Process and Schedule; Review Declared Disasters and Public Assistance Funding to Concord; Develop New Hazard Identification and Risk Assessment (HIRA), Begin to Identify Potential and Past Hazard Locations 2017-2021; Prepare for Maps 1-2 Revisions; Schedule Meetings	Nobis Engineering, Penacook Village Association, Concord Hospital, NH Technical Institute, Concord Community TV, Concord School District, Merrimack Valley School District, InTown Concord, Resident JG, Resident JD
Work Session 1 <i>Remotely held via Zoom Webinar</i>	05-19-22	Finish Identifying Recent Past Hazard Events 2017-2021; Update Critical and Community Facilities Vulnerability Assessment and Develop Problem Statements; Revise Maps 1-2	Nobis Engineering, Concord School District, Penacook Village Association, Concord Hospital, NH Technical Institute, Concord Community TV, Overcomers Refugee Services, Concord Coalition to End Homelessness, Resident JD
Work Session 1.2	05-23-22	Finish Identifying Recent Past Hazard Events 2017-2021; Update Critical and	Penacook Village Association, Concord Community TV, Concord

City of Concord, NH Hazard Mitigation Plan Update 2024

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Meeting	Date	Agenda Activities – See APPENDIX C	Attended by Public and Stakeholders
<i>Remotely held via Zoom Webinar</i>		Community Facilities Vulnerability Assessment and Develop Problem Statements; Revise Maps 1-2 , Review and Update Goals and Objectives	School District, Concord Coalition to End Homelessness, St. Paul’s School, Resident JD
Meeting 2 <i>Remotely held via Zoom Webinar</i>	06-06-22	Finalize Problem Statements and Identify Those to Utilize as NEW 2021 Mitigation Actions; Begin Department Roundtable- Review & Update of Capability Assessment	Penacook Village Association, NH Technical Institute, Concord Community TV, Resident JD, Resident JG, Resident SD
Work Session 2 <i>Remotely held via Zoom Webinar</i>	06-20-22	Complete Problem Statements and Identify Those to Utilize as NEW 2021 Mitigation Actions; Continue Department Roundtable- Review & Update of Capability Assessment	Concord Hospital, NH Technical Institute, Concord Community TV, Concord School District, Resident JG
Work Session 2.2 <i>Remotely held via Zoom Webinar</i>	07-11-22	Complete Department Roundtable- Review & Update of Capability Assessment	Concord Hospital, NH Technical Institute, Concord Community TV, Resident JD
Work Session 2.3 <i>Remotely held via Zoom Webinar</i>	07-18-22	Complete Department Roundtable- Review & Update of Capability Assessment	Concord Community TV, Resident JG
Meeting 3 <i>Remotely held via Zoom Webinar</i>	09-12-22	Determine Status of the 2015 Mitigation Actions; Begin to Develop Mitigation Action Plan 2024; Schedule New Meetings	Concord Community TV, Resident JG
Work Session 3 <i>Remotely held via Zoom Webinar</i>	09-20-22	Develop Mitigation Action Plan 2024; Begin to Prioritize Mitigation Action Ranking Scores for Action Achievability	Concord Community TV, Concord School District, NH Technical Institute, Resident JG
Work Session 3.2 <i>Remotely held via Zoom Webinar</i>	09-27-22	Complete Mitigation Action Plan 2024	NH Technical Institute, Resident JG
Work Session 3.3 <i>Remotely held via Zoom Webinar</i>	10-04-22	Prioritize Mitigation Action Ranking Scores for Action Achievability	Concord Community TV, Resident JG
Work Session 3.4 <i>Remotely held via Zoom Webinar</i>	10-17-22	Prioritizing Mitigation Action Ranking Scores for Action Achievability;	Concord Community TV, Penacook Village Association, Resident JG
Work Session 3.5 <i>Remotely held via Zoom Webinar</i>	10-24-22	Complete Prioritizing Mitigation Action Ranking Scores for Action Achievability;	Concord Community TV, Penacook Village Association, Concord Coalition to End Homelessness, Resident JG
Work Session 3.6 <i>Remotely held via Zoom Webinar</i>	11-01-22	Complete Prioritizing Mitigation Action Ranking Scores for Action Achievability; Overview of Meeting 4/Work Session 4 and Public Information Meeting	Concord Community TV, Resident JG
Meeting 4 <i>Remotely held via Zoom Webinar</i>	12-06-22	Review Draft Hazard Mitigation Plan Update 2024; Overview of Work Session 4 Tasks; Schedule Public Information Meeting	Penacook Village Association, NH Technical Institute, Concord Community TV, Resident JG

City of Concord, NH Hazard Mitigation Plan Update 2024

1 PLANNING PROCESS

Meeting	Date	Agenda Activities – See APPENDIX C	Attended by Public and Stakeholders
Work Session 4 <i>Remotely held via Zoom Webinar</i>	12-14-22	Review Draft Hazard Mitigation Plan Update 2024; Review Draft Community Survey for Haz Mit and Severe Weather Events; Interim Hazard Mitigation Plan Implementation 2022-2026; Prepare for Public Information Meeting; Review Plan Approval Process; Prepare for City Council Adoption Meeting	Penacook Village Association, NH Technical Institute, Concord Community TV, Resident JG
Public Information Meeting <i>Remotely held via Zoom / Held in-person</i>	12-21-22	HMC members present sections of the Plan to the public in a brief question and answer format meeting. Describe hazards and mitigation Actions. Maps will be available.	Concord Community TV, NH Technical Institute, Resident JG
Meeting 5 (special) <i>Remotely held via Zoom Webinar</i>	07-10-23	Review Concord HMP Approval Progress; Identify Highest Magnitudes of Natural Hazards	Penacook Village Association, NH Technical Institute, Concord Community TV, Concord School District, Concord Monitor
Work Session 5 (special) <i>Remotely held via Zoom Webinar</i>	07-17-23	Review Concord HMP Approval Progress; Finish Identifying Highest Magnitudes of Natural Hazards	Penacook Village Association, NH Technical Institute, Concord Community TV, Concord School District

Source: Concord Hazard Mitigation Committee Agendas, 2022-2023

For all meetings, since the meetings were held remotely via Zoom, CNHRPC staff took a roll call during each meeting and completed a meeting match timesheet for participants 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 **Enhanced 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** and in **Table 1**. 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 **2024 Plan Update** section. Maps were reviewed and updated by the Committee and guests and revised by City staff using ARC/GIS Geographic Information System (GIS) technology.

In between meetings, City 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 and the **2023 State Hazard Mitigation Plan**.

Public Outreach Strategy

Many individuals were personally invited to attend and participate in the Concord Hazard Mitigation Plan Committee meetings. They included City Boards and Committees, City Departments, Concord School District, abutting Town emergency management directors, non-profit organizations, neighborhood residents, NH Homeland Security and Emergency Management (NHHSEM) Representatives, and others, along with general email invitations through the City's public notification email list. In addition, an online and highly publicized Severe Weather and Hazard Mitigation Survey yielded **89** responses.

The Hazard Mitigation Committee itself was comprised of City Department staff and volunteers, including City Administration, Fire Department, General Services Department, Police Department, Planning Department, Engineering Department, Community Development, Information Technology, Library and Concord School District. Other staff members or volunteers may have occasionally participated on behalf of their Departments.

The public process for this Plan included posting the meeting information on the City's online calendar and website at www.concordnh.gov. Meetings were held remotely via the secure Zoom Webinar platform. For the first meeting, the City advertised by sending a mass email to the City's notification list and posting flyers and meeting announcements at the City Hall. A press release was sent to the Concord Monitor. Copies of publicity for the Plan are included in **APPENDIX C**.

The Central NH Regional Planning Commission staff facilitated the Hazard Mitigation Committee meetings, guided the planning process, compiled new and old data, updated information, and prepared the **2024 Plan** documents, Appendices, and Maps.

To obtain final public input, a specially noticed Public Information Meeting was held on December 21, 2022 in the Fire Department Training Room at which many members of the public participated. This meeting was publicly noticed on the City website and calendar, and in the City's regular noticing locations. All documents were available for review on the City's website in advance of the meeting. The attendees and publicity of the public planning process are noted in the **Acknowledgements**.

OPPORTUNITY FOR PUBLIC PARTICIPATION

Public Input from the Hazard Mitigation Committee Meetings

The public notification is described in the Public Outreach Strategy sidebar. Over a dozen members of the public attended the HMC meetings as indicated in the **Acknowledgements** and by the Attendance Sheets in **APPENDIX C Meeting Information**, in addition to Public Information Meeting attendees.

Table 1A

Public Invitees to HMC Meetings and Participation Opportunity

MUNICIPAL INVITEES	How Invited	Participation (see Attendance Sheets)
General Public Residents Businesses Non-Profit Organizations Neighborhood Associations	City website, Meetings Calendar, https://www.concordnh.gov/ Online Survey Personal email or call invitations from City Fire Dept staff, City Manager's Newsletter City Email Notification List (sign up)	Completed Online Survey Many attended HMC Meetings (see Attendance Sheets)
City Staff Fire Dept – Chief/EMC, Deputy Chief Police Department- Lieutenant City Planners City Administration- Deputy Information Technology - Director Library- Director Code Enforcement - Officer General Services - Director Engineering & GIS Dept– GIS Coordinator, City Engineer Parks and Recreation - Supervisor	Appointed by City Manager, Emailed HMC Meeting Notifications	Hazard Mitigation Committee Attended HMC Meetings (see Attendance Sheets). May have participated outside of regular HMC meetings by providing Plan update information by email.
City Boards (volunteer) Conservation Commission Energy Committee	Not appointed, but invited to participate by personal call & email from City staff (some staff also serve on Boards – overlap)	None (some staff also serve on Boards – overlap)
Non-Municipal Local Stakeholders	How Invited	Participation (None or How)
Schools & Colleges- Merrimack Valley School District Concord School District NH Technical Institute St. Paul's School	Personal call & email from City staff, Emailed Stakeholder invitations by CNHRPC, Emailed HMC Meeting Notifications	Attended HMC Meetings (see Attendance Sheets)
Neighborhoods- Penacook Village Association Heights District Snow Pond Northeast District	Personal email from City staff, Emailed Stakeholder invitations by CNHRPC, Emailed HMC Meeting Notifications	Attended HMC Meetings (see Attendance Sheets)
Non-Profits- Concord Community Television InTown Concord Concord Coalition to End Homelessness Overcomers Refugee Services	Personal call & email from City staff, Emailed Stakeholder invitations by CNHRPC, Emailed HMC Meeting Notifications	Attended HMC Meetings (see Attendance Sheets)
Businesses – Concord Hospital	Personal email from City staff	Attended HMC Meetings (see Attendance Sheets)

City of Concord, NH Hazard Mitigation Plan Update 2024

1 PLANNING PROCESS

MUNICIPAL INVITEES	How Invited	Participation (see Attendance Sheets)
Nobis Engineering	Emailed Stakeholder invitations by CNHRPC, Emailed HMC Meeting Notifications	
Abutting Community EMDs:	How Invited	Participation (None or How)
Loudon EMD volunteer Bow EMD P/T Hopkinton EMD volunteer Pembroke EMD volunteer Webster EMD volunteer Boscawen EMD volunteer Canterbury EMD	Emailed Stakeholder invitations by CNHRPC	None of the others attended. Many of these communities were involved in BRIC 2020 for their local Plan updates, while others were getting ready to begin in the next grant round.
Capital Area Public Health Network	Emailed Stakeholder invitations by CNHRPC	None
Concord Monitor (daily newspaper)	Announcements emailed by City	Attended Plan re-update Meeting 5
Regional & State Stakeholders	How Invited	Participation (None or How)
Central NH Regional Planning Commission	Contracted by City of Concord	Facilitated and prepared Plan update on behalf of community
NH Homeland Security and Emergency Management	Received all HMC Meeting Notification Emails	Attended some meetings

Members of the public would have assisted with completing the Agendas, including developing the **Hazard Identification Risk Assessment**, **Critical and Community Facilities Vulnerability Assessment**, **Capability Assessment**, and **Mitigation Action Plan**, completing the **Enhanced STAPLEE Action Prioritization**, etc. along with the Committee members. The general public had the opportunity to attend and participate in the **17** posted meetings or to contact the City Emergency Management Coordinator for more information prior to the City Council adoption of the Plan.

Public Input from the Public Information Meeting

The **Public Information Meeting (PIM)** was held on **December 21, 2022**. The Hazard Mitigation Committee members presented portions of the Plan and had the Maps available for display. The agenda and draft minutes are included in **APPENDIX C**. Held during a special daytime meeting, the PIM offered additional opportunity for the public to listen to presentations, ask questions and had the opportunity to review the final draft Plan document, Appendices and Maps.

Concord Community Survey for Hazard Mitigation and Severe Weather Events

The HMC attempted to obtain broad public input on hazard mitigation and severe weather events using an online community survey posted on Survey Monkey. The survey was opened in **May 2022** and remained open through the **December 21, 2022** PIM. Every person on the City's public email distribution list received notification of the survey, the City website prominently published its link, as did Department social media. A total of **89** responses was received from the community at large.

The Hazard Mitigation Committee read and discussed the survey results. Because the findings assisted Departments with their work priorities and were consistent with **Hazard Mitigation Plan 2024** content, no specific, additional content updates were made to the **Plan** from the survey's results. The survey is considered a supplement to the Plan that provides information to Departments to affect change not described or undertaken in the Plan. Following the HIRA hazard list, the survey asked respondents the following questions:

➤➤ **Q1 I'm answering this survey from the perspective of (choose which best fits you):**

Most respondents (68%) lived in Concord while 22% worked or went to school in Concord. Six percent (6%) responded on behalf of an organization while nearly 5% answered as a commuter traveling through Concord.

➤➤ **Q2 Which road(s) or areas are you most concerned about in Concord when severe weather or other hazard events occur? Check all that apply.**

Respondents were concerned about many roads and areas in the city. Most frequently, respondents noted I-93 Exit 15, Loudon Road (Bridge St. to Hazen Drive), Fort Eddy Road, I-93 Exit 14, US 3/Fisherville Road, and Penacook Area Roads. Many residents also noted I-393 Exits 1-4, I-93 Exit 13, I-93 Exit 16, Loudon Road (Hazen Drive to East Side Drive), Loudon Road (East Side Drive to Loudon town line), and Main Street (Downtown). Additionally, Clinton Street/NH 13, I-89, US 4/202/Pleasant Street, Main Street North and South Ends, I-93 Ext 12, US 3/Manchester Street, NH 132/Mountain Road/East Side Drive, Rural West-Northwest Area Roads, and Rural Northeast Area Roads were all also noted by 10 or more respondents each.

➤➤ **Q3 How concerned are you about the following natural hazards, severe weather events, or human/technological hazards impacting Concord? (On a 1 [Not Concerned at all] to 5 Extremely Concerned scale).**

Respondents were most concerned (Extremely Concerned 5 and Very Concerned 4) about Aging Infrastructure (75%), Public Health (55%), Severe Winter Weather (62%), Long Term Utility Outage (51%), Cyber Events (49%) and High Wind Events (48%). Aging Infrastructure was most frequently rated (35%) in the Extremely Concerned category.

➤➤ **Q4 Natural hazards can have a significant impact on a community but planning for or mitigating these events can help lessen the impacts. Planning may require City funds as well as federal funds in addition to City staff support and volunteer support. Please**

indicate how important you believe these mitigation planning priorities are for Concord: (on a 1-5 Importance scale).

Respondents felt the City's mitigation planning priorities (Extremely Important 5 and Very Important 4) were to Strengthen Emergency Services (98%) followed closely by Protecting and Reducing Damage to Utilities (86%). Respondents also heavily prioritized Protecting City Facilities and Operations (79%), Protecting Public Facilities and Operations (78%), and Promoting Cooperation and Shared Education (73%). Strengthen Emergency Services was most frequently rated (54%) in the Extremely Important category.

- **Q5 & Q6** Can you describe any hazard events or severe weather events you experienced in Concord? For Event 1: If yes, please provide brief comments on up to 2 events by describing what happened (What), the location (Where), the approximate month and year of the occurrence (When), and how bad the event was from 1 [Not Bad] to 100 [Extremely Bad] impact scale.

Forty five (45) out of 89 respondents answered this question. Respondents frequently recalled flooding, winter storms, high winds, ice storms, trees down with the related power/utility outages during these times. The locations of these impacts were felt all over the City. Mentioned multiple times were West Concord/West End, Concord Heights, and Downtown. Varying time frames were cited for these memorable hazard events. On average, the hazards were rated about a 45 out of a 100 (Extremely Bad) scale.

- **Q7 & Q8** Can you describe any hazard events or severe weather events you experienced in Concord? For Event 2: If yes, please provide brief comments on up to 2 events by describing what happened (What), the location (Where), the approximate month and year of the occurrence (When), and how bad the event was from 1 [Not Bad] to 100 [Extremely Bad] impact scale.

Twenty (20) respondents answered this question for Event 2. Respondents frequently recalled flooding, winter storms, high winds, ice storms, trees down with the related power/utility outages during these times. The locations of these impacts were felt all over the City. Mentioned multiple times were West Concord, East Concord, and Downtown. Varying time frames were cited for these memorable hazard events. On average, the hazards were rated at about 37 out of a 100 (Extremely Bad) scale.

- **Q9** In your household/business/agency/organization, has anyone completed any of the following preparedness or mitigation activities? Check all that apply.

Regarding mitigation and preparedness, respondents most frequently chose that they had talked about what to do in case of severe weather emergency or natural disaster (54%), as well as removed hazardous trees at their location (47%), prepared a family emergency plan (43%), made a 72-hour emergency kit with necessary supplies (43%), and attended disaster training, workshops, or webinars (39%). The lowest activity was floodproofing or elevating structures (5%).

- **Q10** What are the best ways for you to receive information about disasters and severe weather events in Concord? Please check your top 4:

Respondents preferred Local Television WMUR9 (60%), CodeRed/NH Alerts/Cellular Emergency Message Service (53%), Internet News Media (48%), and City Notify Me Email Alerts (44%), followed by City Department Facebook and Twitter (36%) as the best ways to receive information about disasters and severe weather events in the city. The least preferred way to receive information was Local Gatherings (1%) and View Notices in Public Buildings (1%).

- **Q11** Please feel free to provide any other information related to severe weather and hazard mitigation in the space below.

Nearly two dozen respondents added comments with a wide range of concerns. There were multiple references to concerns about City infrastructure, trees and the damage they can cause during a severe weather event, and the need for better and more widespread notification of events and planning, and suggestions to include toxic pollution, climate change, cyber defense and nuclear war.

The summary of survey responses is provided in **APPENDIX F**.

How Public and Community Input Was Incorporated into the Plan

The general public has shown an exceptional amount of interest in updating the **Concord Hazard Mitigation Plan** compared to surrounding communities and compared to previous **Plan** update cycles. During periods of relatively few major weather events, emergency declarations, or disaster declarations, the public tends to not participate until they experience a significant event and want to affect change. It is difficult for New Hampshire communities including Concord to retain volunteers for their regular municipal committees. Volunteers often are available during the evening after their jobs have ended while Department staff, who hold the bulk of the update information needed for the **Plan**, are available

during the daytime because their jobs require nighttime meetings or calls. City Department staff and others participating in the Plan update process are often Concord residents.

Anyone who participated in developing the **Hazard Mitigation Plan 2024**, including the members of the general public, Hazard Mitigation Committee, City staff, City volunteers, stakeholders, and guests, attended meetings and worked on the following group tasks as noted in the Agendas **Table 1**, including: **Goals and Objectives (CHAPTER 3)**, **Hazard Identification Risk Assessment** and identification of new hazard events since the last Plan (**CHAPTER 4**), **Critical and Community Facilities Vulnerability Assessment (CHAPTER 5)**, **Capability Assessment (CHAPTER 6)**, identifying the **Status of Prior Actions (CHAPTER 7)**, developing **Mitigation Action Plan** from problem statements, new ideas, and deferred Actions, and completing the **Enhanced STAPLEE Action Prioritization (CHAPTER 8)**. These primary tasks are the basis upon which the **Hazard Mitigation Plan** is founded, about **75%** of the document. These sections are found in the **TABLE OF CONTENTS**.

COMPLETION OF THE PLAN STEPS AND DATES

On December 21, 2022, 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 December 28, 2022, this Plan, Appendices and Maps were submitted to the NH Homeland Security and Emergency Management (NHHSEM) and FEMA for compliance review and revision to apply for Approved Pending Adoption (APA) status, also known as conditional approval. The initial APA Plan and Review Tool were reviewed and returned by FEMA through NH HSEM for further revision on March 22, 2023. Because the revisions and adoption by the City were not able to be completed by April 18, 2023, this Plan would fall under the **Local Mitigation Planning Policy Guide effective April 19, 2023**. At present, the State of New Hampshire HSEM currently does not have Plan approval authority under FEMA's Program Administration by States (PAS) Program, so the **Concord Hazard Mitigation Plan 2024** will be reviewed and approved directly by FEMA.

After reconvening the Hazard Mitigation Committee twice in July 2023, on July 25, 2023, the Plan was resubmitted with 2023 revisions to NH HSEM and FEMA. Required revisions were sent back by FEMA on December 4, 2023 related to documenting underserved populations in the planning process and NFIP substantial damages/substantial improvements details. On December 12, 2023, the Plan was resubmitted a third time for initial approval after conferring with City staff members. On March 6, 2024, Concord received an **Approved Pending Adoption (APA)** notification from NHHSEM/FEMA. The APA states the Plan will be approved by FEMA after proof of adoption by the local governing body, an Adoption Resolution from City Council, is submitted.

On April 8, 2024, the City Council **adopted the Hazard Mitigation Plan Update 2024** for the City at a duly noticed public meeting. Copies were been made available at the City Office and on the City website

for public review. The public notice and flyers are included in **APPENDIX C**. The signed Adoption Resolution was sent to NHHSEM/FEMA.

On **Month xx, 2024**, Concord received 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 **Month xx, 2029**.

Final Plan Dates

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

Table 2

Concord's Hazard Mitigation Plan Adoption History

Year of FEMA-Approved Hazard Mitigation Plan	Adoption by Concord City Council	NH HSEM/ FEMA's Formal Approval	Plan Lapse
Original 2007	12/11/2006	04/06/2007	04/06/2012
Update 2012	01/09/2012	04/11/2012	04/11/2017
Update 2017	07/10/2017	07/21/2017	07/21/2022
Update 2024	04/08/24	0x/xx/24	0x/xx/29

Source: Plan Adoption History

2 COMMUNITY PROFILE

It has been over five years since the last Plan was written, with some basic information available from the newest 2020 decennial US Census beginning in mid-2021. The best available new data has been used in this Chapter to portray the population, housing, and overall demographic picture of present-day Concord. 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 City 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 City'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 City 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 City of Concord is situated in Central New Hampshire within Merrimack County. Concord is bordered by the Towns of Webster, Boscawen, and Canterbury to the north, Loudon, Chichester, and Pembroke to the east, Bow to the south, and Hopkinton the west.

The wide, slow and meandering Merrimack River bisects the entire length of City into western and eastern sections. The eastern border of the City is formed by the Soucook River, shared by the Town of Pembroke. The Contoocook River flows through Concord's northwestern corner from Hopkinton to Boscawen. The Turkey River flows from south Concord into Bow. The city has a rich history centering on population centers along these four rivers.

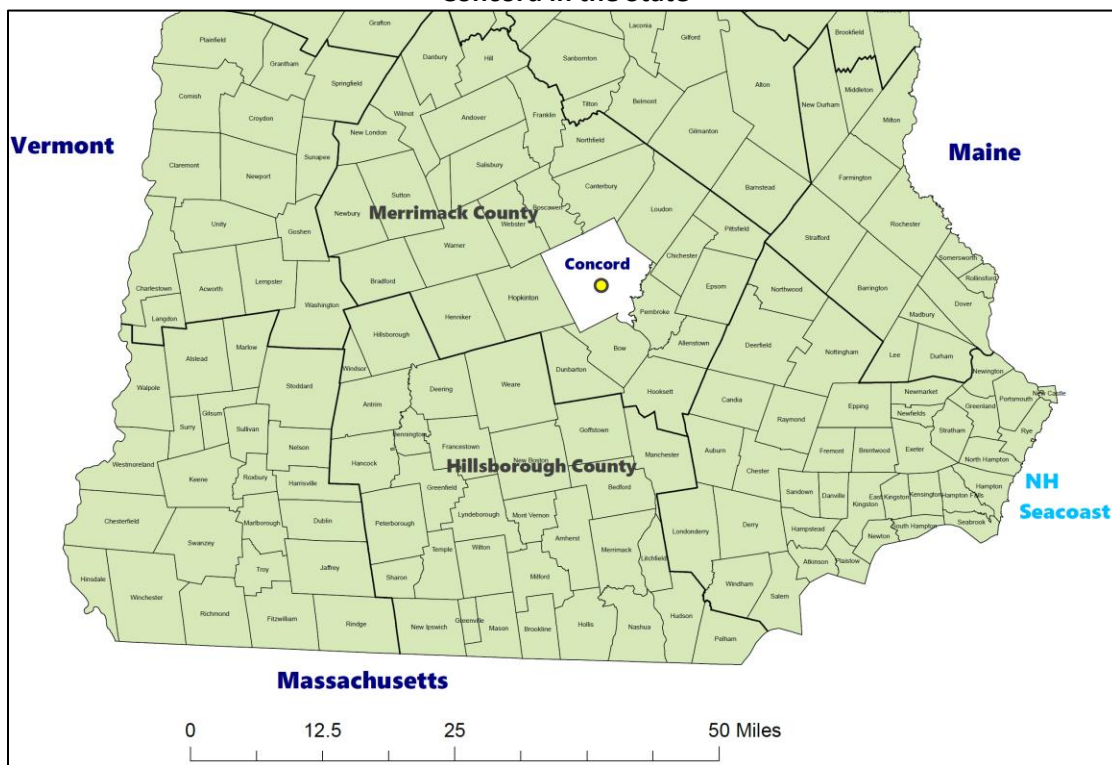
Interstate 93 bisects the length of the City parallel to the Merrimack River. Interstate 89 travels across the southwestern corner of the City from Hopkinton into Bow where it joins with Interstate 93. I-393, a relatively short spur of I-93, begins at the end of North Main Street and continues west through Concord Heights and joins with Route 106 before traveling into Loudon/Pembroke and with Routes 4/9 into Chichester. I-393 is a heavily traveled route to cross Concord and to reach the seacoast. Other routes in the City include NH 132 which travels into Canterbury and Route 4/202 which travels west to Hillsborough and Keene. These routes are essential travel corridors for commuters traveling through the White Mountain, Lakes, Central, Southern NH region, Seacoast and into Boston. The City is host to an active railroad line running roughly parallel to the Merrimack River into Bow but ending near Horseshoe Pond; this line transports and stores various materials within its railcars.

CONCORD'S LOCATION IN NH

Merrimack County in which Concord 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 located about **50** miles from the Massachusetts state border, the Vermont state border, the Maine state border, and the seacoast. New Hampshire's many Interstates, US Routes, NH Routes, and local roadways generally enable travel and commute from Central NH to most of these points in about one hour. Geographically, Concord is about **55** miles east of the Vermont state border, the mid-way point between Concord and Keene on NH 9/US 202. The City of Concord's context within Merrimack County and the State of New Hampshire is shown in **Figure 1**.

Figure 1
Concord in the State



Source: Central NH Regional Planning Commission

CONCORD'S LOCATION IN CENTRAL NH

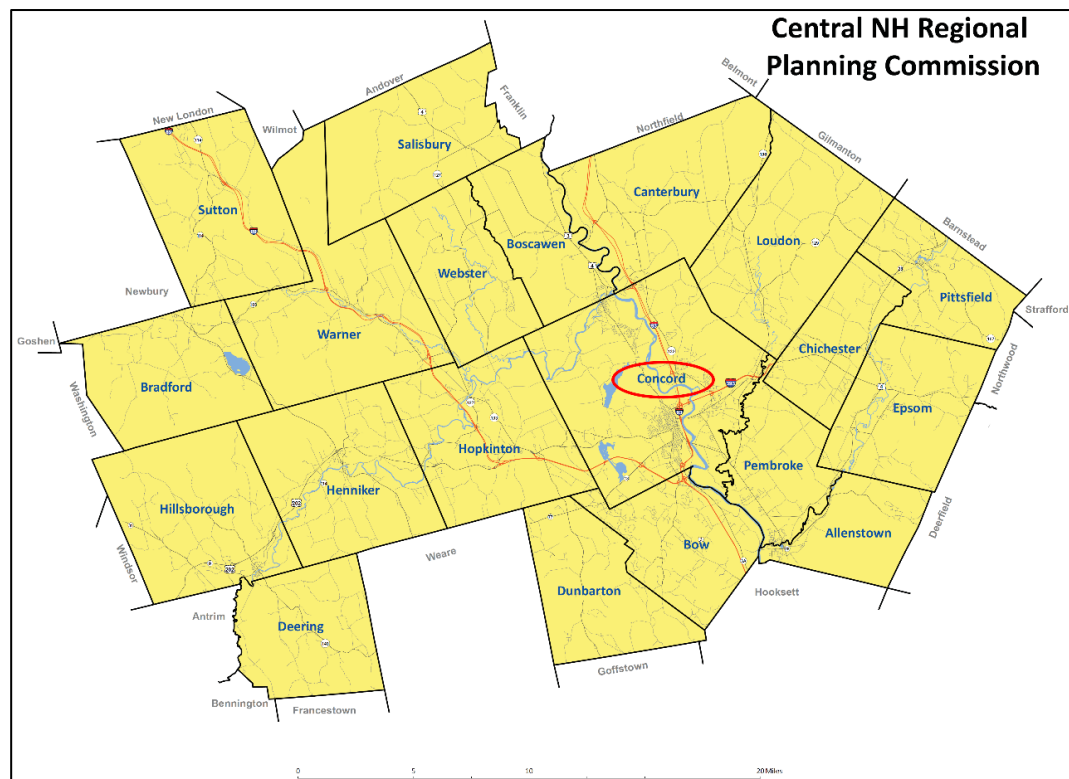
The City is a voluntary member of the Central New Hampshire Regional Planning Commission. The **19** Towns and **1** City comprising the Central NH Region contain several major rivers and New Hampshire and Interstate highways.

The **Blackwater River** (Salisbury, Webster, Hopkinton) and the **Warner River** (Bradford, Sutton, Warner, Webster, Hopkinton) flow south into the **Contoocook River**. The **Contoocook River** flows in a north-easterly direction through Hillsborough, Henniker, Hopkinton, Concord and Boscawen until its confluence with the **Merrimack River** in Boscawen/Penacook (Concord). The **Contoocook River** and the **Merrimack River** 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 too converges with 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 3 flow north-south and US 4/202 traverses in an east-west direction. Concord can be accessed via all three interstates in the Central NH Region. of NH state highways crisscross the entire region. A map of the Central NH Region in which Concord is situated, with the region's major routes, is displayed in **Figure 2**.

Figure 2
Concord in
the Central
NH Region

Source:
Central NH
Regional
Planning
Commission



Population and Housing Growth

The **20/20 Vision Concord Master Plan** adopted in **2001** and the updated **Master Plan 2030** adopted in **2008** are being updated by the City as individual component Master Plans over several years. These include the overall Concord Master Plan, Energy Master Plan, Historic Resources Master Plan, Sewer & Water Maser Plan, Penacook Vision Plan, Main Street Design Guidelines, Airport Master Plan, Open Space Master Plan, Park Master Plan, Opportunity Corridor Master Plan, Bicycle Master Plan, and Pedestrian Master Plan. The Master Plan is anticipated to be updated between **2023-2025** for most components. A new Three Rivers Master Plan which studies the Merrimack River, Soucook River, and Contoocook River is anticipated to be completed by **2025**. The **Hazard Mitigation Plan 2024** could be adopted as an Appendix or a new component to the City **Master Plan**. The Master Plan influences the Zoning Ordinance Codes and the Land Development Regulations (Subdivision Regulations, Site Plan Review Regulations, Excavation Regulations) along with the **10-Year Capital Improvements Program 2023-2032**. These documents are used by local land use boards and staff to guide growth and development of Concord.

POPULATION AND HOUSING TRENDS

The following tables contain the newest consistent data on housing and population growth which depict development trends over time. Minimal **2020** Census figures were available. Shown in **Table 3**, Concord's population and housing boomed during the **1980-1990** decade (**+18%** people, **+29%** homes). Beginning with the **1990-2000** decade (**+13%** people and **+8%** homes), population and housing trends slowed dramatically. The **2000-2010** decade which included a series of significant natural disasters and an economic recession experienced slower growth (**+5%** people and **+12%** homes). The new **2020** Census population and ACS 2015-2019 housing unit figures calculated **+3%** people and **+1%** housing units in indicating the slowest growth period in **50** years.

Table 3
Overall Population and Housing Growth Trends in Concord, 1970-2020

Growth	Population	Net Change #	Net Change %	Housing Units	Net Change #	Net Change %
1970 Census	30,022	N/A	0	9,547	N/A	0
1980 Census	30,400	378	1.3%	12,126	2,579	27.0%
1990 Census	36,006	5,606	18.4%	15,697	3,571	29.4%
2000 Census	40,687	4,681	13.0%	16,881	1,184	7.5%
2010 Census	42,695	2,008	4.9%	18,852	1,971	11.7%
2020 Census	43,976	1,281	3.0%	19,085	233	1.2%
Total Change from 1970 – 2020 Census	---	13,954	46.5%	---	9,538	99.9%

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 2019 Group Quarters.

US Census 2020 Population, ACS 2015-2019

The City believes the number of housing units from the **2020** Census is about accurate. The assessing database records indicate the **19,085** housing units figure is close to City records if including dormitories.

Population and Housing Data

In total, the City has grown by **+13,954** people and **+9,538** housing units by confirmed Census counts and estimates from **1970-2020**. In **Table 3**, Concord's confirmed **2020** Census population of **43,976** shows an overall increase of about **+46.5%** in population over the previous five decades, up from **30,022** people in **1970**. The **2020** Census housing units (**+233**) displays an overall increase of about **+99.9%** (**9,538** units) since **1970** to total **19,085** units by **2020**. The City began with a population of **30,022** in **1970**, and after growth booms between **1970-1990**, the population and housing increases tapered off significantly. Between **2000-2020**, the City's population increased by **+3,289** people while during the same time housing units increased by **+2,204** units.

Overall growth trends seem to be slowing over the current partial **2010-2020** decade, with a population growth of **+3%** (**+1,281** people) and **+1.2%** housing units growth (**+233** units) to date. Over the nearly five decade timeframe of **1970-2020**, this is by far the smallest amount of growth seen in Concord. The City of Concord is the most highly populated community in the Central NH region.

Over the **1970-2020** period, the number of people living in each housing unit has declined steadily from its high of **3.1** people per housing unit in **1970** to its steady low of **2.3** people per housing unit between **2000-2020**. Overall, these numbers likely indicate fewer families, an aging population and less Group Quarters cohabitation.

Since **2000**, the number of renter occupied housing units has been slowly declining while the number of owner occupied housing units has slowly increased. In **2000**, renters occupied **49%** of housing units while owners occupied **51%** of units. By **2020**, renters occupied **45%** of units while owners occupied **55%** of housing units in Concord. These figures are displayed in **Table 4**.

Table 4
Percentage of Owner Occupied and Renter Occupied Housing Units, 2000-2020

Housing Unit Type	2000	2010	2020
Percentage of Renter Occupied	48.6%	45.9%	45.4%
Percentage of Owner Occupied	51.4%	54.1%	54.6%
Totals	100.0%	100.0%	100.0%

Source: Census 2000-2020

The **2022** housing developments underway or to be evaluated by the Planning Board for approval future approval could increase the number of rental units by about **300-400** when fully built out. By **2030**, the comparison percentage between owner occupied and renter occupied housing units could become nearly equal again.

Population Density

Another good measurement of community population and housing change is population density, or how many people live in a square mile of land area. Although Concord encompasses a total area of **67.2** square miles (**43,002** acres), **3.2** square miles (**2,066** acres) is water area, with **40,934** land acres where people can live (**64.0** land square miles). Over the **50-year** period between **1970-2020**, the data for population density for the land area is displayed in **Table 5**.

Table 5
Population Density in Concord, 1970-2020

Municipality Size		Persons per Square Mile					
Land Acreage	Land Area in Square Miles	1970	1980	1990	2000	2010	2020
40,934	64.0	468	475	563	636	668	688

Sources: **Table 3**, NH Office of Planning and Development GIS acreage calculations, 2013

From **Table 4**, the overall population density between **1970** and **2020** increased by **+218** people, from **468** people per square mile in **1970** to an estimated **688** people per square mile in **2020**. Concord is a geographically large-sized community in the Central NH Region at **67** square miles (including water acreage). Even for its large geographic size, Concord has a comparatively large number of people per square mile.

NEW CONSTRUCTION

Table 6 displays Concord's estimated new home and new building construction permits issued by the Building Department between **2017-2022**. During this **6-year** period, a total of **362** new construction permits for homes and housing units were issued, but not necessarily built.

Table 6
New Construction Permits Issued by Building Type, 2017-2022

Building Type	2017	2018	2019	2020	2021	2022*	6-Year Totals
Single Family Homes**	24	32	17	33	30	18	154
Accessory Dwelling Units	2	1	0	0	3	0	6
Multi-family Homes	6	26	26	20	21	5	104
Manufactured Homes	17	23	26	16	12	4	98
Non-Residential Buildings	0	4	8	5	14	13	44
Totals	49	86	77	74	80	40	406

Source: Source: City of Concord Permit Tracker and EnerGov Permitting System, 1/1/2017-12/8/2022

**Does not include sheds, porches, garages, barns, gazebo, carports or other secondary structures

From **Table 6**, **154** permits were issued for new single family homes, with **6** permits for new accessory dwelling units, over the last **6** years. The number of new construction permits for manufactured homes (**98** permits) and multi-family homes (**104** permits) was about equal. This period was also active for the construction of new non-residential buildings, totaling **44** new commercial/ industrial/ exempt permits. The most active year was **2018** when a total of **86** new construction permits were issued, while **2022** through **12-08-22** had the lowest number issued to date at **40** total new permits.

It is important to note that the number of permits *issued* does not necessarily equate to buildings *constructed*.

Land Use and Zoning

According to NH Office of Planning and Development's **2013** geographic information system (GIS) calculations, Concord has a total land area of **40,934** land acres, or **64.0** square land miles. An additional **2,066** acres (about **3.2** square miles) is water area, to total **43,000** City acreage within its political boundaries.

For New Hampshire and specifically the Central NH Region, Concord is considered a geographically large-sized community in terms of land area. Concord's proportion of residential land is a little higher than the smaller towns in the Central NH Region because of urban development, apartments and multi-family developments plus single family homes. Yet, many sections of the City are rural and forested with little commercial development. Concord has a large number of conservation lands and public trails. Other areas like the Downtown Main Street, Concord Heights, Manchester Street, and Penacook encourage commercial, industrial, residential, and multi-use development. With current commuter traffic patterns and development activity in Concord, there seems to be incentive for enabling developments to occur in their respective districts in the future.

LAND USE TYPES AND ACREAGE

The most recent GIS land use database from **2022** reports a total of **43,048** acres, including **2,007** water acres. These figures differ slightly from the City's assessing database land use at **40,916** Total Acres because there is some overlap with some acreage categories. Examples include one of St. Paul's School's private lakes is included in the Assessing counts acreages and this inclusion helps account for differences. Most water acres are state-owned public waters and are not included within the land use assessing database. Many condominiums and manufactured homes were assigned **0** acres because the land is often owned by a cooperative or homeowner's association. Public right of way acres may have been accounted for in the Transportation and Utilities acreage category. Overall, the difference between the assessing and GIS data sets is minute for **Hazard Mitigation Plan** purposes. Small differences

between the actual taxable land calculations from the assessing records and the acreage from the basic GIS calculations are often found and are not unusual.

Table 7 provides a snapshot of the City's **2022** land use acreage from the City's assessing database calculations. The complicated land use categories were combined for ease of summary. Overall, residential development of all types is the largest land use at **32.0%**, followed by forest land, open space and agriculture combined at **27.3%**. Together, institutional land use, transportation and utilities, and exempt land uses are **26.3%**. Vacant commercial and industrial land use is **7.1%**. Other land uses include commercial at **3.8%**, industrial at **2.9%** and recreation at **0.4%**.

Table 7
Assessing Land Use Acreage, 2022

Land Use Category	Acres	% of City
Residential	11,706	28.6%
Residential Mobile Home*	296	0.7%
Residential Apartments	469	1.1%
Residential Condo*	627	1.5%
Residential Group Housing (Boarding Schools, Dorms, Nursing Homes)	34	0.1%
Commercial	1,523	3.7%
Commercial Housing (Hotels, Motels, etc.)	16	0.0%
Industrial	1,203	2.9%
Institutional (State, Federal, County, Etc.)	2,765	6.8%
Transportation & Utilities	2,503	6.1%
Exempt (City, Schools, Churches, Etc.)	5,487	13.4%
Agriculture	2,506	6.1%
Forest Land	8,310	20.3%
Open Space	319	0.8%
Wet	55	0.1%
Recreation Unbuilt	147	0.4%
Recreation Built	37	0.1%
Vacant Commercial	343	0.8%
Vacant Industrial	256	0.6%
Vacant Residential	2,312	5.7%
Total Acres	40,916	100.0

Source: Concord 10-22 Assessing Database

*Any split LU Codes, first/most prominent use was utilized (ex. Commercial building with an apartment on top = commercial) *Both Condo and MH had many 0 Land Acres values

The total number of Concord parcels is **14,938** in **2022**, an increase of **145** parcels from **2017 (14,793** parcels).

CONCORD ZONING

The perspective of the City's Zoning Districts offers another way to view how the land is utilized within Concord in **Table 8**. Several tables of dimensional and density regulations pertaining to water and septic, lot frontages, setbacks, buffers and lot sizes, etc. are available within the Code of Ordinances. The ordinance includes a table of uses for each district, indicating what types of facilities are permitted. Several commercial and residential districts fall within Concord, over which aquifer, floodplain, shoreland and wetland protection overlay districts apply further regulation.

Table 8
Concord Zoning Districts, 2022

Zoning District	Abbreviation
Open Space Residential	RO
Medium Density Residential	RM
Single-Family Residential	RS
Neighborhood Residential	RN
Downtown Residential	RD
High Density Residential	RH
Neighborhood Commercial	CN
General Commercial	CG
Urban Commercial	CU
Highway Commercial	CH
Central Business Performance	CBP
Gateway Performance	GWP
Opportunity Corridor Performance	OCP
Office Park Performance	OPF
Civic Performance	CVP
Institutional	IS
Industrial	IN
Urban Transitional	UT
Total	
Zoning Overlay District	Abbreviation
Flood Hazard	FH
Shoreland Protection	SP
Historic	HI
Penacook Lake Watershed Protection	WS
Aquifer Protection	AP
Total	

Zoning District	Abbreviation
Other Zoning Ordinances pertaining to Land Use	
Recreational Vehicle Park Code	
Development Design Standards	
Small Wind Energy Systems	
Solar Collection Systems	
Access, Circulation ,Parking and Loading	
Earth Materials Removed	
Housing and Building Codes	

Source: City of Concord Zoning Ordinance Online and GIS 2022

https://library.municode.com/nh/concord/codes/code_of_ordinances?nodeId=10210

The overlay districts are superimposed upon the zoning districts so additional regulations shall apply. For any conflicting regulation, the more restrictive shall apply. The Code of Ordinances has sections amended periodically by City Council. The codes are applied by the Community Development Department, Engineering Department, Code Administration, the Planning Board and the Zoning Board of Adjustment.

The City's Zoning Map is located at <http://nh-concord.civicplus.com/DocumentCenter/View/1202> and the set of individual Zoning panel maps with parcels are located at <https://www.concordnh.gov/1255/Zoning-Map-Book>.

3 GOALS AND OBJECTIVES

The overall purpose of this Plan is to reduce future losses to life and property from potential hazard events by identifying appropriate **Actions** to implement during the five-year span of this Plan.

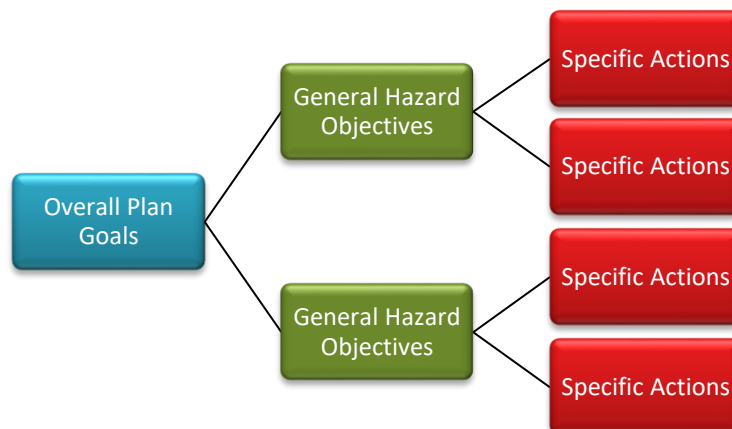
Inspired by early *State of New Hampshire Hazard Mitigation Plans*, the following Concord **Goals** were initially developed in the previous **Concord Hazard Mitigation Plans** and thus were reviewed and updated as applicable by the Hazard Mitigation Committee during a public meeting for the **2024 Plan**. While the hazard incidents have remained essentially the same as from the **2017 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**. Lastly, with the most recent change in hazard types utilized in the *State of New Hampshire Hazard Mitigation Plan 2023*, it was necessary to revise some of the main hazard groups for the **General Hazard Mitigation Objectives** identification.

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** provide a macro-level view of what emergency managers want to accomplish to keep the City'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



HAZARD CATEGORIES

From the [Hazard Identification and Risk Assessment](#), the individual natural, technological and human hazards under consideration have been grouped into similar event types for simplification, the Main Hazard categories in [Table 9. Objectives](#) begin to narrow down the focus of the overall **Goals** into hazard minimization statements and will use these categories.

Finally, **Actions** are the specific activities or projects which can be undertaken to accomplish an **Objective**. The **Action** is the target to reach to help mitigate hazards in the community. The completed **Action** fulfills the associated **Objectives**. Actions will be listed and reviewed later in **8 MITIGATION ACTION PLAN**.

Table 9
Main Hazard Categories for Objectives

Main Hazard Category	Specific Hazards Included		
EARTH	DROUGHT	EARTHQUAKE	LANDSLIDE Soil, Rockslide or Excavation Areas
EXTREME TEMPERATURES	EXTREME TEMPERATURES Excessive Heat, Heat Wave, Cold or Wind Chill		
FIRE	WILDFIRE Brushfire, Outdoor Fires or Accidental		LIGHTNING
FLOOD	INLAND FLOODING Rains, Snow Melt, or Flash Floods	DAM FAILURE Water Overtop, Breach or Beaver	RIVER HAZARDS Ice Jams, Scouring, Erosion, Channel Movement or Debris
HEALTH	PUBLIC HEALTH Infectious Diseases, Air & Water Quality, Biological, Addiction, Arboviral or Tick-borne		
SOLAR	SOLAR STORMS AND SPACE WEATHER Solar Winds, Geomagnetic Storms (Aurora Borealis), Solar Radiation or Radio Blackout		
WIND	HIGH WIND EVENTS Wind, Thunderstorms, Hail, Downbursts, Tornadoes or Debris		TROPICAL AND POST-TROPICAL CYCLONES Hurricanes, Tropical Storms or Tree Debris
WINTER	SEVERE WINTER WEATHER Snow, Ice, Blizzard or Nor'Easter		AVALANCHE <i>appears in 2018 State HMP but is not relevant to Concord's geography and development.</i>
TECHNOLOGICAL	AGING INFRASTRUCTURE Bridges, Culverts, Roads, Pipes or Underground Lines		FIRE Vehicle, Structure, Arson or Conflagration
	LONG TERM UTILITY OUTAGE Power, Water, Sewer, Gas, Internet, Communications or Live Wire Danger		HAZARDOUS MATERIALS Haz Mat Spills, Brownfields or Trucking
HUMAN	TRANSPORTATION CRASH Vehicle, Airplane, Helicopter, Rail, Interstate, Pedestrian or Bicycle		MASS CASUALTY INCIDENT As a result of any hazard event

Main Hazard Category	Specific Hazards Included	
	TERRORISM/ VIOLENCE Active Shooter, Hostage, Public Harm, Civil Disturbance/Unrest, Politically Motivated Attacks, Incendiary Devices, Sabotage or Vandalism	CYBER EVENT Municipal Computer Systems Attack, Cloud Data Breach, Identity Theft, Phishing, Ransomware or Virus

Source: Concord Hazard Identification and Risk Assessment (HIRA)

Not all of these main natural hazard categories may be important for Concord to develop as Plan Objectives, and these would be noted at the end of the 3 GOALS AND OBJECTIVES.

Overall Hazard Mitigation Plan Goals

The following 3 Goals for the **Hazard Mitigation Plan 2024** 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 **2017 Plan** to emphasize hazard mitigation instead of preparedness, response and recovery which are covered in the **Emergency Operations Plan**. The **Hazard Mitigation Goals** are displayed in **Figure 4**.

Figure 4
Hazard Mitigation GOALS

1. To reduce the risk of injury in the City from the impacts of natural hazards, severe weather, disasters, and from the impacts of human and technological hazards.
2. To reduce the risk of potential damage to public and private property, infrastructure, critical facilities, historic resources, and the natural environment from the impacts of natural hazards, severe weather, disasters, and human and technological hazards.
3. To enhance communication and public outreach, educational programs, and enforcement activities to help protect the community from the impacts of natural hazards, severe weather, disasters, and from human and technological hazards.

Source: Concord Hazard Mitigation Committee

General Hazard Mitigation Objectives

Main hazard event categories of **Earth, Extreme Temperatures, Fire, Flood, Public Health, Solar Storms, Wind, Winter, Technological,** and **Human** 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 Concord. 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.

Although human and technological hazards are not natural disasters, many technological hazards are secondary to (are caused by) the natural and weather hazards. Eighteen **(18) General Hazard Mitigation Objectives** were crafted for the **Concord Hazard Mitigation Plan 2024** as displayed in **Figure 5**.

Figure 5
Hazard Mitigation OBJECTIVES

EARTH HAZARDS

1. Minimize the threat of potential landslide or rockslide areas along local roads and excavation areas.
2. Engage in public awareness of local earthquake activity and safety precautions.
3. Minimize the impact of drought events to agricultural areas, private wells, City wells ad water supplies, and other locations through public awareness.

EXTREME TEMPERATURE HAZARDS

4. Minimize the damage to life, property, and infrastructure from severe winter weather, including storms, snow, snow load/building collapse, ice, and wind chill events and from excessive heat events including heat waves, declining air and water quality and climate change warming.

FIRE HAZARDS

5. Minimize the damage to life, property, and infrastructure including the conservation properties, Garvin Falls, Broken Ground, and Mast Yard, and rural/country road areas, the Downtown conflagration area, Hazardous Abandoned Vacant (HAV) buildings, suburban areas adjacent to these rural areas of City Forests, the public trail system, woodlands and communication towers from wildfires, brushfires, and other outdoor fires, and lightning.

FLOOD HAZARDS

6. Minimize the damage to life, property, and infrastructure from floodwater or erosion of the Merrimack, Contoocook, Turkey, and Soucook Rivers; Rattlesnake Brook, Beaver Meadow Brook, Mill Stream Brook, Woods Brook, Bela Brook, Bow Brook and other brooks and their floodplain; and from the ponds such as Snow Pond, Penacook Lake, Turkey Ponds, Horseshoe Pond, and Turtletown Pond; and Hoit Marsh, wetlands, and other water bodies.
7. Minimize the damage to life, property and infrastructure caused by snow-melt and precipitation resulting in erosion and flooded roads; river scouring and ice jams, culvert washouts, dam failures, stormwater system under capacity, debris (tree limbs, leafy material, sediment), or beaver dam breakage/failure, etc.

PUBLIC HEALTH HAZARDS

8. Minimize the threat or impact of public health events to the public, including close-quarter communicable diseases (coronavirus, influenza, hepatitis, meningitis), air and water quality decline, biological infestations (milfoil, emerald ash borer, woolly adelgid, red pine scale, cyanobacteria, etc), arboviral (mosquito) and tick-borne diseases, addiction, etc.

SOLAR STORMS

9. Minimize the impact to life, property and infrastructure from solar storms and space weather, including solar winds, geomagnetic storms, solar radiation, and radio blackout.

WIND HAZARDS

10. Minimize the damage to life, property, and infrastructure including Concord Municipal Airport and transportation systems in both urban areas and in rural areas from severe wind events, including thunderstorms, hail, downbursts, tornadoes, hurricanes and tropical storms, and damages caused by resulting tree debris.

WINTER HAZARDS

11. Minimize the damages to life, property and infrastructure from winter weather events, including storms, snow, ice and minimize damages from utility failure, blocked transportation routes, and roof collapses.

HUMAN HAZARDS

12. Minimize the risk of impact and damage to life, property, and infrastructure resulting from transportation crashes and fires involving transport trucks, vehicles, pedestrians, bicycles, airplanes, helicopters, drones, etc., along the flightpaths, and blocked transportation systems, including the US Route 202/9, I-93, I-89, I-393, NH Route 132, NH Route 106, US Route 3, and Main Street and local Concord roads, especially during severe weather events.
13. Minimize the risk of impact and damage to life, property and infrastructure, including incidents at the schools, City buildings, the State Offices, the Federal Building, and Concord Hospital, from human terrorism and violence threats such as active threat incidents, hostage situation, civil disturbance/riots, politically motivated attacks, incendiary devices, sabotage, vandalism, or other public harm.

TECHNOLOGICAL HAZARDS

14. Minimize the risk of cyber events, including overall systems takeover, takeover of the City website, telecommunications rerouting, cloud data breach, phishing, malware, ransomware, virus installation, on City computer systems to maintain essential operations, and provide education to minimize cyberattack risk to residents and businesses, including identity theft and telephone scams.
15. Minimize the damages from multiple hazards to the aging infrastructure of the community, including bridges, culverts, dams, local roads, lines, and seek to maintain operational efficiency.
16. Minimize the impact to Concord residents from the risks of various utility outages, such as live wire dangers and long-term outages in electrical power, municipal water and sewer, internet and telecommunications services.
17. Minimize the impacts of fire conflagration and explosion, especially near densely populated areas or buildings, from fuel tanks, high tension power lines and vehicles.
18. Minimize the damages to life, property, and infrastructure from hazardous materials exposure, chemical spills, trucking accidents, and radiological materials incidents, including damages, impacts and exposures caused by brownfields sites, leaking underground storage tanks, and occupational sites.

Source: Concord Hazard Mitigation Committee

4 HAZARD RISK ASSESSMENT

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

The *State of New Hampshire Hazard Mitigation Plan 2023* recommends that municipalities examine multiple natural hazards, including several new hazards. Two natural hazards, avalanche and coastal flooding, are not discussed in Concord's Plan because they have no ascertained relevance to the City. The former human hazards of Civil Disturbance/ Public Unrest, Sabotage/ Vandalism, and Hostage Situation are absorbed into the **Terrorism/ Violence** hazard category. The opportunity was available to combine several of the former flood-related hazards into the new **Inland Flooding**. Likewise, several former wind-related hazards are compiled within **Wind**. No natural hazards from the **2017 Plan** have been removed, only placed into other groupings for evaluation. Within the **Hazard Mitigation Plan 2024**, the **14** evaluated natural hazards and the **8** evaluated human or technological hazards have been incorporated under these basic categories, also displayed in **3 GOALS AND OBJECTIVES Table 9**:

 Earth Hazards	 Solar Storm Hazards
 Extreme Temperature Hazards	 Wind Hazards
 Fire Hazards	 Winter Hazards
 Flood Hazards	 Human Hazards
 Public Health Hazards	 Technological Hazards

Within these basic hazard categories are numerous related subcategories, all of which are detailed in the **Hazard Identification and Risk Assessment (HIRA)**. This Assessment provides a measure of **Frequency (Probability of Occurrence)**, **Location Area**, **Severity of Impact to the City**, **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 City. 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 Concord 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 Identification and Risk Assessment (HIRA) Ratings

Twenty-two (**22**) natural, technological, and human hazards are evaluated within this Plan. The **14** natural hazards are ranked within in the [Hazard Identification 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 Concord 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 City** column.

Knowing where events may be likely to occur, the **2023** Hazard Mitigation Committee examined each potential hazard for its **Probability of Occurrence in 10 Years** and its potential **Severity of Impact to the City** affecting people, services/infrastructure and property based on past personal recollections and community hazard trends to determine the **Overall Risk** to the community.

HIRA RATINGS EXPLANATION

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

Probability of Occurrence in 10 Years

1	Unlikely	0 - 25% chance
2	Possible	25 - 50% chance
3	Likely	51 - 75% chance
4	Highly Likely	76 - 100% chance

The Committee determined the likely **Severity of Impact to the City** of an event based on a **1-2-3-4** scale for **3 Impact** characteristics – Human Injuries, the length of time Essential Services/Infrastructure are shut down and resulting Property Damage or Economic Impact. Not all of these characteristics must 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 in 10 Years** score was multiplied by the average of each **Severity of Impact to the City** (Human Injury, Essential Services or Infrastructure and Property Damage or Economic Impact) 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 2024**. However, **Dam Failure** was promoted to a natural hazard and was rated because of its close correlation to **Flooding**.

Severity of Impact to the City

1	Limited	Human: Injuries treatable with first aid. Essential Services/Infrastructure: Minor “quality of life disturbance; Shutdown for 3 days or less. Property Damage or Economic Impact: Less than 10%.
2	Significant	Human: Significant injuries or illnesses result in no permanent disability. Essential Services/Infrastructure: Shutdown for up to 2 weeks. Property Damage or Economic Impact: 10% to 25%.
3	Critical	Human: Significant injuries or illnesses result in permanent disability. Essential Services/Infrastructure: Complete shutdown for at least 2 weeks. Property Damage or Economic Impact: 25% to 50%.
4	Catastrophic	Human: Death or multiple deaths. Essential Services/Infrastructure: Complete shutdown for 30 days or more. Property Damage or Economic Impact: Greater than 50%.

Concern Summary of HIRA Scores

A summarization of the scores is provided to ascertain at a glance the **Probability of Occurrence**, **Severity of Impact**, and **Overall Risk** using a **HIGH**, **MEDIUM** or **LOW Concern** designation for the numeric results. This summarization is also utilized in the following the **Description and Magnitude of Hazard Events** section.

Numeric Probability and Severity	CONCERN SUMMARY	Numeric Overall Risk Score
1	LOW	1.0 – 4.9
2	MEDIUM	5.0 – 7.9
3	HIGH	8.0 – 11.9
4	EXTREME	12.0 – 16.9

OVERALL RISK ASSESSMENT SCORES

The highest possible **Overall Risk** score a natural hazard could be ranked using this **Hazard Identification Risk Assessment (HIRA)** 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 in 10 Years** and **Severity of Impact to the City**.

Out of the **14** ranked natural hazards, Concord's highest ranking hazards scored an **Overall Risk** between **16.0 – 1.0** (out of a possible Risk score of **16**), displayed with calculated decimals in **Table 10**.

Table 10

Highest Overall Risk Hazards and Hazard Events Since the Last Plan

Natural Hazard Event	HIRA Overall Risk 1-16	CONCERN	Notable Hazard Events Within the Last 5 Years?* (See Table 13)	Mitigation Actions Developed For EXTREME, MEDIUM & HIGH Hazards? (See Mitigation Action Tables)
River Hazards	16.0	EXTREME	Yes	Yes
Inland Flooding	14.7	EXTREME	Yes	Yes
High Wind Events	13.3	EXTREME	Yes	Yes
Tropical and Post Tropical Cyclones	13.3	EXTREME	Yes	Yes
Public Health	12.0	EXTREME	Yes	Yes
Severe Winter Weather	12.0	EXTREME	Yes	Yes
Extreme Temperatures	10.7	HIGH	Yes	Yes
Lightning	9.3	HIGH	Yes	Yes
Wildfire	8.0	HIGH	Yes	Yes
Solar Storms and Space Weather	6.7	MEDIUM	Yes	Yes
Drought	5.3	MEDIUM	Yes	Yes
Earthquake	4.0	LOW	No	
Dam Failure	3.3	LOW	No	
Landslide	1.0	LOW	No	

*NO = No notable impacts since the last Plan. Stated in Table 11 as "NO Event(s) Within Last 5 Years."

YES = Notable impact events added to Table 13. Stated in Table 11 as "Event(s) Within Last 5 Years."

ANNUAL = Annual occurrence with variable impacts; any notable impacts added to Table 13. Stated in Table 10 as "Annual Occurrence Within Last 5 Years" whether or not a notable event was added to Table 13.

Source: Compilation of Concord HMC Data

HAZARD IDENTIFICATION AND RISK ASSESSMENT RATINGS

Included with the **Table 11 Hazard Identification Risk Assessment (HIRA)** is whether each hazard event occurred within the last **5** years in Concord. This is indicated by either ***Events(s) Within Last 5 Years***, ***ANNUAL Occurrences Within Last 5 Years*** or ***NO Event(s) Within Last 5 Years*** beneath each *Hazard Category*. Dates and descriptions of the new hazard impacts within the last **5** years are provided in a later table, **Table 13 Local and Area Hazard Event and Disaster History (Sequential)**. The existing potential hazard locations, or those locations in Concord which could be currently at present day susceptible to each of the hazard categories, are provided within **Table 11** since these locations contribute to the **Severity of Impact** ratings determinations of Committee. The **HIGH, MEDIUM or LOW Concern** for each *natural* hazard is provided in the **Overall Risk** column.

The highest potential Magnitude of each of the natural hazards has been measured for Concord within the next 10 years. Sometimes multiple widely-used scientific or meteorological Magnitude scales are used. The range of options for each scale is provided along with identification of each scale used and a hyperlink to the information.

Table 11

Hazard Identification and Risk Assessment (HIRA)

Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
DAM FAILURE Water Overtop, Breach, Beaver, etc. *NO Event(s) Within Last 5 Years**	♦ 2 High Hazard (H) dams: 051.013 Penacook Lake Dam (City of Concord) on Rattlesnake Brook, 051.025 Turkey Pond Dam (St. Paul's School) on Turkey River. 2 Significant Hazard (S) dam: 051.002 York Dam Contoocook River (NHDES) on Contoocook River, 051.006 Penacook Upper Falls Dam (Briar Hydro Assoc.) on Contoocook River. 6 Low (L) Hazard dams: 051.012 Lower St Paul's School Pond Dam (St. Paul's School) on Turkey River, 051.021 Turtle Pond Dam (City of Concord) on TR Mill Brook, 051.028 Hoit Road Marsh Dam (NHF&G) on TR	2	1	3	1	3.3 LOW	High Hazard Dam Fail	Non-Menace to High Hazard Dam Class	NHDES Dam Hazard Classifications	https://www.des.nh.gov/documents/db-15-classification-dams-new-hampshire

4 HAZARD RISK ASSESSMENT

Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	Hackett Brook, 051.043 Rolfe Canal Gate Structure (NHDES) on Rolfe Canal 051.046 Rolfe Canal Penstock Intake Dam (Briar Hydro Assoc.) on Rolfe Canal, 051.062 Sheep Davis Rd. Dam (City of Concord). ♦ Dams in other Towns could have a serious downstream impact should they fail or release too much water. ♦ Two dozen other recreation ponds, Non-Menace dams and regular beaver dams could breach and flood roadways. NM dams are found along the Merrimack River, Contoocook River Branches, Mill Brook, Hayward Brook, Turkey Pond Tributaries, Bow Brook, Natural Swales, Beaver Meadow Brook, at detention ponds and recreation ponds all of which are unlikely to flood but still have potential. (See APPENDIX A for list). ♦ Beaver dams carry a high probability of flooding and potential for breakage. Beaver dams are located throughout Concord, and depending on size and location, could cause significant damage to roads if the natural dams breach.									
DROUGHT <i>*Event(s) Within Last 5 Years*</i>	♦ Entire City. Areas susceptible to drought and dry conditions include farms and orchards, nurseries, and maple sugar operations: Lewis Farm, Cascade Brook Farm, Apple Hill Farm, Rossvie Farm, Generation Farm LLC, White Barn, Morrill Farm Dairy, Dimond Hill Farm, Carter Hill Orchard, Rockey Ole Farm and others. ♦ Farm animals, hay fields, produce, vegetable gardens are negatively impacted by drought. When hayfields die off and wells go dry, livestock animals in the City cannot easily be locally fed or watered.	4	1	1	2	5.3 MEDIUM	D4 Exceptional Drought	D0 Abnormally Dry to D4 Exceptional Drought	US Drought (D-scale) Monitor Intensity Scale	https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH

4 HAZARD RISK ASSESSMENT

Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	Larger farms become economically impacted when their products are unable to grow. ♦ Water Supplies: Private water supplies for the outside the Concord Water Works District and public water supplies serving 25+ people. Dug wells are known to go dry. ♦ Drought means increased risk of brush fire with dry vegetation (see Wildfire). Gravel roads (City paved) can be affected because City is unable to grade them when water is low. Rural paved gravel roads may become fire hazards with overhanging dry growth. ♦ Fire ponds/ dry hydrant water supplies can run dangerously low; see APPENDIX A for a list of the dry hydrants and large cisterns. When fire ponds or dry hydrants are low, response time increases as the Department needs to draw from the Rivers, brooks, and ponds (see Inland Flooding).									
EARTHQUAKE *NO Event(s) Within Last 5 Years*	♦ Entire City. The Central NH Region is seismically active and earthquakes are regularly felt from area epicenters. Locations with high density population or potential gathering sites to evacuate include: Downtown and village areas including Penacook, schools, multi-unit housing, manufactured housing parks, congregate care facilities, child care facilities, and municipal buildings. ♦ Damage to utility poles and wires, roadways and infrastructure could be significant. Aboveground poles, underground electric lines, underground water, sewer and natural gas lines could be susceptible. ♦ Fuel storage locations such as Concord Irving Heating Oil, East Concord Mobil, Energy North	4	1	1	1	4.0 LOW	VII Very Strong Intensity 5.5 MM	I Not Felt to X Extreme Shaking Intensity <1.5 Magnitude to 8> Magnitude	USGS Modified Mercalli Intensity Scale KGS Earthquake Moment Magnitude (Size) Scale,	https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale https://geokansas.ku.edu/measuring-earthquake-magnitude-and-intensity

4 HAZARD RISK ASSESSMENT

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	Propane, Exxon Station, Hess Gas Station, Irving Oil, Johnny Prescott & Son Oil Co, Inc., Johnson & Dix Fuel Corp., Loudon Rd. Sunoco, Manchester St. Sunoco, Mobil Service Station, South Main Mobil, St Paul's, and other facilities store underground or aboveground fuel tanks which may be vulnerable during a strong earthquake. ♦ Areas with the old, historic buildings are particularly susceptible to earthquake including public and private buildings (historic homes), 2 ½ Beacon Street (NRHP), Beaver Meadow Brook Archaeological Site (NRHP), Capitol Center for the Arts, Carrigan Commons, Carter Hill Orchard, Chamberlin House (NRHP), Chase Block, Concord City Hall, Concord Civic District (NRHP), Concord Theatre, Downtown Historic Area, Eagle Hotel (NRHP), Eagle Stable Complex, Eastman Street Historic Area, Endicott Hotel (NRHP), Farrington House (NRHP), Fire Department Headquarters, Franklin Pierce (UNH School of Law), Gas House), Gov. Frank West Rollins House (AKA Governor's Mansion) (NRHP), Henry J. Crippen House (NRHP), Leavitt Farm (NRHP), Leavitt Farm (NRHP), Lewis Downing Jr. House (NRHP), Merrimack County Bank (NRHP), Merrimack County Court House (NRHP), Millville School (NRHP), Morrill Brothers Building, Museum of NH History, NH Division of Historical Resources, NH Historical Society, NH Records and Archives, NH Savings Bank Building (NRHP), NH State House, NH State Library, North Main Street Historic District, Old Post Office – LOB (NRHP), Penacook Historic Area, Phenix Hall, Pierce Manse, Pierce Manse, Pleasant View Home (NRHP), Reuben Foster								formerly Richter Magnitude	

4 HAZARD RISK ASSESSMENT

Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	House and Perley Cleaves House (NRHP), Rolfe Barn, Sheraton Building, St. Paul's School Complex Area, Upham-Walker House (NRHP), White Farm (NRHP), White Park (NRHP), and about 13 cemeteries throughout City.									
EXTREME TEMPERATURES Excessive Heat, Heat Wave, or Cold, Wind Chill *Heat Event(s) Within Last 5 Years* *Cold Event(s) Within Last 5 Years*	♦ Entire City. Groups most susceptible to extreme heat or cold include those located at: Concord Schools, City Hall, manufactured housing neighborhoods, multi-unit housing, childcare facilities, public assistance facilities and congregate care facilities. ♦ Senior residences, congregate care facilities or those dwellings without air conditioning or those receiving fuel assistance are especially vulnerable to high heat or extreme cold events could include Granite Ledges of Concord [70 beds], Harris Hill Nursing Home [80 beds], Havenwood-Heritage Heights [226 beds], Hospice Care at Concord Hospital [10 beds], John H. Whitaker Assisted Care [54 beds], Pleasant View Center [174 beds], Presidential Oaks [290 beds], The Birches at Concord [53 beds], TLC Medical Daycare for Adults [31 patients]. Residents should be moved to air conditioned (cooling) or warming facilities. ♦ Youth groups and Child Care Facilities need to be protected from hot and cold temperatures. These facilities include: After School Program – Abbott Downing School [82 students + 13 staff], After School Program – Beaver Meadow School [38 students + 6 staff], After School Program – Broken Ground School [110 students + 12 staff], After School Program – Christa McAuliffe School/Concord Boys and Girls Club [70 students + 6 staff], After	4	4	2	2	10.7 HIGH	≤ 10 minutes to frostbite Class III Very Hot 105 -129 Degrees	<5 minutes to > 2 hours for Frostbite Times Class IV Very Warm to Class I Extremely Hot	NOAA Wind Chill Temperature Index NOAA Heat Index	https://www.noaa.gov/jetstream/global/wind-chill https://www.noaa.gov/jetstream/global/heat-index

4 HAZARD RISK ASSESSMENT

Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	School Program – Concord High School [98 students + 7 staff], After School Program – Mill Brook School [40 students + 8 staff], After School Program – Penacook Elementary School/Penacook Community Center [30 students + 3 staff], After School Program – Rundlett Middle School [95 students + 7 staff], Concord Boys and Girls Club [220 students + 30 staff], Concord Family YMCA Child Center [126 students + 28 staff], Concord Head Start [114 students + 32 staff], Concord High School Child Care Center at Abbott-Downing School [13 students + 3 staff], Discovery Village Early Learning Center [17 students + 4 staff], East Side Learning Center [250 students + 32 staff], Emerson School for Preschoolers [52 students + 4 staff], Girls Inc. of NH [58 students + 6 staff], Head 2 Toe Learning Center [25 students + 4 staff], Merrimack Valley Day Care [50 students + 5 staff], Merrimack Valley DC @ Eagles Bluff [24 students + 4 staff], Merrimack Valley DC @ Jennings Dr. [18 students + 2 staff], Merrimack Valley DC @ NH Hospital (20 students + 4 staff), NHTI Child & Family Development Center [62 students + 20 staff], Penacook Community Center [30 students + 3 staff], Presidential Oaks Children’s Center [25 students + 5 staff], Second Start [110 students + 55 staff], Second Start [20 students + 7 staff], Shaker Road Child Care Center [54 students + 10 staff], Step Ahead Learning Center [66 students + 10 staff], The Children’s Place [80- students + 5 staff], The Early Enrichment Center [65 students + 14 staff], The Learning Center @ Concord Hospital [120 students + 27 staff], The Tot Spot [42 students + 7									

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	staff], Woodside @ St. Paul's School [57 students + 17 staff], Woodside School [126 students + 20 staff]. ♦ Extreme cold or heat may be experienced by recreationalists in remote conservation lands, City Forests, and other outdoor places. ♦ Areas vulnerable to effects of extreme heat or cold include agriculture and farms (see list above in Drought) ♦ See APPENDIX A for the list of vulnerable facilities or groups.									
HIGH WIND EVENTS Wind, Thunderstorms, Hail, Downbursts, Tornadoes, Debris *Event(s) Within Last 5 Years*	♦ Entire City. Most high wind -vulnerable areas include populated buildings, high-density locations and aboveground utilities serving residents & businesses. ♦ Utilities at risk of failing during high wind events include telecomm towers; Unitil electric lines; transmission lines, Comcast cable lines; water and sewer pumping stations. ♦ High density developed areas can have greater impacts from high winds : Concord Schools, City Hall, manufactured housing neighborhoods, multi-unit housing, childcare facilities, public assistance facilities and congregate care facilities. ♦ Construction, manufacturing, or industrial-like areas like those along NH 106 (Sheep Davis Road), US 3 (North State Street) and open land/excavation pits are collectively vulnerable to the effects of high wind events. ♦ Downbursts are occurring with greater regularity. The City's highest elevation points (see Map 1 Potential Hazards) may experience the greatest high wind impacts, including the steep slopes and	4	4	3	3	13.3 EXTREME	11 Storm Force 64 to 75 mph 4 Moderate 1.5" Ping Pong Ball	0 Calm to 12 Hurricane Force Wind 1 Marginal to 5 High Thunderstorm Risk Categories 1/4" Peach Size to 4.5" Grapefruit Size Hail Stones	Beaufort Wind Scale (Land) NOAA Severe Thunderstorm Risk Categories NOAA Hail Size	https://www.weather.gov/pqr/wind https://www.spc.noaa.gov/misc/about.html https://www.weather.gov/boi/hailsize

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	hillsides. Many city roads, private roads and Rural paved roads lead up and through these hills. ♦ Most of the City north of NH 202 and West of US 3 or North of I-393 and East of I-93 is wooded and forested and sections would be difficult to access with trees and power lines down on the gravel, hilly residential roads. They could be difficult to access with treefall and power lines down from high wind events. Remote neighborhoods include manufactured housing parks and neighborhoods on roads with only one egress. ♦ Outdoor recreation spots such City Forests, Range Roads, rail trails, conservation lands, and current use lands utilize large amounts of tree cover. During high wind events, people recreating in the City Forests and trail systems could experience unfavorable conditions during high wind events and may require rescue assistance in difficult to access locations. ♦ Agricultural operations are vulnerable to damage from High Winds (see list above in Drought) ♦ Older, or historical buildings are vulnerable to high wind damage include public and private buildings (historic homes), 2 ½ Beacon Street (NRHP), Beaver Meadow Brook Archaeological Site (NRHP), Capitol Center for the Arts, Carrigan Commons, Carter Hill Orchard, Chamberlin House (NRHP), Chase Block, Concord City Hall, Concord Civic District (NRHP), Concord Theatre, Downtown Historic Area, Eagle Hotel (NRHP), Eagle Stable Complex, Eastman Street Historic Area, Endicott Hotel (NRHP), Farrington House (NRHP), Fire Department Headquarters, Franklin Pierce (UNH School of Law), Gas House),						H5 Destructive 30-50 mm EF3 136-165 mph	H0 5mm Hard Hail Storm to H10 >100mm Super Hail Storm EF0 65-85 mph to EF5 >200 mph	TORRO Hailstorm Intensity Scale Adapted NOAA Enhanced Fujita Scale for Tornadoes and Downbursts	https://www.torro.org.uk/research/hail/hscale https://www.spc.noaa.gov/faq/tornado/ef-scale.html

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	Gov. Frank West Rollins House (AKA Governor's Mansion) (NRHP), Henry J. Crippen House (NRHP), Leavitt Farm (NRHP), Leavitt Farm (NRHP), Lewis Downing Jr. House (NRHP), Merrimack County Bank (NRHP), Merrimack County Court House (NRHP), Millville School (NRHP), Morrill Brothers Building, Museum of NH History, NH Division of Historical Resources, NH Historical Society, NH Records and Archives, NH Savings Bank Building (NRHP), NH State House, NH State Library, North Main Street Historic District, Old Post Office – LOB (NRHP), Penacook Historic Area, Phenix Hall, Pierce Manse, Pierce Manse, Pleasant View Home (NRHP), Reuben Foster House and Perley Cleaves House (NRHP), Rolfe Barn, Sheraton Building, St. Paul's School Complex Area, Upham-Walker House (NRHP), White Farm (NRHP), White Park (NRHP), and about 13 cemeteries throughout City, historical monuments and cemeteries (headstones) throughout City could be especially vulnerable to high winds. ♦ Floods are also possible with severe windstorm events (see Inland Flooding).									
INLAND FLOODING Rains, Snow Melt or Flash Floods <i>*Event(s) Within Last 5 Years*</i>	♦ Entire City, Floodplains of the Merrimack River, Contoocook River, and Soucook River. <u>Major watercourses</u> include the three rivers, Turkey River, Bow Brook, Burnham Brook, Hoyt Brook, Bowen Brook, Mill Brook, Hayward Brook, Hackett Brook, Snow's Brook, Turree Brook, Bela Brook, Ash Brook, Rattlesnake Brook, and White Brook are the most prominent waters flowing in City. <u>Major waterbodies</u> include wildlife and recreation ponds which are among the main standing bodies of water in addition to Horseshoe Pond, Little Turkey	4	3	4	4	14.7 EXTREME	500 (.02%) Year Flood, Now 6% Chance 500 Year Flood within 30 years	100 Year to 500 Year Flooding	Special Flood Hazard Areas (SFHAs) on 2010 & Preliminary Digital Flood Rate	https://msc.fema.gov/portal/home

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	Pond, Great Turkey Pond, Hoit Marsh and Sewalls Falls. ♦ Flooding could occur from breached High, Significant, and Low Hazard Dams within and connected to Concord. Other recreation ponds, Non-Menace dams and regular beaver dams can breach and flood roadways. See Dam Failure hazard above. ♦ Any of these waters could flood local roads, homes, buildings, and waterfront properties. ♦ Runoff from roadways or heavy rain or snowmelt can cause floods and washouts over the Entire City. Regular washout locations occur. (See also Aging Infrastructure) ♦ Roads, bridges, drainage systems and related areas can flood, creating flooded infrastructure for many travelers.						>70% High Excessive Rainfall Risk (flash flooding)	>5% Marginal to >70% High Rainfall Risk	Insurance Maps (Zones A, AE, X) NOAA Excessive Rainfall Risk Categories	https://www.wp.cncep.noaa.gov/qpf/excessive_rainfall_outlook_ero.php
LANDSLIDE Soil, Rockslide or Excavation Areas *NO Event(s) Within Last 5 Years*	♦ Slopes greater than 15%, which is much of the community (see Map 1) including roads with steep ditching or embankments are most vulnerable to landslide. The City has numerous hills over 1,000' in elevation, many of them with roads or trails. ♦ Roads with steep ditching or embankments are most vulnerable to landslide. No roads were identified by the HMC as having landslide vulnerability. (see Inland Flooding). Landslide is an uncommon hazard but one that could have devastating effects, including property damage. ♦ There are several known excavation sites in the City, some of which may have the potential of landslide/ rockslide. Many areas are reclaimed and vegetated.	1	1	1	1	1.0 LOW	Relatively Moderate Risk (Yellow)	Very Low Risk (Blue) to Very High Risk (Red)	No widely-used scale measuring the complex magnitude of landslides FEMA National Risk Index Map	USGS Landslide Inventory Mapper https://usgs.mapviewer/index.html?id=a120962f459434b8c904b456c82669d

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									(Landslides)	
LIGHTNING <i>*Event(s) Within Last 5 Years*</i>	♦ Entire City. Areas of particular concern to lightning include critical facilities, high density areas, high elevations. ♦ The City & cultural facilities including City Hall, Fire Station, Churches, Gas House, Concord Public Library, and others are tall buildings. (see also High Wind). ♦ Several municipal buildings do not have lightning rods. ♦ Numerous outdoor recreational and gathering places such as School fields, City Forests, and the various trails on conservation lands could be vulnerable to lightning. ♦ Other locations containing large numbers of people include Concord Schools, City Hall, manufactured housing neighborhoods, multi-unit housing, childcare facilities, public assistance facilities congregate care facilities, and high density housing. Lightning and Wildfire and potential conflagration could result in these densely populated areas. ♦ Businesses with potentially hazardous materials onsite such as fuel, gasoline, used fluids (various automotive repair shops, construction and lumber yards, salvage yards) could each be vulnerable to lightning and fire. ♦ Outdoor utilities and antennas would have high impacts should lightning strike, such as the telecommunications towers, high transmission lines, Until electric lines, Comcast lines, and telephone switching stations.	4	4	2	1	9.3 HIGH	LAL 5 Numerous Thunderstorms	LAL 1 No Thunderstorms to LAL 6 Dry Lightning Activity	NWS Lightning Activity Level (LAL)	https://graphical.weather.gov/definitions/defineLAL.html

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	◆ Old, historic or wooden structures and those structures without lightning rods would be more susceptible to damage from a strike than those buildings with the rods. Old wooden buildings at high elevations within forested areas could be especially vulnerable to lightning. ◆ Remote, forested areas, parks, public City Forests, conservation areas, open recreation fields, points of higher elevation can be dangerous to people and property if struck by lightning, including the many conservation lands and trail systems.									
PUBLIC HEALTH Infectious Diseases, Air & Water Quality, Biological, Addiction, Arboviral, or Tick-borne *Event(s) Within Last 5 Years*	◆ Entire City. Congregated populations, older and younger residents, medical facilities and social settings can be more vulnerable to infectious diseases: ◆ Schools: Abbott Downing School, Beaver Meadow School, Bishop Brady High School, Broken Ground School, Christa McAuliffe School, College for Lifelong Learning, Concord High School, Merrimack Valley High School, Merrimack Valley Middle School, Mill Brook School, New Hampshire Technical Institute, NH Fire Academy, NH Police Academy, Penacook Elementary, Rundlett Middle School, Second Start, Shaker Road Private School (K-8), St. Paul's School, Trinity Baptist Church Private School (K-12), University of New Hampshire Law Center. ◆ Multi-Unit Housing, Alton Woods [384 apts], Beaver Meadow Village [46 apts], Boucher Apartments [16 apts], Briar Pipe Apartments [77 apts], Brickstone Commons/Morningstar [172 apts], Canterbury Meadows Townhouse [60 apts], Capitol Plaza/Crutchfield Apartments [105 apts], Centerstone Residence [60 apts], Cirillo Apartments	4	4	2	3	12.0 EXTREME	No monitored locations by DES. City has tested swimming pools. Hazardous 300+ Air Quality (EPA)	Bacteria Advisory to Bacteria Warning Good Air to Hazardous Air Quality	DES Cyanobacteria/Public Beach Bacterial Warning Levels NHDES Air Quality Index	https://experience.arcgis.com/experience/180c28fa3a4c4371a9771d999454e8c4/ https://www4.des.state.nh.us/airdata/

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	[9 apts], Cobblestone Pointe Senior Village [140 apts], Concord Commons Condominiums [60 apts], Concord Gardens/Royal Gardens [300 apts], Concord Park North [36 apts], Cranmore Ridge [200 apts], Eagles Bluff [63 apts], East Side Village/Eastern Ave Apartments [30 apts], Edgewood Heights [120 apts], Endicott Hotel Apartments [24 apts], Family Village 1 [5 apts], Family Village 2 [5 apts], Farmhouse Apartments [29 apts], Fire House Block Apartments [68 apts], Florence V. Hodges Apartments [50 apts], Franklin Square [60 apts], Friedman Court I & II [86 apts], GAA Plaza/Alosa Rentals [58 apts], Havenwood [113 apts], Heritage Heights [186 apts], Hillside View Apartments [108 apts], Hollis Commons Apartments [60 apts], Horseshoe Pond Place [77 apts], Island Shores Condominiums [265 apts], Kennedy Apartments [82 apts], Mast Yard West Condominiums [144 apts], McKenna's Purchase Condominiums [148 apts], Meadow Brook Apartments [120 apts], Menino Place [45 apts], Mill Place West [21 apts], Mulberry Village Condos [60 apts], Oak Bridge Condominiums [180 apts], Oak Creek [72 apts], Ormond Street Apartments [21 apts], Parkview Place [76 apts], Parmenter Place [25 apts], Pembroke Place Apartments [113 apts], Penacook Place [150 apts], Penwood Apartments [108 apts], Perley Place [11 apts], Pinewood Village Apartments [68 apts], Pleasant View Retirement Home [72 apts], Prescott Place Apartments [72 apts], Prescott Street Apartments [18 apts], Regency Hill Estates [95 apts], Riverhill Condos [28 apts], Salisbury Green Apartments [226 apts], South Concord Meadows [180 apts], The Pines Apartments									

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	[66 apts], The Vineyards of Concord [120 apts], Village at Thirty Pines [90 apts], Vineyard Terrace [24 apts], William Haller Apartments [50 apts], Willow Crossing [24 apts], Windor Estates [18 apts]. ◆ Manufactured housing neighborhoods, Alosa's Mobile Homes [65 homes], Concord Terrace [139 homes], Crestwood Estates/Jensen's Inc. [320 homes], Fisherville Co-op [56 homes], Foxcroft Estates [117 homes], Green Acres Mobile Homes/Valley Stream Estates [119 homes], Green Meadows Manufactured Home Park [108 homes], Neighboring Pines [22 homes], Princess Mobile Homes [6 homes], Riverview Landing [86 homes]. ◆ Congregate Care Facilities, After School Program – Abbott Downing School [82 students + 13 staff], After School Program – Beaver Meadow School [38 students + 6 staff], After School Program – Broken Ground School [110 students + 12 staff], After School Program – Christa McAuliffe School/Concord Boys and Girls Club [70 students + 6 staff], After School Program – Concord High School [98 students + 7 staff], After School Program – Mill Brook School [40 students + 8 staff], After School Program – Penacook Elementary School/Penacook Community Center [30 students + 3 staff], After School Program – Rundlett Middle School [95 students + 7 staff], Concord Boys and Girls Club [220 students + 30 staff], Concord Family YMCA Child Center [126 students + 28 staff], Concord Head Start [114 students + 32 staff], Concord High School Child Care Center at Abbott-Downing School [13 students + 3 staff], Discovery Village Early Learning Center [17 students + 4 staff], East Side Learning Center [250									

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	students + 32 staff], Emerson School for Preschoolers [52 students + 4 staff], Girls Inc. of NH [58 students + 6 staff], Head 2 Toe Learning Center [25 students + 4 staff], Merrimack Valley Day Care [50 students + 5 staff], Merrimack Valley DC @ Eagles Bluff [24 students + 4 staff], Merrimack Valley DC @ Jennings Dr. [18 students + 2 staff], Merrimack Valley DC @ NH Hospital (20 students + 4 staff), NHTI Child & Family Development Center [62 students + 20 staff], Penacook Community Center [30 students + 3 staff], Presidential Oaks Children's Center [25 students + 5 staff], Second Start [110 students + 55 staff], Second Start [20 students + 7 staff], Shaker Road Child Care Center [54 students + 10 staff], Step Ahead Learning Center [66 students + 10 staff], The Children's Place [80- students + 5 staff], The Early Enrichment Center [65 students + 14 staff], The Learning Center @ Concord Hospital [120 students + 27 staff], The Tot Spot [42 students + 7 staff], Woodside @ St. Paul's School [57 students + 17 staff], Woodside School [126 students + 20 staff]. ♦ Public Assistance Facilities, American Red Cross, Colonial Arms Rooming House [21 beds], Concord Coalition to End Homelessness Resource Center, Families in Transition [6 beds], Families in Transition [10 beds], First Baptist Church Food Pantry, First Congregational Church Food Pantry, Friendly Soup Kitchen, Friends Emergency Housing [30 beds], Immaculate Conception Church Food Pantry, Jobin Rooming Housing [3 beds], McKenna House Shelter/Group Home [42 beds], Oakstream Rooming House – South Street [14 beds], Oakstream Rooming House – Warren Street [15 beds], Rape and									

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	Domestic Violence Shelter [7 beds], Rollins Street Rooms [9 beds], Salvation Army, St. John's Church Food Pantry, St. Paul's Church Food Pantry, Stearns Rooming House [11 beds], Whitfield House [11 beds]. ◆ Medical facilities, Concentra Medical Center, Concord Family Medicine, Concord Hospital, Concord Hospital at Horseshoe Pond, Concord OB-GYN, Concord Orthopedics, Concord Otolaryngology, Dartmouth-Hitchcock Clinic, Equality Health Center, Eye Center of Concord, Family Tree Health Care, HealthSouth Rehabilitation Hospital, Memorial Medical Office Building, New Hampshire Hospital, Penacook Family Physicians, Pillsbury Medical Office, Pleasant Street Family Medicine, St. Paul's Infirmary. ◆ Local stores and eateries increase the risk of exposure to and transfer of food-borne illness, causing potential public health concerns. T ◆ The City's local Point of Dispensing (POD) is located at the NH Technical College in Concord. Concord is a member of the Capital Area Public Health Network. ◆ The many forests, conservation areas, agriculture, wooded areas, and ponds can support ticks (Tick-borne) hosting bacterial diseases (Lyme, Anaplasmosis, Leptospirosis, more) and mosquitos (Arboviral) can host many bacteria (West Nile, EEE, Equine Infectious Anemia, etc) which transmit diseases. The conservation lands and trail systems attract people, which can also enable disease transmission. Lyme disease rates are increasing according to NH Health WISDOM, with no indication of decline.									

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	♦ Waters and beaches susceptible to high bacteria counts in the summer include banks of the Merrimack River, Soucook River, and Contoocook River, and any locations used as public or private beaches. Ponds especially are prone to high cyanobacteria (blue-green algae) counts that are harmful to people, or host e. coli counts from people or wildlife. ♦ Some of the largest sources of local air pollution are vehicular traffic of I-93 and Granite Shore Merrimack Station (coal-fired) across the Merrimack River in Bow. Air pollution regularly reaches the Central NH region from Canada or the US Midwest.									
RIVER HAZARDS Ice Jams, Scouring, Erosion, Channel Movement or Debris *Event(s) Within Last 5 Years*	♦ Entire City, Floodplains of the Merrimack River, Contoocook River, Turkey River, and Soucook River. Major watercourses include the three rivers, Turkey River, Bow Brook, Burnham Brook, Hoyt Brook, Bowen Brook, Mill Brook, Hayward Brook, Hacket Brook, Snow's Brook, Turree Brook, Bela Brook, Ash Brook, Rattlesnake Brook, and White Brook are the most prominent waters flowing in City. Major waterbodies include wildlife and recreation ponds which are among the main standing bodies of water in addition to Horseshoe Pond, Little Turkey Pond, Great Turkey Pond, Hoit Marsh, and Sewalls Falls. ♦ Erosion of banks could occur along locations of the Merrimack River (see Map 5 Fluvial Geomorphic Location 2015 series), or the Contoocook or Soucook Rivers. ♦ Ice jams could endanger the dams, bridges and nearby infrastructure and have the potential to recur, endangering travelers.	4	4	4	4	16.0 EXTREME	17' Moderate Flood Stage (with no dam failure) 15' Major Flood Stage	0' Low Stage to 20' Major Flood Stage Merrimack 9' Action Stage to 15' Major Flood Stage Soucook	USGS Merrimack River Flood Stage (River Gage) USGS Soucook River Flood Stage	CONN3 Merrimack River at Concord (at NH 9 WW2 Memorial Bridge over Merrimack River) https://water.weather.gov/ahps2/hydrograph.php?wfo=gxx&gage=conn3 SOUN3 Soucook River at Pembroke (north of Pembroke Rd/North Pembroke at

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	♦ Floating debris down the rivers and brooks can accumulate at bridges and dams.								(River Gage)	https://water.weather.gov/ahps2/hydrograph.php?wfo=gyx&gage=soun3 https://dashboard.waterdata.usgs.gov/app/nwd/en/?region=lower48&aoi=default
SEVERE WINTER WEATHER Snow, Ice, Blizzard or Nor'Easter <i>*Event(s) Within Last 5 Years*</i>	♦ Entire City. Particular areas of concern during winter weather include high density areas as listed in High Wind Events. ♦ Utilities at risk of winter weather include telecomm towers; Unifil electric lines; transmission lines, Comcast switching stations and cable lines; water and sewer pumping stations. Telecomm tower antenna arrays as well as City Department antennas could receive significant impacts from snow, ice, and blizzards. ♦ The schools close during inclement weather and have automatic messaging alerts sent to parents about status updates.	4	4	2	3	12.0 EXTREME	5 Extreme Snowfall Major Winter Impacts	1 Notable to 5 Extreme Snowfall No Impacts to	Northeast Snowfall Impact Scale (NESIS) NWS Winter Storm Severity	https://www.ncei.noaa.gov/access/monitoring/rsi/nesis https://www.weather.gov/ict/WSI_Overview

4 HAZARD RISK ASSESSMENT

Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	♦ The entire Concord road network is susceptible to winter conditions, including the state roads (US 202, US 3, NH 13, NH 3A, NH 106, I-93, I-86, I-393). Local City roads are also often difficult to travel. Many accidents during storms. Many local roads and the hilly gravel roads have sharp incline/ decline or cars have trouble traveling the road during winter conditions. ♦ Neighborhoods at higher elevation include the hilly roads which can be difficult to keep clear of snow and tree fall. ♦ Much of the City is wooded and forested with most sections vulnerable to snow, ice effects and power failure. Homes are difficult to access with trees and power lines down on the hilly residential roads. They could be difficult to access with treefall and power lines down from winter storm events. Remote housing could become isolated by treefall, especially those with only one egress. The manufactured housing parks have homes less capable of withstanding snowload. ♦ These roads and especially the one-egress roads are often blocked by fallen trees or powerlines, and residents cannot access their homes or leave their homes until the road is clear. ♦ Local government operations in the Concord City Hall, Fire Stations, General Services Department, Police Headquarters, Meldrim Thompson Office Park East, Merrimack County Court House/Offices, NH Department of Health and Human Services, NH Department of Transportation, NH Homeland Security and Emergency Management, NH Legislative Office Building, NH Military Reservation,						4 Ice Damage	Extreme Winter Impacts 0 Damage to 5 Ice Damage	Index (WSSI) Sperry-Piltz Ice Accumulation Index	https://www.spi-a-index.com

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	NH State Fire Training Facility, NH State House, NH State Office Park South, NH State Police Headquarters, NH State Prison, NH Supreme Court, Shea Farm, US Federal Building conduct essential business and may make decisions during winter weather conditions that keep residents safe. These vital personnel may not live in City or may have commuting difficulties getting to work to perform these duties.									
SOLAR STORMS AND SPACE WEATHER Solar Winds, Geomagnetic Storms (Aurora Borealis), Solar Radiation or Radio Blackout *NO Event(s) Within Last 5 Years**	♦ Entire City. Should a solar event impact the Region, it is likely most electrical and radio systems will become unavailable. The City's critical facilities must be operational to support residents Concord City Hall, Fire Stations, General Services Department, Police Headquarters, Meldrim Thompson Office Park East, Merrimack County Court House/Offices, NH Department of Health and Human Services, NH Department of Transportation, NH Homeland Security and Emergency Management, NH Legislative Office Building, NH Military Reservation, NH State Fire Training Facility, NH State House, NH State Office Park South, NH State Police Headquarters, NH State Prison, NH Supreme Court, Shea Farm, US Federal Building, Schools, telecomm towers, high tension power lines, underground water, sewer, and gas lines, pumping and switching stations. The aurora borealis is regularly seen on Mount Kearsarge to the northwest in Warner and could likely be spotted from Pat's Peak (Henniker), indicating geomagnetic storms are present without noticeable effects. ♦ The City's technology is most vulnerable to space weather, especially communications systems	4	1	2	2	6.7 MEDIUM	G4 Severe Geomagnetic Storm S3 Severe Solar Radiation R3 Severe Radio Blackouts	G1 Minor to G5 Extreme Geomagnetic Storm S1 Minor to S5 Extreme Solar Radiation R1 Minor to R5 Extreme Radio Blackouts	NOAA Geomagnetic Storms Scale NOAA Solar Storms Scale NOAA Radio Blackouts Scale	https://www.swpc.noaa.gov/noaa-scales-explanation https://www.swpc.noaa.gov/noaa-scales-explanation https://www.swpc.noaa.gov/noaa-scales-explanation

4 HAZARD RISK ASSESSMENT

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	(internet, cable, cellular, landline) and the electrical grid. Private wells and private septic serve most residents but municipal water and sewer lines serve thousands of residents and businesses. Gas lines may be operational. Electricity (powerlines & substations) may be interrupted, which could cause automated backup systems to operate. ♦ Alternate support or communications systems available in the event of blackout or equipment failure include: City Department back-up generators and resident generators can temporarily provide power alternatives, and the Capital Area Fire Mutual Aid Dispatch could provide regional communications, and local ham radio operators could provide assistance.									
TROPICAL AND POST-TROPICAL CYCLONES Hurricanes, Tropical Storms or Tree Debris <i>*Event(s) Within Last 5 Years*</i>	♦ Entire City. Most Tropical Events would impact vulnerable areas including populated buildings, high-density locations, and utilities serving residents and business, antennas, and telecommunications towers (See listed under Earthquake & High Wind). ♦ Much of the City north of US 202 and West of US3 or North of I-393 and East of I-93 is wooded and forested and sections would be difficult to access with trees and power lines down on the residential roads. They could be difficult to access with treefall and power lines down from Tropical events. Many of the remote neighborhoods could be difficult to access when tropical cyclone events occur. (See remote areas listed under High Wind). ♦ Agricultural areas are vulnerable to damage from Tropical Events : (See listed under Drought). ♦ Older, or historical buildings are vulnerable to Tropical wind damage.	4	4	3	3	13.3 EXTREME	Category 4 Hurricane	Category 1 74-95 mph Minimal to Category 5 >157 mph Catastrophic Winds	NOAA Saffir-Simpson Hurricane Wind Scale	https://www.nhc.noaa.gov/aboutsshws.php

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Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
WILDFIRE Brushfire, Outdoor Fires or Accidental *Event(s) Within Last 5 Years*	♦ Entire City. Locations most susceptible to Wildfire include vulnerable populations and buildings as identified in Lightning. Backyard burning without a permit is often the cause of brushfires throughout City. The Oak Hill Fire tower in Concord at the Loudon town line is seasonally staffed. ♦ Remote, forested areas, parks, public City Forests, conservation areas, open recreation fields, points of higher elevation than surrounding area can be dangerous to people and property during Wildfire. ♦ The public conservation lands and trail systems, Rural paved Range Roads, could experience difficult to access wildfires on these lands, with people in proximity or possible danger. ♦ Much of the City is privately owned wooded and forested lands which could be difficult to access in case of wildfire. There are dozens of backlot or undeveloped parcels in the City which are 50 acres or greater located on unmaintained City roads, indicating potentially difficult access by fire apparatus. Many of the high elevation roads could be difficult to evacuate should wildfire encroach. ♦ Several extremely large, undeveloped parcels are located around the city (See APPENDIX A) ♦ Slash and brush are found on the ground throughout Concord. As people venture into the woods, potential wildfires are waiting to happen.	4	3	1	2	8.0 HIGH	Extreme (Red) Fire Danger	Low (Green) to Extreme (Red) Fire Danger	National Fire Danger Rating System	https://www.nh.gov/nhdf/comm unity/daily-fire-danger.htm https://www.wfas.net/index.php/fire-danger-rating-fire-potential--danger-32/class-rating-fire-potential-danger-51

4 HAZARD RISK ASSESSMENT

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
SECONDARY TECHNOLOGICAL AND HUMAN HAZARDS										
AGING INFRASTRUCTURE Bridges, Culverts, Roads, Pipes or Underground Lines <i>*Event(s) Within Last 5 Years*</i>	♦ Entire City. Most dams, culverts, and bridges could experience impacts of aging infrastructure . Many bridges have been threatened (but not damaged) by high water debris or ice floes.. ♦ Concord shares many of its bridges with neighboring communities. The City owns multiple red listed bridges including 048/082 Washington St. Over Canal Inlet, 142/116 Delta Dr. over I-93, US 4, 147/028 US 202, NH 9 over Ash Brook, 150/107 US 202 over NHRR Constitution Ave, 152/108 I-393, US 4, US 202 over I-93, 163/111 World War II Veterans Memorial Bridge NH 9 (Loudon Rd) over Merrimack River, 190/067 Iron Works Rd over Turkey River, 193/027 Birchdale Rd. over Bela Brook, 200/015 Hooksett Turnpike over Bela Brook. ♦ Many old or undersized culverts remain vulnerable, although the Highway Department replaces many annually. ♦ In general, the City’s roads are becoming more difficult to maintain and rehabilitate because of lack of funding and over 217 miles of City paved roads, plus miles of sidewalks . ♦ Underground electric utilities, water, sewer, gas or telephone lines are often old and subject to breakage during earthquake or aging materials . See also Earthquake for known roads over lines. ♦ Utility stations like Concord Water Works, or any water & sewer pumping stations require maintenance and upgrade.	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A

4 HAZARD RISK ASSESSMENT

Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
FIRE Vehicle, Structure, Arson or Conflagration <i>*Event(s) Within Last 5 Years*</i>	♦ Several locations around the City are potential sites for explosions and serious fires and numerous other sites that have the potential for prolonged burning. They include above ground fuel tanks, high tension power lines, areas away from cisterns or hydrants; vacant buildings, foreclosed homes or seasonal buildings; or buildings in densely populated areas like downtown areas and Penacook village; or agricultural operations because of fertilizers and pesticides. See Drought for an agricultural operation list. ♦ High Density neighborhoods such as downtown and Penacook village, Manufactured housing neighborhoods (Alosa's Mobile Homes, Concord Terrace, Crestwood Estates/Jensen's Inc., Fisherville Co-op, Foxcroft Estates. Green Acres Mobile Homes/Valley Stream Estates, Green Meadows Manufactured Home Park, Neighboring Pines, Princess Mobile Homes, Riverview Landing), Independent living facilities or apartment buildings (Alton Woods, Beaver Meadow Village, Boucher Apartments, Briar Pipe Apartments, Brickstone Commons/Morningstar, Canterbury Meadows Townhouse, Capitol Plaza/Crutchfield Apartments, Centerstone Residence, Cirillo Apartments, Cobblestone Pointe Senior Village, Concord Commons Condominiums, Concord Gardens/Royal Gardens, Concord Park North, Cranmore Ridge, Eagles Bluff, East side Village/Eastern Ave Apartments, Edgewood Heights, Endicott Hotel Apartments, Family Village 1, Family Village 2, Farmhouse Apartments, Fire House Block Apartments, Florence V. Hodges Apartments,	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	Franklin Square, Friedman Court I & II, GAA Plaza/Alosa Rentals, Havenwood, Heritage Heights, Hillside View Apartments, Hollis Commons Apartments, Horseshoe Pond Place, Island Shores Condominiums, Kennedy Apartments, Mast Yard West Condominiums, McKenna's Purchase Condominiums, Meadow Brook Apartments, Menino Place, Mill Place West, Mulberry Village Condos, Oak Bridge Condominiums, Oak Creek, Ormond Street Apartments, Parkview Place, Parmenter Place, Pembroke Place Apartments, Penacook Place, Penwood Apartments, Perley Place, Pinewood Village Apartments, Pleasant View Retirement Home, Prescott Place Apartments, Regency Hill Estates, Riverhill Condos, Salisbury Green Apartments, South Concord Meadows, The Pines Apartments, The Vineyards of Concord, Village At Thirty Pines, Vineyard Terrace, William Haller Apartments, Willow Crossing, Windsor Estates) and other higher density areas could be subject to conflagration (see also Lightning). ◆ Concord is home to several commercial and industrial activities, mills, excavation, auto repair businesses and other flammable activities. School laboratories and other facilities could catch fire through occupational event, accident, or arson. Other businesses could be vulnerable to fire and may utilize hazardous materials in their work. The Concord Municipal Airport & flight paths and businesses on NH 9 contain perhaps the greatest risk for fire, crash, or explosion. See APPENDIX A for hazardous materials and business lists.									

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	♦ Vehicle fires could occur anywhere, in parking lots, driveways, or roadways. I-93 from Concord to Manchester is the most highly traveled route. The Concord Fire Department and emergency medical services respond to crashes. See also APPENDIX A. ♦ Perhaps the greatest rural concern for human-started fires are the forested trails, Range Roads and conservation lands which would be difficult for fire response. See Lightning and High Wind for other remote area lists.									
HAZARDOUS MATERIALS Haz Mat Spills, Brownfields or Trucking <i>*Event(s) Within Last 5 Years*</i>	♦ Most likely routes of vehicular traffic transport of hazardous materials include I-93 from Concord to Manchester, I-393 from Concord to Chichester, and US 3 from Concord to Boscawen. Other local roads could have serious transportation accidents involving hazardous materials. ♦ Vulnerable areas for targeted mass evacuation/shelter in place from hazardous materials spills include Downtown, Heights, Penacook area residences and facilities, and the Schools. ♦ The largest or most dangerous stationary sites that store and/or handle haz mat on site (fertilizer, pesticides, fuel, etc) are listed in APPENDIX A but include Concord Municipal Airport (aviation fuel), St. Paul's (anhydrous ammonia), Johnny Prescott & Son Oil Co, Inc., Pan Am Railway/Maine Central Railway/Boston & Maine Railway, and others. See also list of agriculture operations in Drought. Occupational stationary haz mat sites where spills could occur include schools, manufacturing, industry, of which there are many in the City. Key sites would include excavation sites, automotive	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	businesses, construction businesses, and the General Services Garage and Transfer Station. ♦ Possible brownfields sites to be aware of include any old mill sites along the Merrimack, Soucook, or Contoocook Rivers, former River rail lines, and parcels with suspected soil contamination. There could also be properties with “illegal” long term, non-permitted junkyard use or salvage yard use occurring before the City is notified.									
LONG TERM UTILITY OUTAGE Power, Water, Sewer, Gas, Internet, Communications or Live Wire Danger <i>*Event(s) Within Last 5 Years*</i>	♦ Entire City. Electrical outages are often city wide, but high density areas or vulnerable populations are of greatest concern: the high density neighborhoods and Schools (see Public Health for a list). ♦ Power outages (Unitil) may last for several days in the most remote areas before service is restored from a large event. Systems failures could affect City businesses and local government on an isolated scale. The internet Xfinity/Comcast enables alternative communication options, and many rely on VOIP for telephones instead of landlines. ♦ Communications failure would be worse if it occurred during a holiday or inhibited emergency dispatch and EOC operations. Some City radios are interoperable, and they are used in more than one location. Local antennas are located on City Department buildings. Other towers throughout the city provide cellular services. ♦ The City is serviced by the Capital Area Mutual Aid Fire Compact which handles all emergency medical service and Fire dispatching. They have redundant capabilities and are regularly upgrading their systems.	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	- Many businesses in city provide propane, natural gas, and oil services locally and statewide. - Other utility systems, such as LP gas, natural gas, generators, oil tanks, wood fuel and more, are used by residents as both back up and primary heating. See also Aging Infrastructure and APPENDIX A. - Much of the City is wooded and forested and sections would be difficult to access with excessive power lines down. See also High Wind or Winter Weather). - The agricultural farms (feeding or dairy animals) should be monitored (See Drought) during extended utility outage.									
TRANSPORTATION CRASH Vehicle, Airplane, Helicopter, Rail, Interstate, Pedestrian or Bicycle *ANNUAL Occurrences Within Last 5 Years*	- I-93 from Concord to Manchester and Concord to Tilton, I-89 from Concord to Hopkinton, US 202 from Concord to Hopkinton, and I-393 from Concord to Chichester are the main highways through the City and have the most reported crashes. Rerouting traffic can be dangerous resulting in other potentially severe crashes. Some of the more frequent crash locations occur along hilly intersections. - Crashes also occur throughout the community at rural intersections, along hills and s-curves. All gravel roads have a low speed limit. Winter and summer months are of particular concern. See also MAPS 1-4. - Crashes increase during hazard events, winter weather, spring snow melt (washouts) and windstorms. The Rural paved Range Roads and the local trail system could have the potential for serious crashes or conflict of use crashes.	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
	♦ The City has alternative crash potential, such as air traffic. The Concord Municipal Airport is an active airport with multiple small planes. The Manchester-Boston Regional Airport is nearby and supports large-engine plane traffic which have the potential of crashing in nearby communities. Concord's NH National Guard also has regular helicopter traffic.(See also Map 1) ♦ Increased use of personal drones creates additional hazard for those on the ground.									
MASS CASUALTY INCIDENT As a result of any hazard event *NO Event(s) Within Last 5 Years*	♦ Unlikely, but Possible. A mass casualty event could occur as a possible secondary effect of a large scale event, such as Terrorism/Violence, Public Health, Transportation Crash, or High Wind Event. These could occur throughout the City. ♦ Any mass casualty event could be localized to a certain area. Locations and occasions of potential public unrest include: City Hall, Government Facilities, City & School Meetings, voting day, local board meetings, visits from political candidates, large events such as Market Days, School sports events, political rallies. ♦ Concord is a member of the Capital Area Public Health Network (CAPHN) and other regional emergency groups. The City's local primary shelter is located at Green Street Community Center which is equipped with a generator, and the Multi-Generational Community Center could serve this purpose. Concord High School is an alternative shelter to coordinate. Ambulances provide EMS and transport to Concord Hospital in under 5 minutes.	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A

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Natural, Technological, Human Hazard Categories	Potential/Susceptible (Existing) Hazard Locations in the City <i>See also Appendix A. Critical Community and Facility Vulnerability Assessment (CCFVA)</i>	PROBABILITY of Occurrence in 10 Years	SEVERITY of Impact			OVERALL RISK (1-16)	Highest Magnitude of Hazard in Concord within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/ Extent Measurement Scale or Index	PRIMARY Magnitude/ Extent Scale or Index Hyperlink
			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
TERRORISM/ VIOLENCE Active Shooter, Hostage, Public Harm, Civil Disturbance/ Unrest, Politically Motivated Attacks, Incendiary Devices, Sabotage or Vandalism <i>*Events(s) Within Last 5 Years*</i>	♦ Possible. Terrorism/ violence could possibly occur anywhere in Entire City and could result in mass casualty. Most susceptible non-municipal or government sites could include Downtown or Penacook Village, City & School Meetings, or the Churches. ♦ All municipal and government facilities in Concord have a risk of terrorism or violence. ♦ Private manufacturing or industrial businesses with large quantities of hazardous materials could be possible terrorism targets. ♦ Sabotage would be most likely to occur at City, School, State or governmental facilities to halt operations or computer systems, including the telecomm towers & antennas, switching stations, the City Hall computer systems, and Concord Water Works or pumping stations. ♦ Vandalism could occur at dams, under bridges, wooden covered bridges, telecommunications or tower, cemeteries, vacant buildings, beaver dams, recreation areas, etc. ♦ Hostage and active shooter situations might most likely occur domestically anywhere in the City, in municipal buildings, Churches, Schools, high density housing (see Public Health). ♦ Sites of local significance (historic markers) or other public places could become potential sites of Terrorism/ Violence.	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A
CYBER EVENT Municipal Computer Systems Attack, Website	♦ Entire City. Cyberattack could target City or School websites, computer systems, cloud data systems, archival records, email phishing, etc. City Hall, Police Department, Fire Department, Transfer Station, General Services Department, Library and	not scored	not scored	not scored	not scored	not scored	N/A	N/A	N/A	N/A

4 HAZARD RISK ASSESSMENT

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			Human Injury Impact	Essential Services or Infrastructure Impact	Property Damage or Economic Impact					
Overtake, Cloud Data Breach, Telephone Rerouting, Identity Theft, Phishing, Ransomware, Virus or Phone Scams <i>*ANNUAL Occurrences Within Last 5 Years*</i>	Historical Society records would be high-value targets. ✦ Email scams and identity theft are likely regular problems for residents and businesses. Towns often post known attempts on websites to inform residents. The large businesses in Concord (See APPENDIX A) would need to be aware of the risks. ✦ The Police Department receives phone calls from residents about internet and email scams and reports them to the appropriate authorities.									

Source: Concord Hazard Mitigation Committee

Central NH Region Major Disaster Declarations, 1973-2022

The Central NH region, which encompasses parts of Merrimack County (**18** communities) and Hillsborough County (**2** communities), has been damaged by **31** presidentially-declared major disasters [DR-] and presidentially-declared emergencies [EM-] in the last **49** years between **1973-2022**.

Although a natural disaster typically befalls multiple counties in New Hampshire, only those presidentially-declared or emergency declarations within either Hillsborough County or Merrimack County were identified in this Plan.

Disaster declarations [DR-] within a county enable the ability to receive Public Assistance (PA) funding and Individual Assistance (IA) funding, Hazard Mitigation Grant Program (HMGP) *plan* funding is typically made available to all communities statewide, and for those towns with an active, approved Hazard Mitigation Plan, HMGP *project* funding becomes available. *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. EM- declarations typically open Hazard Mitigation Grant Program (HMGP) plan and project funding for communities with an active hazard mitigation plan.

Over the last **17** years (**2005-2022**), the Central NH region containing communities within Merrimack and Hillsborough Counties experienced **18** presidentially- declared natural major disasters [DR-] or presidentially- declared emergency declarations [EM-] which differ between DR- or EM- depending on which county was declared. The earliest Central NH region declarations spanned **1973** to **2004** (**32** years) and yielded total **13** disasters of both [DR-] and [EM-].

PUBLIC ASSISTANCE GRANT FUNDING

For the global COVID-19 pandemic DR-4516 from **2020-2022**, the City obtained **\$1,249,111** in CARES Municipal COVID-19 Cost Disbursement Program and First Responder & Correctional Officer Stipend funding. The last weather disaster declared in Merrimack County for which Concord applied for and received **\$127,177** in federal Public Assistance funding was the winter storm event in **February 2013**. Details of Central NH region declared disasters and emergency declarations since **1973** and federal funding provided to the City of Concord are displayed in **Table 12**. Most of these disasters will be described within the following **Past Disasters and Severe Weather Events** section.

GOVERNOR'S OFFICE FOR EMERGENCY RELIEF AND RECOVERY (GOFERR)

The NH Governor's Office for Emergency Relief and Recovery (GOFERR) at <https://www.goferr.nh.gov/> provides transparent review and access to the state's CARES Act - Coronavirus Relief Fund allocations for the DR-4516 COVID-19 Pandemic. The US HR 748 Coronavirus Aid, Recovery, and Economic Security (CARES) Act enacted 3/27/20 provided **\$1.25b** to the state and is one of several relief bills and funding pots for COVID-19. The GOFERR is making these funds available through various programs. Municipalities, businesses, and individuals can apply to several funding programs through GOFERR.

Table 12

Central NH Region Major Disaster Declarations, 1973 to 2022

FEMA DR-	Local Disaster Name	Incident Period	FEMA Disaster Name	Includes County*		FEMA Public Assistance (PA) Funding To Concord**
				Merr	Hill	
	CITY ADD NEW DISASTER ROWS HERE-					
4516	2020-2022 COVID-19 Pandemic	Apr 3, 2020 – TBD	COVID-19 Novel Coronavirus Pandemic (national, global)	M	H	PA \$281,383 Municipal COVID \$859,583 and First Responder \$389,528
4355	2017 Oct Wind and Rainstorm	Oct 28-20, 2017	Severe Storm and Flooding from Tropical Storm Phillippe	M	---	\$0
4209	2015 January Blizzard	Jan 26-28, 2015	Severe Winter Storm and Snowstorm	---	H	\$0
4105	2013 February Snowstorm	Feb 8-10, 2013	Severe Winter Storm and Snowstorm	M	H	\$127,177
4095 EM-3360	2012 Hurricane Sandy Emergency	Oct 26-Nov 8, 2012	Hurricane Sandy	EM-M	EM-H	\$26,320
4049 EM-3344	2011 Halloween Snowstorm Emergency	Oct 29-30, 2011	Severe Storm and Snowstorm	EM-M	H	\$0
4026 EM-3333	2011 Tropical Storm Irene	Aug 26-Sep 6, 2011	Tropical Storm Irene	M	EM-H	\$19,540
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	\$88,699
1812	2008 December Ice Storm	Dec 11-23, 2008	Severe Winter Storm	M	H	\$87,434
1799	2008 September Flood	Sep 6-7, 2008	Heavy Rains and Floods	M	H	\$0
1782	2008 July Tornado	Jul 24, 2008	Tornado, Severe Winds, Heavy Rains	M	---	\$0
1695	2007 April Spring Flood	Apr 15-23, 2007	Severe Storms and Flooding	M	H	\$28,344
1643	2006 Mother's Day Flood	May 12-23, 2006	Severe Storms and Flooding	M	H	\$213,391

4 HAZARD RISK ASSESSMENT

FEMA DR-	Local Disaster Name	Incident Period	FEMA Disaster Name	Includes County*		FEMA Public Assistance (PA) Funding To Concord**
				Merr	Hill	
1610	2005 Columbus Day Flood	Oct 7-18, 2005	Severe Storms and Flooding	M	H	\$27,935
EM-3211	2005 Snow Emergency	March 11-12, 2005	Snowstorm	---	EM-H	\$0
EM-3207	2005 Snow Emergency	Jan 22-23, 2005	Snowstorm	EM-M	EM-H	\$80,510
EM-3193	2003 Snow Emergency	Dec 6-7, 2003	Snowstorm	EM-M	EM-H	\$72,051
EM-3177	2003 Snow Emergency	Feb 17-18, 2003	Snowstorm	EM-M	EM-H	\$55,846
EM-3166	2001 Snow Emergency	Mar 5-7, 2001	Snowstorm	EM-M	EM-H	\$56,197
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
EM-3101	1993 Blizzard	Mar 13-17, 1993	Blizzards, High Winds and Record Snowfall	EM-M	EM-H	\$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 to Concord 1993-2022**		Weather Disasters DR- & EM-				\$1,164,827
Total GOFERR Assistance to Concord 2020-2022**		Pandemic Funds / CARES or ARPA				\$1,249,111
Total Federal Disaster Funding to Concord 1993-2022**		CARES Act/NH Governor's Office for Emergency Relief and Recovery (GOFERR) 2020-2022 https://www.goferr.nh.gov/welcome				\$2,413,938

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 include only PA and HMGP. PA dataset available at <https://www.fema.gov/openfema-dataset-public-assistance-funded-projects-details-v1>.

To help reclaim some of the costs these disasters wrought on city property and infrastructure and for additional staff time, Concord 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 City employees, equipment rentals, snow removal, washout repair, road reconstruction, bridge repair, debris removal, and more.

The country-wide database where the FEMA Public Assistance funding information resides is available from 1993 to present (2022). Concord in Merrimack County was eligible for reimbursement for up to a

total of **24** disasters and emergency declarations. Disaster funding was sought for and received by Concord for **6** of the **15** [DR-] and for **8** of the **9** [EM-] during this period. All funding awarded to Concord appearing in the Public Assistance database between **1993-2017** totals over **\$1,164,827**. This detail is displayed previously in **Table 12** and is summarized to \$100/\$1000 in the forthcoming **Table 13** for each disaster.

The most expensive disaster for Concord in terms of FEMA Public Assistance (PA) funds received for recovery has been the DR-4516 **2020-2022** COVID-19 pandemic for which Concord received **\$281,383** for seven **(7)** PA-B Emergency Protective Measures projects. Additional monies for the **2020-2022** COVID-19 pandemic was obtained by the City through a federal program, welcoming **\$1,249,111** in CARES Act funding.

Past Disasters and Severe Weather Events

The City of Concord 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 City 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 Concord and its residents. Public Assistance disaster funding opportunities open to communities when a disaster is declared within a county. The City of Concord applied for and received this funding for several recently declared disasters.

Although New Hampshire experienced more disasters than those shown in **Table 12**, typically only those which occurred as declared disasters [DR-] or emergency declarations [EM-] in the Central NH region (Merrimack and Hillsborough Counties) were described. Sometimes a disaster occurring in a nearby county, such as Rockingham County in proximity to Concord, will be included. Refer to the [State of New Hampshire Hazard Mitigation Plan 2023](#) for a complete list of disasters which impacted the rest of New Hampshire.

Also identified were numerous past hazard events or severe weather events that occurred locally in the community and within the area that were impactful enough to note in **Table 13 Local and Area Hazard Event and Disaster History (Sequential)**. These past hazard events are listed consecutively with the newest events at the top of the table. If a specific category of event was not recorded in Concord in the last **5** years, this means the Hazard Mitigation Committee did not recall an event of significance since the **2017 Plan**.

COLOR KEY for Table 13s:

Declared Disasters (DR-) or Emergency Declaration (EM-) in Hillsborough County or Merrimack County in Central NH Region	PA Funding \$ Received by Concord	Other Concord Local Hazard Event	Regional Hazard Event with Concord Impacts

For the **Hazard Mitigation Plan Update 2024**, the disaster declarations, emergency declarations, most notable hazard events and most notable severe weather events have been noted in individual tables to better understand their impact over time. Many of the hazard events could qualify for description in multiple tables; for brevity, the hazard event is placed into the best fitting of the main hazard category tables. The following **Tables 13A- Table 13K** enable all notable hazard and weather events evaluated by the **Concord Plan** to fall under one of the following categories:

Table 13A: High Wind/Tropical | Table 13B: Flood/River | Table 13C: Winter | Table 13D: Drought | Table 13E: Extreme Temperatures | Table 13F: Earthquake/Landslide | Table 13G: Solar | Table 13H: Wildfire/Lightning/Fire | Table 13I: Public Health/Biological | Table 13J: Hazardous Materials | Table 13K: Human/Technological

Table 13A

HIGH WIND/TROPICAL: Local and Area Hazard Event and Disaster History (Sequential)

HIGH WIND/TROPICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Regional Tropical Storm Henri Aug 2021	No	2021	19-27-Aug	N/A	Strong tropical storm with flash flooding, high winds 30-40mph, power outages, tree damage, heavy rain between 2 and 4 inches.	Concord likely felt similar effects as the rest of the state including heavy rain, high winds, potential flooding, tree damage, and power outages	Heavy Rain, Flooding, Wind, Power Failure	CNHRPC, WebEOC, NH SEOC

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

HIGH WIND/ TROPICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
Regional Tropical Storm Isaias Aug 2020	No	2020	3-6- Aug	N/A	Tropical storm with extreme wind gusts, flash flooding, high rainfall, tree damage, and power outages.	Concord experienced the same storm effects including high wind, flooding, rainfall, tree damage, and power outages.	Tropical storm, High wind, power failure, flooding	CNHRPC, WebEOC, NH SEOC, NHPR.org
Regional Windstorm Oct 2017	4355	2017	30 Oct	\$0	Surrounding towns also had high winds leading to tree damage and power outages. Declared disaster in Merrimack County (not Hillsborough County)	Concord did not apply for or receive PA funding. Concord likely experienced significant tree damage and power outages due to high winds. Transportation may have been altered due to road closures.	Wind, Power Failure	CNHRPC, Concord Hazard Mitigation Committee
Hazard Events 2005-2016								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Tornado, Severe Thunderstorm s 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. City officials said the tornado ripped the roof off a barn, but there were no injuries reported.	N/A, although Warner is 2 communities to the west of Concord	Wind, Tornado	WMUR
Hurricane - Hurricane Sandy Oct 2012	4095 EM-3360	2012	Oct 26- Nov 8	\$26,320	Merrimack County and Hillsborough County received a disaster declaration for Emergency Protective Measures. Five 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.	Concord received \$26,320 in FEMA Public Assistance funding for debris removal of fallen trees and limbs, protective measures, and roads and bridges. Power was not lost in Concord.	Wind, Flood, Severe Storm, Hurricane, Debris Impacted Infrastructure	Concord Hazard Mitigation Committee , FEMA, Nashua Telegraph
Tropical Storm- Tropical Storm Irene Aug-Sep 2011	4026	2011	Aug 26- Sep 6	\$19,540	Carroll, Coos, Grafton, and Merrimack Counties suffered severe impacts to roads and bridges as a result of flooding from	Concord received \$19,540 in FEMA Public Assistance funding for debris removal of fallen trees and limbs,	Wind, Flood, Severe Storm, Rainstorm, Tropical	FEMA, Concord Hazard Mitigation Committee

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

HIGH WIND/ TROPICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					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.	protective measures, and roads and bridges.	Storm, Debris Impacted Infrastructure	
Concord Microburst Jun 2005	No	2005	12-Jun	N/A	During a severe regional thunderstorm, lightning struck and severely damaged the historic Loudon City Hall on Clough Hill Road. Winds from a severe thunderstorm knocked down trees and power lines down in the Towns of Warner, Hopkinton, Concord, Bow, Loudon, and Hopkinton in Merrimack County.	A microburst hit the Concord Country Club, which caused downed trees and loss of power. No injuries were reported.	Microburst, Thunderstorm, Lightning, Severe Winds	CNHRPC, Concord Hazard Mitigation Committee, Area Hazard Mitigation Committees
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Downbursts Jul 1999	No	1999	6-Jul	N/A	Other communities in the Central NH Region experienced damages, including Hopkinton, from high winds and downbursts during this event	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).	Wind, Downburst	Concord Monitor, NH HSEM
Concord Severe Thunderstorms Jul-Sep 1995	No	1995	Jul 8, Jul 15, Sep 14	N/A	Three separate regional thunder storms in summer 1995.	A severe thunderstorm caused several trees to blow down in Concord. Hail was reported. Another severe thunderstorm in Concord caused a large tree to fall over on top of a manufactured	Thunderstorms, Severe Wind Events, Hail, Lightning, Heavy Rain Storms, Debris	Concord Mitigation Committee

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

HIGH WIND/ TROPICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						home. Thunderstorms ahead of a fast moving cold front produced damaging winds which downed trees and power lines, causing power outages in Concord.	Impacted Infrastructure	
Severe Storm-Hurricane Bob Aug 1991	917	1991	Aug 18-20	N/A for Concord	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 Concord is within Merrimack County, it likely experienced heavy rains, wind gusts, tree debris, power outages and possibly some flooding.	Wind, Hurricane	FEMA, CNHRPC
Concord Beaver Meadow Tornado Jul 1979	No	1979	Jul 27	N/A	N/A, although some regional communities likely experienced a thunderstorm	In Concord, a severe thunder and lightning storm lit skies, and uprooted trees. 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.	Severe Winds, Tornado, Thunderstorm	Concord (Daily) Monitor
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Severe Thunderstorm Aug 1968	No	1968	Aug	N/A	N/A, although some regional communities likely experienced a thunderstorm	A violent wind, hail, and thunderstorm uprooted trees and downed powerlines. Lightning struck the South Congregational Church steeple on Pleasant Street. A second storm later that month clocked winds at 71 miles per hour.	Severe Winds, Thunderstorm, Hail, Debris Impacted Infrastructure	Concord (Daily) Monitor
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	Downed trees, wind damage, and flooding was likely experienced in Concord during many of these hurricanes.	Wind, Flood, Hurricane, Tropical Storm, Debris Impacted	NH Homeland Security and Emergency Management, Concord Hazard

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HIGH WIND/ TROPICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					on September 11, 1954, Donna on April 12, 1960 (heavy flooding), Doria on August 28, 1971, Bell on August 10, 1976, Gloria on September 27, 1985, and Bob in 1991.		Infrastructure	Mitigation Committee
Concord Severe Thunderstorm Jun 1950	No	1950	Jun 26	N/A	N/A	A severe wind and rain storm, with 100-mile per hour gusts, ripped the roofs off of homes and businesses, felled hundreds of trees which blocked streets, and disrupted the electricity and telephone lines. The drive-in theater screen was flattened. Planes at the airport were toppled and severely damaged. It was "the worst storm since the 1938 hurricane." About \$1 million in damages was estimated.	Severe Wind Events, Downburst, Thunderstorm, Rainstorm	Concord (Daily) Monitor
Concord Airport Road Tornado Jul 1946	No	1946	Jul 23	N/A	N/A	A tornado struck and damaged the National Guard Armory on Airport Road	Tornado, Severe Wind Events	Concord (Daily) Monitor
Concord 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	The hurricane of September 1938 impacted Concord with flooding and high winds. Thirteen people died in New Hampshire; one man was killed in Concord as a cause of high winds. This was the worst hurricane to ever strike New England, resulting in 564 deaths and over 1,700 injuries. In Concord, areas along the Merrimack River experienced heavy flooding. The Merrimack River rose to 11 feet over its flood stage. Roads throughout Concord	Severe Wind, Hurricane & Tropical Storms, Flood, Debris Impacted Infrastructure	Wikipedia, Concord Monitor, Concord Hazard Mitigation Committee, NH HSEM

HIGH WIND/ TROPICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						were washed out, making them impossible to pass. Concord became isolated from the State because all roads leading out of Concord were either flooded or obstructed by trees. Rollins Park in the South End was flooded. In Concord, winds caused more than 1,000 electrical poles to topple and were responsible for the death of one Concord man. In front of the State House, five century-old elms were knocked down. As reported in the Concord Monitor in September 1938, the hurricane was “the sharpest setback the state has ever experienced.” Thirteen deaths and 1,363 families received assistance because of the hurricane. Other losses included smashed homes, crippled communication lines, blocked roads, and total direct losses of \$12,337,643 (1938 dollars). The timber industry was hit hard with the loss of trees		
Concord Hurricane Jul 1889	No	1889	Jul 30	N/A	N/A, although it is likely regional communities experienced the severe winds of this event	Damage from this hurricane resulted from high winds, and struck portions of the State. In Concord’s South End, uprooted trees were reported.	Hurricane, Severe Winds	History of Concord, NH (J Lyford)

Table 13B

FLOOD/RIVER: Local and Area Hazard Event and Disaster History (Sequential)

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Regional Flash Flooding Aug 2021	No	2021	1-Aug	N/A	Heavy rainfall 0.5-2 inches in areas throughout the state sufficient to produce flooding and road closures.	Concord likely experienced heavy rainfall	Heavy Rain, Flooding	CNHRPC, WebEOC, NH HSEM
Regional Heavy Rainstorm Jul 2021	4624	2021	30-Jul	N/A for Concord	Heavy rainfall 0.5-2 inches in areas throughout the state sufficient to produce flooding. This was not a declared disaster in Merrimack or Hillsborough Counties	Concord experienced heavy rainfall and likely flooding.	Heavy Rain, Flooding	CNHRPC, WebEOC, NH HSEM
Regional Severe Storm and Flooding Jul 2021	4622	2021	18-Jul	N/A for Concord	Heavy rainfall 0.5-2 inches in areas throughout the state sufficient to produce flooding. This was not a declared disaster in Merrimack or Hillsborough Counties	Concord experienced heavy rainfall and likely flooding.	Heavy Rain, Flooding	CNHRPC, WebEOC, NH HSEM
Regional Christmas Rain and Windstorm Dec 2020	No	2020	25-Dec	N/A	Heavy rain and strong winds throughout the state. 1.5-2.5 Inches of rain and gusts of wind from 45-55 mph. Combined with snowmelt the storm caused flooding.	Concord likely felt strong winds and heavy rains potentially causing flooding, tree damage, and road closures.	Heavy Rain, Wind, Flooding	CNHRPC, WebEOC, NH WMUR

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
Regional Severe storm and Flooding Jul 2019	4457	2019	11-12-Jul	N/A for Concord	Repeated severe thunderstorms resulted in flash flooding throughout regions of New Hampshire. This was not a declared disaster in Merrimack or Hillsborough Counties	Concord likely experienced storms producing heavy rain causing the potential of flooding.	Heavy Rain, Flooding	CNHRPC, WebEOC, FEMA, Boston Globe
Regional Spring Flooding Apr 2019	No	2019	19-22-Apr	N/A	Warmer weather, snowmelt, and heavy rain causes regional spring flooding.	Concord likely experienced flood conditions from the rain and its rivers.	Heavy Rain, Flooding	CNHRPC, WebEOC, NBC Boston, NHDOT Twitter
Regional Flash Flooding Aug 2018	No	2018	3-Aug	N/A	Other towns may have received intense rains resulting in flash flooding.	Intense rain, measuring 1.2 inches in 30 minutes caused flash flooding especially in the Lincoln and Federal Street area. Drainage in this area is under capacity leading to more frequent flash flooding.	Flooding	CNHRPC, Concord Hazard Mitigation Committee
Regional Storm and flooding Mar 2018	4370	2018	2-8 Mar	N/A for Concord	Severe storm, rain, and wind causes flooding and near 60,000 state residents experiencing electrical outages. This was not a declared disaster in Merrimack or Hillsborough Counties	Concord likely experienced the heavy rain and wind causing electrical outages.	Wind, Rain, Flooding, Power Failure	CNHRPC, WebEOC, FEMA
Hazard Event 2016-2005								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Floods and Flash Floods 2013-2016	No	2013-2016	Sep 20	N/A	It's likely the region experienced some flooding events during times of heavy rain	Issues to be resolved in 2016- Lincoln Street, low catchment areal catch basin & hydraulic capacity of area is deficient, floods during flash storm. Kimball Jenkins Estate - water from I-393 and Main Street cascades down over retaining wall (waterfall). Velocity eroded the north side of the pavement and washes out the area.	Floods and Flash Floods, Severe Rain Storms	Concord Hazard Mitigation Committee

4 HAZARD RISK ASSESSMENT

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						Driveway and foundation near building keep eroding. Currently (10-16) working on a solution for placement of new pipe system into Horseshoe Pond to divert water. Allison Street culvert failure in 2013, Main Street spring 2014 at Warren Street, 2015 I-93.		
Concord Areas of Soucook and Turkey Fluvial River Erosion, Landslide 2015	No	2015		N/A	The Turkey River begins in Concord at the Turkey Ponds and flows southeast into Bow. The Soucook River begins in Loudon and flows south forming the Concord/Pembroke boundary into Bow where it empties into the Merrimack River. The Merrimack travels through many Central NH Region communities then flows south to southern NH, and flows south east into Massachusetts with its mouth at Newburyport.	Based on the Turkey and Soucook Fluvial Geomorphic Assessments and associated maps, there are many locations along these rivers that are currently eroding or have features that will encourage flooding under heavy flow conditions. Slope erosion at the Concord Airport destroyed a drainage outfall near Runway 35 and the system had to be reconstructed a year later.	Fluvial Erosion, Landslide, Flooding	Concord Hazard Mitigation Committee, NHGS Fluvial Geomorphic Assessments, CNHRPC (Assessments & Maps are part of this Haz Mit Plan)
Concord Ice Jam on Contoocook River 2014	No	2014	---	N/A	Contoocook River flows through Boscawen and into Concord as it empties into the Merrimack River.	Contoocook River ice jam in 2014 upstream of the Penacook Dam.	Ice Jam	Concord Hazard Mitigation Committee
Severe Storms and Flooding Mar 2010	1913	2010	Mar 14-31	No	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)	The City of Concord sustained damaging winds up to 68 miles per hour and a 1.7 inches rain fall. The impacts of the weather caused Operational and Communications units of the Concord Fire Department to be pushed to the maximum of their capabilities. Over 136 calls for service for Concord Fire Department and 578 runs throughout the Capital Area Mutual Aid	Severe Wind, Microburst, Flood, Debris Impacted Infrastructure, Power Failure	Concord Hazard Mitigation Committee, FEMA, Concord Fire Department After Action Report, 2/25/10 and General Services Letter to FEMA 5/12/10

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						Compact were received. Multiple calls for downed power lines and trees into structures were received. An audible alarm was transmitted to call back off duty members to assist with emergency response. The City EOC was activated to support the event. Costs included removing trees and limbs off streets immediately after the wind storm to open streets up and placing barricades to close streets when power lines were down on them until the power company was able to take care of the downed power lines. The costs are also for picking up debris from streets, sidewalks, parks, cemeteries and the public golf course for several weeks after the storm came through.		
Severe Storms and Flooding – Sep 2008	1799	2008	Sep 6-7	No	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 City reimbursement. Hillsborough County's	Concord did not apply for/receive funding. Likely Concord experienced drainage system flooding and watercourse overflow	Flood, Debris Impacted Infrastructure	FEMA, CNHRPC

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4 HAZARD RISK ASSESSMENT

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					damage was much higher at \$6.90 per capita (400,721 people in 2010)			
Severe Winds, Heavy Rains July Tornado Jul 2008	1782	2008	Jul 24	No	An F2-F1 tornado touched down in Rockingham County then proceeded into another county. Then in Merrimack County, the tornado was rated up to an 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	Concord did not apply for/receive funding. The path of the tornado did not travel through Concord, although it was only about 2-3 towns to the east. In Epsom, 84,000 acres were destroyed and there was significant damage to personal property, destroying or damaging 9 homes.	Wind, Tornado, Downburst, Severe Storm, Debris Impacted Infrastructure	FEMA, Epsom Hazard Mitigation Committee, CNHRPC
Severe Storms and Flooding - April Spring Flood Apr 2007	1695	2007	Apr 15-23	\$28,244	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 Epsom were 14,100 ft ³ , which was determined to be greater than 100-year flood discharge levels. Rain developed across New Hampshire Sunday morning and spread northward. The rain became heavy during the afternoon and overnight. By morning, 3 to 5 inches of rain had fallen over much of	Concord received \$28,344 in FEMA Public Assistance funding for FEMA funds were obtained for plowing and salting streets, and then repairs to roads and shoulders that had been washed out by the rains.	Flood, Wind, Debris Impacted Infrastructure, Rapid Snow Pack Melt	FEMA, USGS Flood of 2007, Concord Hazard Mitigation Committee

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					southeastern New Hampshire and 1 to 3 inches across much of the remainder of the state. In the mountains of New Hampshire, 3 to 11 inches of snow had fallen. Although the heaviest precipitation fell from Sunday afternoon into Monday afternoon, precipitation persisted into Tuesday. Flooding: 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. Power outages persisted, and stream and river flooding continued across the region.			
Suncook River Avulsion in Epsom May 2006	1643	2006	May 14-17	N/A	The Suncook River through Epsom changed its course during this recent heavy rain event and its resultant flooding. The River shifted hundreds of meters, flowing around two dams, creating about a mile of new river through a sand pit a half mile from its original course, and leaving a similar	Area event N/A to Concord, see storm effects on Concord below	Flood, Earth, Landslide, Erosion, Debris Impacted Infrastructure, Channel Movement	Concord Monitor

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					length of dry riverbed. The water carved through peat bogs and tore away a corner of a sand excavation pit. Local communities of Epsom, Allenstown, and Pembroke later dealt with siltation and erosion issues from the new river course			
Severe Storms and Flooding – Mother's Day Flood May 2006	1643	2006	May 12-23	\$213,391	Extensive flooding caused by severe storms impacted seven counties including Merrimack and Hillsborough. 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. The City and surrounding area experienced record rainfall within a 72 hour period. This caused local streams and rivers to overflow their banks resulting in localized and area flooding.	Concord received \$213,391 in FEMA Public Assistance funding for extreme flooding and washout damage to roads, culverts, ditches, and embankments. 2006- St. Paul's School suffered tremendous flooding damage during the Mother's Day flood from the Turkey River. The School has undertaken measures to lessen future damage. Concord Steam, a locally owned public utility, was forced to shut down its operations for the first time. It reopened within 48 hours. FEMA funds were obtained by the City for repairs to roads and shoulders washed out by the rains. During the Mother's Day flood, flooding on Iron Works Road washed the bridge out. Rattlesnake Brook leaves the City's water supply and travels through a residential zone, spilling out into the floodplain. The Mother's Day storm had blowdown which had an impact on some of the older culverts.	Flood, Wind, Debris Impacted Infrastructure, Erosion, Scouring, Landslide	Concord Hazard Mitigation Committee, FEMA, USGS
Severe Storms and Flooding - Columbus Day	1610	2005	Oct 7-18	\$29,300	Extensive flooding caused by severe storms impacted five	Concord received \$29,300 in FEMA Public Assistance funding for	Flood, Wind, Debris	Concord Hazard Mitigation

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
Flood Oct 2005					counties, including Merrimack and Hillsborough. Alstead experienced several fatalities as the result of dam failure.	the Columbus Day Flood. Roads and bridges were damaged by flooding and washouts, debris clogged culverts, roads were washed out and slopes were eroded. The EOC was activated. FEMA funds were obtained to pump waste water from storage tanks. FEMA funds were also obtained to repair roads and shoulders of Elm Street and Farmwood Road that had been washed out by the rains.	Impacted Infrastructure, Erosion	Committee, FEMA
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Flooding Event Aug 2003	No	2003	Aug 12	N/A	Likely the region experienced flooding during heavy rain event.	Thirty residential properties were damaged by flooding in the Penacook, West Concord, and Riverhill sections of the City. Damages included flooded basements and washed-out driveways.	Floods and Flash Floods, Severe Rain Storms	Concord Hazard Mitigation Committee
Severe Storms and Flooding Jun-Jul 1998	1231	1998	Jun 12-Jul 2	\$0	Heavy flooding in six counties, including Merrimack and Hillsborough Counties. Damages of \$3.4m for all counties.	Concord did not apply for/receive funding. The City likely experienced heavy rains and possibly some flooding.	Flood, Wind, Debris Impacted Infrastructure	FEMA
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.	Concord did not apply for/receive funding. It is likely experienced heavy rains and possibly some flooding.	Flood	FEMA, NH HSEM, CNHRPC
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).	Concord did not apply for/receive funding. It is likely experienced heavy rains and possibly some flooding.	Flood	FEMA, Federal Register, CNHRPC

4 HAZARD RISK ASSESSMENT

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
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 Concord is within Merrimack County, it likely experienced heavy rains, tree debris, power outages and possibly some flooding.	Flood, Wind	FEMA, NH HSEM
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 Concord is within Merrimack County, it likely experienced heavy rains, tree debris, power outages and possibly some flooding.	Flood, Wind	FEMA, NH HSEM
Severe Storms and Flooding Jul-Aug 1986	771	1986	Jul 29-Aug 10	N/A for Concord	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).	It is likely Concord experienced heavy rains and possibly some flooding.	Flood, Wind	FEMA, NH HSEM
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	Flood, Wind	FEMA
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Rapid Snow Pack Melt Flooding 1969	No	1969	—	N/A	N/A, although some regional communities likely experienced similar melt and flooding conditions	The Concord Daily Monitor regularly reported lowland flooding from the Merrimack River due to rapid pack snowmelt. The Bridge Street level reading was 9' 11", and at 11'3" Fort Eddy would be flooded. Evacuation information was sought for East and West Portsmouth Streets,	Flood, Rapid Snow Pack Melt	Concord Hazard Mitigation Committee

4 HAZARD RISK ASSESSMENT

FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						Foundry Street, and Eastman Street.		
Concord Ice Jam on Soucook River Mar 1968	No	1968	Mar 19	N/A	N/A, although the Soucook River forms the border of Concord/Pembroke	Maximum annual gage height, 10.48 feet due to an ice jam recorded at USGS gage Soucook River near Concord, New Hampshire on March 19, 1968	Ice Jam	US Army Corps of Engineers NH Ice Jams Database
Concord Ice Jam on Soucook River Apr 1959	No	1959	Apr 3	N/A	N/A, although the Soucook River forms the border of Concord/Pembroke	Maximum annual gage height of 12.03 feet, affected by backwater from ice, reported at USGS gage Soucook River near Concord, on April 3, 1959	Ice Jam	US Army Corps of Engineers NH Ice Jams Database
Concord Flood 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 Winnepesaukee, Contoocook and Pemigewasset rivers that were largely responsible for the destruction in Concord and the surrounding area. NH issued boil water warnings to everyone.	In Concord, the flooding caused by heavy snowfall totals, heavy rains, warm weather, and run-off from melting snow overflowed the rivers and caused severe damage. An ice jam occurred in the Merrimack River and resulted in road flooding. As a result of heavy snowfall totals, heavy rains, and warm weather, ice chunks jammed up the Contoocook River. The train tracks running through Concord were covered, preventing passage. Country roads throughout the City were damaged, many being completely washed out. More than 60 Concord families had their homes isolated by floods and were forced to evacuate with the aid of a boat. It took more than seven days before roads were open again.	Flood, Ice Jams, Rapid Snow Pack Melt	Concord Monitor, Union Leader, Army Corps of Engineers Ice Jam Database, Northeast States Emergency Consortium
Concord Flood Apr 1852	No	1852	Apr 21-24	N/A	N/A, although the Merrimack River is a Central NH river and other communities	Merrimack River was at its highest stream stage in 70 years.	Flood, Rapid Snow Pack Melt	Concord Hazard Mitigation

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FLOOD/RIVER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					likely experienced flooding conditions from brooks or local rivers			Committee, NH HSEM
Concord Ice Jam on Merrimack River Apr 1812	No	1812	Apr 12	N/A	N/A, although the Merrimack River forms part of the Bow/Concord boundary	Ice chunks carried 100 feet of a Concord bridge downstream on the Merrimack River.	Ice Jam	History of Concord (Bouton)

Table 13C

WINTER: Local and Area Hazard Event and Disaster History (Sequential)

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Regional Snowstorm Feb 2021	No	2021	1-2-Feb	N/A	Severe snowstorm impacting the state resulting in 3-16 inches of snow.	Concord experienced 7 inches of snow and potential tree damage, and power outages.	Extreme Temp, Snow, Power Failure	CNHRPC, WebEOC, NH WMUR
Regional Snowstorm Dec 2020	No	2020	17-Dec	N/A	Severe snowstorm impacting the state resulting in 5-25 inches of snow.	Concord experienced over 24 inches of snow likely causing tree damage, and potential power outages.	Extreme Temp, Snow, Power Failure	CNHRPC, WebEOC, NH HSEM, manchesterinklink.com
Regional Storm and Power Outages Feb 2020	No	2020	7-8-Feb	N/A	Regional storm with many hours of snow, freezing rain, sleet, and rain across the state. Resulting in ice	Concord likely experienced the winter storm precipitation, ice accumulation, and many power outages.	Snow, Heavy Rain, Freezing Rain, Ice,	CNHRPC, WebEOC, NH WMUR

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					accumulation. Just under 27,000 power outages were reported.		Power Failure	
Regional Snowstorm Dec 2019	No	2019	29-Dec	N/A	Severe snowstorm impacting the state resulting in 6-10 inches of snow mixed with rain in the central part of the state.	Concord experienced heavy snow, ice, tree damage, and power outages.	Extreme Temp, Snow, Power Failure	CNHRPC, WebEOC, NH HSEM, NH SEOC
Regional Snowstorm Dec 2019	No	2019	2-Dec	N/A	Severe snowstorm impacting the state resulting in 1-12 inches of snow.	Concord 8.5 inches of snow likely experienced tree damage and power outages.	Extreme Temp, Snow, Power Failure	CNHRPC, WebEOC, NH HSEM, WMUR
Regional Winter Storm Feb 2019	No	2019	12-13-Feb	N/A	Snow and wintery mix storm throughout the state. 6-12 inches of snow mixing with sleet, freezing rain, and rain throughout the storm	Concord likely experienced heavy snow and other precipitation causing potential for tree damage and power outages	Snow, Heavy Rain, Freezing Rain, Ice, Power Failure	CNHRPC, WebEOC, WMUR
Regional Snowstorm Jan 2019	No	2019	20-Jan	N/A	Severe snowstorm impacting the state resulting in 4-12 inches of snow.	Concord experienced 4.5 inches of snow, and likely freezing rain, high wind, tree damage, and power outages	Wind, Extreme Temp, Snow, Power Failure	CNHRPC, WebEOC NH HSEM, NOAA, WMUR
Regional Snowstorm Mar 2018	4371	2018	13-Mar	N/A for Concord	Severe snowstorm impacting the state resulting in 8-25 inches of snow. This was not a declared disaster in Merrimack or Hillsborough Counties	Concord experienced heavy snow 17 inches likely resulting in tree damage and power outages.	Extreme Temp, Snow, Power Failure	CNHRPC, WebEOC, NH HSEM, WMUR
Hazard Events 2016-2005								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Severe Winter Storm and Snowstorm - January Blizzard Jan 2015	4209	2015	Jan 26-28	N/A for Concord	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"	During this blizzard, a homeless person in a wheelchair died because the state sidewalk on I-393/Commercial Street had not been plowed and he was in the road, trying to get to the Friendly Kitchen.	Extreme Temp, Snow, Power Failure, Severe Winds	Concord Hazard Mitigation Committee, fema.gov, Boston Globe

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					in some areas with heavy snow and 50 mph whiteout wind conditions. There was no declaration for Merrimack County The closest reporting weather station, Concord Airport (CON), had accumulated 29" of heavy snow, 50 mph whiteout wind conditions in the region. <u>Not declared in Merrimack County.</u>			
Concord 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 presidentially declared disaster in NH.	Overnight storm, power outages lasting up to 3 days, trees down. Significant amount of work clearing roads and utility companies came in from Canada and Northeast. Power and access were disrupted. Turkeys were substituted by rotisserie chicken from grocery stores and had roast beef and turkeys on the grill. Roof slid off due to snow load and improper construction.	Extreme Temp, Snow, Power Failure	Concord Hazard Mitigation Committee, Concord Monitor
Severe Winter Storm and Snowstorm - Winter Storm NEMO Feb 2013	4105	2013	Feb 8-10	\$127,177	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.	Concord received \$127,177 in FEMA Public Assistance funding for protective measures (snow removal). The storm needed plowing, salt and sand and overtime. The City had a difficult time relocating snow after receiving nearly 24"	Severe Winter Weather, Extreme Temp, Snow, Ice, Wind	FEMA, Concord Hazard Mitigation Committee, Concord Monitor
April Fool's Snowstorm Apr 2012	No	2012	1-Apr	N/A	A Nor'easter snowstorm impacted the State, causing over	Concord experienced some snow and inconvenience. The	Extreme Temp, Snow	wmur.com, USA Today

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					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.	Parks and Recreation Dept had been readying its tennis courts ready for spring. The Dept challenged followers of its Facebook page to submit pictures of snowmen in the parks.		
Snowstorm-Halloween Snow Storm Oct 2011	4049	2011	Oct 29-30	N/A for Concord	FEMA-4049-DR. Towns in Central NH were impacted by this shocking, early severe snowstorm, although a major disaster declaration was <u>not</u> 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.	Concord did not apply for/receive funding. Trees down on power lines and roads, power companies Unitil & Eversource & NH Coop had to come into City to fix. This major snowstorm brought over 13" to Concord.	Extreme Temp, Snow Storm	FEMA, Concord Hazard Mitigation Committee
Severe Winter Storm Feb-Mar Storm and Flooding 2010	1892	2010	Feb 23-Mar 3	\$88,699	FEMA-1892-DR. 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.	Concord received \$88,699 in FEMA Public Assistance funding for protective measures and debris removal. In Concord, 2,000 Unitil customers were out of power at the peak outage period. Unitil opened their emergency operations center, and the City opened their EOC for a few hours. Problems included Interference with electrical lines, trees down, and road blockages. Crews were out clearing the entire period. The Green Street community center shelter opened, hosting over 15 people at peak who were mostly from	Extreme Temp, Snow, Wind, Flood, Wind Chill, Dam Failure	Concord Hazard Mitigation Committee, FEMA, Unitil

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						Canterbury. Multiple carbon monoxide issues from people using generators too close to their homes. Response time was 4-5 times what it normally was because of call volume and road closures. A large amount of FEMA funds were received for removing trees and limbs off streets immediately after the wind storm to open streets up and placing barricades to close streets when power lines were down on them until the power company was able to take care of the downed lines. The costs are also from picking up debris from streets, sidewalks, parks, cemeteries, and the public golf course for several weeks after the storm. Some resident's homes were without power for several days		
Severe Winter Storm - Dec 2008 Ice Storm	1812	2008	Dec 11-23	\$87,434	FEMA-1812-DR. Accumulating ice, snow, rain, and strong winds caused downed trees and power lines, with power outages and traffic accidents resulting. In 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	Concord received \$87,434 in FEMA Public Assistance funding for debris removal and protective measures. Hundreds of thousands of home and business owners in the State were without heat or electricity after an ice storm moved through the State causing the largest power outage in New Hampshire's history. Unitil had 5,000 customers out in Concord. A large amount of FEMA funds were received for snow and ice removal from streets and sidewalks as well as removing trees	Extreme Temp, Ice, Wind, Technological, Power Failure, Debris Impacted Infrastructure	Concord Hazard Mitigation Committee, FEMA, Unitil

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WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					with ice and snow during the winter storm. The weight of the ice caused branches to snap, and trees to either snap or uproot, and brought down power lines and poles across the region. About 400 thousand utility customers lost power during the event, with some customers without power for two weeks. Property damage across northern, central and southeastern New Hampshire was estimated at over \$5 million. Event was the largest power outage in New Hampshire's history.	and limbs off streets when they came down with ice on them.		
Concord Heavy Snowload Roof Collapses Feb 2008	No	2008	Feb	N/A	N/A	Heavy snowloads caused multiple building collapses, including Oak Bridge Condominium Pool Building, Beede Electric, Hall Street Capitol Distributors loading dock.	Severe Winter Weather, Snow and Ice	Concord Hazard Mitigation Committee
Snow Emergency Jan 2005	EM-3207	2005	Jan 22-23	\$80,51	Record and near record snowstorm for 8 NH counties including Merrimack and Hillsborough. Emergency protective measures declared for reimbursement.	Concord received \$80,510 in FEMA Public Assistance funding for protective measures (snow clearing, sanding, salting).	Extreme Temp, Snow	FEMA
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Snow Emergency Dec 2003	EM-3193	2003	Dec 6-7	\$72,051	Record snow fall event impacting much of New England. In NH, 8 counties received emergency protective measures, including	Concord received \$72,051 in FEMA Public Assistance funding for (snow clearing, sanding, salting).	Extreme Temp, Snow	FEMA

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					Merrimack and Hillsborough.			
Snow Emergency Feb 2003	EM-3177	2003	Feb 17-18	\$55,846	Record and near record snowstorm for 5 NH counties including Merrimack and Hillsborough. Emergency protective measures declared for reimbursement.	Concord received \$55,8460 in FEMA Public Assistance funding for (snow clearing, sanding, salting).	Extreme Temp, Snow	FEMA
Snow Emergency Mar 2001	EM-3166	2001	Mar 5-7	\$56,197	Record and near-record snowfall from late winter storm, emergency declaration was issued for protective measures. Merrimack, Hillsborough and 5 other counties were declared eligible.	Concord received \$56,197 in FEMA Public Assistance funding for protective measures, plowing, sanding & salting.	Extreme Temp, Snow	FEMA
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.	Concord did not apply for/receive funding. As the entire state and Central NH region experienced the ice storm, it is very likely Concord experienced similar damages	Extreme Temp, Ice Storm, Debris Impacted Infrastructure, Traffic Accidents, Power Failure, Communications Failure	FEMA, US Army Corps of Engineers NH Storms database, Concord Hazard Mitigation Committee
Blizzard of Feb 1978	No	1978	Feb 5-7	N/A	RSI Index of Category 5 (Extreme). This snowstorm is described	Concord reportedly received 15" of snow. The City likely	Extreme Temperatures, Severe	American Meteorological Society,

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					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.	experienced many of the same effects as the rest of NH.	Snow Storms, Windchill, Debris Impacted Infrastructure, Power Failure	Northeast States Emergency Consortium, NY Times 03/15/84
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Severe Snow Storms Feb-Mar 1967	No	1967	Feb-Mar	N/A	N/A, although it is likely the snowstorms were experienced within the Central NH region	Two February storms brought 8.5 inches and 9.5 inches of snow to Concord. In March, a major snowstorm dumped an additional 12-14 inches of snow.	Extreme Temperatures, Severe Snow Storms, Windchill, Power Failure	Concord (Daily) Monitor
10 Severe Snowstorms 1940-1978	No	1940 to 1978		N/A	Ten severe snowstorms are documented in south-central New Hampshire during this time span, February 14-15, 1940 (depths over 30” and high winds), February 14-17, 1958 (20-33”), March 18-21,	Although it is unknown what Concord experienced, it is likely many of the same depths occurred. Concord has a long history of severe winter weather storms.	Extreme Temperatures, Severe Snow Storms, Ice, Windchill, Power Failure	American Meteorological Society

WINTER Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					1958 (22-24"), March 2-5, 1960 (up to 25"), January 18-20, 1961 (up to 25", blizzard conditions), January 11-14, 1964 (up to 12"), January 29-31, 1966 (up to 10"), February 22-28, 1969 (24-98", slow-moving storm), December 25-28, 1969 (12-18"), January 19-21, 1978 (up to 16").			

Table 13D

DROUGHT: Local and Area Hazard Event and Disaster History (Sequential)

DROUGHT Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Regional Drought May 2021	No	2021	4-May	N/A	Much of Merrimack and Hillsborough counties experienced moderate levels of drought.	Concord likely experienced moderate drought conditions.	Drought	CNHRPC, WebEOC, NCEI/NOAA
Regional Drought Dec 2020	No	2020	1-Dec	N/A	Drought conditions in Merrimack and Hillsborough counties ranging from D1 Moderate Drought to, D2 Severe Drought, and	Concord likely experienced moderate or severe drought conditions.	Drought	CNHRPC, WebEOC, NCEI/NOAA

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DROUGHT Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					further east D3 Extreme Drought.			
Regional Drought Oct 2020	No	2020	27-Oct	N/A	Moderate, severe, and extreme drought conditions affecting the state, very high fire danger declared.	Concord likely experienced severe or extreme drought conditions	Drought	CNHRPC, WebEOC
Regional Drought Sep 2020	No	2020	1-Sep	N/A	Drought conditions in Merrimack and Hillsborough counties ranging from D1 Moderate Drought to, D2 Severe Drought.	Concord likely experienced severe drought conditions.	Drought	CNHRPC, WebEOC, NCEI/NOAA
Regional Drought Jul 2020	No	2020	10-Jul	N/A	Much of the state including the Concord area experienced moderate levels of drought.	Concord likely experienced moderate drought conditions.	Drought	CNHRPC, WebEOC, NHDES
Hazard Events 2016-2005								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord/Merrimack County Drought Severe Emergency Feb 2016-2017	No	2017	Feb 21	N/A	Extreme Drought (D3) intensities are found in northern Hillsborough and southern Merrimack Counties. Some of the communities in the Central NH Region are experiencing Severe Drought (D2) or Moderate Drought (D1) conditions. The NH DES has issued a series of statements and tips for homeowner water conservation. As of September 2016, residents and municipalities are requested to voluntarily conserve water. Some communities or water precincts have enacted water restrictions or bans for certain water usage. More restrictions may be enacted or may eventually be required by the State if	The Severe Drought (D2) conditions as of 02/17 continue to cover the entire community of Concord. The City Manager's 01/17 newsletter reminded residents about the severity of the drought and suggested wise water usages. General Services developed an informational video about the drought conditions and offered tips on how to conserve water and request voluntary water restrictions. Summer 2016- water supplies are lower than usual, dug wells have reported going dry.	Earth, Drought	US Drought Monitor NH, NH DES, Concord General Services – see video hyperlink

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4 HAZARD RISK ASSESSMENT

DROUGHT Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					conditions remain the same or worsen.			
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
NH Drought Emergency Aug 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.	The City of Concord pumped extra water from the Contoocook River into Penacook Lake. The City also approved \$55,000 for emergency river water pumping	Drought, Extreme Temperatures, Earth, Fire	Concord Monitor 8/20/02, NHDES
Concord Drought Apr 1999	No	1999	Apr	N/A	N/A, although a drought is usually experienced regionally	There was concern for crops and domestic water supplies in Concord. It was the third driest April ever recorded with 0.83 inches of precipitation. Normal precipitation for the month of April is 2.91 inches.	Drought	NH HSEM
Concord Drought Aug 1974	No	1974	Aug	N/A	N/A, although a drought is usually experienced regionally	A months-long drought impacted Concord and surrounding towns. There were multiple area brush fires. Water restrictions were imposed in Concord, and area towns did likewise. Rain was hoped for to alleviate the fire danger conditions.	Drought	Concord (Daily) Monitor
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Drought Conditions Oct 1963	No	1963	Oct 19	N/A	N/A, although a drought is usually experienced regionally	The Concord Daily Monitor reported that the Merrimack River	Earth, Drought	Concord (Daily) Monitor

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

DROUGHT Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						dried up around Sewalls Falls.		

Table 13E

EXTREME TEMPS: Local and Area Hazard Event and Disaster History (Sequential)

EXTREME TEMPS Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Regional Extreme Temperatures Jun 2021	No	2021	29-Jun	N/A	Heatwave experienced throughout the state. Extreme temperatures from 90-100 degrees recorded at various times throughout the summer.	Concord experienced extreme temperatures with high heat and humidity. (Concord 96 degrees)	Extreme Temp	CNHRPC, WebEOC, NH WMUR
Regional Winter Weather and Wind Chill Feb 2020	No	2020	13-Feb	N/A	Wind Chill advisory with temperatures of 15-25 below zero during the night. Snow showers also occurred throughout the state.	Concord likely experienced extreme cold temperatures and windchill as well as snowfall.	Extreme Temperatures, Snow	CNHRPC, WebEOC, NH WMUR
Regional Heatwave Jul 2019	No	2019	19-Jul	N/A	High heat and humidity temperatures ranging from 90-100 degrees Fahrenheit	Concord likely experienced the same high temperatures as the rest of the state	Extreme Temp	CNHRPC, WebEOC
Hazard Events 2016-2005								

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

EXTREME TEMPS Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Excessive Heat Wave Jul 2012	No	2012	Jul 4	N/A	N/A Although mutual aid may have been called in from surrounding communities.	Capital Area Public Health Network opened cooling center at Fire Department administration headquarters with cold drinks available - little response despite calls from Fire Department to senior housing residents.	Extreme Temp, Extreme Heat	Concord Hazard Mitigation Committee
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee

Table 13F

EARTHQUAKE/LANDSLIDE: Local and Area Hazard Event and Disaster History (Sequential)

EARTHQUAKE / LANDSLIDE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

EARTHQUAKE / LANDSLIDE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Manor Road Sink Hole Aug 2018	No	2018	1-Aug	N/A	Neighboring towns may have provided aid in response to the hazard.	A 24 inch clay pipe bult in 1935 leaking at the joints resulted in a major sink hole on Manor Road. The road had to be closed and repaired.	Landslide	CNHRPC, Concord Hazard Mitigation Committee, Concord Monitor
Hazard Events 2016-2005								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Earthquake 2.9M Warner Epicenter Mar 2016	No	2016	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, Concord, Concord, and Hillsborough	Reports were made to the USGS from Concord residents feeling the earthquake as a loud noise. Phone calls were received by Police Department reporting explosions, but no damage occurred.	Earth, Earthquake	USGS, Concord Hazard Mitigation Committee
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 Pittsfield	Reports were also likely made to the USGS from Concord residents feeling the earthquake.	Earth, Earthquake	Earthquake track.com
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, Webster, Concord, Salisbury, Franklin	Reports were made to the USGS from Concord residents feeling the earthquake as a rumble or loud noise. Warner is 2 communities to the west	Earthquake	USGS
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	Reports may have been made to the USGS from Concord with an earthquake of this	Earthquake	Concord Monitor, Earthquake track.com

EARTHQUAKE / LANDSLIDE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					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.	magnitude as it was felt around the Central NH Region.		
Earthquake 3.4M 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 felt all over the state, Southern Maine and Massachusetts, but most reports were received from the Central NH region.	Reports may have been made to the USGS from Concord with the epicenter less than 5 miles to the northeast in Boscawen. Boscawen abuts Concord to the west sharing the Merrimack River boundary. Two service calls were received related to building assessments. No damages were reported (people called PD stating Wheelabrator exploded (was not the case, was earthquake).	Earth, Earthquake	Union Leader, USGS, Concord Hazard Mitigation Committee
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Earthquake 2.2M Henniker-Hopkinton	No	2004	20-Jan	N/A	An earthquake measuring 2.2 on the Richter Scale was centered in the	Reports were likely made to the USGS from Concord residents feeling the earthquake	Earth, Earthquake	Concord Monitor, January 2004, USGS,

4 HAZARD RISK ASSESSMENT

EARTHQUAKE / LANDSLIDE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
Epicenter Jan 2004					Henniker- Hopkinton area. Shaking and noise were reported, but no damage occurred.	as a rumble or loud noise. The epicenter was only 1-2 communities away from Concord, to the west		Earthquake Monitor
Earthquake 4.5M Sanbornton Jan 1982	No	1982	19-Jan	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.	With a quake of this size, it is highly likely Concord experienced some strong shaking and noise. This caused a water main to rupture in Concord 20 miles away.	Earthquake	Earthquaket rack.com, Northeast States Emergency Consortium
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 the State.	N/A, although some Concord residents may have felt the effects	Earthquake	Northeast States Emergency Consortium
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
NH Earthquakes December Dec 1940	No	1940	Dec 20 & 24	N/A	In late December, New Hampshire felt the shock of two earthquakes, both at 5.5 on the Richter scale. The earthquakes originated near Tamworth in Ossipee but the tremors were felt in Concord, 50 miles away.	Tremors were felt in Concord, 50 miles away. The State Library sustained damage and a building at St. Paul's School was cracked.	Earth, Earthquake	National Earthquake Information Center, Northeast States Emergency Consortium
Concord Earthquakes 1870-1884	No	1870-1884	---	N/A	Realistically, these earthquakes would have been felt throughout the Central NH Region. Epicenters and magnitude unknown.	10-20-1870- Four earthquake shocks were felt in Concord at 11:30 am. 11-18-1972- "Every heavy shock of earthquake" was reported at 2:05 pm in Concord. 12-19-1882- Heaviest shock "ever remembered" occurred at 5:20 pm in Concord. 11-23-1884- Two heavy	Earth, Earthquake	History of Concord, NH (J Lyford)

4 HAZARD RISK ASSESSMENT

EARTHQUAKE / LANDSLIDE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						shocks of an earthquake were reported at 12:30 and again at 12:45 in Concord.		

Table 13G

SOLAR: Local and Area Hazard Event and Disaster History (Sequential)

SOLAR Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Regional Geomagnetic Storm Apr 2022	No	2022	4-Apr	N/A	Many towns utilized the CAFMAC antennas for emergency communication. The geomagnetic storm would have impacted any of these towns as well.	Geomagnetic storm impacted CAFMAC microwave antennas on Mount Kearsarge, Pak Hill, Plausawa Hill, and towers on Pat's Peak. Some of the damaged antennas needed to be replaced. The impact of the storm on the antennas disrupted 911 communications.	Geomagnetic Storm	CNHRPC, Concord Hazard Mitigation Committee
Regional Geomagnetic Storm G3 Watch Oct 2021	No	2021	30-31-Oct	N/A	NOAA issued a G3 "strong" geomagnetic storm watch. A storm of this capacity can cause voltage irregularities on protection devices, potentially harmful currents in power grids,	There were no known impacts in the city, but predictions had noted potential radio interference, potential harmful currents in the power grid, and potential disruptions to	Solar Storm, Space Weather, Power Failure	CNHRPC, NOAA, CNN

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4 HAZARD RISK ASSESSMENT

SOLAR Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					disruptions in global positioning systems (GPS), as well as the potential to cause high frequency radio blackouts. Visible effects of a geomagnetic storm include enhancing the visibility of the aurora borealis across large parts of the United States and Europe. A geomagnetic storm of this capacity likely reaches large portions of the earth, including the entire northeast of the United States and the Central New Hampshire Region	global positioning systems (GPS).		
Regional Geomagnetic Storm Apr 2021	No	2021	4 Apr	N/A	The geomagnetic storm impacted multiple CAFMAC microwave antennas throughout the region. Many regional towns utilize these antennas and their communications were disrupted including for 911 calls.	A geomagnetic storm impacted CAFMAC microwave antennas on Mount Kearsarge, Oak Hill, Plausawa Hill, and Pat's Peak Towers some needed replacing. The impact from the storm disrupted 911 communications in Concord	Solar Storm, Geomagnetic storm	CNHRPC, Concord Hazard Mitigation Committee
Hazard Events 2016-2005								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee

Table 13H

WILDFIRE/LIGHTNING/FIRE: Local and Area Hazard Event and Disaster History (Sequential)

WILDFIRE/ LIGHTNING/ FIRE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Fire on Pleasant St Mar 2022	No	2022	27- Mar	N/A	Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 85 Pleasant Street in Concord.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Concord Fire on Whitney Rd Feb 2022	No	2022	16- Feb	N/A	Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 11 Whitney Road in Concord.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Concord Fire on South St Sep 2021	No	2021	23- Sep	N/A	Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 29 South Street in Concord.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Concord Fire on Bog Rd Apr 2021	No	2021	26-27 April	N/A	Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 29 Bog Road in Concord.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Concord Fire on North State St Apr 2020	No	2020	10- April	N/A	Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 266 North State Street in Concord.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Concord Fire at Murray Farm Apr 2019	No	2019	10- April	N/A	Mutual aid companies were required in response to a fire at Murray Farm in Concord.	Multi-alarm fire destroyed multiple buildings at Murray Farm in Concord	Fire	CNHRPC, Concord Hazard Mitigation Committee

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4 HAZARD RISK ASSESSMENT

WILDFIRE/ LIGHTNING/ FIRE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
Concord Fire on Bog Rd Dec 2018	No	2019	10- April	N/A	Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 20 Bog Rd.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Lighting Strike Damage Oct 2018	No	2018	23- Oct	N/A	Other regional towns fire alarm systems may have been disrupted if they communicate with the system in Concord.	The fire alarm system was disrupted due to a lightning strike. The Lakes Region alarm system has redundant capabilities ensuring that no calls were missed.	Lightning	CNHRPC, Concord Hazard Mitigation Committee
Concord Fire on Rolfe St Apr 2018	No	2019	18- April	N/A	Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 28 Rolfe Street in Concord.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Concord Fire on Liberty St Jan 2018	No	2018	16- Jan		Mutual aid companies were required in response to the fire in Concord.	Multi-alarm building fire at 109 Liberty Street in Concord.	Fire	CNHRPC, Concord Hazard Mitigation Committee
Hazard Events 2016-2005								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Wildfire at Long Pond Road May 2015	No	2015	May 4	N/A	N/A Although mutual aid may have been called in from surrounding communities.	May 4, 2015 - 6 alarm wildfire on hill at Long Pond Road by Lake View Drive, 70 firefighters and about 60 acres of damage. Helicopter assistance was needed.	Wildfire	Concord Hazard Mitigation Committee, Concord Monitor
Concord Wildfire at Rattlesnake Hill Apr 2015	No	2015	Apr 25	N/A	N/A, Although mutual aid may have been called in from surrounding communities.	April 25, 2015 – Rattlesnake Hill at Little Pond Road was covered with 3 forest fires, from ½ acre to 2 acres in size. Human causation was suspected.	Wildfire	Concord Hazard Mitigation Committee, Concord Patch
Concord Friendly Kitchen Fire Apr 2011	No	2011	Apr 30	N/A	N/A Although mutual aid may have been called in from surrounding communities.	The fire at the Friendly Kitchen at 14 Montgomery Street destroyed the facility which provides meals to several thousand low income people annually. They relocated to a temporary facility but it will took many months	Fire	Concord Hazard Mitigation Committee

4 HAZARD RISK ASSESSMENT

WILDFIRE/ LIGHTNING/ FIRE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						and donations rebuild a permanent facility on Constitution Ave.		
Concord Wildfire Sep 2010	No	2010	Sep 22	N/A	N/A	St. Paul's Island in Turkey Pond is uninhabited with mature trees. A brush fire was burning for days before it was reported to the Fire Department. The fire was put out with no injuries.	Wildfire	Concord Hazard Mitigation Committee
Loudon Pleasant View Greenhouse Fire Jan 2010	No	2010	21- Jan	N/A	Pleasant View Gardens suffered a fire which destroyed about 30,000 square feet of greenhouses, plus a building. The cause is undetermined. This was a significant commercial fire.	N/A, although Loudon abuts Concord to the northwest. Concord has several greenhouses in the City.	Fire	Loudon Hazard Mitigation Committee
Concord Friendly's Heights Business Fire Oct 2009	No	2009	Oct 3	N/A	N/A	Friendly's Restaurant on Loudon Road was closed for nearly 9 months, which impacted many employees. A photo of the fire is provided in the APPENDIX of Historical Photos.	Fire	Concord Hazard Mitigation Committee
Concord Lightning Strikes 2004-2007	No	2004- 2007	---	N/A	N/A Although mutual aid may have been called in from surrounding communities.	An inventory of lightning strikes is available. Highlights- 2007- A tree near 74 Weir Road was struck by lightning. 2007- Lightning hit a tree at 8 Crestwood Drive and sent a surge into the adjoining mobile home, igniting an electrical panel in a closet. 2006- Lightning ignited a brush fire at Oak Hill Road near Tuttle Town Pond. 2005- Lightning struck at 4 Deer Track Lane destroyed a transformer plugged into a wall outlet in a garage. 2004- Lightning struck a shed at 30 Fairfield Drive. The shed was destroyed by the resulting fire	Lightning, Thunderstorms, Wildfire	Concord Hazard Mitigation Committee

4 HAZARD RISK ASSESSMENT

WILDFIRE/ LIGHTNING/ FIRE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
Concord Dunkin Donuts Downtown Business Fire May 2006	No	2006	May 12	N/A	N/A Although mutual aid may have been called in from surrounding communities.	A late night fire at the Dunkin Donuts at 121 South Main Street resulted in the complete destruction of the facility. This accidental fire originated within the restaurant and placed the business out of service for 5 months until a new facility could be rebuilt. Most employees were absorbed into other shops operated by the same owner.	Fire	Concord Hazard Mitigation Committee
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord French's Downtown Business Fire Apr 2004	No	2004	Apr 13	N/A	N/A Although mutual aid may have been called in from surrounding communities.	French's Toy Shoppe, an established downtown business, was damaged by fire. A neighboring business and 3 abutting apartments were also damaged. The building was 230 years old. No injuries were reported, however, business was forecasted to be shut for one month for repairs.	Fire	Concord Monitor
Concord Wildfire May 1986	No	1986	May 15	N/A	N/A, the Garvins Falls area is bordered by the Soucook River to the east	A suspicious forest fire burned 50 acres near Garvins Falls Road. The isolated area made efforts to fight the fire difficult; the railroad bed did provide some access.	Wildfire	Concord (Daily) Monitor
Concord Wildfire Apr 1985	No	1985	Apr	N/A	N/A, although a fire of this size and dry conditions could have allowed the fire to reach surrounding communities	Several fires occurred while the City experienced drought conditions. A Garvins Falls brush fire consumed 20 acres. Many local and area brush fires were occurring. One, a fire on the Heights, burned 90	Wildfire, Drought	Concord (Daily) Monitor

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4 HAZARD RISK ASSESSMENT

WILDFIRE/ LIGHTNING/ FIRE Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						acres, during which five homes were threatened. It was the worst forest fire since the same area burned in 1962		
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Lightning Strike 1969	No	1969	—	N/A	N/A, although some regional communities likely experienced thunderstorm and/or lightning	The Concord Daily Monitor reported that a bolt of lightning killed a youth on Pleasant Street during a severe storm.	Lightning	Concord (Daily) Monitor
Concord Severe Wildfire Apr 1962	No	1962	Apr 30	N/A	N/A, although a fire of this size and dry conditions could have allowed the fire to reach surrounding communities	A Concord Heights blaze fueled by drought conditions covered 300 acres. Homes were evacuated along Old Loudon Road and Sheep Davis Road. Rainfall finally extinguished the fire.	Wildfire, Drought	Concord (Daily) Monitor

Table 13I

PUBLIC HEALTH/BIOLOGICAL: Local and Area Hazard Event and Disaster History (Sequential)

PUBLIC HEALTH/ BIOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

PUBLIC HEALTH/ BIOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Seabrook Nuclear Unusual Events Alerts Oct 2021	Site Area Emergen cy	2021	22- 23- Oct	N/A	N/A. Although most Central NH towns are just outside the 50-mile EPZ, situational awareness is preferred.	Concord is outside the 50-mile EPZ, although situational awareness is preferred.	Nuclear, Technologi cal, Public Health	CNHRPC, WebEOC
Regional Arboviral Risk Oct 2021	No	2021	6-Oct	N/A	Towns in Merrimack County experienced higher arboviral risk levels	Concord experienced low arboviral risk but had positive cases of Jamestown Canyon Virus in mosquitos.	Public Health	CNHRPC, WebEOC, NHDHHS
New Hampshire Statehouse Vaccine Protest Sep 2021	No	2021	14- Sep	N/A	Protest at New Hampshire State House in Concord. Rally against vaccine mandates. Surrounding town response authorities were likely notified in the event additional aid was required.	Civil Disturbance as a protest at the NH State House against Vaccine mandates. No known damage or violence occurred. City personnel and resources were likely directed towards ensuring safety during the protest.	Human (Civil Disturbanc e)	CNHRPC, WebEOC, Concord Monitor
Regional Air Quality Advisory Aug 2021	No	2021	12- 13- Aug	N/A	NHDES expected ground-level ozone concentrations to rise to levels that are unhealthy for those who are sensitive.	Concord potentially had the same increased concentrations of fine particle air pollution that could be harmful.	Public Health	CNHRPC, WebEOC, NHDES
Regional Air Quality Advisory Jul 2021	No	2021	26- 27-Jul	N/A	NHDES expected concentration of fine particle air pollution to reach unhealth levels for those who are sensitive throughout the entire state.	Concord likely had increased concentrations of fine particle air pollution that could be harmful.	Public health	CNHRPC, WebEOC, NHDES
Regional Smoke Advisory Jul 2021	No	2021	20-Jul	N/A	NHDES declared smoke advisory expecting concentrations of fine particle air pollution from smoke to reach levels that could cause respiratory health effects for those who are sensitive throughout the state.	Concord likely experienced the possibly dangerous air quality.	Public Health	CNHRPC, WebEOC, NHDES
COVID-19 Pandemic Apr 2020 - 2022	4516 M-H	2020	3-Apr – TBD	\$281,383	The NH Governor issued social activities restrictions, minimal public meetings, remote meetings held,	The City follows the Governor's orders. To date over 11,100 Concord residents have tested positive in	Public Health, Pandemic infectious	CNHRPC, NH HSEM, NH DHHS, WMUR

PUBLIC HEALTH/ BIOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					social distance practices in April 2020 for all counties. Cases closely tracked by NH Division of Health and Human Services and NH HSEM. The State EOC was activated.	Concord. The City Hall was closed to the public for several months through 2021. A long period occurred with no meetings, then remote only meetings were held. Most meetings held in person are socially distanced when possible. Hand sanitizing/masking station was available, signs posted, front door was often locked, etc. In addition to PA funding Concord received \$1,249,111 in CARES funding.		
Regional Air Quality Advisory Jan 2020	No	2020	22- Jan	N/A	NHDES expected concentration of fine particle air pollution to reach unhealth levels for those who are sensitive. Especially in the southwestern region of the state.	Concord potentially had increased concentrations of fine particle air pollution that could be harmful.	Public health	CNHRPC, WebEOC, NHDES
Regional Hepatitis A Outbreak May 2019	No	2019	May	N/A	A significant increase in the number of people in the state diagnosed with Hep A. 10 Cases diagnosed in Merrimack County including one death. 36 Cases in Hillsborough County.	No impact on Concord, although some residents may have been impacted.	Public Health	CNHRPC, WebEOC, DHHS
Hazard Events 2016-2005								
Concord Invasive Insects Apr 2016	No	2016	April	N/A	The Emerald Ash Borer (EAB) is found in Merrimack County. Other surrounding counties are vulnerable or also infected (Belknap, Hillsborough, and Rockingham). The EAB was found in New Hampshire in Concord on March 2013. EAB attacks ash trees and is responsible for the death of millions of ash trees in the Midwest. A quarantine of all	Concord-owned conservation land is infested with Emerald Ash Borer (EAB), known as ground-zero for the infestation in NH. Red Pine Scale is also seen at many parks and the woolly adelgid made an appearance. Measures for the EAB include pesticide, cutting down trees and a parasitic wasp release in Concord and abutting Canterbury. Concord is	Biological, Invasive Species Infestation	Concord Monitor, UNH Cooperative Extension Merrimack County website, report sightings to nhbugs.org, NH DRED

City of Concord, NH Hazard Mitigation Plan Update 2024

4 HAZARD RISK ASSESSMENT

PUBLIC HEALTH/BIOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					hardwood firewood, ash wood-products and all ash nursery stock is in effect for the above 4 counties.	within the quarantine area of Merrimack County.		
Concord Bedbug Infestation 2010	No	2010	---	N/A	N/A	The City saw an increase in bedbug activity in 2010. The infestations have been reported in Meadow Brook, the Kennedy Apartments, the Endicott Hotel, and Capital Towers.	Biological, Public Health	Concord Hazard Mitigation Committee
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord & Hopkinton Suspicious Powder Mailings Oct 2001-Feb 2002	No	Oct 2001 – Feb 2002	---	N/A	There were several reports of a powder substance being mailed to prominent State and/or Federal officials living in Hopkinton. Due to the heightened level of security for the US, the substances were tested for biological or chemical substances and the results were negative.	The Concord community responded to many suspicious package and substance calls as a result of the introduction of anthrax spores into US Postal facilities elsewhere in the country.	Sabotage, Terrorism, Biological, Public Health	Hopkinton Hazard Mitigation Committee, Concord Hazard Mitigation Committee
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee

Table 13J

HAZARDOUS MATERIALS: Local and Area Hazard Event and Disaster History (Sequential)

HAZARDOUS MATERIALS Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Hazmat Spill on North Spring St Dec 2021	No	2021	29-Dec	N/A	Mutual aid companies were required in response to the spill in Concord.	Mercury Spill occurred at 51 North Spring Street in Concord requiring Haz Mat response teams.	Haz Mat	CNHRPC, Concord Hazard Mitigation Committee
Concord Fuel Spill on Sheep Davis Rd Dec 2021	No	2021	11-Dec	N/A	Mutual aid companies were required in response to the spill in Concord.	Over 20 gallons of fuel spilled at 242 Sheep Davis Road requiring response from Haz Mat teams.	Haz Mat	CNHRPC, Concord Hazard Mitigation Committee
Concord Oil Spill on Poplar Ave Dec 2021	No	2021	1-Dec	N/A	Mutual aid companies were required in response to the spill in Concord.	60 gallons of hydraulic oil spilled requiring response from Haz Mat teams occurred at 14 Poplar Ave in Concord.	Haz Mat	CNHRPC, Concord Hazard Mitigation Committee
Concord Hazmat Spill on Hall St March 2021	No	2021	25-Mar	N/A	Mutual aid companies were required in response to the spill in Concord.	Mercury Spill occurred with a patient at 125 Hall Street in Concord requiring Haz Mat response teams.	Haz Mat	CNHRPC, Concord Hazard Mitigation Committee
Concord Hazmat Spill on I-393 Sep 2020	No	2020	21-Sep	N/A	Mutual aid companies were required in response to the spill in Concord.	Heavy equipment rollover causing a Haz Mat Spill occurred on I-393 East requiring response.	Haz Mat	CNHRPC, Concord Hazard Mitigation Committee
Concord Hazmat Spill on Eagle Sq Jul 2020	No	2020	9-Jul	N/A	Mutual aid companies were required in response to the spill in Concord.	Haz Mat Spill requiring response from multiple teams occurred at 7 Eagle Square.	Haz Mat	CNHRPC, Concord Hazard Mitigation Committee
Hazard Events 2016-2005								

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4 HAZARD RISK ASSESSMENT

HAZARDOUS MATERIALS Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Canterbury Explosion at Gold Star Sod Farm Jan 2005	No	2005	23-Jan	N/A	A near-fatal explosion occurred at the Gold Star sod farm in Canterbury. Gasoline fumes ignited a propane heater, triggering a fiery explosion and fire that consumed a large workshop and part of the main storage building. Fire crews from several departments battled the fire and laid sand down as a buffer between a nearby river in order to prevent contamination as pesticides and other chemicals burned. Gold Star Sod Farm is no longer in business	N/A, but the property lies along the Merrimack River near Concord	Fire, Explosion, Technological, Hazardous Materials	Concord Monitor, Canterbury Hazard Mitigation Committee
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Hazardous Materials Spill May 2004	No	2004	May 27	N/A	N/A, although regional commuters traveling through this area might have experienced local air pollution	In May 2004, 53 businesses were forced to close at the Concord Center on Ferry Street when state officials discovered more than 70 buckets of formaldehyde, motor oil, roofing tar and cleaning solvents in the flooded basement. There were no reported injuries but some workers complained of headaches and dizziness.	Hazardous Materials Spill	Concord Hazard Mitigation Committee
Hazard Events Before 1973								

HAZARDOUS MATERIALS Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee

Although **Human** and **Technological Hazards** can sometimes be caused by natural hazards and severe weather events, they are not given prominence in the **Hazard Mitigation Plan** which has a focus of natural disasters as directed by the federal 1998 Stafford Act, as revised. Still, many such hazards have impacted Concord and it would be remiss not to include the more notable events.

Table 13K

HUMAN/TECHNOLOGICAL: Local and Area Hazard Event and Disaster History (Sequential)

HUMAN/TECHNOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
CITY TO ADD NEW EVENT ROWS HERE								Concord Hazard Mitigation Committee
Hazard Events 2017-2022 (Since Last Plan)								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord School District Active Shooter Hoax Dec 2022	No	Dec	8	N/A	This hoax impacted multiple school districts across the state, but they were not identified in information released to the public. Newspapers reported Concord, Portsmouth and Dover as being notified of an active shooter threat. This type of hoax is called a "swatting" incident. These incidents are being investigated with	In Concord, St. John's Regional School received an active shooter threat which turned out to be a wide-scale hoax. Concord School District placed several schools in lockdown citing an "active shooter" situation. Police arrived at the St. John campus and forced their way into several school buildings, then were	Terrorism, Human	CNHRPC, Concord Hazard Mitigation Committee. NH Department of Safety, Npr.org

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HUMAN/TECHNOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
					similar swatting incidents across the country.	notified of similar calls across the State.		
Concord School District Cyberattack Dec 2022	No	Dec	5	N/A	No connection was identified to outside towns or agencies.	A city-wide cancellation of classes commenced, including School District servers, individual connections, all communications, and telephone system because of an HVAC issue in the server room. Without the servers running with their protection, the server "outage" would have been a security issue. The entire school district closed operations for the day..	Technological, Cyber	CNHRPC, Concord Hazard Mitigation Committee. Patch.com
Concord Counter Protest to COVID Arrests in 2021 Oct 2022	No	2022	Oct	N/A	Mutual aid was alerted to respond to the crowd.	A small counterprotest was held at the Police Standards Training/NHTI to protest the arrests one year ago for the Governor and Council COVID vote in Oct 2021.	Civil Unrest, Human	CNHRPC, Concord Hazard Mitigation Committee
Concord Shooting on Broken Ground Trails May 2022	No	2022	May	N/A	Surrounding town authorities provided aid in response and investigation of the shooting.	A double homicide occurred on the Broken Ground Trails in Concord. The shooting are being investigated	Violence, Active Shooter, Human	CNHRPC, Concord Hazard Mitigation Committee
Concord Vandalism near Fort Eddy Road Mar 2022	No	2022	23-Mar	N/A	Surrounding town response authorities were likely notified in the event additional aid was required or if similar vandalism occurs.	An alt-right Patriot Front group vandalized an emergency access tunnel facing Fort Eddy Road. The organization is known for many similar incidents and has been identified as a general hate group the performs other acts of vandalism in Concord.	Vandalism, Civil Unrest	CNHRPC, Concord Hazard Mitigation Committee
Concord Civil Unrest Police Protest Oct 2021	No	2021	13-Oct	N/A	Mutual aid was alerted to respond to the crowd.	Civil disturbance occurred to protest Governor and Council who met at the Police Standards/ NHTI to vote whether to accept federal COVID funds. Some arrests occurred but no violence or damage was known to	Civil Unrest, Human	CNHRPC, Concord Hazard Mitigation Committee

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4 HAZARD RISK ASSESSMENT

HUMAN/TECHNOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						occur. This was a multi-agency response prepared to ensure safety of protesters and G&C members.		
State General Election Nov 2020	No	2020	3-Nov	N/A	The NH general election occurred hosted at 307 polling locations across the state, involving 185 town police departments and state police.	Concord hosted election sites and town authorities were required for logistics and safety	Human (Civil Disturbance)	CNHRPC, WebEOC, NH State Police
Concord BLM Civil Unrest June 2020	No	2020	Jun 6 & 27	N/A	N/A, although mutual aid and NH State Police may have assisted. The statewide Day of Action was also held in Portsmouth, Nashua, and Manchester.	In June 2020, Emergency Management personnel opened the EOC twice for civil unrest monitoring. A grassroots Concord High School group held a very large supportive march from Memorial Field to the Statehouse for Black Lives Matter, which attracted counter-protesters. Later in June an organized statewide rally for "Day of Action" at the Statehouse was held to support Black Lives Matter was held. Law enforcement officials were on scene. No violence or damage was known to occur.	Civil Unrest, Human	CNHRPC, Concord Hazard Mitigation Committee, https://www.nhpr.org/nh-news/2020-06-06/n-h-is-not-innocent-in-concord-students-lead-march-against-racial-injustice
Concord Active Shooter on North State Street Feb 2020	No	2020	5-Feb	N/A	Surrounding town's authorities may have been called in response to the threat of violence.	An active shooter threat occurred at 450 North State Street in Concord.	Violence, Active Shooter	CNHRPC, Concord Hazard Mitigation Committee
Regional Merrimack Station Protest Dec 2019	No	2019	8-Dec	N/A	Protest at Merrimack Station in Bow. Rally against the functions of the station for environmental reasons.	Concord personnel and resources may have been required for safety.	Human (Civil Disturbance)	CNHRPC, WebEOC, Bow Incident Action Plan
Regional Merrimack Station Protest Sep 2019	No	2019	28-Sep	N/A	Protest at Merrimack Station in Bow. Rally against the functions of the station for environmental reasons.	Concord personnel and resources may have been required for safety.	Human (Civil Disturbance)	CNHRPC, WebEOC, Bow Incident Action Plan

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HUMAN/TECHNOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
Hazard Events 2016-2005								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Civil Disturbance Jul 2013	No	2013	Jun 18	N/A	N/A. Concord is the seat of NH government	On the City Hall Plaza in front of the NH State House, two groups clashed relative to gun control demonstration. Officers were assaulted and fights broke out in the crowd. One subject arrested for simple assault on Police Officer, Resisting Arrest and Disorderly Conduct.	Human, Civil Disturbance	Concord Hazard Mitigation Committee
Concord Hostage Situation Apr 2012	No	2012	Apr 29	N/A	N/A Although mutual aid may have been called in from surrounding communities.	On Laurel Street a male subject took his ex-girlfriend and 3 year old daughter hostage in her apartment for a period time however the two were able to escape on their own prior to SWAT response. Suspect later arrested on several charges including False Imprisonment x2	Human, Hostage Situation	Concord Hazard Mitigation Committee
Concord Rail & Air Transportation Accidents Feb-May 2011	No	2011	Feb-May	N/A	N/A Although mutual aid may have been called in from surrounding communities.	In Feb 2011, a train rolled over at the Grappone Conference Center (on Constitution Avenue) injuring two occupants. In May 2011, a light plane crashed on arrival at Concord Airport, injuring the pilot. The pilot was transported to Concord Hospital.	Transportation Accident	Concord Hazard Mitigation Committee
Concord Hospital Bomb Threats Oct 2010	No	2010	1-Oct	N/A	N/A, although Concord Hospital was the main health center in the region in 2010. People from all over Central NH use Concord Hospital for services.	A bomb threat was called in to Concord Hospital as a result of a child custody issue and the group known as the "Oathkeepers." The FBI was contacted, but nothing was found in the Hospital during a bomb sweep. Phone lines were flooded with	Human, Terrorism	Concord Hazard Mitigation Task Force 2012

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4 HAZARD RISK ASSESSMENT

HUMAN/TECHNOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						calls by the Oathkeepers to inhibit using the landlines. The incident was determined to be harassment instead of an actual event.		
Concord Communications Systems Failure Oct 2010	No	2010	Oct	N/A	N/A Although the communications outage would have impacted surrounding CAFMAC communities.	The City facilities experienced communications failure when the City's dispatch unit had a power failure at 24 Horseshoe Pond. The City's internet and phone went down as well as most Police, EMS, and Fire communications. The cause was oversight in power where the transformer was lost. The Fire Department began working on alternate dispatch site.	Communications Failure, Sabotage	Concord Hazard Mitigation Committee
Concord Statehouse Iraq Public Unrest Oct 2006	No	2006	18-Mar	N/A	N/A, although Concord is the seat of the region	A reported 400 citizens marched in Concord to recognize the 3 year anniversary of the beginning of the war in Iraq. The protestors marched around downtown Concord and finished in front of the statehouse.	Human, Public Unrest, Civil Disturbance	NH Independent Media Center
Hazard Events 2004-1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee
Concord Library and NHTI Bombs Oct 1998	No	1998	Oct	N/A	N/A, although Concord is the seat of the region and NHTI students live both on campus and around NH	The lit fuse of a bomb left in the Concord Library stacks set off smoke alarms that may have saved the lives of many people. The individual allegedly responsible for the bomb scare left notes complaining about state government. A second bomb was later found on the State Library steps About a dozen	Human, Terrorism	AP Online 11/01/98, NH Homeland Security and Emergency Management

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HUMAN/TECHNOLOGICAL Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Concord	Local Effects Occurring in Concord	Hazard Category	Source
						buildings were evacuated after the New Hampshire Technical Institute in Concord received an anonymous call warning that three bombs had been placed on campus. This event followed the bomb scares at the Concord Library.		
Hazard Events Before 1973								
City TO ADD OLD EVENT ROWS HERE								Concord Hazard Mitigation Committee

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

Description and Magnitude of Hazards

A compilation of past hazards that have occurred in Concord and the Central NH Region area is provided in the prior Table of **Local and Area Hazard Events**. **Existing and Susceptible Hazard Locations in the City** 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 the City to provide focus to future potential problem areas and to help with mitigation action development and are provided in the **Potential Future Hazards** section.

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

Cumulative hazard events were researched using a wide variety of sources for the **original Concord Hazard Mitigation Plan 2007** and the **2012** and **2017 Plan Updates** which were the basis for many of the past disaster events and then were updated to the present day. The **2017 Plan** provided recent information on many of the extreme disasters experienced between **2005-2008**. Sources and techniques included interviewing local townspeople, researching City 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 2024** 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 the City**. While additional hazards might have occurred in the City, 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.

Numeric of Probability and Severity	CONCERN SUMMARY	Numeric of Overall Risk Score
1	LOW	1 - 4.9
2	MEDIUM	5 - 7.9
3	HIGH	8 - 11.9
4	EXTREME	12 - 16

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 because 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 2023* as no new studies have made specific data available. It is generally known that radon exists throughout 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 **Concord Hazard Mitigation Plan** because of the lack of State monitoring and available action.

There are several types of **EARTH** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included		
EARTH	DROUGHT	EARTHQUAKE	LANDSLIDE Soil, Rockslide or Excavation Areas

Drought

The overall ratings of **Drought** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
DROUGHT	4 HIGH	1 LOW	1 LOW	2 MEDIUM	5.3 MEDIUM	D4 Exceptional Drought

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. 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 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 City water supplies would be threatened. The City has the capability to implement or recommend volunteer water restrictions during dry conditions within the district area. The City uses Penacook Lake as the main water supply, supplemented by the Contoocook River using pump stations at Broad Cove and Mountain Roads. The City has three gravel wells along the Soucook River which are unused at this point.

The remaining residences, non-residential buildings and City facilities rely either on community water systems pumped from bedrock or on individual well water systems which are not easily replenished during periods of drought. During the **2015-2022** drought period, many residences notified the City 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 the City would be affected by drought. Additionally, wildfires have the potential of being more severe and commonplace during periods of drought, more difficult to contain. The Fire Department can use larger water sources like the rivers for pumping into tankers for fire suppression.

Magnitude of Drought

Table 14 displays overall drought magnitude as measured by the US Drought Monitor (USDM) and Palmer Hydrological Drought Index (PHDI), the extent of hydrological drought in the form of long-term, cumulative monthly moisture conditions. The weekly [US Drought Monitor for NH](#) can be accessed online. The Palmer indices are developed by algorithms taking into consideration precipitation, temperature data, and the local Available Water Content (AWC) of the soil.

Table 14
US Drought Monitor Intensity Scale

Category	Description	Description of Possible Impacts	Palmer Drought Severity Index (PDSI)
D0	Abnormally Dry	Going into drought: - Short-term dryness, slow planting, growth of crops or pastures Coming out of drought: - Some lingering water deficits - Pastures or crops not fully recovered	-1.0 to -1.9
D1	Moderate Drought	- Some damage to crops, pastures - Streams, reservoirs or wells low, some water shortages developing or imminent - Voluntary water use restrictions requested	-2.0 to -2.9
D2	Severe Drought	- Crop or pasture losses likely - Water shortages common - Water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	- Major crop/pasture losses - Widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	- Exceptional and widespread crop/pasture losses	-5.0 or less

		- Shortages of water in reservoirs, streams and wells creating water emergencies	

Source: <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH>
as compiled by CNHRPC, accessed 02-22-19

Earthquake

The overall ratings of **Earthquake** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
EARTHQUAKE	4 HIGH	1 LOW	1 LOW	1 LOW	4.0 LOW	VII Very Strong Intensity
						5.5 MM

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 possibly snow avalanches, which are not considered relevant to Concord's geography. 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 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. New Hampshire experiences regular, minor earthquakes with its bedrock geology.

Magnitude of Earthquake

Earthquake hazard magnitude can be measured by multiple scales. Most commonly known is the Richter Scale (M) as shown now superseded by the logarithmic Moment Magnitude (MM) which is better at measuring the largest earthquakes. Earthquake intensity can be measured by the Modified Mercalli Instrumental Intensity (MMI) scale. These scales do not correlate consistently among sources but utilizing a combination of scales and descriptions on USGS and NOAA sites, **Figure 6** approximates the Richter/Moment to Mercalli comparison. For practical purposes, descriptions of potential impacts to people, furnishings, the built environment and the natural environment are provided to better place earthquake magnitude in perspective.

Figure 6

Modified Mercalli and Richter Magnitude Scales

Earthquake Intensity Scale

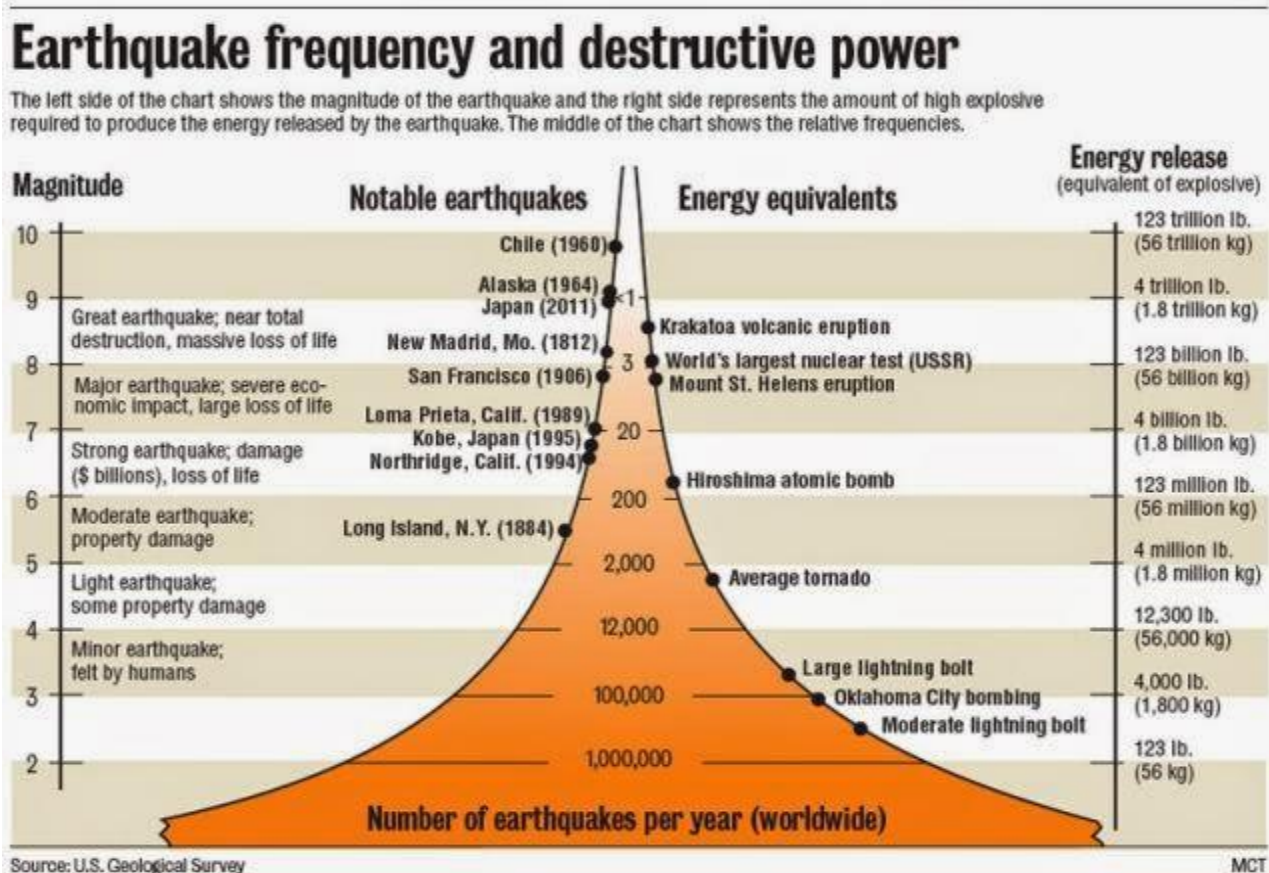
Modified Mercalli Intensity (MMI)

	INTENSITY	SHAKING	DESCRIPTION
	I	Not Felt	Not felt except by a very few under especially favorable conditions.
	II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
	III	Weak	Felt quite noticeable by persons indoors. Many people do not recognize it as an earthquake. Standing cars may rock slightly, vibrations are similar to a passing truck.
	IV	Light	Felt indoors by many, outdoors by few. At night, some are awakened. Dishes, windows, and doors are disturbed. Sensation like a heavy truck striking a building. Standing cars rock noticeably.
	V	Moderate	Felt by nearly everyone; many awakened. Dishes and windows are broken. Unstable objects are overturned. Pendulum clocks may stop.
	VI	Strong	Felt by all; many frightened. Some heavy furniture moved. A few instances of fallen plaster. Damage is slight.
	VII	Very Strong	Negligible damage to buildings of good design/construction. Slight to moderate damage in well-built/ordinary construction. Considerable damage in poorly built/ordinary structures. Some chimneys broken.
	VIII	Severe	Slight damage to specially designed structures. Considerable damage to ordinary construction, including partial collapse. Damage is great in poorly built structures. Fall of chimneys, columns, monuments, and walls. Heavy furniture overturned.
	IX	Violent	Considerable damage to specially designed structures; well-designed frame structures are thrown out of plumb. Damage is great in substantial buildings, with partial collapse. Buildings shifted off foundations.
	X+	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures with foundations are destroyed. Rails are bent.

Source:

National Oceanic and Atmospheric Administration (NOAA), <https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale>
and other sources compiled by CNHRPC Feb 2021

Figure 7
Magnitude (Energy Release) of Earthquakes



Source: USGS

USGS ShakeMap Instrumental Intensity can be used to view the locations of new earthquakes <https://earthquake.usgs.gov/data/shakemap/> and USGS Earthquakes 2.5M+ records the Moment (Richter) Magnitude of new earthquakes over 2.5 M at <https://earthquake.usgs.gov/earthquakes/map/>. The Moment Magnitude is better explained at <https://geokansas.ku.edu/measuring-earthquake-magnitude-and-intensity>

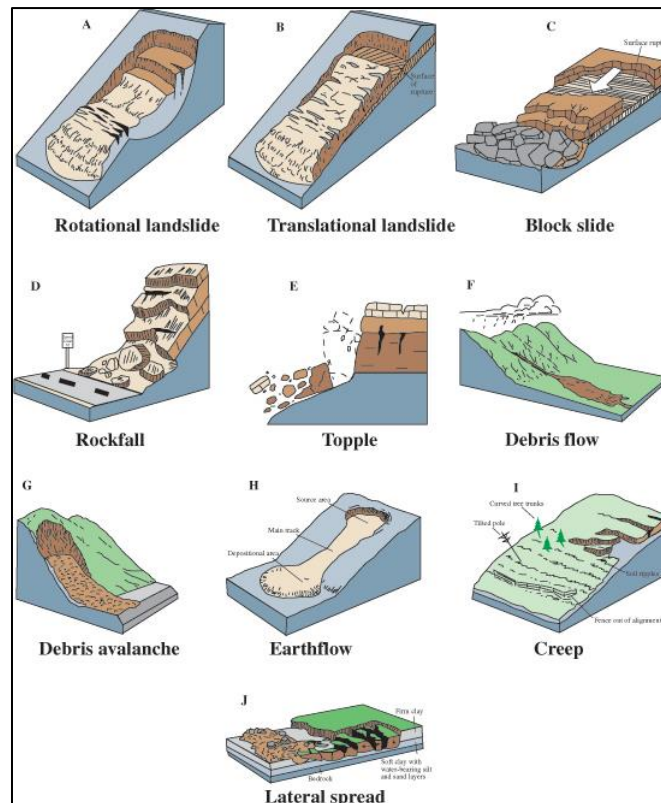
Landslide

The overall ratings of **Landslide** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
LANDSLIDE	1 LOW	1 LOW	1 LOW	1 LOW	1 LOW	Relatively Moderate Risk (Yellow)

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** could damage or destroy State roads or local City paved roads, electrical and telephone lines, buildings, sewers, bridges, dams, forests, parks, and farms and landslides are dangerous to people. A display of different types of landslides is shown in **Figure 8**.

Figure 8
Basic Types of Landslides



Source: US Geological Survey (USGS)

Magnitude of Landslide

There is no known standardized measurement of landslide magnitude available. However, FEMA's National Risk Index Map of natural hazards includes landslides (<https://hazards.fema.gov/nri/map>), so the Hazard Mitigation Committee chose to use their rating for Merrimack County.

EXTREME TEMPERATURE HAZARDS

Extreme temperature hazards include diverse hazards such as severe cold or windchill, excessive heat, and heatwaves. Excessive heat or extreme cold can create other hazards such as public health issues, utility outages. The severity of these hazards is influenced by New Hampshire's changing climate and severe weather systems. This category is meant to encompass all the hazards which can be influenced by the extreme weather temperatures that New England, New Hampshire, the Central NH Region, and Concord are experiencing.

There are several types of **EXTREME TEMPERATURE** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included
EXTREME TEMPERATURES	EXTREME TEMPERATURES Excessive Heat, Heat Wave, Cold or Wind Chill

The environmental temperature spectrum is addressed under extreme temperatures, from very cold to very hot.

The overall ratings of **Extreme Temperatures** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
EXTREME TEMPERATURES Excessive Heat, Heat Wave, or Cold or Wind Chill	4 HIGH	4 HIGH	2 MEDIUM	2 MEDIUM	10.7 HIGH	Class III Very Hot 105 -129 Degrees
						<= 10 minutes to frostbite

Extreme Heat or Heatwave

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**.

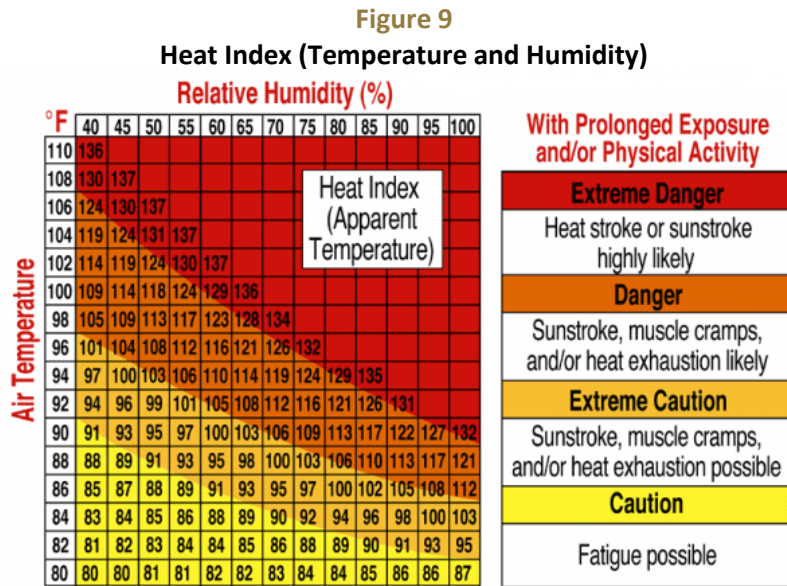
The National Weather Service categorizes a **Hot Day** when temperatures reach **90°** or warmer. An official **Heat Wave** is defined as three or more consecutive days with the temperature reaching or exceeding **90°**.

Extreme heat weather is forecasted with the following levels of high temperatures. **Excessive Heat Outlooks** are issued when the potential exists for an excessive heat event in the next **3-7** days. An Outlook provides information to those who need considerable lead-time to prepare for the event.

 Excessive Heat WATCH	A Heat WATCH is issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
BE PREPARED	
 Excessive Heat ADVISORY	An Excessive Heat ADVISORY is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Warning is when the maximum heat index temperature is expected to be 105°F or higher for at least 2 days and nighttime air temperatures will not drop below
BE AWARE	75°F ; however, these criteria vary across the country, especially for areas not used to extreme heat conditions. If you don't take precautions immediately when conditions are extreme, you may become seriously ill or even die.
 Excessive Heat WARNING	A Heat WARNING is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Advisory is when the maximum heat index temperature is expected to be 100°F or higher for at least 2 days, and nighttime air temperatures will not drop below 75°F ; however,
TAKE ACTION	these criteria vary across the country, especially for areas that are not used to dangerous heat conditions. Take precautions to avoid heat illness. If you don't take precautions, you may become seriously ill or even die

Magnitude of Excessive Heat of Heat Wave

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 9**.



Source: weather.gov; <https://www.noaa.gov/jetstream/global/heat-index>

The **Caution** stage describes how fatigue is possible, while **Extreme Caution** temperatures can result in sunstroke, muscle cramps, or heat exhaustion. The **Danger** temperatures could cause sunstroke, while at the **Extreme Danger** temperatures, heatstroke or sunstroke is likely according to the humidity and temperature Heat Index. Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to **15°F**. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Extreme Cold or Wind Chill

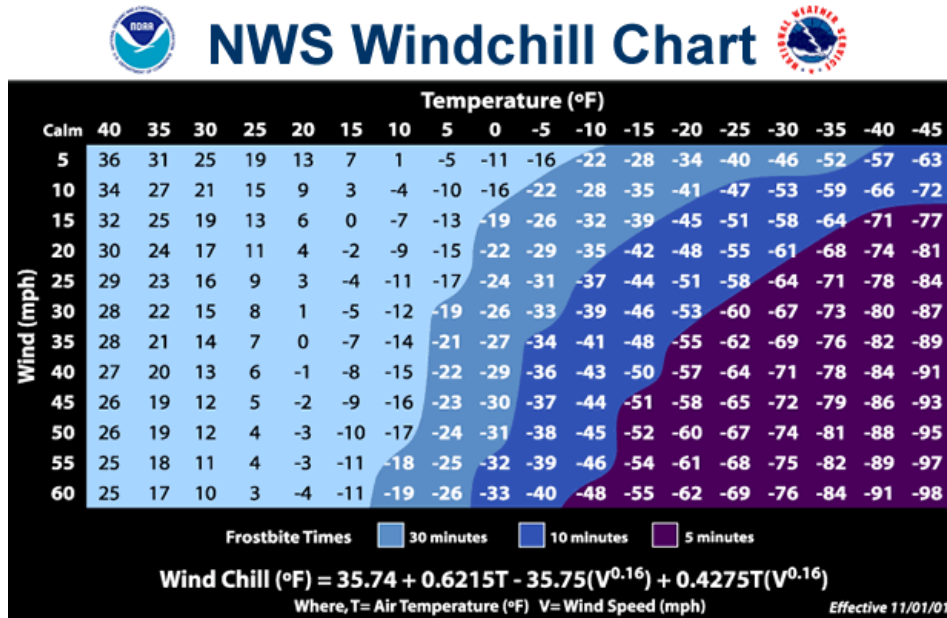
Extreme cold temperatures are associated with continental Arctic air masses. The actual temperatures reached depend specifically on the nature of the cold air mass and where it originated. In general, those from the Arctic regions are the coldest. Though cold temperatures are dangerous, they become more so in conjunction with strong winds. The combination produces a wind-chill factor, which is 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° F**. At **2700 Wm⁻²**, exposed flesh freezes within a half-minute.

Magnitude of Extreme Cold or Wind Chill

Extreme cold magnitude can be measured for **windchill** using the **NWS Windchill Temperature (WCT) Index** as displayed in **Figure 10**, measuring the wind and temperature leading to how quickly frostbite can occur. The **extreme cold weather** warning stages describe the potential impacts of the weather.

Figure 10

Windchill Temperature (WCT) Index



Source: [National Weather Service](https://www.weather.gov/eou/prepare/prepare-windchill/)

Cold weather warnings incrementally warn people of the dangers of **extreme cold**. The [National Weather Service](https://www.weather.gov/eou/prepare/prepare-windchill/) provides watches, advisories, and warnings.

Wind Chill WATCH BE PREPARED	NWS issues a wind chill watch when dangerously cold wind chill values are possible. As with a warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least a half tank of gas and update your winter survival kit.
Wind Chill ADVISORY BE AWARE	NWS issues a wind chill advisory when seasonably cold wind chill values, but not extremely cold values, are expected or are occurring. Be sure you and your loved ones dress appropriately and cover exposed skin when venturing outdoors. A Wind Chill Advisory is issued for New Hampshire when wind chill values are expected to be -20°F to -29°F and winds are greater than 5 mph.
Wind Chill WARNING TAKE ACTION	NWS issues a wind chill warning when dangerously cold wind chill values are expected or are occurring. A Wind Chill Warning is issued for New Hampshire when wind chill values are expected to be -30°F and winds are greater than 5 mph.

In addition to cold winds, the National Weather Service provides **extreme cold** guidance for several stages of weather alerts that are usually directed towards vegetation and crops. However, these freezing stages can also apply to watercourses, to animals kept outdoors or in barns, and to infrastructure such as bridges, dams, and roads (“black ice”).

❄️ Frost Advisory BE AWARE	A Frost Advisory is issued when areas of frost are expected or occurring, posing a threat to sensitive vegetation. Frost develops on clear, calm nights and can occur when the air temperature is in the mid-30°Fs. Each plant species has a different tolerance to cold temperatures.
❄️ Freeze Watch BE PREPARED	NWS issues a Freeze Watch when there is a potential for significant, widespread freezing temperatures (below 32°F) within the next 24-36 hours. A freeze watch is issued in the autumn until the end of the growing season and in the spring at the start of the growing season.
❄️ Freeze Warning TAKE ACTION	When temperatures are forecasted to go below 32°F for a long period of time, NWS issues a Freeze Warning . This temperature threshold kills some types of commercial crops and residential plants.
❄️ Hard Freeze Warning TAKE ACTION	NWS issues a Hard Freeze Warning when temperatures are expected to drop below 28°F for an extended period of time, killing most types of commercial crops and residential plants.

The **extreme cold** is difficult to define because what constitutes **extreme cold** varies in different parts of the country. Generally, in New Hampshire **extreme cold hazards** can arise through a combination of wind chill, below freezing cold temperatures, and winter storm events. In the Northeast, **extreme cold** means temperatures below zero (-0°F). Extended **extreme cold** durations are often referred to as cold snaps.

Although New Hampshire residents are used to frosts, freezes and vegetation protection, **extreme cold** may cause water pipes to freeze and burst in homes that are poorly insulated or without enough heat. The demand for additional heating fuel is necessary during **extreme cold** events, and often electricity failure is experienced during winter storms with **extreme cold**. Exposure to cold conditions can cause frostbite or hypothermia and become life-threatening. Infants, children, and elderly people are most susceptible. Most New Hampshire households are become used to winter storm events and use woodstoves, or propane or electric generators to keep homes warm during extreme cold when power failure occurs. Recommendations are to maintain at least **72** hours' worth of fuel, food, water, medical supplies, medications, and warm clothing in a storm emergency kit as well as to keep vehicles fueled.

Frostbite is damage to body tissue caused by **extreme cold**. A wind chill of **-20°F** will cause frostbite in just **30** minutes. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, ear lobes or the tip of the nose. Additional exposure can turn the appendage purple, a dangerous condition. If symptoms are detected, get medical help immediately. If help must wait, slowly re-warm affected areas. However, if the person is also showing signs of hypothermia, warm the body core before the extremities.

Hypothermia is a potentially deadly condition when the body temperature drops to less than **95°F** through exposure to **extreme cold**, or extended cold or water submersion. For those who survive, there are likely to be lasting kidney, liver and pancreas problems. Warning signs include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and apparent exhaustion. Take the person's temperature and if below **95°F**, seek medical care immediately. If help must wait, place the person into a lukewarm bath to warm the core gradually.

FIRE HAZARDS

Fire can be caused by several agents and can spread rapidly to consume property and endanger lives. This **2024 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, densely packed residential areas, cul-de-sacs, and roads or areas of the City 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 several types of natural **FIRE** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included	
FIRE	WILDFIRE Brushfire, Outdoor Fires or Accidental	LIGHTNING

Wildfire

The overall ratings of **Wildfire** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
WILDFIRE Brushfire, Outdoor Fires or Accidental	4 HIGH	3 HIGH	1 LOW	2 MEDIUM	8.0 HIGH	E Extreme (Red) Fire Danger

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. With the City's conservation lands, **wildfire** seems particularly relevant. The burning of brush, permitted or not, can become an uncontrollable brushfire in dry or unsuitable conditions.

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

Although there are several potential indices, the current standard of measuring wildfire magnitude is utilizing the National Wildfire Coordinating Group (NWCG)'s wildfire classification scale. **Table 15** displays the wildfire classification size per the number of acres burned.

Table 15
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 <https://www.nwcg.gov/data-standards/approved/fire-size-class>

The [New Hampshire Department of Natural and Cultural Resources Division \(NHDNCR\) of Forest and Lands \(DFL\)](#) helps to promote daily fire danger ratings which community members can readily understand. The Fire Department posts the information in a prominent location, at the Fire Station. The **National Fire Danger Rating System (NFDRS)** categories are as follows:

 Low GREEN	Fire starts are unlikely. Weather and fuel conditions will lead to slow fire spread, low intensity and relatively easy control with light mop-up. Controlled burns can usually be executed with reasonable safety.
 Moderate BLUE	Some wildfires may be expected. Expect moderate flame length and rate of spread. Control is usually not difficult and light to moderate mop-up can be expected. Although controlled burning can be done without creating a hazard, routine caution should be taken.
 High YELLOW	Wildfires are likely. Fires in heavy, continuous fuel such as mature grassland, weed fields and forest litter, will be difficult to control under windy conditions. Control through direct attack may be difficult but possible and mop-up will be required. Outdoor burning should be restricted to early morning and late evening hours.
 Very High ORANGE	Fires start easily from all causes and may spread faster than suppression resources can travel. Flame lengths will be long with high intensity, making control very difficult. Both suppression and mop-up will require an extended and very thorough effort. Outdoor burning is not recommended.
 Extreme RED	Fires will start and spread rapidly. Every fire start has the potential to become large. Expect extreme, erratic fire behavior. NO OUTDOOR BURNING SHOULD TAKE PLACE IN AREAS WITH EXTREME FIRE DANGER.

Source: <https://www.wfas.net/index.php/fire-danger-rating-fire-potential--danger-32/class-rating-fire-potential-danger-51>

Lightning

The overall ratings of **Lightning** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
LIGHTNING	4 HIGH	4 HIGH	2 MEDIUM	1 LOW	9.3 HIGH	LAL 5 Numerous Thunderstorms

The [NOAA National Severe Storms Laboratory defines lightning](#) as: a giant spark of electricity in the atmosphere between the clouds, the air, or the ground. In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up enough, this insulating capacity of the air diminishes, forming a rapid discharge of electricity (lightning). The flash of lightning temporarily equalizes the charged regions in the atmosphere until the opposite charges build up again.

All thunderstorms contain lightning, but not all lightning is caused by thunderstorms. Lightning can also be seen during volcanic eruptions, surface nuclear detonations, and heavy snowstorms. 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.” Lightning can strike where it is not raining, or even before rain reaches the ground.

There are four main types of lightning:

- ➔ Cloud-to-ground (CG) strike is the most common type of lightning, reaching toward the surface.
- ➔ Cloud flashes like intra-cloud (IC) or sheet lightning occur either in the same cloud or from cloud-to-air (CA) and do not reach the ground.
- ➔ Cloud-to-cloud (CC) or spider lightning travel among and illuminate multiple clouds.
- ➔ Transient luminous events (TLE) are rarely observed from the ground and occur in the high atmosphere above the storms.

Where the CG lightning will strike downward, a channel current of **1-2** inches develops toward the earth’s surface. As lightning nears the ground, objects like trees, telephone poles, and buildings start sending up static electricity sparks to meet this channel. Taller objects such as trees and historic buildings with cupolas, or hills are more likely than the surrounding ground to produce one of the connecting sparks and so are more likely to be struck by lightning. Yet lightning can strike the ground in an open field even if the tree line is nearby. The National Weather Service more provides information about [lightning safety](#).

The City has a host of conservation lands and public trails. Not are they monitored for fire danger, but also for disturbances along the walkways.

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 16**.

Table 16
Lightning Activity Level (LAL)

Level 1-6	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; <https://graphical.weather.gov/definitions/defineLAL.html>

FLOOD HAZARDS

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 farming and 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. The **500-year** floods are phrased as **0.2%** annual chance of flood.

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.

Dam Breach, Release or Failure has a close relationship with **Flood Hazards**, uses the NH DES Dam Hazard Classification categories, and has therefore been rated along with the natural hazards.

There are several types of **Flood Hazards** examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included	
FLOOD	INLAND FLOODING Rains, Snow Melt, or Flash Floods	RIVER HAZARDS Ice Jams, Scouring, Erosion, Channel Movement or Debris
	DAM FAILURE Water Overtop, Breach, Beaver, etc.	

Inland Flooding

The overall ratings of **Inland Flooding** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
INLAND FLOODING Rains, Snow Melt or Flash Floods	4 HIGH	4 HIGH	3 HIGH	3 HIGH	14.7 EXTREME	500 (.02%) Year Flood, Now 6% Chance 500 Year Flood within 30 yrs
						>70% High Excessive Rainfall Risk (flash flooding)

Inland flooding hazards from storms, spring temperatures, rains and more can be measured by Special Hazard Flood Areas (SFHAs) and river gage flood stage heights.

Magnitude of Inland Flooding

Flooding magnitude, or how severe flooding could occur in Concord, can be measured by the following SFHA Flood Zone scale in **Table 18**. “Flood” encompasses all types of flooding including **Rains, Snow Melt, Floods and Flash Floods** and is often the result of other natural hazards, such as **Tropical and Post Tropical, Severe Storms**, etc. Magnitude can also be rated by Excessive Rainfall percentage.

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 **2009** (Hillsborough County) and **2010** (Merrimack County). In Concord (**#330110**) New Hampshire (**33011C**), there are several DFIRMs identifying floodplains. DFIRM panels are not printed when floodplains are not present in an area.

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 for Concord are now set on an aerial photography background that displays roads, buildings, forested areas, waterbodies and watercourses. Concord’s Zoning Ordinance references the **2010** maps appropriately as the official DFIRMS. The general Flood Zone types appear in **Table 17**.

Table 17
Special Flood Hazard Area (SFHA) Zones on 2010 DFIRMS

Special Flood Hazard Areas on Concord DFIRMS	
Zone A	1% annual chance of flooding • 100-year floodplains <i>without</i> Base Flood Elevations (BFE)
Zone AE (with or without floodways)	1% annual chance of flooding • 100-year floodplains <i>with</i> 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 <i>without</i> 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

Concord 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 **2010** Floodplain Maps in the City 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.**

Excessive Rainfall

NOAA defines the risk of rainfall exceeding flash flood guidance within 25 miles of a point. These risks are categorized by a Marginal (5%+) Risk to a High (70%+) Risk. As more summer storms impact the Central NH region and the Northeast, excessive rainfall is likely to continue to occur due to climate change.

Risk Category	Probability of Excessive Rainfall (within 25 mi)
Marginal	At least 5%
Slight	At least 15%
Moderate	At least 40%
High	At least 70%

https://www.wpc.ncep.noaa.gov/gpf/excessive_rainfall_outlook_ero.php

Rapid Snowpack 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 snowpack melt because of the flooding from the **Merrimack River, Soucook River, Contoocook River, or Turkey River** and the various brooks along the roads, roadside wetlands, and from the culverts directing the watercourses. Locations in Concord that may be vulnerable to rapid snowpack melt include undersized or unmaintained culverts, roads, driveways, slopes, yards or fields, or any of the City's fast moving brooks or drainage areas. Damage to roads is expected.

Magnitude of Rapid Snowpack Melt

Rapid snowpack 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, or see the list of road washouts found later in this **4 HAZARD RISK ASSESSMENT** chapter.

River Hazards

There are several types of **RIVER** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included
RIVER	RIVER HAZARDS Ice Jams, Scouring, Erosion, Channel Movement or Debris

River hazards are considered different from flooding in this **Hazard Mitigation Plan**. They include ice jams, scouring of banks and infrastructure, erosion of banks and shoreline, channel movement, and woody material debris. These types of incidents could occur on large brooks or other watercourses as well as rivers.

The overall ratings of **River Hazards** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
RIVER HAZARDS Ice Jams, Scouring, Erosion, Channel Movement or Debris	4 HIGH	4 HIGH	4 HIGH	4 HIGH	16.0 EXTREME	Merrimack 17' Moderate Flood Stage (with no dam failure) Soucook 15' Major Flood Stage

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
						Much Above Normal Stream Flow (Blue)

River Height and Flow Volume by Stream Gages

Gages that measure the height and volume of water along rivers are very helpful tools in understanding what level of flooding will become a concern. Flood stage measurements differ per river and these indicators help the community prepare for flood conditions.

Magnitude of River Height and Flow Volume by Stream Gages

The Merrimack River runs below the NH 9/Loudon Road bridge at a river gage was placed. Monitored by the USGS and updated with real time information, the magnitude of flooding can be tracked by Flood Stage. The magnitude of the Soucook River at the NH 106 bridge with Pembroke can also be tracked by Flood Stage category.

Merrimack River

Flood Categories (in feet)

Major Flood Stage:	20
Moderate Flood Stage:	17
Flood Stage:	14
Action Stage:	12
Low Stage (in feet):	0

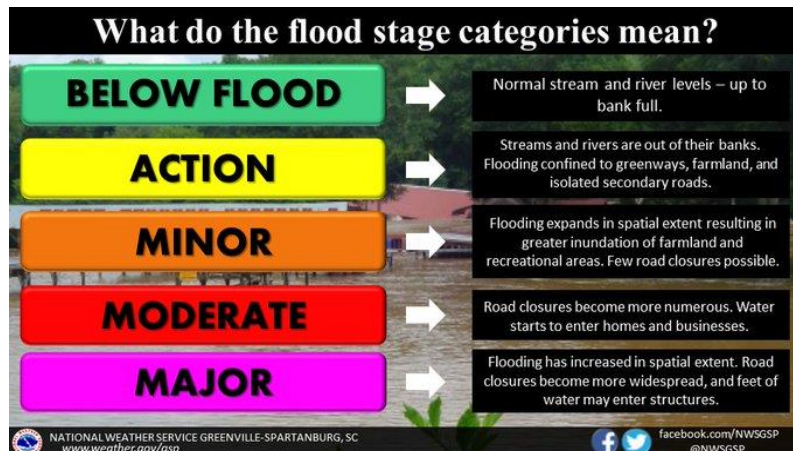
Suncook River

Flood Categories (in feet)

Major Flood Stage:	15
Moderate Flood Stage:	13
Flood Stage:	11
Action Stage:	9

Merrimack: <https://water.weather.gov/ahps2/hydrograph.php?wfo=gyx&gage=conn3>

Soucook: <https://water.weather.gov/ahps2/hydrograph.php?wfo=gyx&gage=soun3>



The USGS National Water Dashboard is an interactive map which monitors Stream Gages and other water mapping layers to predict how much below normal to how much above normal flow conditions are for that particular day of the year. At least 10 years (10 data points) of data are needed for this evaluation.

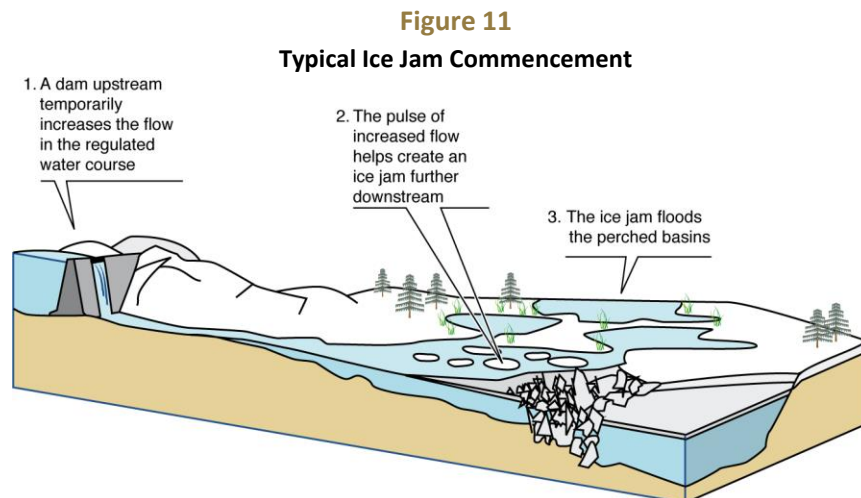
<https://dashboard.waterdata.usgs.gov/app/nwd/en/?region=lower48&aoi=default>

Streamflow Status

● High	All-time high for this day (100% max)
● > 90th percentile	Much Above Normal
● 76th - 90th percentile	Above Normal
● 25th - 75th percentile	Normal
● 10th - 24th percentile	Below Normal
● < 10th percentile	Much Below Normal
● Low	All-time Low for this day (0%)
○ Not ranked	

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 11**.



Source: USGS, Internet Accessed May 2015

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.

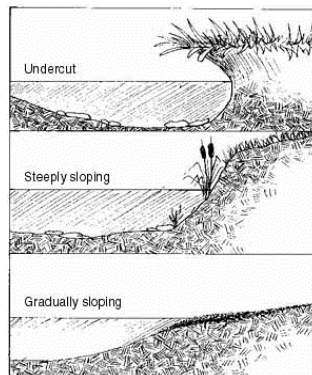
The US Army Corps of Engineers (ACOE) maintains the [Ice Jam Database, Bulletins & Surveys](#) website which locates where known ice jams are presently occurring and where they have occurred in the past. Reports can be generated in various formats so emergency responders can identify the locations of prior ice jams and begin to mitigate the effects of future events.

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 12** displays visual bank erosion characteristics. In Concord, fluvial geomorphology is most pertinent to the **Merrimack River**, **Soucook River**, **Contoocook River**, and the **Turkey River**.

Figure 12
Bank Erosion Characteristics

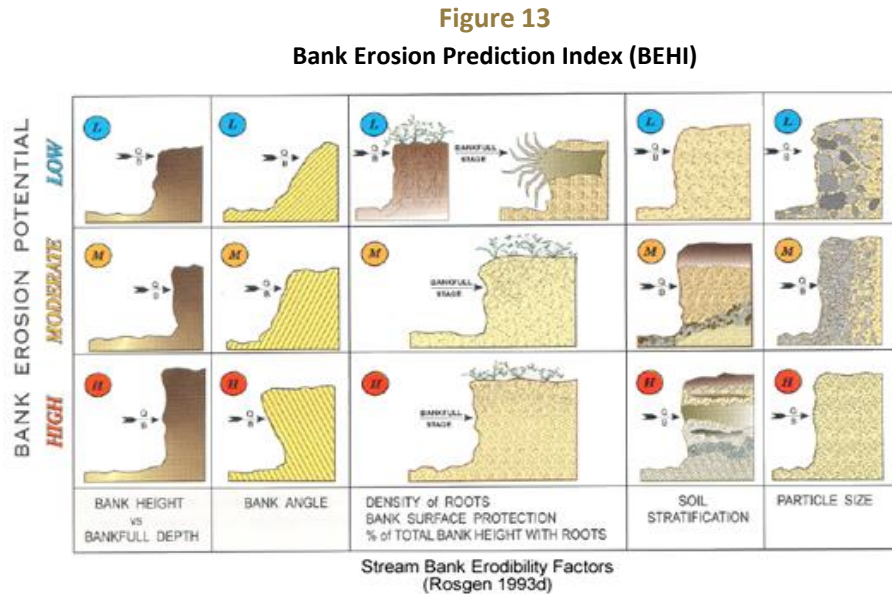


Source: US Geological Survey (USGS)

Magnitude of (Fluvial) Riverbank Erosion

River and streambank erosion magnitude could be measured by the US EPA Bank Erosion Prediction Index (BEHI), which is used with the Near Bank Stress (NBS) quantification, but this is a difficult, lengthy evaluation and depends on specific sites instead of entire rivers. 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. The BEHI magnitude was not determined for the **Hazard Mitigation Plan**. Figure 13 displays the visual version of the index.



Source: US Environmental Protection Agency (US EPA)

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.

The overall ratings of **Dam Failure** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
DAM FAILURE Water Overtop, Breach, Beaver, etc.	2 MEDIUM	1 LOW	3 HIGH	1 LOW	3.3 MEDIUM	High Hazard Dam Fail

Magnitude of Dam Failures

Although dam failure is considered a **Technological Hazard**, it is often a secondary hazard caused by flooding conditions and has been rated along with the natural hazards. Classifications of dams and their magnitude of failure can be measured by the [NH DES Dam Hazard Classifications](#) shown in **Table 18**.

The City's Penacook Lake Dam is a High Hazard and is owned by the City. The City regularly upgrades its dam, completes new EAPs, and complies with necessary direction from NH DES. The City hosts

Table 18
New Hampshire Dam Hazard Classifications

Dam Classification	
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 *
LOW Hazard Structure	Inspection
L 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/city road or private road accessing property other than the dam owner's that could render the road impassable or 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
S 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
H Means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life from: ○ 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 2 years

Dam Classification

- Water levels and velocities causing structural failure of a foundation of a habitable residential, commercial, or industrial structure, which is occupied under normal conditions.
- Water levels rising above the first floor elevation of a habitable residential, 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.

Source: NH Department of Environmental Services (NHDES) Dams Bureau [Fact Sheet WD-DB-15](#), 2012

PUBLIC HEALTH HAZARDS

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, Borrelia miyamotoi or Powassan (tickborne diseases), Eastern Equine Encephalitis (EEE), West Nile, Jamestown Canyon Virus or Zika (arboviral, mosquito-borne diseases) and any could occur in Concord. The City 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 City’s heavily forested sections and into State Forests. The **coronavirus** global pandemic is contagious between humans in aerosol /droplet form and is much more contagious and deadly than influenza.

Other wide-spread public health hazards include **water quality degradation** (failing septic systems, flooding, pipes breaking, runoff, haz mat spills) that 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 from water quality issues.

Air quality could decline from ground-level ozone or fine particulates and is monitored by the [NH Department of Environmental Services](#). Air Quality Action Days are announced when monitoring sites report poor breathing air.

Food-borne illnesses could result from improperly handled or cooked food, either at home or at restaurants, cafeterias, or from markets or farms.

There are several types of **PUBLIC HEALTH** hazards examined in the [Hazard Identification and Risk Assessment](#):

Main Hazard Category	Specific Hazards Included
PUBLIC HEALTH	PUBLIC HEALTH Infectious Diseases, Air & Water Quality, Biological, Addiction, Arboviral or Tick-borne

Most of these diseases can cause epidemics transmitted through food, water, environment, or personal contact. An epidemic could also result from bioterrorism, whereby an infectious agent is released into a susceptible population. Drug addiction is reportedly high in New Hampshire and is considered a public health hazard. There are many facets public health hazards could take in Concord. The City of Concord is an active member of the [Capital Area Public Health Network](#) and has a designated Point of Dispensing (POD) location at the NH Technical Institute Community College in Concord.

The overall ratings of **Public Health** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
PUBLIC HEALTH Infectious Diseases, Air & Water Quality, Biological, Addiction, Arboviral, or Tick-borne	4 HIGH	4 HIGH	2 MEDIUM	3 HIGH	12.0 EXTREME	No locations monitored by DES (bacteria). City tests swim pools.
						Hazardous 300+ Air Quality (EPA)

Coronavirus (Respiratory Infectious)

Coronaviruses are a large family of viruses, but only several types are known to commonly cause infections in people, with these common human coronaviruses usually causing mild to moderate respiratory illness (like the common cold). Newer human coronaviruses, like Severe Acute Respiratory Syndrome (SARS), Middle Eastern Respiratory Syndrome (MERS), and the COVID-19 can cause more severe symptoms. The COVID-19 is originally thought to have spread from animals to humans, but now person-to-person spread is occurring. The virus is spread through the air by coughing and sneezing; by close personal contact, such as touching or shaking hands; and by touching an object or surface with the virus on it, then touching mouth, nose, or eyes before washing hands.

The NH Department of Health and Human Services maintains a [COVID-19 dashboard website](#) with current information, statistics, legislation, and testing locations, and resources. Social distancing (staying at least **6** feet away from people outside of one's household), wearing cloth facial masks, sanitizing hands, monitoring for symptoms, working from home, remote schooling, and staying at home when possible are the ways to fight the COVID-19. Vaccinations and boosters were necessary and are now an annual (endemic) necessity. Two years into the pandemic (**Mar 2020-Mar 2022**), people throughout the state and United States were feeling stifled and restrictions eased, a surge of new cases occurs even as vaccines are administered. Home testing and self-quarantining became possible.

Within the **14** day span of **October 1-14, 2022**, **556** Concord residents tested positive for the deadly respiratory coronavirus COVID-19. During this same time, **361** Merrimack County residents were reported to have tested positive. In New Hampshire, new cases totaled **3,235** within these **14** days.

Since **March 2, 2020**, a total of **11,078** Concord cases tested positive by **October 2022**. Within this period, over **351,000** New Hampshire cases tested positive for COVID-19. Of these, **37,310** cases are Merrimack County residents. Over **2,700** New Hampshire residents died through **October 2022**. The numbers change daily and should be reviewed on the state's COVID dashboard at <https://www.nh.gov/covid19/index.htm>.

Vaccinations began in **December 2020** over a planned phasing process for New Hampshire residents. As of October 2022, **65.5%** of the state's population completed vaccinated and **75.3%** of those obtained a booster. See **Figure 14** and **Figure 15** for case summaries. With home testing available, only those people consulting a doctor will be counted toward a coronavirus case; as such, the number of cases are sure to be under-reported and under-counted.

Figure 14

Current New 14 Days NH COVID-19 Cases and Cumulative (Total) NH COVID-19 Cases through 10-14-22

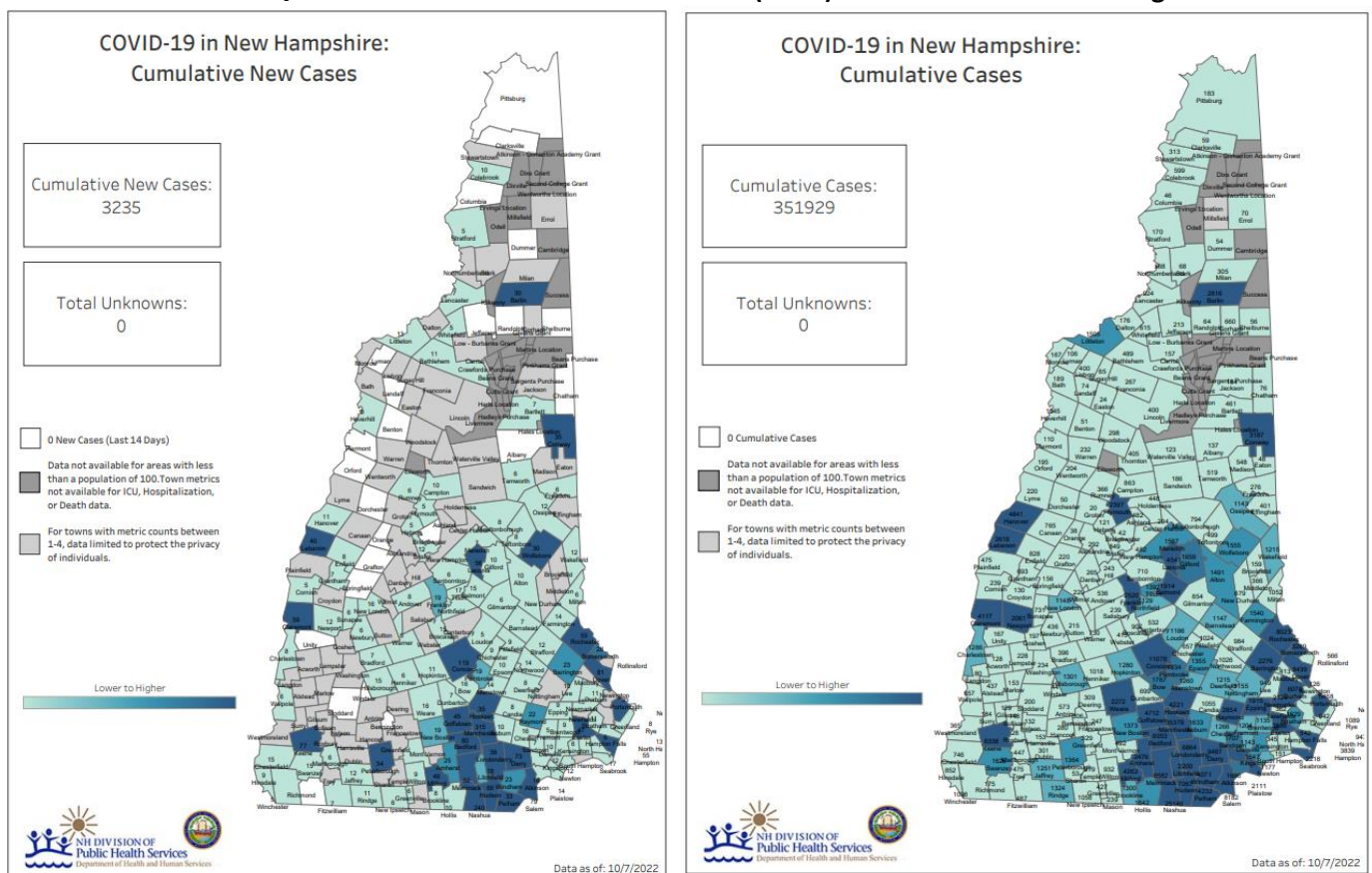
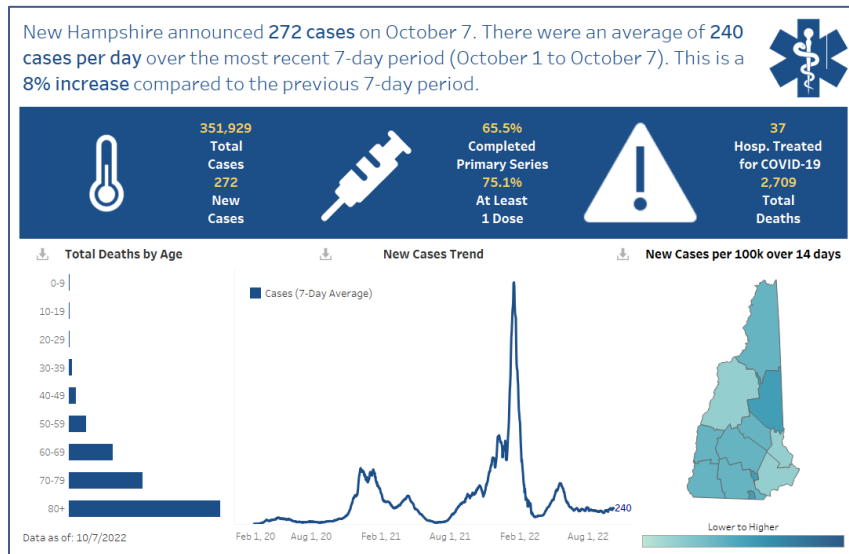


Figure 15

NH COVID-19 Statistics Overview



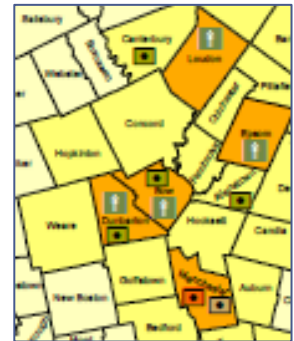
Source for Figures: NH Division of Health and Human Services
Dashboard COVID-19
<https://www.nh.gov/covid19/>

Influenza (Respiratory Infectious)

A magnitude scales for **Pandemic Severity Index (PSI) for Influenza** and resulting Community Mitigation Strategies is available from the US Center for Disease Control (US CDC). The [State of New Hampshire Influenza Pandemic Public Health Preparedness and Response Plan 2007](#) included the **PSI for Influenza** classification system and the Community Strategies. As a growing high-density community, Concord may be particularly vulnerable to influenza.

Arboviral Transmission Diseases

New Hampshire developed guidelines for phased response to the arboviruses (mosquito-borne) Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV) and Jamestown Canyon Virus (JCV). Annually, the [NH DHHS publishes the State of New Hampshire Arboviral Illness Surveillance, Prevention, and Response Plan 2021](#) and its associated [Arboviral Risk Map 2021](#). Risk Categories determine human illness probability and the recommended response to outbreaks. Regionally, cases of Jamestown Canyon Virus (JCV), human Jamestown Canyon Virus (JCV), and West Nile Virus (WNV) have made appearances in 2020 and 2021.



The new [State of New Hampshire Zika Virus Response Plan 2018](#) describes Response Phases **0** to **3** and is written like an Emergency Operations Plan Annex for emergency responders to follow.

The NH DHHS and the Capital Area Public Health Network should be notified of all public health emergencies, no matter the type of threat.

Tick-borne Transmission Diseases

Tick-borne diseases are increasing in New Hampshire, and now include Lyme Disease, Anaplasmosis, Babesiosis, Powassan Virus, and more. These are all carried by the black legged tick in New Hampshire. The State has currently stopped producing annual maps and updates of tick-borne disease locations, but they have other resources available such as the [2015 State of NH Tickborne Diseases Prevention Plan](#). Check back here at the NH Department of Health and Human Services for future updates: <https://www.dhhs.nh.gov/dphs/cdcs/lyme/index.htm>. No increase in Lyme Disease in Concord residents has been noted.

Air and Water Quality Decline

The [NH DES Drinking Water and Groundwater Bureau](#) administers the federal Safe Drinking Water Act and NH statutes to protect public water systems, drinking water sources and groundwater supplies to help maintain safe **water quality** for drinking. NHDES calculates Total Maximum Daily Load (TMDL) reports of pollutants for the state's water every two years.

Water quality hazards such as radon, arsenic, uranium Per- and polyfluoroalkyl substances (PFAS) industrial chemicals, cyanobacteria, coliform bacteria, lead and copper in public water systems, are constantly being tested for and when found, monitored. Once these enter the groundwater (aquifers) system, they are extremely difficult to mitigate. Various publications describe the NHDES efforts understand how damage to infrastructure from natural hazards such as **Inland Flooding** and spring **snow melt** runoff can occur to create more resilient water systems.

Air quality is a particular danger to the young, elderly people, and those with Chronic Obstructive Pulmonary Diseases (COPD), asthma and other breathing diseases. Ground level ozone and particle pollution are monitored, reported and forecasted for New Hampshire counties. The [Map of Current Air Quality](#) changes daily and is coded to [US EPA's Air Quality Index](#). Air Quality Action Days are announced when the air quality becomes Moderate, Unhealthy or Hazardous. Transportation such as I-89 and I-93, large local industries such as Merrimack Station and Wheelabrator contribute to Central NH Region air pollution, but New Hampshire is impacted by industries and wildfires across the United States and Canada. Greenhouse gases from industrial pollution and manufacturing contributes to poor **air quality**.

The NH DHHS maintains [NH Health WISDOM](#), a database of public health data for air quality, childhood lead, cancer, asthma, tickborne disease, radon, and more. Many public health threats in New Hampshire have indices, monitoring, and data recording. The NH Department of Health and Human Services (NH DHHS) <https://www.dhhs.nh.gov/> is a good resource to determine what diseases are most prominent.

Biological Infestation

Depending on the type of biological invasive species, a different State department monitors and reports their appearance within New Hampshire.

Invasive Insect Pests

The [NH Department of Agriculture, Markets and Foods Division of Plant Industry's](#) mission is to promote and protect plant health by curtailing the spread of dangerous insects, diseases and weeds moved in commerce. A biological pest, the [Emerald Ash Borer](#), has consumed most of the Central NH Region's ash trees. Only a minority have not been infected. Active logging operations are asked to identify them. The problem has been increasing over the years in Merrimack County and surrounding areas.

Invasive Land Plants

Invasive plants like need to be managed or removed. The [NH Department of Agriculture, Markets and Foods Division of Plant Industry](#) (NHDAMF) also regulates invasive upland plants: It is illegal in New Hampshire to collect, transport, sell, distribute, propagate or transplant any living or viable portion of any listed prohibited invasive plant species including all of their cultivars, varieties, and specified hybrids.

Invasive Aquatic Plants and Insects

The NHDES hosts an [invasive aquatic species program](#) and maintains a [statewide map of the invasive aquatic plant infestations](#) along with an accompanying [list of infested waterbodies](#). and invertebrate pest species and [NH Fish and Game](#) regulating invasive aquatic invertebrates. For public waters throughout the region, the NHDES Volunteer Rivers AP and NH Lakes Association can check help monitor [invasive water species](#).

Public Beach Monitoring

The NH Department of Environmental Services [Public Beach Inspection Program](#) regularly tests public beaches, both freshwater and saltwater, for the presence of bacterias, like cyanobacteria and e. coli, and dangerous species like jellyfish. Cyanobacteria advisories are issued when there are blooming conditions and cyanobacteria cell concentrations exceed 70,000 cells/ml in recreational waters. Freshwater beach standards for e. coli is 1 sample > 158 counts/100 ml.

Concord's larger ponds could experience **milfoil** infestation. Rivers can carry invasive species like **zebra mussels**. Public boat launches, many of which also serve as beaches, along Merrimack River could be subject to such biological hazards. The [NHDES OneStop](#) data resource center can be accessed to provide reports on potential water hazards.



Cyanobacteria Bloom in Loudon, 2022

Opioid and Illicit Drugs Endemic

New Hampshire has seen a rise in the number of heroin and opioid deaths in the decade between **2012-2022**. Even Concord has been subject to additional calls for

service for overdose. Along with the use of these substances is a commensurate amount of buying and/or making of illegal drugs. The State made national headlines during the early years of the decade for its struggles with overdoses and public recognition of the problem. A particular concern to Concord officials and the Police and Fire/EMS Departments is illegal drug usage and overdosing in the community. Data was submitted by each Department to cover their calls over the last five years.

By **2022**, the Police Department's call volume for overdose calls and overdose deaths remained fairly consistent over the period, totaling over **727** calls for service. Data for **2022** will not be complete until toxicology is completed, so the **2022** numbers are preliminary. Police Department data is provided in **Table 19** and **Figure 15**.

Table 19
Police Department Overdose Call Analysis, 2017-2022*

Police Department Reporting	2017	2018	2019	2020	2021	2022 Preliminary***	6-Year Totals
Overdose Calls for Service*	152	138	124	103	87	123	727
Overdose Deaths**	15	17	15	19	15	13	94

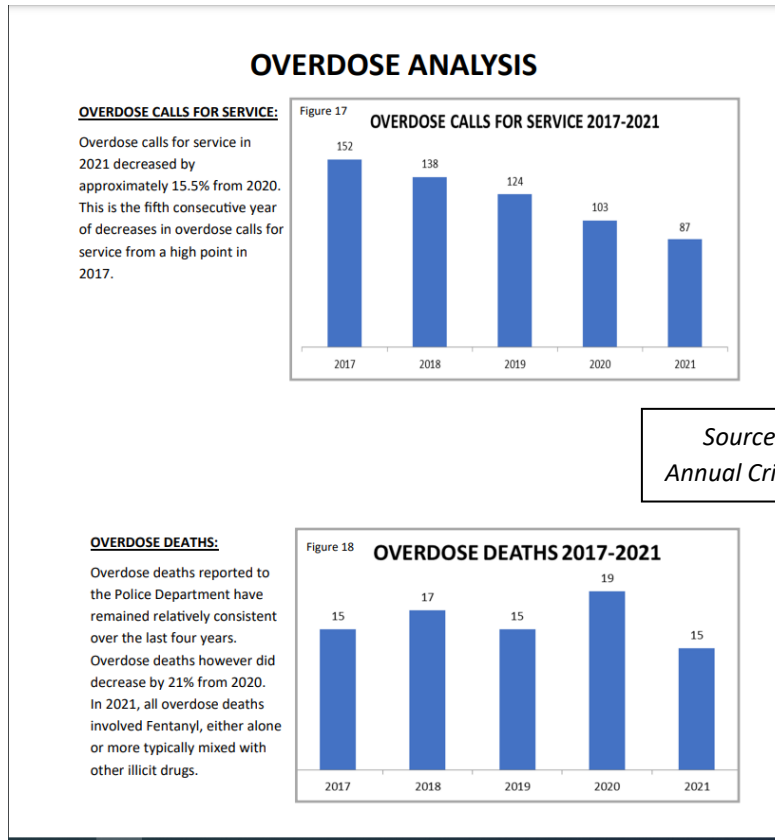
*Overdose calls for service in **2021** decreased by approximately 15.5% from **2020**. This is the fifth consecutive year of decreases in overdose calls for service from a high point in **2017**.

Overdose deaths reported to the Police Department have remained relatively consistent between **2017-2021. Overdose deaths did decrease by 21% from **2020**. In **2021**, all overdose deaths involved Fentanyl, either alone or more typically mixed with other illicit drugs.

*****2022** records as of 12-10-22 are not yet complete, since the toxicology results for deaths are still pending and are subject to change. To date, 13 overdose deaths have been handled by Concord Police and one was handled by NH State Police. It is important to note that in some instances, the initial call for service may not be an overdose.

Figure 15

Police Department Overdose Call Analysis, 2017-2022*



By **2022**, the Fire/EMS Department's call volume for drug overdose increased over the period totaling over **585** calls for service. Data for **2022** is not yet complete so the **2022** numbers are preliminary. There may be some overlap between Police and Fire Department calls. Fire Department data is provided in **Table 20** indicating heroin is the prevalent drug abused within Concord, at **310** calls for service during this time.

Table 20

Fire/EMS Department Overdose Call Analysis, 2017-2022*

Fire & EMS Department Reporting	2017	2018	2019	2020	2021	2022 Preliminary*	6-Year Totals
Drug Overdose (Intentional Self-harm, includes prescription meds)	0	0	0	0	1	0	1
Drug Overdose/Abuse: Cocaine	0	2	0	0	0	0	2
Drug Overdose/Abuse: Heroin (Known or Suspected)	8	7	71	57	67	100	310
Drug Overdose/Abuse: Marijuana/Spice/Other Synthetic Cannabis	0	1	7	8	14	12	42
Drug Overdose/Abuse: Opiates/Narcotics (Non-Heroin, Unknown)	2	3	10	18	16	34	83

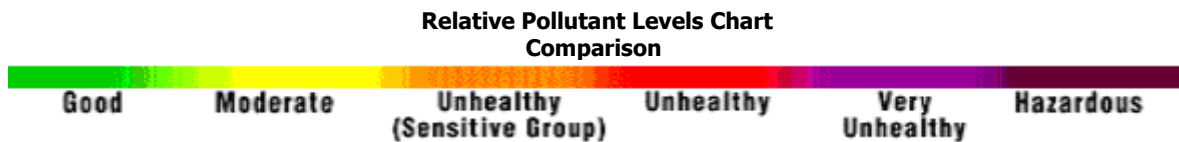
4 HAZARD RISK ASSESSMENT

Fire & EMS Department Reporting	2017	2018	2019	2020	2021	2022 Preliminary*	6-Year Totals
Drug Overdose/Abuse: Other Illicit Drug (Not Otherwise Specified)	1	2	10	6	24	19	62
Drug Overdose/Abuse: Psychoactive Drug (Meth, MDMA, XTC, etc)	3	6	15	17	19	23	83
Poisoning: Overdose of Medication (Intentional Self-Harm/Suicidal)	1	1	0	0	0	0	2
Total Fire & EMS Calls	15	22	113	106	141	188	585

Source: Concord Fire Department call records, supplied 12-14-22

Magnitude of Public Health

One public health magnitude measured by the **Plan** is the NHDES Air Quality Index <https://www4.des.state.nh.us/airdata/> which measures particulates and potential for relative pollutants and provides this information simply to the public:



The US EPA places these categories into an Ozone and Particulate Pollution table that provides a particulate value of indices to use for magnitude:

Table 21
EPA Air Quality Index
AQI Basics for Ozone and Particle Pollution

Daily AQI Color	Levels of	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.

AQI Basics for Ozone and Particle Pollution

Daily AQI Color	Levels of	Values of Index	Description of Air Quality
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Source: <https://www.airnow.gov/aqi/aqi-basics/>

Another potential magnitude measurement could be using the NHDES Public Beach Monitoring system and mapping for healthy swimming <https://www.des.nh.gov/water/healthy-swimming> at known, specific swimming areas. The mapping system includes Warnings, Advisories, and Alerts for fecal bacteria and cyanobacteria <https://experience.arcgis.com/experience/180c28fa3a4c4371a9771d999454e8c4/>. No river, lake or pond locations are monitored in Concord because of the public pool system.

WARNING	CLOSED- Bacteria levels exceed recreational health threshold of 70,000 ccells/ml (cyanobacteria)
ADVISORY	CLOSED – Continued weekly sampling and likely bacteria/toxin exposure
ALERT	POSSIBLE Bacterial Alert – stay wary
OK	NO Advisory or Advisory Removed

The [2023 State Hazard Mitigation Plan](#) includes **Infectious Diseases** as a natural hazard. From this resource, the definition and extent of the potential magnitude of public health threats are identified as follows. These disease levels were described at the [US Center for Disease Control](#) (CDC) and included measures New Hampshire has been practicing for COVID-19, including masking, social distancing, staying at home, and quarantine. However, the levels have been archived by the CDC and are no longer actively published.

The magnitude and severity of infectious diseases are described by its speed of onset (how quickly people become sick or cases are reported) and how widespread the infection is. Some infectious diseases are inherently more dangerous and deadly than others, but the best way to describe the extent of diseases relates to the disease occurrence:

§ Sporadic	Disease that occurs infrequently and irregularly.
§ Endemic	(Baseline) Constant presence and/or usual prevalence of a disease or infection agent in a population within a geographic area.
§ Hyperendemic	The persistent, high levels of disease occurrence in the area.
§ Cluster	The aggregation of cases grouped in place and time that are suspected to be greater than the number expected, even though the expected number may not be known.
§ Epidemic	An increase, usually sudden, in the number of cases of a disease above what is normally expected in the population of the area.
§ Outbreak	The same as epidemic, but over a much smaller geographical area.
§ Pandemic	An epidemic that has spread over several countries or continents, usually affecting many people.

SOLAR STORMS HAZARDS

Solar storms and space weather is a new addition to the **Hazard Mitigation Plan** and can refer to solar flares, coronal mass ejections, high-speed solar wind, or geomagnetic storms. Solar activity can occur for as short a duration as a few minutes to several hours and create resulting effects on the Earth for weeks. When a geomagnetic storm occurs, high speed solar winds penetrate the Earth's magnetosphere and can decrease the Earth's magnetic field for several hours.

There are several types of **SOLAR STORMS** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included
SOLAR STORMS	SOLAR STORMS AND SPACE WEATHER Solar Winds, Geomagnetic Storms (Aurora Borealis), Solar Radiation or Radio Blackout

A significant danger from solar storms is the potential communications and electronics disruption. Satellites, vehicles, radios, airplanes, cell phones, computers, power lines and the internet have the capability for temporary cessation because of solar winds. Solar radiation can become a personal radiation hazard the closer one is to the stratosphere, especially on planes. Satellites, navigation, and electricity are sensitive to geomagnetic storms, which can cause electrical current surges in power lines, interference in the broadcast of radio, television, and telephone signals, and problems with defense communications.

The overall ratings of **Solar Storms** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
SOLAR STORMS AND SPACE WEATHER Solar Winds, Geomagnetic Storms (Aurora Borealis), Solar Radiation or Radio Blackout	4 HIGH	1 LOW	2 MEDIUM	2 MEDIUM	6.7 MEDIUM	G4 Severe Geomagnetic Storm
						S3 Severe Solar Radiation
						R3 Severe Radio Blackouts

Magnitude of Solar Storms

Many in residents in the Central NH region enjoy the aurora borealis viewed from Mount Kearsarge, visible to Concord in the north, although when this phenomenon occurs a geomagnetic storm is reaching New Hampshire. Emergency response personnel could monitor these storms from the Mount Kearsarge Fire Tower in Warner or from Pat's Peak in Henniker, the Oak Hill Fire Tower in Concord, or possibly Plausawa Hill in Pembroke. NOAA's Space Weather Prediction Service <https://www.swpc.noaa.gov/> provides 3-day outlooks on solar storms. Magnitude scales for **Radio Blackout (R)**, **Geomagnetic Storms (G)** and **Solar Radiation Storms (S)** are provided in **Table 22**

Table 22
Solar Storms Magnitude Scales

Magnitude Scale	Description	Effect of Space Storm	Average Frequency (1 cycle = 11 years)
GEOMAGNETIC STORM (G)			
G1 Geomagnetic	Minor	✦ Power systems: Weak power grid fluctuations can occur. ✦ Spacecraft operations: Minor impact on satellite operations possible. ✦ Other systems: Migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).	1700 per cycle (900 days per cycle)
G2 Geomagnetic	Moderate	✦ Power systems: High-latitude power systems may experience voltage alarms, long-duration storms may cause transformer damage. ✦ Spacecraft operations: Corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions. ✦ Other systems: HF radio propagation can fade at higher latitudes, and aurora has been seen as low as New York and Idaho (typically 55° geomagnetic lat.).	600 per cycle (360 days per cycle)
G3 Geomagnetic	Strong	✦ Power systems: Voltage corrections may be required, false alarms triggered on some protection devices. ✦ Spacecraft operations: Surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems. ✦ Other systems: Intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).	200 per cycle (130 days per cycle)
G4 Geomagnetic	Severe	✦ Power systems: Possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid. ✦ Spacecraft operations: May experience surface charging and tracking problems, corrections may be needed for orientation problems. ✦ Other systems: Induced pipeline currents affect preventive measures, HF radio propagation sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).	100 per cycle (60 days per cycle)
G5 Geomagnetic	Extreme	✦ Power systems: Widespread voltage control problems and protective system problems can occur, some grid systems may experience complete collapse or blackouts. Transformers may experience damage. ✦ Spacecraft operations: May experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites. ✦ Other systems: Pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency	4 per cycle (4 days per cycle)

4 HAZARD RISK ASSESSMENT

Magnitude Scale	Description	Effect of Space Storm	Average Frequency (1 cycle = 11 years)
		radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).	
SOLAR RADIATION (S)			
S1 Solar Radiation	Minor	✦ Biological: None. ✦ Satellite operations: None. ✦ Other systems: Minor impacts on HF radio in the polar regions.	50 per cycle
S2 Solar Radiation	Moderate	✦ Biological: Passengers and crew in high-flying aircraft at high latitudes may be exposed to elevated radiation risk. ✦ Satellite operations: Infrequent single-event upsets possible. ✦ Other systems: Small effects on HF propagation through the polar regions and navigation at polar cap locations possibly affected.	25 per cycle
S3 Solar Radiation	Strong	✦ Biological: Radiation hazard avoidance recommended for astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. ✦ Satellite operations: Single-event upsets, noise in imaging systems, and slight reduction of efficiency in solar panel are likely. ✦ Other systems: Degraded HF radio propagation through the polar regions and navigation position errors likely.	10 per cycle
S4 Solar Radiation	Severe	✦ Biological: Unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. ✦ Satellite operations: May experience memory device problems and noise on imaging systems; star-tracker problems may cause orientation problems, and solar panel efficiency can be degraded. ✦ Other systems: Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.	3 per cycle
S5 Solar Radiation	Extreme	✦ Biological: Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. ✦ Satellite operations: Satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources; permanent damage to solar panels possible. ✦ Other systems: Complete blackout of HF (high frequency) communications possible through the polar regions, and position errors make navigation operations extremely difficult.	Fewer than 1 per cycle
RADIO BLACKOUT (R)			
R1 Radio Blackouts	Minor	✦ HF Radio: Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and en route aviators in this sector. ✦ Navigation: Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.	2000 per cycle (950 days per cycle)
R2 Radio Blackouts	Moderate	✦ HF Radio: HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. ✦ Navigation: Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.	350 per cycle (300 days per cycle)
R3 Radio Blackouts	Strong	✦ HF Radio: Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth. ✦ Navigation: Low-frequency navigation signals degraded for about an hour.	175 per cycle (140 days per cycle)

4 HAZARD RISK ASSESSMENT

Magnitude Scale	Description	Effect of Space Storm	Average Frequency (1 cycle = 11 years)
R4 Radio Blackouts	Severe	✦ HF Radio: HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. ✦ Navigation: Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.	8 per cycle (8 days per cycle)
R5 Radio Blackouts	Extreme	✦ HF Radio: Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and en route aviators in this sector. ✦ Navigation: Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.	Less than 1 per cycle

Source: <https://www.swpc.noaa.gov/noaa-scales-explanation>

WIND HAZARDS

Severe wind is likely to occur throughout all seasons. Significantly high winds occur especially during hurricanes, tornadoes, downbursts, 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 City. A communications interruption or failure resulting from damage to telecommunications towers could affect the capabilities of emergency personnel to respond to the hazard event. Often with wind events, precipitation accompanies, increasing the danger of the hazard.

There are several types of **WIND** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included	
WIND	HIGH WIND EVENTS Wind, Thunderstorms, Hail, Downbursts, Tornadoes or Debris	TROPICAL AND POST-TROPICAL CYCLONES Hurricanes, Tropical Storms or Tree Debris

High Wind Events

High wind events can take the form of severe winds, rainstorms, thunderstorms, tornadoes, and downbursts.

The overall ratings of **High Wind Events** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
HIGH WIND EVENTS Wind, Thunderstorms, Hail, Downbursts, Tornadoes or Debris	4 HIGH	4 HIGH	3 HIGH	3 HIGH	13.3 EXTREME	11 Storm Force 64 to 75 mph Beaufort
						4 Moderate Thunderstorm
						1.5" Ping Pong Ball Hail
						H5 Destructive 30-50 mm
						EF3 136-165 mph E-Fujita Downburst

Severe Wind, Rainstorms and Thunderstorms

More commonly experienced are **severe windstorms**, **rainstorms** and **thunderstorms**. The severe windstorms occur during all months of the year while the thunderstorms 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 and hail hazards in addition to severe winds and flooding.

There are several [types of thunderstorms](#): **ordinary cell** – short lived and not severe, brief rain and lightning; **multi-cell cluster** – several cells working as one, garden-variety storms lasting up to an hour with hail, strong winds, brief tornadoes, and/or flooding; **multi-cell line (squall line)** – group of thunderstorms extending laterally for hundreds of miles long but only 10-20 miles wide; **supercell- single cell** - thunderstorm lasting for hours, characterized by updrafts over 100 mph with giant hail and tornados, high precipitation and flash flooding.

Magnitude of Severe Wind and Thunderstorms

The majority of the severe wind events Concord experiences are not hurricanes but are severe windstorms or thunderstorms. Thunderstorms are common in New Hampshire, particularly during the hot weather months. The National Weather Service (NWS) has recently revised its storm warning criteria to better convey the severity and potential impacts from thunderstorm, winds, and hail. The new Impact-Based Warning format uses bullet points issued by the NWS for Severe Thunderstorm Warnings (SVR), Severe Weather Statements (SVS), and Tornado Warnings (TOR) to organize and consolidate public warnings to identify the Hazard, Source, and Impact & Location of wind hazards in these alerts. A summary of the thunderstorm damage threats is provided in **Table 23**.

Table 23
Damage Threats for Severe Thunderstorm Warnings

Thunderstorm Damage Threat	Wind >	Hail Diameter >	Wireless Emergency Alert (WEA)	Impact
Base (Normal Severe Thunderstorm)	> 58 mph (60 mph will appear in the warning)	>1" Inch (US Quarter)	No	Damage expected to be at base level.
Considerable	> 70 mph	>1.75" (Golf-ball)	No	People and animals outdoors will be injured. Hail damage to vehicles is expected. Expect considerable tree damage. Wind damage is also likely to mobile homes, roofs, and outbuildings, and powerlines.
Destructive	> 80 mph	>2.75" (Baseball)	Yes	People and animals outdoors will be severely injured. People should move to an interior room on the lowest floor of a building. Expect shattered windows, extensive damage to roofs, siding, and vehicles. Expect downed trees and powerlines.

Source: National Weather Service [New Damage Threat Categories for Severe Storm Warnings](#), 2021

The NWS Storm Prediction Center issues [Day 1, 2 and 3 severe weather outlook](#) forecasts with risk categories up to 3 days out. They consist of 6 categories: 0- Thunderstorm, 1-Marginal, 2-Slight, 3-Enhanced, 4-Moderate and 5-High and are color-coded from an easy green to an escalated pink. A Level 1 Marginal risk consist of isolated and short-lived severe thunderstorms that have limited intensity; usually these storms will have winds between 40-60 mph, hail up to 1" and is a low tornado risk. A Level 2 Slight risk involves scattered severe storms that are also short-lived with isolated intensity; that consist of 1-2 tornadoes possible, strong winds and wind damage. A Level 3 Enhanced risk deals with numerous and persistent severe storms with a few intense ones; that produce a few tornadoes and several reports of wind damage. A Level 4 Moderate risk thunderstorm will have widespread and long-lived severe storms that are long-lived and intense; that include strong tornadoes, widespread wind damage and large hail. A Level 5 High risk thunderstorm is widespread, long-lived and are very intense storms involved in a tornado outbreak or significant wind damage such as straight-line winds (derechoes). **Figure 16** displays these categories:

Figure 16

Severe Thunderstorm Risk

Understanding Severe Thunderstorm Risk Categories

THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/flooding threats exist with all thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					

* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.



National Weather Service

www.spc.noaa.gov



Source: <https://www.spc.noaa.gov/> 2021

The Beaufort Wind Scale (Land) as a form of wind magnitude measures the wind speed, description, and allocates a magnitude scale of 0 (Calm) -to 12 (Hurricane Force).

Table 24

Beaufort Wind Scale (Land Effects)

Beaufort Number	Description	Speed	Visual Clues and Damage Effects
0	Calm	Calm	Calm wind. Smoke rises vertically with little if any drift.
1	Light Air	1 to 3 mph	Direction of wind shown by smoke drift, not by wind vanes. Little if any movement with flags. Wind barely moves tree leaves.
2	Light Breeze	4 to 7 mph	Wind felt on face. Leaves rustle and small twigs move. Ordinary wind vanes move.
3	Gentle Breeze	8 to 12 mph	Leaves and small twigs in constant motion. Wind blows up dry leaves from the ground. Flags are extended out.
4	Moderate Breeze	13 to 18 mph	Wind moves small branches. Wind raises dust and loose paper from the ground and drives them along.
5	Fresh Breeze	19 to 24 mph	Large branches and small trees in leaf begin to sway. Crested wavelets form on inland lakes and large rivers.

Beaufort Number	Description	Speed	Visual Clues and Damage Effects
6	Strong Breeze	25 to 31 mph	Large branches in continuous motion. Whistling sounds heard in overhead or nearby power and telephone lines. Umbrellas used with difficulty.
7	Near Gale	32 to 38 mph	Whole trees in motion. Inconvenience felt when walking against the wind.
8	Gale	39 to 46 mph	Wind breaks twigs and small branches. Wind generally impedes walking.
9	Strong Gale	47 to 54 mph	Structural damage occurs, such as chimney covers, roofing tiles blown off, and television antennas damaged. Ground is littered with many small twigs and broken branches.
10	Whole Gale	55 to 63 mph	Considerable structural damage occurs, especially on roofs. Small trees may be blown over and uprooted.
11	Storm Force	64 to 75 mph	Widespread damage occurs. Larger trees blown over and uprooted.
12	Hurricane Force	over 75 mph	Severe and extensive damage. Roofs can be peeled off. Windows broken. Trees uprooted. RVs and small mobile homes overturned. Moving automobiles can be pushed off the roadways.

Source: <https://www.weather.gov/pqr/wind>

Thunderstorms include hail, hard balls of frozen water ranging from under pea-sized to softball-sized which rain down onto trees, roof, vehicles and roads. Often hail is damaging to vehicles and landscaping. The NOAA Hail Size at <https://www.weather.gov/boi/hailsiz> describes the size of hail while hail can be also depicted by the TORRO Hailstorm Intensity Scale (H0 to H10):

Scale	Intensity category	Typical hail diameter (mm)*	Size Object Comparison	Typical damage impacts
H0	Hard hail	5	Pea	No damage
H1	Potentially damaging	5-15	Mothball	Slight general damage to plants, crops
H2	Significant	10-20	Marble, grape	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	Ping pong ball	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	Golf ball	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-75	Tennis ball	Severe roof damage, risk of serious injuries
H8	Destructive	60-90	Orange	Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100	Softball	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: <https://www.torro.org.uk/research/hail/hscale>, https://www.weather.gov/vef/Thunderstorm_Infographics

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 **200** 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 Concord 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) and is provided in **Table 25**.

Table 25

Enhanced Fujita (EF) Scale

EF Rating	3-Second Gust mph
EF0	65-85 mph
EF1	86-110 mph
EF2	111-135 mph
EF3	136-165 mph
EF4	166-200 mph
EF5	over 200 mph

Source: National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center
<https://www.weather.gov/oun/efscale>

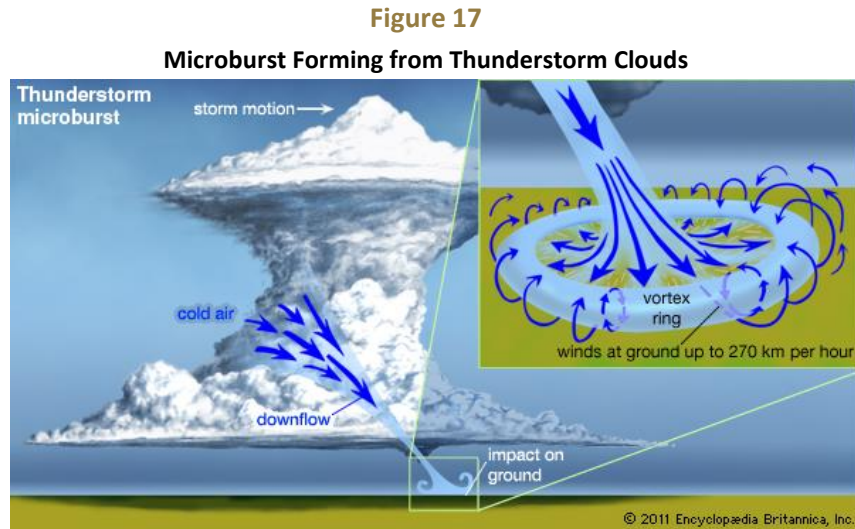
The western, northeastern and southeastern sections of the City are forested and its rural paved roads run the risk of isolation through **debris impacted infrastructure** (trees down on roads and powerlines) after a **tornado**, resulting in **power failure** with little emergency access until the way is cleared. Wooded and forested sections of the City are vulnerable to tree fall. One-egress roads and remote neighborhoods are especially at risk to the impacts of high wind events, including 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. The "dry" microbursts or macrobursts are strong downdrafts known to occur in Central New Hampshire almost annually, but the "wet" microbursts accompanied by rain are uncommon in the Northeast.

Downbursts of both sizes can produce strong wind shear, 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 17**.



Source: Internet (Encyclopedia Britannica)

Another wind with thunderstorm squall lines is a **derecho**. Derechos are straight-line winds associated with a downburst. They blow out in front of the squall line and are the strongest winds created by the downburst. This happens because the movement of the storms is already in that direction. Derechos can be as large as **200** miles wide with gusts of at least **58** mph. They can last up to **12** hours or more and are associated with very strong straight-line winds. Derechos can knock over trees and power lines and cause rain and lightning to come from all directions.

Magnitude of Downbursts

Downburst magnitude is rated on the same **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.

Debris Impacted Infrastructure

The immediate result of severe wind events becomes another hazard, **debris impacted infrastructure**. The infrastructure could include roads, culverts, powerlines, utility lines, water towers, bridges or dams. Infrastructure could also be the natural infrastructure, such as rivers, ponds, lakes and brooks.

Typically, trees and woody material and debris are blown down from **severe wind events** causing **debris impacted infrastructure**. Watercourses, including the rivers, brooks, intermittent streams, and ditches alongside roads, and stationary waterbodies such as lakes, ponds, wetlands, swamps, bogs, and wet meadows receive trees, leafy material and other debris and can then **flood** their banks, **overflow culverts**, or cause **road washouts** during certain conditions. Trees and limbs falling on power lines, substations, or communications towers cause **power failure** and **live wire danger**. Trees and limbs falling onto roadways can **road blockages** and **transportation crashes**. Debris from wind could include roofs, siding, shingles, and more from buildings which can cause potential human injury as well as **road blockages**, **power failure** and **live wire danger**.

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 rivers can cause scouring to infrastructure such as bridge abutments, and woody debris can flow downstream to become hazards to the landowners who have shoreland frontage.

Most dams and bridges could experience **debris impacted infrastructure**. Debris generated during storms and winds could continue for many years. This woody material debris is a concern during and after storm events. For emergency removal, the City could contact the NH Department of Environmental Services and remove the trees right away, obtaining a “retroactive permit” during emergency situations.

Bridges vulnerable to debris dislodged during storm events may be eligible for NH Bridge Aid funding to help rehabilitate these bridges. All outlying roads are susceptible to tree fall and downed powerlines from **severe wind events**.

Magnitude of Debris Impacted Infrastructure

There is no standardized scientific scale for debris impacted infrastructure. However, the [US Federal Highway Administration](#) rates the potential for river/brook debris delivery to the infrastructure site and for river/brook accumulation across an infrastructure span. These can be utilized for hydrologic debris impacted infrastructure measurements.

Tropical and Post-Tropical Cyclones

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 Concord during hurricanes.

Numerous hurricane events in recent history have occurred in the State, region, and the local area surrounding Concord that may have also had an impact on the City.

The overall ratings of **Tropical and Post Tropical Cyclones** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
TROPICAL AND POST-TROPICAL CYCLONES Hurricanes, Tropical Storms or Tree Debris	4 HIGH	4 HIGH	3 HIGH	3 HIGH	13.3 EXTREME	Category 4 Hurricane

A hurricane is a tropical cyclone in which winds reach speeds of **74** miles per hour or more and blow in a large spiral around a relatively calm center. 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 Concord 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**'s 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 26**.

Saffir-Simpson Hurricane Scale		
Category	Wind speed mph (km/h)	Storm surge ft (m)
5	≥156 (≥ 250)	>18 (> 5.5)
4	131 – 155 (210 – 249)	13 – 18 (4.0 – 5.5)
3	111 – 130 (178 – 209)	9 – 12 (2.7 – 3.7)
2	96 – 110 (154 – 177)	6 – 8 (1.8 – 2.4)
1	74 – 95 (119 – 153)	4 – 5 (1.2 – 1.5)
Additional classifications		
Tropical storm	39 – 73 (63 – 117)	0 – 3 (0 – 0.9)
Tropical depression	0 – 38 (0 – 62)	0 (0)

Table 26
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)

WINTER HAZARDS

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. Numerous severe winter events in recent history have occurred in the State, region, and the local area surrounding Concord that may have also had an impact on the City. 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.

There are several types of **WINTER** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included
WINTER	SEVERE WINTER WEATHER Snow, Ice, Blizzard or Nor'Easter

Although avalanche appears in the *State of New Hampshire Multi-Hazard Mitigation Plan 2018*, this winter hazard is not believed relevant to Concord's geography and development.

The overall ratings of **Severe Winter Weather** in Concord from the **HIRA** are:

Natural, Technological, Human Hazard Categories	Probability of Occurrence in 10 Years (1-4)	Human Injury Impact (1-4)	Essential Services or Infrastructure Impact (1-4)	Property Damage or Economic Impact (1-4)	OVERALL RISK (1-16)	Highest Magnitude in 10 Years
SEVERE WINTER WEATHER Snow, Ice, Blizzard or Nor'Easter	4 HIGH	4 HIGH	2 MEDIUM	3 HIGH	12.0 EXTREME	5 Extreme Snowfall NESIS
						Major Winter Impacts WSSI
						4 Ice Damage SPIA

Severe Winter Storms

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

An ice storm involves rain, which freezes upon impact. Ice coating at least **¼"** 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.

Heavy snow can immobilize a region, strand commuters, stop the flow of supplies, and disrupt emergency responders. Accumulations of snow can knock down trees and power lines and cause some roofs to collapse. Homes and farms may be isolated for days and unprotected livestock may be lost while businesses either close or are open with reduced hours. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on New Hampshire communities.

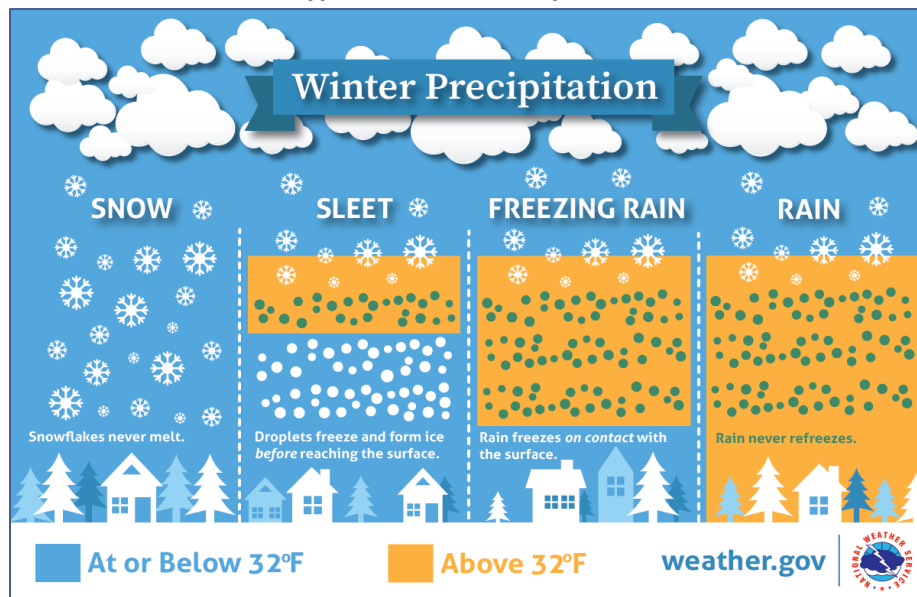
Winter precipitation includes the following types of weather described and is summarized in **Figure 18**:

-  **Blizzard:** Winds of 35 mph or more with snow and blowing snow reducing visibility to less than ¼ mile for 3 hours or more.
-  **Blowing Snow:** Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
-  **Snow Squalls:** Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
-  **Snow Showers:** Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
-  **Snow Flurries:** Light snow falling for short durations with little or no accumulation.
-  **Freezing Rain:** Occurs when the layer of freezing air is so thin, raindrops do not have enough time to freeze before reaching the ground.
-  **Sleet:** Frozen raindrops occurs when the layer of cold, freezing air along the surface is thicker than the warmer air above. This causes the raindrops to freeze before reaching the ground.

- ☁ **Ice Storm:** Results in the accumulation of at least .25" of ice on exposed surfaces. Creates hazardous driving and walking conditions, and tree branches and powerlines can easily snap under the weight of the ice.
- ☁ **Lake Effect Storm:** Cold, dry air mass moves over the Great Lakes regions, picking up moisture from the Great Lakes. This air, now full of water, dumps the water as snow in areas to the south and east of the Lakes.

Figure 18

Types of Winter Precipitation



Source: https://www.weather.gov/bou/winter_wx_preparedness_week

Recent Severe Winter Weather in New Hampshire

As an example, 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 – Seacoast flooding, Concord wind gusts 36 mph, about 1"
- March 7-8, 2018 – Concord 11"
- March 12-14, 2018 – Concord 11", Epsom 23"
- March 22, 2018 – Concord 3"

Future Marches seem to have a significant snowstorm mid-month. 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 can be measured using several different scales and indices including the Winter Storm Severity Index (WSSI), the NCDC Regional Snowfall Index (RSI) for the Northeast and forecasted weather advisories.

Figure 18 displays the [NOAA Weather Prediction Center's Winter Storm Severity Index \(WSSI\)](#), a 1-5 color-coded indices from 0- No Impacts to 5- Extreme Impacts, which is used on the winter maps to predict storms 1-3 days out. Users are advised the WSSI does not depict official warnings.

Figure 19

Winter Storm Severity Index (WSSI)

Potential Winter Storm Impacts	
	No Impacts Impacts not expected.
	Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.
	Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.
	Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.
	Major Impacts Extensive property damage likely, life saving actions needed. Will likely result in major disruptions to daily life.
	Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.

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 NESIS <https://www.ncei.noaa.gov/access/monitoring/rsi/nesis> in **Table 27** is a measurement of the magnitude of a snowstorm in the Northeast, which includes New Hampshire.

Table 27

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)

Several types of public alert warnings are issued to people have a chance to prepare and respond accordingly to the winter weather threat. Winter warnings are the most serious alert and represent different types of storms forecasted as displayed in **Table 28**.

❄️ Winter Watch BE PREPARED	Issued in the 24 to 72 hour forecast timeframe when the risk of a hazardous winter weather event has increased (50 to 80% certainty). It is intended to provide enough lead time so people can prepare.
❄️ Winter Advisory BE AWARE	Advisories are issued when a hazardous winter weather event is occurring, is imminent, or has a very high probability of occurrence (generally greater than 80%). An advisory is for less serious conditions that cause significant inconvenience and, if caution is not exercised, could lead to situations that may threaten life and/or property.
❄️ Winter Warning TAKE ACTION	Warnings are issued when a hazardous winter weather event is occurring, is imminent, or has a very high probability of occurrence (generally greater than 80%). A warning is used for conditions posing a threat to life or property within the next 12-36 hours.

Table 28

Winter Weather Warning Events

Warning Type	Criteria	Description for Next 12-36 Hours
Blizzard Warning	Gusts $\geq$ 35 mph, visibility $< 1/4$ mile	Blizzard event is imminent or expected in the next 12 to 36 hours. Sustained wind or frequent gusts greater than or equal to 35 mph will accompany falling and/or blowing snow to frequently reduce visibility to less than 1/4 mile for three or more hours.
Ice Storm Warning	$\frac{1}{2}$ " ice over 50% of area	An ice storm event is expected to meet or exceed local ice storm warning criteria in the next 12 to 36 hours. Criteria for ice is 1/2 inch or more over at least 50 percent of the zone or encompassing most of the population.
Winter Storm Warning	7" snow in 12 hrs, or 9+" snow in 24 hrs over 50% of area	A winter storm event (heavy sleet, heavy snow, ice storm, heavy snow and blowing snow or a combination of events) is expected to meet or exceed local winter storm warning criteria in the next 12 to 36 hours. Criteria for snow is 7 inches or more in 12 hours or less; or 9 inches or more in 24 hours covering at least 50 percent of the zone or encompassing most of the population. Use "mid-point" of snowfall range to trigger warning (i.e 5 to 8 inches of snow = warning). Criteria for ice is identical to Ice Storm Warning.
Lake Effect Snow Warning	7" snow in 12 hours, limited area	A lake effect snow event is expected to meet or exceed local lake effect snow warning criteria in the next 12 to 36 hours. Widespread or localized lake induced snow squalls or heavy snow showers which produce snowfall accumulation to 7 or more inches in 12 hours or less. Lake effect snow usually develops in narrow bands and impacts a limited area within a county or forecast zone. Use "mid-point" of snowfall range to trigger warning (i.e 5 to 8 inches of snow = warning).
Wind Chill Warning	Low temps to -25°F	Wind chill temperatures are expected to meet or exceed local wind chill warning criteria in the next 12 to 36 hours. Wind chill temperatures may reach or exceed -25°F .

Source: [Weather.gov](https://www.weather.gov), 2021

Table 29
Sperry Ice Accumulation Index

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

Source: Adapted from spia.com

TECHNOLOGICAL HAZARDS

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**.

One of the technological hazards has been rated along with the natural hazards within the **Hazard Identification and Risk Assessment**. There are several specific hazards of the **TECHNOLOGICAL** hazard category examined in the **HIRA**:

Main Hazard Category	Specific Hazards Included			
TECHNOLOGICAL	AGING INFRASTRUCTURE Bridges, Culverts, Roads, Pipes or Underground Lines	DAM FAILURE Water Overtop, Breach, Beaver, etc.	FIRE Vehicle, Structure, Arson or Conflagration	HAZARDOUS MATERIALS Haz Mat Spills, Brownfields or Trucking
	LONG TERM UTILITY OUTAGE Power, Water, Sewer, Gas, Internet, Communications or Live Wire Danger			

Magnitude of Technological Events

The magnitudes of technological hazards are not addressed in this Plan. Technological events could have rating systems within their sphere of influence, but these are outside the scope of this **Hazard Mitigation Plan**. More information is provided for reference as needed for some of these technological hazards.

Aging Infrastructure

Infrastructure of a community includes its roads, sidewalks, bridges, culverts, water lines, sewer lines. Those components such as electric lines, telecommunications towers and dams are not considered in this section because they are not usually municipal-owned. The State of New Hampshire maintains responsibility for I-93, I-89, I-393, US Route 3, US Route 202, NH Route 132, NH Route 9, NH Route 3A, and NH Route 13 in Concord. The City is responsible for **287 miles** of local City paved roadways, sidewalks, as well as the bridges and culverts. Communities in New Hampshire are faced with the dilemma of poor conditioned infrastructure with not enough funding to pay for rehabilitation, even with grants from the NH Department of Transportation (NHDOT) for roads and bridges and revolving loans from the NH Department of Environmental Services for water infrastructure.

Aging infrastructure creates hazards to people, through **transportation crashes**, **public health water quality crisis**, weakened bridges during **flooding** events, undersized culverts unable to accommodate storm water, and more.

Bridges, Culverts, Roads

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.

Some of the gravel City roads in Concord are constructed using ditching instead of storm drains. The City is required to develop and maintain MS4 stormwater regulations, which it has done. Some of the City maintained roads are gravel, enabling easier maintenance and washout repair. Bridges and dams are described in the **APPENDIX A Critical and Community Vulnerability Assessment**.

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 contained in this section for convenience. No magnitude scales were defined for these types of non-natural fires.

Hazardous Materials

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. The necessity for continuing the program of holding biennial municipal Household Hazard Waste (HHW) collection days is crucial to helping to maintain a healthy environmental for Concord's residents.

Long Term Utility Outage

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.

Any service-providing businesses in the City (gas station, bank, fast food, convenience, etc.) would rely on electricity provided by powerlines, and in many cases, enterprise comes to a standstill during disaster events. Aging, vulnerable populations are at greatest risk in rural Concord from the effects of **power/utility failure** and **communications failure**. A few individuals in the City require oxygen and power failure and the likely accompanying communications systems failure would comprise the most vulnerable populations. The Fire and Rescue Department and Police Department conduct welfare checks for many residents known to be in need.

As a rule of thumb, all residents should be able to shelter in place in their homes for up to **3** days or **72** hours, gathering needed supplies and water ahead of time. **Power failure** can cause inconvenience, loss of economy, extra City 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 **High Wind Events** and **Winter Weather** hazard events described earlier as well as **Debris Impacted Infrastructure** and **Transportation Crash** hazard events in the following sections.

Electricity

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, currently owned by Granite Shore Power, formerly owned by Eversource and Public Service of New Hampshire. As of **2018**, the Merrimack Station is partially decommissioned, only operating when there is a need for additional kilowatt hours in the area. The Station requires **24** hours to become operational, then ceases firing when there is no additional electrical demand. The Merrimack Station is the largest coal-fired electrical generating station and when it was operating around the clock, supplied power to **190,000** households. Coal fuel generated only **7%** of the State's electricity in **2016**. 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 snowstorm, ice storm, or other severe weather event, customers can easily lose power and/or other utilities. Concord is served by Eversource and Unil.

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 or city, 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.

Telecommunications towers often carry local, regional, county, state and sometimes federal antennas that relay emergency communications. In addition, personal cellular communications are often co-located at the same tower. When a major communications tower is out of service, its impacts are widespread. In some Central NH Regional municipalities, the existing towers do not provide coverage to the entire community and create dead zones. This is particularly dangerous to people without landlines or when emergency services are necessary. Regional and state communications are often co-located on the tower upon which City's emergency communications are based. The City is a member of the Capital Area Mutual Aid Fire Compact which is a centralized communications hub for emergency fire and medical communications. The CAMAFC has redundancy sharing with the Lakes Region Fire Mutual Aid Compact.

HUMAN HAZARDS

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. Mass casualty incidents, caused by any number of hazards, would also be addressed as a human hazard. Cyber events, while a technological hazard, are considered another type of artificial, human-developed hazard.

There are several types of **HUMAN** hazards examined in the **Hazard Identification and Risk Assessment**:

Main Hazard Category	Specific Hazards Included			
HUMAN	TRANSPORTATION CRASH Vehicle, Airplane, Helicopter, Rail, Interstate, Pedestrian or Bicycle	MASS CASUALTY INCIDENT As a result of any hazard event	TERRORISM/ VIOLENCE Active Shooter, Hostage, Public Harm, Civil Disturbance/Unrest, Politically Motivated Attacks, Incendiary Devices, Sabotage or Vandalism	CYBER EVENT Municipal Computer Systems Attack, Cloud Data Breach, Identity Theft, Phishing, Ransomware or Virus

Human Hazards are examined by descriptions of the types of hazards and in the [Potential Future Hazards](#). Scientific measures of magnitude are not available for individual human hazards.

Transportation Crashes

Automobile crashes 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 Route 4/202 or US Route 3; on NH Route 3A, NH Route 9, NH Route 13, NH Route 28, NH Route 31 NH Route 49, NH Route 77, NH 103, NH Route 106, NH Route 107, NH 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. A vehicle-pedestrian or vehicle-bicycle crash has a greater casualty rate on the local and state roads as different road users use the same limited space.

In the region, 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 crashes or sabotage. Concord Municipal Airport is a small airport in the Central NH region used by private small planes, but Manchester-Boston Regional Airport (MHT) can be accessed via NH 28 or US 3 in about 30 minutes. Air traffic can also be hazardous to the region's citizens. Small local sites such as JBI Helicopter and other helipads in Concord increase the chances for a possible aviation crash, especially in the higher elevations around Mount Kearsarge and Pat's Peak. With the technological prominence of personal drones that can be flown within site of the user, possibilities for drone crashes with people or vehicles increase.

Mass Casualty Incident

Mass casualty is the situation for which local, regional, state and national personnel train for treating large numbers of people who are injured from any natural, human or technological disaster. The Central NH Region has many partners for mass casualty training and preparation. [Capital Area Public Health Network](#) (CAPHN) works to promote, protect, and improve the health and well-being of communities within the Capital Area of New Hampshire through the proactive, coordinated, and comprehensive delivery of essential public health services. These include substance misuse prevention, suicide prevention, public health emergency preparedness, vaccinations, and more. The staff works with area emergency management directors. Across New Hampshire, there are **13** regional public health networks.

Concord Hospital is a **295**-licensed beds (plus **238** staffed beds) facility and the only trauma center in the Central NH Region. New London Hospital (**25** critical access beds, **58** long term care beds) and Franklin Regional Hospital (**25** critical access beds) are smaller hospitals in Merrimack County. In Laconia, the Lakes

Region General Hospital (**137** beds) has a trauma center. The Dartmouth-Hitchcock Medical Center (**396** beds) in Lebanon has a trauma center and is New Hampshire's only and teaching hospital. Mass casualty preparedness is a situation regularly trained for by hospital employees.

The [New Hampshire Hospital Association](#) provides leadership through advocacy, education and information in support of its member hospitals and health care delivery systems. The NHHA has an encourages its members to develop hospital emergency plans and staffs an Emergency Preparedness Coordinator position to plan for such events. **Mass casualties** of the magnitude that can be expected with a disaster related to terrorism or other incidents demand an expanded role for hospitals. They must be supported by their communities as they attempt to protect the facility, its patients and personnel while attending to the victims of a disaster. The NHHA has a mutual aid network designed to work together during times of crisis.

Terrorism/Violence

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.

Sabotage/Vandalism

Sabotage is a deliberate action aimed at someone or some institution 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. Vandalism is the willful defacement or destruction of property.

Hostage Situation

A **hostage situation** is an incident where innocent civilian(s) are held by someone or some group of persons demanding something from third party not related to the individual(s) being held hostage to ensure the fulfillment of certain terms. Often, a hostage situation results from a domestic dispute.

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.

Bioterrorism

Biological hazards can also be caused by bioterrorism, the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants. The [US Center for Disease Control \(US CDC\)](#) has categorized the bioterrorism agents into priority Categories **A**, **B** or **C**, indicating how easily they can be spread and the severity of illness or death they cause. The bioterrorism Categories measure the risk of transmission of infectious organisms, germs, or pathogens but does not include chemicals.

Cyber Event

While **cyber events** could be considered technological hazards, they are deliberately initiated by a person or group of people, thus falling into the human hazard category. Cyberattacks are malicious attempts to access or damage a computer system. These events are socially- or politically- motivated attacks carried out primarily through the Internet. Cyberattacks target the general public or national and corporate organizations and are carried out through the spread of malicious programs (viruses), unauthorized web access, fake websites, and other means of stealing personal or institutional information from targets of attacks, causing far-reaching damage. **Cyberattacks** are oriented toward organizations, services, and individuals to obtain private, technical, and institutional information, and other intellectual assets for the purpose of vandalism or monetary gain.

As computer crimes, they can cause serious consequences to those against which this threat is used. The cyber events range from more harmless such as website hacking, to personally harmful such as identity theft to more dangerous, such as those that cripple critical infrastructure. Cyber events cause harm to people or property and can generate fear. Much of the infrastructure upon which the State of NH relies is automated and could be subject to cyberattacks. These could include the government, military, communications systems, utilities, fuel, electrical systems, nuclear power plants, transportation systems, financial systems, emergency medical services and more.

On a municipal level, computer systems data storage, transmission of emergency communications, daily operations and monitoring or financial information, could be disrupted or be redirected to the perpetrators. Information Technology (IT) **cybersecurity** is paramount, as is employee training, to reduce the incidence of malware, phishing, SQL injection, man-in-the-middle attack, zero-day exploit, and other techniques to gain access to systems. With our society's increasing reliance on electronic devices and computers, Concord's local government and residents should be prepared to address **cyber events** in the various and growing forms they take.

Potential Future Hazards

After the inventory of hazard types and past hazards in the City, a list of hazards which currently exist or need to be monitored in Concord has been completed along with potential future hazards that could occur in the same or other areas. This unique listing of **Potential Future Hazards** was compiled so the City 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 Identification and Risk Assessment (HIRA)**. 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 the City.

Potential future hazards in **Table 30** indicate locations in the community where a hazard event could occur and how that hazard could impact the City. The **Overall Risk** score between **1-16** for the **14** rated hazards from the **HIRA** is provided to understand the scale of risk to Concord from all natural hazards. Also from the **HIRA** is whether or not each hazard event occurred within the last **5** years in Concord, indicated by either ***Events(s) Within Last 5 Years***, ***ANNUAL Occurrences Within Last 5 Years***, or ***NO Event(s) Within Last 5 Years*** beneath each *Hazard Category*. The magnitude or extent scale where available from previous **4 HAZARD RISK ASSESSMENT** descriptions enable possible effect measurement of the noted Concord locations.

Table 30
Potential Future Hazards

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
DAM FAILURE Water Overtop, Breach, Beaver, etc. *NO Event(s) Within Last 5 Years**	3.3 LOW	- There are several constructed dams in Concord with potential for future flooding damage if breached or failed as indicated in the APPENDIX A CRITICAL AND COMMUNITY FACILITY. The two High Hazard (H), two Significant (S) Hazard and the six Low (L) Hazard dams may be unlikely to flood or breach but still have the potential during a strong flooding event. The one municipal High Hazard Dam is D051.013 Penacook Lake Dam which protects the City's water supply. Nearly two dozen Non-Menace dams are located on are found along a tributary of the Merrimack River, Contoocook River, Turkey River, or various brooks. No significant dam breach issues have occurred in the community or upstream. - Beaver dams carry a high probability of flooding and potential for breakage. Beaver dams are located throughout the City and depending on size and location, could cause significant damage to roads if the natural dams breach. The General Services Department regularly breaks up smaller, temporary dams and relocates the beavers.	NHDES Dam Classifications
DROUGHT *Event(s) Within Last 5 Years*	5.3 MEDIUM	- During future drought events, agricultural farms, orchards, nurseries tree farms run the risk of high damage from droughts which also bring economic consequences. Some farms are homestead farms which provide food and income for owners. Crop and livestock loss are consequences of droughts in these locations. In Concord, agricultural operations include multiple farms, orchards, nurseries, livestock, including), and others. When hayfields die off, livestock animals in the City cannot easily be locally fed. See APPENDIX A for the list. - While drought has been a continuing problem and is expected to periodically occur in the future, much of Concord is served by municipal water supply for which mandatory restrictions can be enacted. Throughout Concord community members have private, individual wells. In future drought conditions, private homeowner wells will continue to go dry especially at the higher elevations. When this occurs, the owners typically have a new well dug. City fire ponds and dry hydrants are found throughout the community, but over time they may dry up from drought. The Fire Department uses an alternate source of water such from the Rivers instead of drawing from the water hydrants. - Users of municipal water supply might need to follow voluntary or required water restrictions to conserve the supply. The City has a Watershed Protection Overlay Districts to help reduce the impact of different threats to the City's drinking water, including a Penacook Lake Watershed Protection District and an Aquifer Protection District	US Drought (D-scale) Monitor Intensity Scale
EARTHQUAKE *NO Event(s) Within Last 5 Years*	4.0 LOW	- Since Concord is located within an active but mild seismic region, residents are expected to feel the larger future earthquakes, but any damages should be minor. - Locations to watch include historic buildings and essential City facilities. Although the buildings may receive little damage from earthquakes, they should be carefully monitored because the buildings	- Moment Magnitude (formerly Richter) Scale - USGS Modified Mercalli Intensity Scale

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
		are structurally larger, typically contain numerous people, may contain vulnerable populations, and are critical to the City's operations and culture. • Damage to utility poles and wires, roadways and infrastructure could be significant. Aboveground poles, underground electric lines, underground gas, water and sewer lines could be susceptible.	
EXTREME TEMPERATURES Excessive Heat, Heat Wave, or Cold, Wind Chill <i>*Heat Event(s) Within Last 5 Years*</i> <i>*Cold Event(s) Within Last 5 Years*</i>	10.7 HIGH	• Excessive heat and extreme cold will continue being problematic for Concord residents. There are many group facilities, multi-family housing, manufactured housing parks, and the Schools containing seniors, children, vulnerable and/or marginalized populations. The Fire Department and Police Department should continue to check on at-risk residents when possible. • Should the temperature remain high (or low), the Green Street Community Center Downtown and the Multi-Generational Community Center on the Heights could be opened as a temporary cooling (or warming) center (without formal School District, Red Cross, and/or Capital Area Public Health Network assistance. The formal official City shelter is the Concord High School, but a lot of coordination with the School District would need to occur for any of the District's schools to be used as a shelter.	◆ NOAA Heat Index ◆ NOAA Wind Chill Index
HIGH WIND EVENTS Wind, Thunderstorms, Hail, Downbursts, Tornadoes, Debris <i>*Event(s) Within Last 5 Years*</i>	13.3 EXTREME	• All of Concord will experience future severe wind, rainstorms, and thunderstorms often with lightning, particularly common in the summer months. In addition, tornadoes and downbursts are anticipated in the future based on past areal events. Flooding, debris, and property damage will accompany these events. Electrical power (Eversource & Unitil) is disrupted during most wind-related events. The main telecommunications tower and antennas, water and sewer pumping stations, Eversource and Unitil electric lines and substations, and transmission lines could be damaged by High Wind events. • The whole City could be impacted by a tornado or downburst. Winds alongside the Merrimack River, Contoocook River, or Turkey River, as well as along Main Street, or along US 3, US 202, NH 9 NH 106, NH132 NH 13 or NH 3A could be strong, as tornadoes travel through flat areas and valleys. These cover much of the geography of the City, where people and vulnerable facilities would be at risk. • Future high wind events will likely endanger roadways and utility lines from falling trees and limbs. NH 132, NH 9, NH 13, in addition to US 202 and US 3 are critical local routes that lead to thousands of residences. Other City paved City roads may be suitable for temporary commuter detour traveling but most of them are gravel and hilly and are in danger of tree fall during high wind events. Others lead to unmaintained Rural paved roads. These steep slopes and hillsides leading to homes. • Portions of the city including north of US 202 and west of US 3 or North of I-393 and east of I-93 are wooded. The historic downtown area with state and city services is located near US 3/Main Street and commercial locations along NH 9. These areas are much more densely populated. Other sections would be difficult to access with trees and power lines down on the residential roads. Should a downburst or	◆ Beaufort Wind Scale (Land) ◆ NOAA Severe Thunderstorm Risk Categories ◆ NOAA Hail Size ◆ TORRO Hailstorm Intensity Scale Adapted ◆ NOAA Enhanced Fujita Scale for Tornadoes and Downbursts

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
		tornado run through the recreational areas and current use lands, recreationalists would likely need assistance if a severe weather event was unexpected. Throughout the entire city older historic or wooden buildings including many public and private buildings (historic homes), and other historic sites like City Hall, farms, schools, cemeteries, the entire Downtown Historic Area, and the Penacook Historic Area may be more vulnerable to wind damage because of their age and type of construction.	
INLAND FLOODING Rains, Snow Melt or Flash Floods <i>*Event(s) Within Last 5 Years*</i>	14.7 EXTREME	- Future flooding is expected in Concord, whether from storm events or snowpack melt. The Merrimack River, Contoocook River, Soucook River and Turkey River, numerous brooks, unnamed streams, and culverts have the potential to flood their banks. - Some of the City's roads have steep slopes and tend to washout during storm events. The community has unnamed brooks that flow under roads that would become impassible during heavy rainfall and resultant flooding conditions. Regularly washout locations are identified and are anticipated to do so in the future from spring snow melts or heavy rainfall at least until repaired. Rain events are concurrent with beaver dam events and culvert washouts, a compounded problem. - Although bridge flooding has not yet occurred, some of the bridges have come close to flooding, with water flowing just underneath the decking. Newer bridges are elevated from the banks, so flooding would have to be significant to overtop. - During extreme flooding inundation water could overwhelm city water and sewer as well as impede access to Concord Hospital. In the past Concord Airport has had drainage failures during flooding but these have been corrected. See also the Special Flood Hazard Areas (floodplains), Waterbodies, and Road Washouts sections for details. The SFHAs and road washout areas are anticipated to flood in the future during extreme events.	- Special Flood Hazard Areas (SFHAs) on 2010 Digital Flood Rate Insurance Maps (Zones A, AE, X) - Excessive Rainfall Risk Categories
LANDSLIDE Soil, Rockslide or Excavation Areas <i>*NO Event(s) Within Last 5 Years*</i>	1.0 LOW	- Generally, vegetation and best operational practices of excavation sites in Concord are good at preventing landslides or rockslides. Sites include the commercial excavation operations, some of which has been reclaimed. Potential future landslides are not expected to occur at the excavation sites in the City, although slides are possible under the right conditions. - The City has numerous hills over 800' in elevation or on slopes greater than 15%, most of them with roadways leading to homes. - Roads with steep ditching or embankments will remain vulnerable to landslide in the future. Road washouts and flash-flooding of gravel or paved roads could cause landslides. Gravel roads with ditching in Concord could be subject to landslide conditions (see Inland Flooding). Blasted State or US Routes can have landslide (small rocks land on the roadway occasionally). Landslide is an uncommon hazard but one that	No known widely-used scale measuring the magnitude of landslides

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
		could cause property damage, otherwise the City is not particularly susceptible.	
LIGHTNING <i>*Event(s) Within Last 5 Years*</i>	9.3 HIGH	• Future lightning strikes may cause the damage at City Hall, Churches, the NH Statehouse, and other important State, City and School facilities. The large tax exempt facilities and buildings without lightning rods may also be susceptible in cleared areas or on the high hills. Conflagration could start at these denser facilities as a result of lightning strike and be most dangerous. • Other structures and homes located in the populated areas would be most vulnerable to the power surges and outages caused by these strikes, especially those high density populations in proximity to wooded and forested areas. The potential for resulting wildfire and conflagration is high in these densely populated areas. • City essential facilities buildings, construction/lumber businesses, and the haz mat or fuel businesses (businesses with potentially hazardous materials onsite such as fuel, gasoline, natural gas, propane) and used fluids (various automotive repair shops) could each be vulnerable to lightning and fire. The City General Services Department and aircraft operations could be vulnerable to lightning strike. Also, the higher elevations may be susceptible to lightning. • Outdoor utilities and antennas are highly vulnerable to future lightning strike, such as the telecommunications tower, electric lines, and telephone switching stations, repeaters, and other communications equipment. • Forested areas and open recreation fields can be dangerous to people and property. Trees are constantly struck. These include the public City lands, City Trail Systems, and State Forests, conservation areas, and points of higher elevation which can be dangerous to people and property if struck by lightning. Outdoor recreational (golf club) and gathering places could be vulnerable to lightning. Some locations cannot be easily accessed by emergency vehicles, whether to fight the fire or remove people from harm's way.	◆ NWS Lightning Activity Level (LAL)
PUBLIC HEALTH Infectious Diseases, Air & Water Quality, Biological, Addiction, Arboviral, or Tick-borne <i>*Event(s) Within Last 5 Years*</i>	12.0 EXTREME	• Public health issues may occur in the community in the future during warm or cold months. For indoor contamination, the highest risk facilities for pick-up or transfer of viruses and bacteria can include the: Abbott Downing School, Beaver Meadow School, Bishop Brady High School, Broken Ground School, Christa McAuliffe School, Concord High School, Merrimack Valley High School, Merrimack Valley Middle School, Penacook Elementary, Rundlett Middle School, Colleges, other Private Schools, Churches, City Hall, and the NH Statehouse. Food-borne illness can be transferred at any of the many public eateries throughout the city. All winter long, people of Pembroke in close quarters get sick from different viruses. • Medical facilities including Concord Hospital and its companion facilities, Penacook Family Physicians, Pleasant Street Family Medicine, St. Pauls Infirmary, Dartmouth-Hitchcock Clinic are densely populated locations with high potential for infectious diseases	◆ No available current Infectious Disease Levels Scale ◆ DES Cyanobacteria/ Public Beach Bacterial Warning Levels ◆ NHDES Air Quality Index

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
		- Outdoor susceptibility to arboviral and tickborne diseases is expected to grow. Concord has many waterbodies, wetlands, and other swampy areas for these arthropods to thrive. The wet areas, vernal pools and the many public trails on conservation lands can also enable transmission. Several horse farms are in the area and can contribute to infection. - Air quality warnings from Canadian fires and drifting smog do little to prevent particulate inhalation by Concord's more vulnerable populations and outdoor enthusiasts. - Banks of the Merrimack River, Contoocook River, Soucook River, Turkey river or any watercourse or waterbody used as beaches may expose people to cyanobacteria. The public canoe launches/ beaches can be shut down in the future due to high cyanobacteria levels, and this situation is one to watch during the warm season in July-August. The City has a Watershed Protection zoning ordinances surrounding Penacook lake and Aquifers throughout Concord to preserve water quality and public health. - Much of NH 106 and its businesses are situated atop the Soucook River aquifer. Potential environmental damage to water quality by trucking, fuel spills, and long term exposure is a concern. Many Concord area residents obtain water from this aquifer. - The City's local Point of Dispensing (POD) is located at the Concord's NH Technical Community College. Concord is a member of the Capital Area Public Health Network, which will assist the City in times of public health crisis.	
RIVER HAZARDS Ice Jams, Scouring, Erosion, Channel Movement or Debris <i>*Event(s) Within Last 5 Years*</i>	16.0 EXTREME	- Future ice jams in the Merrimack River, Contoocook River, Soucook River and Turkey River could be expected. Roads within the Rivers' floodplain areas could in the future be subject to ice jam damage. Floodplains could become inundated and evacuations might be necessary. - The Merrimack River flows through the heart of Concord passing many residences and large businesses. If it was to ever flood it could cause major damage. Flooding, erosion, and channel movement for the Contoocook River could cause damage to many houses located along the banks of the river or roads like River Road close by. The Soucook River forms the Southeastern border of Concord. Flooding, erosion, and channel movement has the potential to impact roads near or crossed by the river including North Pembroke Road. The Turkey River would also cause property damage if significant hazard occurred. - Erosion/washout of certain City roads along the Rivers is anticipated to continue due to flooding and heavy rains. - Floating debris down the Rivers can accumulate at bridges and dams during future flooding events.	- USGS Merrimack River Flood Stage (River Gage) - USGS Soucook River Flood Stage (River Gage) - National Water Dashboard (USGS Stream Gages, Groundwater Monitors)
SEVERE WINTER WEATHER	12.0 HIGH	It is extremely likely that Concord will be impacted by severe winter weather in the future. Damage and serious conditions can result in all areas of the community. Areas above 800 feet (See Map 1), the remote,	Northeast Snowfall Impact Scale (NESIS)

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
Snow, Ice, Blizzard or Nor'easter *Event(s) Within Last 5 Years*		forested and difficult to access areas are among the most vulnerable areas to ice and snow conditions. - As severe winter conditions are expected to continue in the future and to increase in severity, concerns remain regarding safety on roads, especially in narrow, straight areas and at intersections. Many local roads have a sharp incline/decline and cars have trouble traveling the roads during winter conditions, especially when icy. City General Services keeps up with the snowfall on the City roads, but ice storms require more time and resources to keep the roads safe. During the winter months, the crew sees regular severe warming and snowmelt which then freezes to ice. With the changing climate, this situation is anticipated to grow in the future. - Particular areas of concern during winter weather include the more highly traveled roads including the highways and US 202, US 3, NH 9, NH 13, NH 132, and NH 3A. Power outages and isolation may occur from heavy snow loads and downed trees on roads. - The City facilities buildings, Broadway Fire Station, Central Fire Station, City Hall, Fire Department Headquarters, General Services Department, Heights Fire Station, Manor Fire Station, and Police Headquarters must be able to function during severe winter events. Personnel driving to and from these facilities must travel on the main roads. - During future storms, some historic buildings or City facilities with large or flat roofs, barns or sheds, and older manufactured homes may be vulnerable to heavy snow loads or other events that could cause the roof to collapse. Flat roofs can be a problem with snow-loading. - The various telecommunications towers and antennas, Eversource & Unitil electric lines, and switching stations as well as Department building antennas could be highly impacted from future snow, ice, and blizzards.	◆ NWS Winter Storm Severity Index (WSSI) ◆ Sperry-Piltz Ice Accumulation Index
SOLAR STORMS AND SPACE WEATHER Solar Winds, Geomagnetic Storms (Aurora Borealis), Solar Radiation or Radio Blackout *NO Event(s) Within Last 5 Years**	6.7 MEDIUM	- The aurora borealis has been photographed on nearby Mount Kearsarge in Warner 20 miles to the north due to geomagnetic storms. These types of events are likely to recur. At this time, the City is aware of potential impacts to its communications and electrical systems to its City and School facilities but has rated the hazard unlikely to cause damages. - The telecommunications arrays, Eversource and Unitil high tension power lines or telephone/fiber switching stations could be impacted in the future by a geomagnetic event as could City Department radios, base station, cellular phones, and VOIP that use emergency communications. - A geomagnetic storm impacted Capital Area Mutual Aid Fire Compact dispatch microwave antennas on Mount Kearsarge, Oak Hill, Plausawa Hill, and Pat's Peak towers and impacted 911 communications. Some of the antennas need to be replaced following the interference.	◆ NOAA Geomagnetic Storms Scale ◆ NOAA Solar Radiation Storms Scale ◆ NOAA Radio Blackouts Scale

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
		Concord is a member of Capital Area Mutual Aid Fire Compact dispatch which in 2020 combined with Lakes Region Mutual Aid dispatch. The Police Department uses the Merrimack County Sheriff's Office dispatch. Other City staff (Highway, City Office, and residents) rely on non-locally owned cell towers with national service provider antennas. Repeaters on the tower require backup generator maintenance and operation, which is out of local control.	
TROPICAL AND POST-TROPICAL CYCLONES Hurricanes, Tropical Storms or Tree Debris <i>*Event(s) Within Last 5 Years*</i>	13.3 EXTREME	- In 2021, tropical storms impacted Concord with high winds which break trees and limbs and downpours that flood older storm drains Downtown. Tree debris often falls on roadways and/or utility lines. As Concord has a number of highly rural communities with woods and trees along most of their roads, high winds will continue to impact the entire City, blocking roads and causing power and internet failure and downpours will continue to flood older storm water infrastructure until upgrades are made. - Hurricane Sandy in 2012 impacted Concord. There will be future tropical cyclones to impact Concord. Although the vulnerable areas are spread all over the City instead of more site-specific, the facilities and locations at greatest risk are shared with High Wind Events and Inland Flooding above.	◆ Saffir-Simpson Hurricane Wind Scale
WILDFIRE Brushfire, Outdoor Fires or Accidental <i>*Event(s) Within Last 5 Years*</i>	8.0 MEDIUM	- Although few substantial wildfires have impacted Concord since the last Plan, the potential exists for large fires in remote or difficult to access locations in the future. Drier foliage, slash on the ground, one-egress roadways, in the conservation lands and in private woodlots could mean both future severe fires and difficulty accessing these fires should the need arise. As a member of the Concord Area Fire Mutual Aid Compact, the City regularly provides other communities with mutual aid for wildfires and would receive aid in turn. - The public conservation lands and trail systems are heavily used and may be the primary concern for future wildfires. ◆ Numerous neighborhoods with about 1,500 people are surrounded by woods and have only one egress/access route. The City is dotted with these cul-de-sac and one-egress residential roads (City paved, Rural paved and private) in the Wildland Urban Interface which have limited emergency access. Unmaintained Rural paved Roads are particularly vulnerable to wildfire. - In many areas Concord is heavily wooded, with difficult, remote areas and many slopes. 2020 land use indicates the forest areas are declining, but additional lands are residential with wooded unbuilt area. Any residential area within the City could be particularly prone to wildfire since all are situated in rural and wooded locations. A lot of slash remains on the ground. An aircraft crash in the flightpaths of JBI Helicopter, Concord Municipal Airport, NH Army National Guard, or Manchester-Regional Airport could result in a wildfire. - Some of the lots on private roads or Rural paved unmaintained roads could be particularly vulnerable to wildfire as they might not be readily	◆ National Fire Danger Rating System

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
		accessible for fire apparatus, either not maintained or not constructed to city road standards. • See also Lightning.	
TECHNOLOGICAL AND HUMAN HAZARDS			
AGING INFRASTRUCTURE Bridges, Culverts, Roads, Pipes or Underground Lines <i>*Event(s) Within Last 5 Years*</i>	not scored	• Any future natural hazard could render the culverts, ditching, and drainage systems vulnerable. Many State bridges and shared bridges are aging, additionally the City owned bridges also are aging and could be subject to future floods, ice, transportation crashes or debris impacted infrastructure. There are many redlisted bridges present in Concord that are more prone to potential hazard. See APPENDIX A for the list. • There are municipal water lines, wastewater lines, stormwater lines, and natural gas lines. Future hazard events such as earthquakes, floods, hard freezing and continued aging infrastructure will make any existing problems worse. • See list of Road Washouts for a list of culverts susceptible to future floods, ice jams, debris, and other hazards as well as the Action Plan to address them. • The City's 191 miles of roads often difficult to maintain, upgrade and rehabilitate. With increased difficulty with floodings events and severe winter weather anticipated to increase and impact multiple roads during each event. • Asset management and inventories are available for most City infrastructure, including RSMS for roads.	N/A
FIRE Vehicle, Structure, Arson or Conflagration <i>*Event(s) Within Last 5 Years*</i>	not scored	• The previously noted higher density areas could be subject to potential conflagration which would have devastating effects on the entire community. Drought conditions increase dryness and flammability. • Serious vehicular fires resulting from crashes could occur, especially on I-93, I-89, I-393, US 202, US 3, NH 9, NH 106, NH 13, and NH 3A where speeds are faster and more delivery vehicles travel. Some delivery vehicles carry fuel (gasoline, diesel, propane, natural gas, flammable haz mat) to local businesses. • The multiple constructions, excavation, lumber, automotive and fuel businesses in the City could be subject to potential explosions or fires (see APPENDIX A for the list). Significant risks include businesses and from aircraft flightpaths over Concord. • Vacant structures, vacant housing units, housing run by absentee landlords, unmaintained housing, or similar commercial structures run a greater risk of arson than occupied or well-kept premises. • Conservation areas and public trails may carry the significant risks and damages of any future arson or accidental fire.	N/A
HAZARDOUS MATERIALS	not scored	• Transportation of hazardous materials could be an everyday occurrence through Concord. In the future, delivery trucks could rollover	N/A

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
Haz Mat Spills, Brownfields or Trucking *Event(s) Within Last 5 Years*		to spill their contents (fuel, liquids, propane, solids, etc) onto these significant roadways. High traffic volumes would contribute to secondary crashes and long detours. • Should a future haz mat spill occur in Concord, not only could the contents of the spill reach the Merrimack River, Contoocook River, Soucook River, or Turkey River, and Downtown Main Street Area or Penacook Village, populations would need to be immediately evacuated or the decision to shelter in place would need to be made and conveyed to occupants. • Several occupational facilities in the City handle, store, or use hazardous materials. Any of these facilities could have a spill at their site or during transport which could result in a spill. Key sites include any fuel stations, auto repair shops, excavation sites, and construction businesses. See APPENDIX A for the full list. • Existing and future potential brownfields sites such as old mills along the Rivers, vacant or former industrial properties, salvage yards and illegal junkyards may exist and pose future danger to new property owners or river users in the area. The City should be aware of and inventory these locations.	
LONG TERM UTILITY OUTAGE Power, Water, Sewer, Gas, Internet, Communications or Live Wire Danger *Event(s) Within Last 5 Years*	not scored	• Aboveground electric lines in Concord make the City particularly vulnerable to outage during future disaster events. High tension transmission lines run through the City. Utilities (Eversource, Unitil, internet, cable) may be restored to the most critical areas first, the City facilities, before the more remote locations in Concord have utilities restored. • Most City facilities have backup generator when electricity fails, but long term solutions are necessary when outages over 3 days occur. • There are several miles of underground water, gas, and sewer lines in Concord from which a strategic break could isolate all those connections at the far end of the line. • Long-term future electricity outages may impact the rural residents and the schools most heavily. Many Concord residences own generators for their homes or have solar panels and are prepared for several days of no utilities to their homes during future storms. • The telecommunications towers in Concord contain cellular antennas, CAFMAC, County, State, and federal repeaters may be disrupted during future storm events. Local antennas are located on City Department buildings and are especially vulnerable. Essential communications may be paused until redundant capabilities are reestablished in the region.	N/A
TRANSPORTATION CRASH Vehicle, Airplane, Helicopter, Rail, Interstate,	not scored	• With multiple highway and high volume roads the City's Fire Dept and Police Department are often the first to respond to the vehicle crashes experienced on these main State and local roadways. These routes are used heavily by commuters as they travel through Concord to their destinations. Crashes may increase over time, especially when	N/A

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
Pedestrian or Bicycle *ANNUAL Occurrences Within Last 5 Years*		conditions become icy from winter snow melt for the fast highways and greater numbers of vehicles use the roads. - The City maintained roads, Rural paved unmaintained roads and private roads can have elevation changes that will continue to make travel difficult in the future in snowy, icy, flooded, or debris blockage conditions. See Winter Hazards for the list. Any time of year, dangerous intersections become more difficult to navigate with heavy winds, rain, treefall, or flooding hazards and could cause crashes. - Downtown Concord around Main Street and Penacook Village are some of the many areas where vehicle/pedestrian or bicycle crashes could occur in the future. Other locations include sidewalks and crosswalks near the schools and parks. Bikes and pedestrian have the potential for serious crashes with vehicles. - The City also has alternative future crash potentials, such as airplanes, helicopters, and drones. The City hosts the flightpath of Concord Municipal Airport, and may be in the path of JBI Helicopter flights and NH Army National Guard air traffic. The Manchester-Boston Regional Airport is nearby and supports large-engine plane traffic which have the potential of crashing in nearby communities. With the increased usage of private drones for personal or commercial use, the future potential for their crashing in populated areas or causing vehicular crashes is anticipated to rise.	
MASS CASUALTY INCIDENT As a result of any hazard event *NO Event(s) Within Last 5 Years*	not scored	- Large groups of people are regularly located at the NH State House City Hall, the Schools, other Municipal Buildings, NH State Prisons, and other NH State Government facilities which may be where a future mass casualty event could occur because of any other type of hazard event. - Concord is the state capital and one of the largest cities in the state. There are many active groups and large events such as political candidate visits, Concord School District sporting events, School Board meetings, State Government Hearings, City Council Meetings, Market Days, and other community gatherings could set the location for future mass casualty incidents. - During times of mass casualty, it is likely the communications network will be overloaded. Residents may not be able to telephone and emergency responders could have difficulty reaching assistance. The City Hall, Schools, Fire Department, and Police Department phone lines could be jammed with callers. During this time, the City website should be updated regularly.	N/A
TERRORISM/ VIOLENCE Active Shooter, Hostage, Public Harm, Civil Disturbance/ Unrest, Politically Motivated Attacks, Incendiary	not scored	- It is possible the City could be the target of an act of terrorism based on current national trends. Possible susceptible non-municipal targets could Schools and Churches. - The municipal facilities in Concord, City Hall, Fire Stations, Concord Public Library, General Services Department, and Police Headquarters, as well as Government Facilities in the City including the NH State House, Meldrim Thompson Office Park East, Merrimack County Court House and Offices, NHDHHS, NHDOT, NHHSEM, NH legislative office	N/A

4 HAZARD RISK ASSESSMENT

Hazard Risk Assessment Hazards	Overall Risk	Potential Future Hazards – Locations and Impacts	Magnitude/ Extent Measurement Scales
Devices, Sabotage or Vandalism *Events(s) Within Last 5 Years*		building, NH Military Reservation, NH State Fire Training Facility, NH State Office Park, NH State Police Headquarters, NH State Prison, NH Supreme Court, Shea Farm, and the US Federal Building all have a risk of terrorism or violence. Vandalism of City cemeteries may also occur. • Future hostage situations are isolated events and are nearly impossible to predict. The sites where this potential exists could include those listed above under Terrorism, the high density housing neighborhoods (see Severe Winter Weather) and everyday domestic situations. Isolated incidents of violence could occur in the remote forested areas and trails of those Forests, state lands, and conservation lands listed in the Lightning section. • Large scale incidents of civil disturbance and public unrest are possible in Concord. However, the City's participation in the Central NH Special Operations Unit enables Concord's mutual aid assistance where needed. • Bomb threats at the schools are a possibility based on current attitudes and trends. Additionally State governmental buildings could be targeted. The bridges, dams and cultural landmarks could be subject to terrorist threats or bombs that disrupt major travel routes. • Any future sabotage of local utilities, Eversource & Until lines, high tension power lines, Liberty gas line, stormwater system, water and sewer lines, gas lines, pump stations, telecommunications towers, telephone and internet substations, or the local High, Significant and Low Hazard dams could cause an immense amount of damage in Concord.	
CYBER EVENT Municipal Computer Systems Attack, Website Overtake, Cloud Data Breach, Telephone Rerouting, Identity Theft, Phishing, Ransomware, Virus or Phone Scams *ANNUAL Occurrences Within Last 5 Years*	not scored	• The entire City – residents, businesses, municipal department, School District, and state facilities- could be subject to future cyber events. Cyberattacks could target their websites, computer systems, cloud data systems, archival records, or use email phishing or related techniques to install ransomware, etc. The NH State House, City Hall, Library, Municipal Departments, Schools, Water Treatment and Pumping System, Wastewater Treatment, Airport, any technology businesses would be high-value targets for their software and their archival systems. State and federal offices could be targeted as well. • Email scams, phone scams, door-to-door canvassing, and identity theft are likely to continue in the future, causing regular problems for residents and businesses. These scams are more likely to impact the City's senior residents. Significant future damage could be done to municipal and School systems, in addition to tech businesses and other facilities located in the City. Private businesses targeted could create a negative economic impact on the community.	N/A

Source: Concord Hazard Mitigation Committee

Although there are many potential hazards in Concord'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**.

INLAND FLOODING

Flooding is a more easily locatable hazard as waterbodies can be used to approximate the range of future potential flooding areas. The Special Flood Hazard Areas, waterbodies, and road washout locations are listed in detail below for Concord.

Special Flood Hazard Areas (SFHA)

There are **20** active Digital Flood Insurance Rate Maps (DFIRMs) in Concord from the **April 2010** updated set, plus **26** more DFIRMs which do not have flood zones or watercourses. Base Flood Elevations (BFEs) are abundant along the **Merrimack River**, **Soucook River**, **Contoocook River**, and **Turkey River** on the DFIRMs.

Soucook River

The Concord (**330110**) DFIRMs identifying floodplains along the **Soucook River** sharing the boundary with Pembroke (**330119**) from north to south are **#0551**, **#0552**, **#0553**, **#0534**, **#0542** and **#0561**. These **6** DFIRMs include regular **BFEs** along the Soucook River's entire length of Concord's eastern boundary. The BFEs begin at their highest with **315'** at the Loudon (**330117**) boundary and as the river flows south, elevation declines significantly to reach **203'** in Concord as the **Soucook River** converges with the **Merrimack River**, a total decline of **112''**.

Merrimack River

The Concord (**330110**) DFIRMs identifying floodplains along the **Merrimack River** share the northern border with Boscawen (**330105**) and Canterbury (**330108**) and the southern boundary with Bow (**330107**). From north to south, the panels are **#0337**, **#0339**, **#0343**, **#0531**, **#0532**, **#0533**, **#0534**, **#0542** and **#0561**. The BFEs begin at their highest with **253'** where the **Merrimack River** flows into Concord and declines in elevation slowly in each DFIRM to reach its lowest BFE of **204'** in Concord, a total decline of **49'** when the **Soucook River** converges with the **Merrimack River**.

Contoocook River

The Contoocook in an unusual river which flows in the opposite direction, from south to north. The DFIRMs identifying floodplains along the **Contoocook River** include the river's travels through Hopkinton (**330116**) and Boscawen (**330105**) until it converges with the Merrimack in Penacook, a village of Concord. From south to north, the panels are **#0318**, **#0319**, **#0338**, **#0336**, and finally **#0337** which is also shared with the **Merrimack River**. The **BFEs** begin at their highest with **359'** where the **Contoocook River** flows into Concord from Hopkinton and declines in elevation quickly in each DFIRM to reach its lowest **BFE** of **254'** in Boscawen and Concord, a total decline of **155'**, when the **Contoocook River** converges with the **Merrimack River**.

Turkey River

This small local river originates from the Little and Great Turkey Ponds. The DFIRMs identifying floodplains along the **Turkey River** begin in Concord and continue south into Bow (**330107**). From north to south, the panels are **#0530**, **#0540** and **#0541** although there are no **BFEs** for the **Turkey River**. These DFIRMs all display the SHFA **Zone AE** (1% annual risk of flooding) with floodways, SHFA **Zone A** (1% annual risk of flooding) and **Zone X** (0.2% annual risk of flooding) locations. These are highlighted green in **Table 29**. Six (6) additional DFIRM numbered-only panels cover the area of the City of Concord, **#0345**, **#0365**, **#0510**, **#0530**, **#0540**, and **#0541**. As none of these have floodplains, they have not been mapped and no data is available. They also appear in **Table 31** to complete the SFHA portrait of the community.

Table 31

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

Panel NH (33011C)	Flood Zones in Concord (330110)	Base Flood Elevations (BFEs)	Water Body Areas in Floodplains	Community of Concord Geographic Location
#0318	AE with floodway, X	359	Contoocook River	Northwest corner with Webster and Hopkinton. Allen State Forest, Warner Road.
#0319	AE with floodway, AE, X, A	358	Contoocook River, Unnamed Wetland of Merrimack River	Northern edge of Concord, bordering Boscawen and Webster. Blackwater Road, Elm Street, Horsehill Road
#0336	AE with floodway, X	310, 308	Contoocook River	Northern center edge with Boscawen.
#0337	AE with floodway, AE, A, X	253, 252, 251. 254 (Contoocook)	Merrimack River, Burnham Brook, Contoocook River	Northeastern edge with Canterbury. Includes Hannah Dustin Drive, I-93 Exit 17, Penacook Street.
#0338	AE with floodway, AE, A, X	355, 354, 353, 353- 336, 320, 311, 310. Lower Branch 353- 347, 338, 322, 320, 319, 313, 310.	Contoocook River with Canals	North-central section of City in Penacook. Bog Road, Washington Street, Borough Road, Riverhill Avenue
#0339	AE with floodway, AE, A, X	252, 249, 248, 247, 245, 244	Merrimack River, Hoyt Brook, Sewalls Falls, Unnamed Stream	Northern Concord in Penacook along the Merrimack River. Railroad line, I-93, Penacook Street
#0343	AE with floodway, X	245, 242, 241, 239, 236, 237	Merrimack River, Sewalls Falls, Unnamed Stream	Center of Concord, eastern side. I-93, Snow Pond Road, Sewalls Falls Road, Blood Agricultural Preserve, Sewalls Falls WMA
#0506	AE with floodway, X	359	Contoocook River	Northwestern edge with Mast Yard State Forest at Hopkinton border.
#0507	AE with floodway, AE, X	358, 357, 356	Contoocook River	Northwestern edge with Mast Yard State Forest at Hopkinton border. West Parish Road, Broad Cove Road

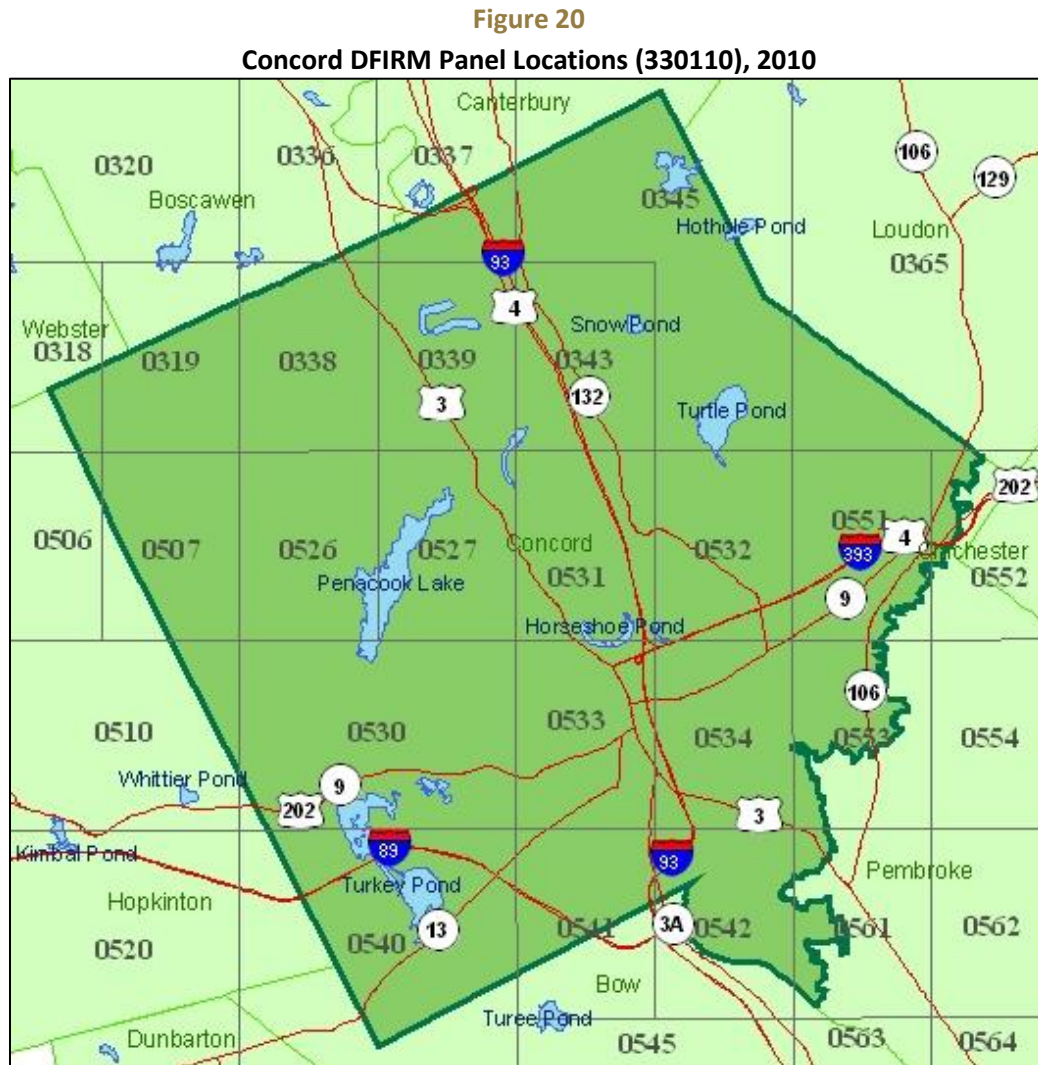
Panel NH (33011C)	Flood Zones in Concord (330110)	Base Flood Elevations (BFEs)	Water Body Areas in Floodplains	Community of Concord Geographic Location
#0526	AE with floodway, AE, X	356, 355	Contoocook River	Northwest area of City, including Carter Hill Road, Bog Road, Riverhill.
#0527	AE, X	237	Merrimack River	Geographic center of City. North State Street, Fisherville Road, Railroad
#0531	AE with floodway, AE, X, A	237, 236, 235, 234, 233	Merrimack River, Cider Mill Dam, Horseshoe Pond, Bowen Brook	Center of the City, with Merrimack River and I-93. Eastside Drive (Exit 16), Commercial Street (Exit 15), Old Locke Road
#0532	AE with floodway, AE, A, X	233	Merrimack River, Mill Brook	Central-eastern section of Concord. North Curtisville Road, Eastside Drive, I-393, Portsmouth Street, NHTI Island Reserve
#0533	AE with floodway, AE, X	232 (Merrimack River), 235 (Horseshoe Pond)	Merrimack River, Horseshoe Pond	Downtown Concord. I-93, I-393, Commercial Street, North Main Street.
#0534	AE with floodway, AE, X	233, 232, 231, 230 (Merrimack)	Merrimack River, Soucook River	Downtown East, Loudon Road. Concord Airport, I-93, I-393, Airport Road, Manchester Street.
#0542	AE with floodway, AE, X	224, 220 (Soucook). 230, 228 (Merrimack)	Soucook River, Merrimack River, Turkey River (Bow)	Southern point at Bow town line. I-93, South Main Street, Integra Drive
#0551	AE with floodway, AE, A, X	285, 283, 281, 281, 279, 277, 276	Soucook River	Eastern edge boundary with Pembroke. East Concord, I-393, Sheep Davis Road, Loudon Road.
#0552	AE with floodway, AE, A, X	315, 314, 313, 312, 311, 304, 300, 294, 284	Soucook River	Eastern edge corner with Loudon and Pembroke at the Soucook River. Ricker Road, Sheep Davis Road, I-393, Dover Road (Route 9), Loudon Road.
#0553	AE with floodway, AE, X	276, 266, 261, 253, 244, 239, 236, 233	Soucook River	Eastern boundary with Pembroke, middle of the Soucook River. Sheep Davis Road, Riverwood Drive, Regional Drive
#0561	AE with floodway, AE, X	233, 225, 216, 210, 203 (Soucook). 204, 202 (Merrimack)	Soucook River, Merrimack River	Southeastern edge where Soucook & Merrimack Rivers converge. Bordering Bow & Pembroke. Route 3, Pembroke Street, Garvins Falls Road
#0345	A	N/A	Hayward Brook, Hackett Brook, Hoit Marsh	Northeast corner with Loudon & Canterbury. Mountain Road, Hoit Road Marsh WMA, Tallant Road.
#0365	None	N/A	None	Eastern edge with Loudon.
#0510	None	N/A	None	Western edge with Hopkinton. Kimball Easement, Ash Brook. No roads.
#0530	A	N/A	Turkey River, Ash Brook, Little	Southwest Concord, edges into Hopkinton. St. Paul's, Pleasant Street,

Panel NH (33011C)	Flood Zones in Concord (330110)	Base Flood Elevations (BFEs)	Water Body Areas in Floodplains	Community of Concord Geographic Location
			Turkey Pond, St. Paul's Dams	Hopkinton Road, Shenandoah Drive, White Farm.
#0540	A	N/A	Little Turkey Pond, Great Turkey Pond, Turkey River, Turree Brook, Bela Brook	Southwestern corner with Hopkinton and Dunbarton. Clinton Street (Route 13), I-89, Silk Farm Road, Birchdale Road
#0541	A	N/A	Turkey River	Southern edge with Bow. I-89 and I-93 junction, Clinton Street, South Street, Cilley State Forest.

Sources: FEMA and [NH Geographically Referenced Analysis and Transfer System \(NH GRANIT\)](#) websites

However, a new set of Preliminary DFIRMs for Concord, as part of the Upper Merrimack Watershed, has been under development by FEMA after holding community meetings around **2020**. The draft Preliminary DFIRMs were published on **October 12, 2022** and include current aerial photography. More specific locations of the SFHAs are displayed in a clearer color scheme. New BFEs and regulated floodways are indicated for the Soucook River. The **2022** Preliminary DFIRMs are under review and are subject to further revision, so they are not used here for hazard mitigation planning.

Figure 20 displays the relative location of each of the DFIRM panels in the community used in **Table 31**. 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 and how they are not consecutive.



Source: Concord DFIRMS can be downloaded at <https://granit.unh.edu/dfirms>,
last accessed 10-21

Figure 21 displays an example of a zoomed-in view of the Concord floodplain at Interstate 393 and the NH Technical Institute (NHTI) campus area. The new 2010 DFIRMs illustrate a significant upgrade from the previous series of paper maps. The maps are now set on an aerial photography background that displays roads, buildings, urban and forested areas. The river has multiple Flood Zone classifications based on location, depth, and elevation. Within this section, the **Merrimack River** is designated as **Zone AE (1% annual chance with BFEs)**, **Zone AE with Floodway (1% annual chance, channelized)**, and **Zone X (0.2% annual chance)**.

Figure 21

Zoom View of Concord Merrimack River DFIRM Panel Location #0532

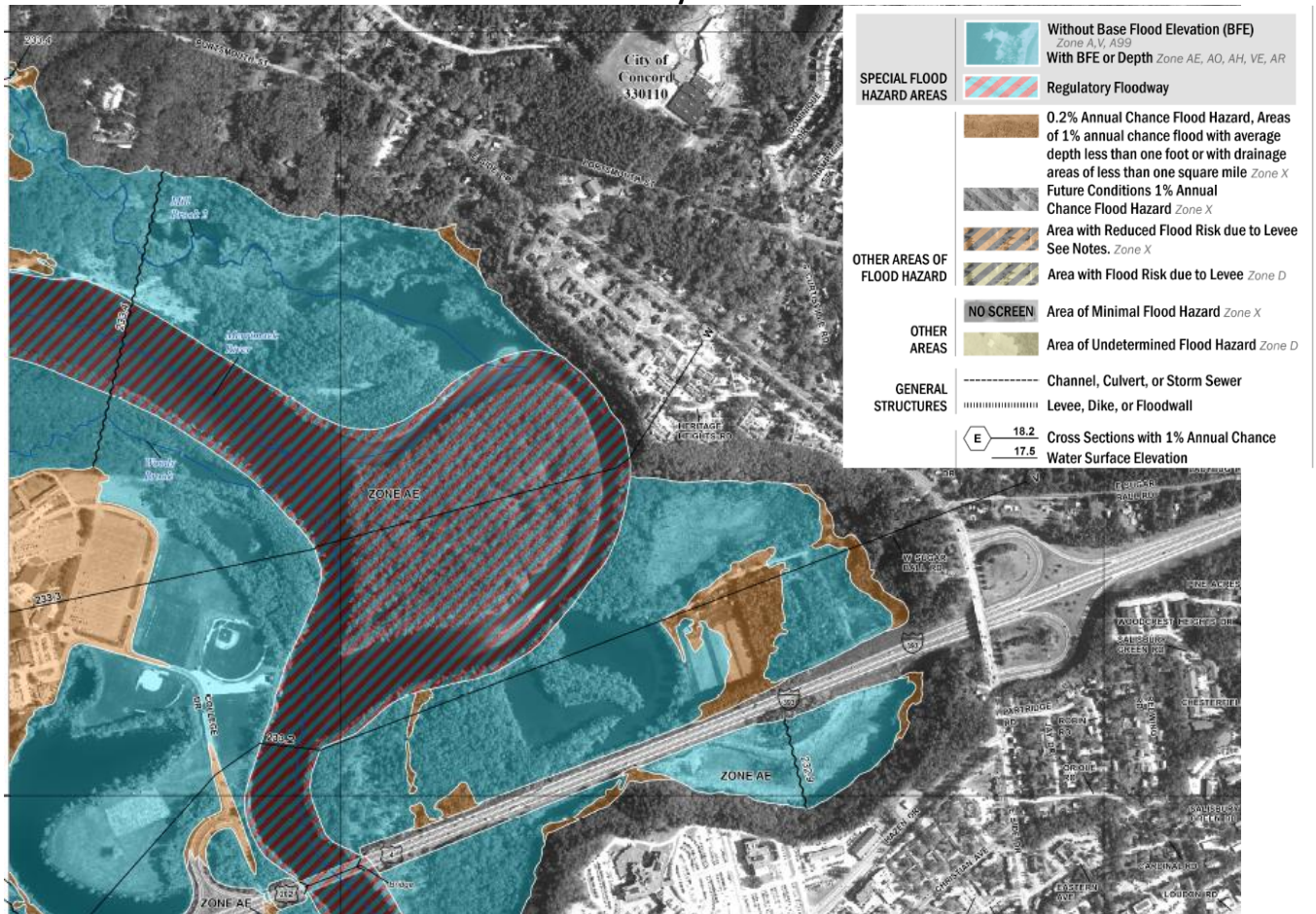


Source: FEMA DFIRM 2010 Panel #33011C-330110-0532 for Concord, NH

Figure 22 is a comparison to the **2010 DFIRM**, with the Preliminary **2022** Panel map of the same location. The location of Zone AE has shifted in some places. The differences may show more considerably along the **Soucook River**, which now has BFEs and a regulated floodway under the Preliminary Maps Series F..

Figure 22

Zoom View of Concord 2022 Preliminary DFIRM Panel Location #0532



Source: FEMA DFIRM Preliminary 2022 Panel #33011F-330110-0532 for Concord, NH

Waterbodies

Concord has several areas particularly susceptible to flooding. The **Soucook River** forms the City's eastern boundary with Pembroke. The wide and meandering **Merrimack River** bisects the community directly in the middle from north (Boscawen) to south (Bow). The **Contoocook River** flows through the rural northwest section of Concord into Penacook where it converges with the Merrimack. The Turkey River begins at the **Turkey Ponds** and flows south into Bow. There are many locations and opportunities for the City to flood from these water bodies. City infrastructure and drainage areas attempt to maintain and upgrade to accommodate storm conditions. During flash flooding and heavy rain events, the City streets can become flooded or washed out.

 **Watercourses:** Merrimack River, Contoocook River, Soucook River, Turkey River, Bow Brook, Burnham Brook, Hoyt Brook, Bowen Brook, Mill Brook, Hayward Brook, Hackett Brook, Snow's Brook, Turree Brook, Bela Brook, Ash Brook, Rattlesnake Brook, White Brook and several unnamed Brooks.

There are also several brooks in Concord which are not in a flood zone but contribute to the City's environment, including: Cemetery Brook, Woods Brook, and unnamed streams.

 **Waterbodies:** Horseshoe Pond, Little Turkey Pond, Great Turkey Pond, Hoit Marsh and Sewalls Falls.

There are several other ponds in Concord which are not in a flood zone but contribute positively to the City's environment, including: Penacook Lake (City water reservoir), Snow Pond, Turtle Pond, Little Pond, Thayer's Pond, and Hothole Pond and unnamed wetlands and ponds.

Floodplains of Turkey River, Soucook River, Merrimack River and the Contoocook River and Rattlesnake Brook result in expanded flooding of Concord. The City is susceptible to flooding because of the close proximity of these rivers. Homes near the Merrimack and Contoocook Rivers, especially in low-lying areas, are at risk. Other water systems, such as the Turkey River, Turkey Pond, Little Turkey Pond, Burnham Brook, Hayward Brook, Woods Brook, Snow's Brook, Hackett Brook, Hoyt Road Marsh, Mill Brook, Bela Brook, Turree Brook, Bow Brook (May 2006), Millstream Brook (May 2006), and Rattlesnake Brook (May 2006) are also prone to flooding.

Areas which are susceptible to regular flooding include the **Merrimack River's** edge at the former Christian Mutual Building, along Shaw's Fort Eddy Road, at the NH Technical Institute fields, at Hall Street in the Amoskeag Beverages area, and at Long Meadow Drive manufactured housing park.

Road Washouts

Some of the local City paved maintained roads in Concord are constructed using ditching; storm drains are found along the densely developed paved roads within the MS4 area. About **191 miles** of the Town maintained (City paved) roads are located throughout Concord. Past and potential future road washouts and areal flooding due to stormwater include:

- Lincoln Street (Between South and Spring Streets)
- Carter Hill Road (ditches occasionally due to road steepness)
- Concord Hospital area

Multiple drainage system areas covering the entire City are located in the **2023-2032** Capital Improvements Program for replacement of stormwater infrastructure. These reconstruction projects should help alleviate the remaining urban flooding, erosion and runoff problems.

The meandering Soucoook, the rough Turkey River, and the wide and high-volume Merrimack River (most of the City is of a much higher elevation to the Merrimack) make the City particularly susceptible to flooding. Both smaller rivers join the Merrimack River. The following areas have been identified by the Hazard Mitigation Committee most recently as being immediately susceptible to the impacts to **flooding**:

- North State Street at Hutchins Street (potential)
- Village Street area near the Contoocook River (potential)
- Hall Street, Main Street, and Loudon Road near Merrimack River (potential)

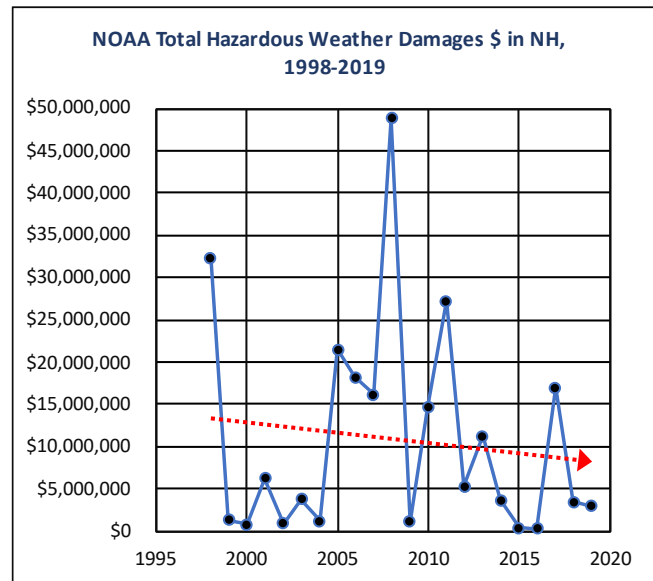
Local Climate and Extreme Weather

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 Concord can expect to see in terms of extreme weather in the future.

Table 32

Summary of Hazardous Weather Fatalities, Injuries, and Damage Costs in NH, 1998-2019

Year	Fatalities	Injuries	Total Damages \$ in Million
2019	0	0	\$2.98
2018	2	9	\$3.4
2017	0	0	\$17.0
2016	1	1	\$0.27
2015	2	34	\$0.37
2015	0	2	\$3.7
2013	0	30	\$11.3
2012	1	4	\$5.28
2011	1	2	\$27.3
2010	1	6	\$14.63
2009	1	0	\$1.13
2008	2	5	\$48.9
2007	0	3	\$16.15
2006	1	9	\$18.2
2005	4	9	\$21.5
2004	0	11	\$1.2
2003	2	29	\$3.8
2002	0	7	\$0.9
2001	0	2	\$6.2
2000	2	6	\$8.0
1999	3	17	\$1.3
1998	1	23	\$32.4



Source: National Oceanic and Atmospheric Administration, last accessed 03/21.

Adjusted for inflation [Consumer Price Index CPI]

<https://www.weather.gov/hazstat/>

Injuries to people and the costs of damages in New Hampshire have slightly decreased from hazardous weather over the last 20 years according to the trendline displayed in the associated chart for Table 30. Between 1998-2008, this slight decline in injuries and damages can be generally applied to the major disasters declared in the State. The highest damage costs

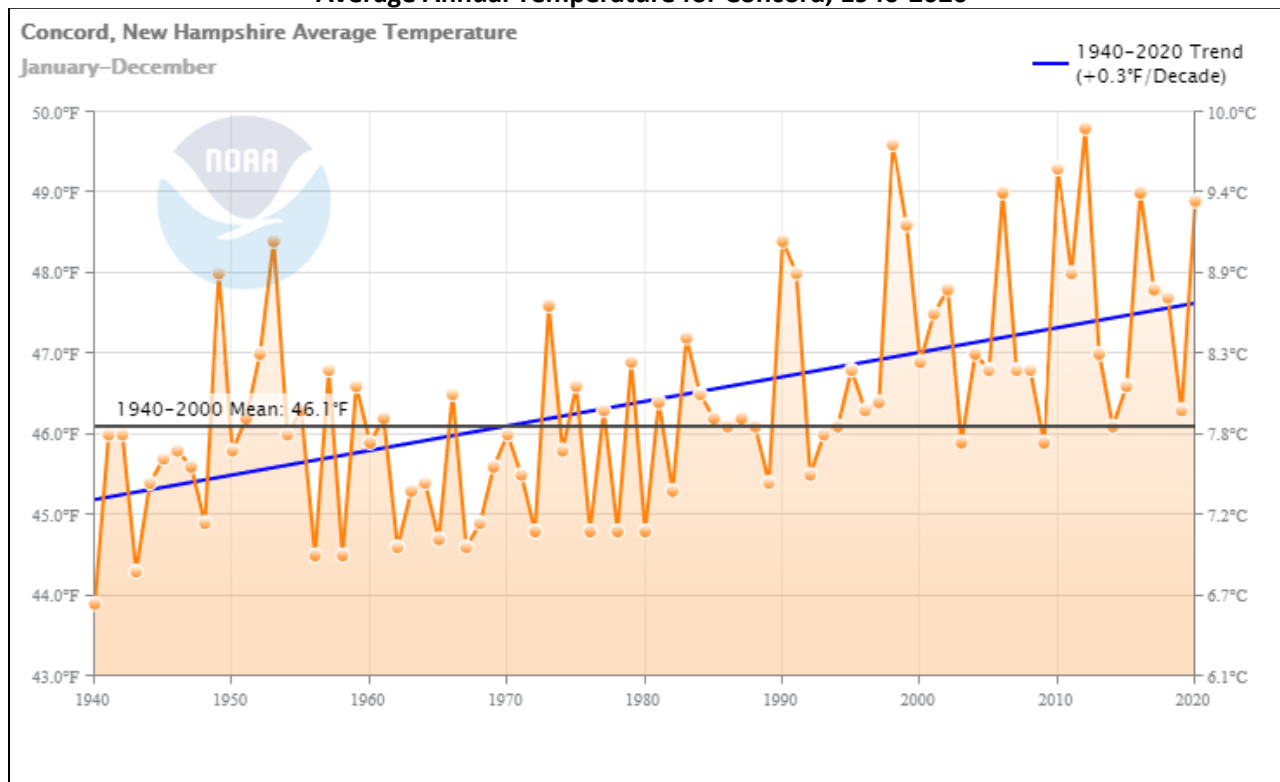
correlate to the 1998 (\$32m) and 2008 (\$49m) ice storms. The number of injuries and fatalities have a less distinct association, with the highest casualties shown in 2015 (36), 2013 (30) and 2003 (31). However, the single greatest number of fatalities during this time period occurred in 2005 (4), likely during the time of the Oct 2005 Columbus Day Floods that struck the southwestern section of the State very hard.

The Central NH Region’s weather history is summarized to provide a view of the trends around the Concord area where some weather measurements have been taken at the Concord Airport since 1868. These measurements should have some reasonable basis, while small unique microsystems are found throughout the region particularly at higher elevations. This is the large and longest active weather station in the CNHRPC region, the measurements will be accurate and used for Concord.

Figure 23 displays Concord’s average annual temperature (Jan-Dec) between 1940 (43.7°F) and 2020 (48.9°F) with a mean temperature over the 1940-2020 period of 46.1°F. The warmest years were 2012 with a 3.7°F departure from normal, 1998 at 3.5°F departure, 2010 at 3.2°F departure, followed by 2016 at 2.9°F departure from the normal mean 46.1°F. 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 coolest years were 1940 at 43.9°F, 1943 at 44.3°F, 1956 and 1958 at 44.5°F, followed by 1962 and 1967 tied at 44.6°F. The displayed trend line allows a definitive way of averaging all temperatures and illustrates an average +0.3°F temperature increase trend per decade and the increase of about 2.4°F total during this 80-year period in Concord.

Figure 23

Average Annual Temperature for Concord, 1940-2020



Source: National Oceanic and Atmospheric Administration, last accessed online 03-31-21

https://www.ncdc.noaa.gov/cag/city/time-series/USW00014745/tavg/12/12/1940-2020?base_prd=true&begbaseyear=1901&endbaseyear=2000&trend=true&trend_base=10&begtrendyear=1895&dtrendyear=2021

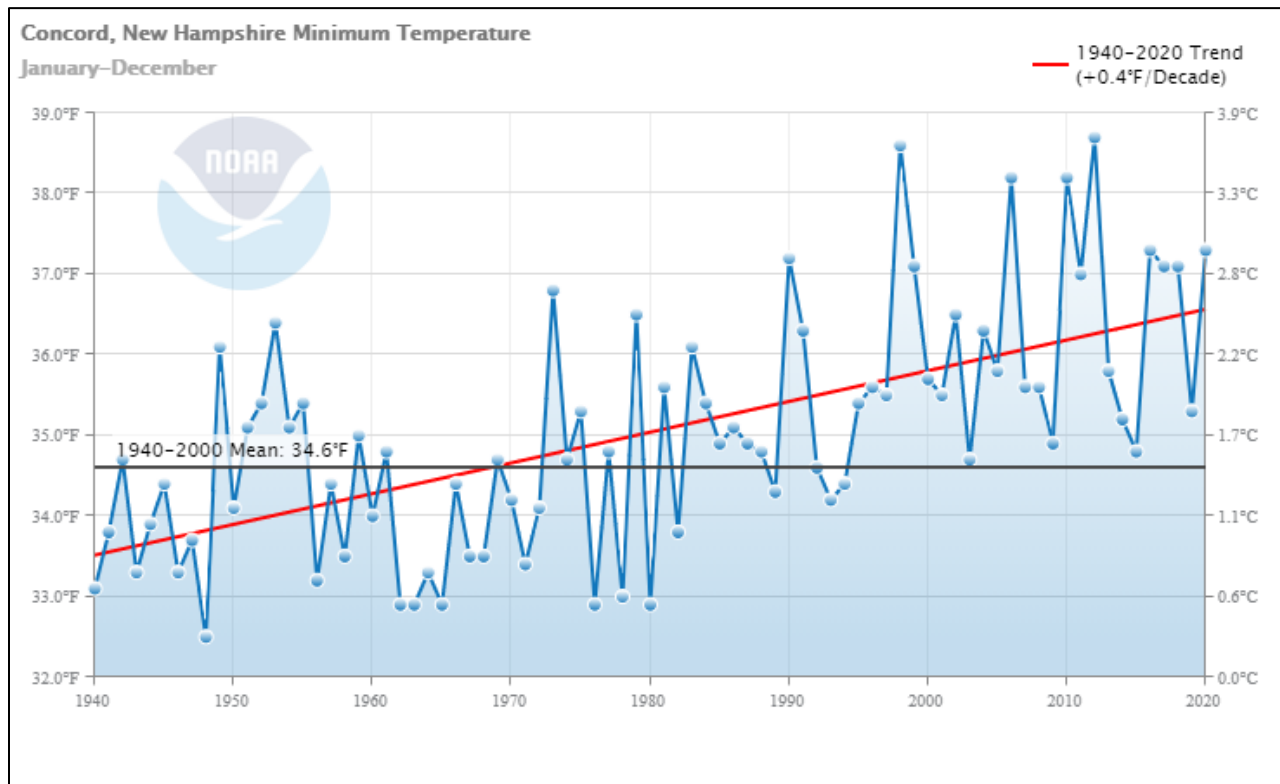
Another way to evaluate how the temperatures is to measure the minimum annual temperatures and maximum annual temperatures are changing. Both the coldest and the hottest temperatures are growing warmer in the Central NH region, which includes Concord.

Figure 24 displays the *minimum* average temperatures for Concord, with a mean (average) of **34.6° F** for **1940-2020**. In **2020**, the *minimum* average temperature was **37.3° F**, as compared to the **1940** *minimum* average temperature of **33.1° F**. Within this 80-year period, the *lowest* minimum was **32.5° F** in **1948**, followed by **32.9° F** (**1962, 1963, 1965, 1976, 1980**), **33.07° F** (**1978**), followed by **33.1° F** (**1940**). The *highest* minimums were in **2012** (**38.7° F**), **1998** (**38.6° F**), tied in **2006** and **2010** (**38.2° F**), followed by **2016** and **2020** (**37.3° F**). In fact, the top **10** highest *minimums* have occurred since **1990** during the nearly **80**-year data span, indicating the coldest temperatures are growing warmer.

The trend line indicates a **+0.4° F** increase per decade between **1940-2020**, about a **+3.2° F** increase in minimum average temperatures.

Figure 24

Minimum Average Temperatures for Concord, 1940-2020



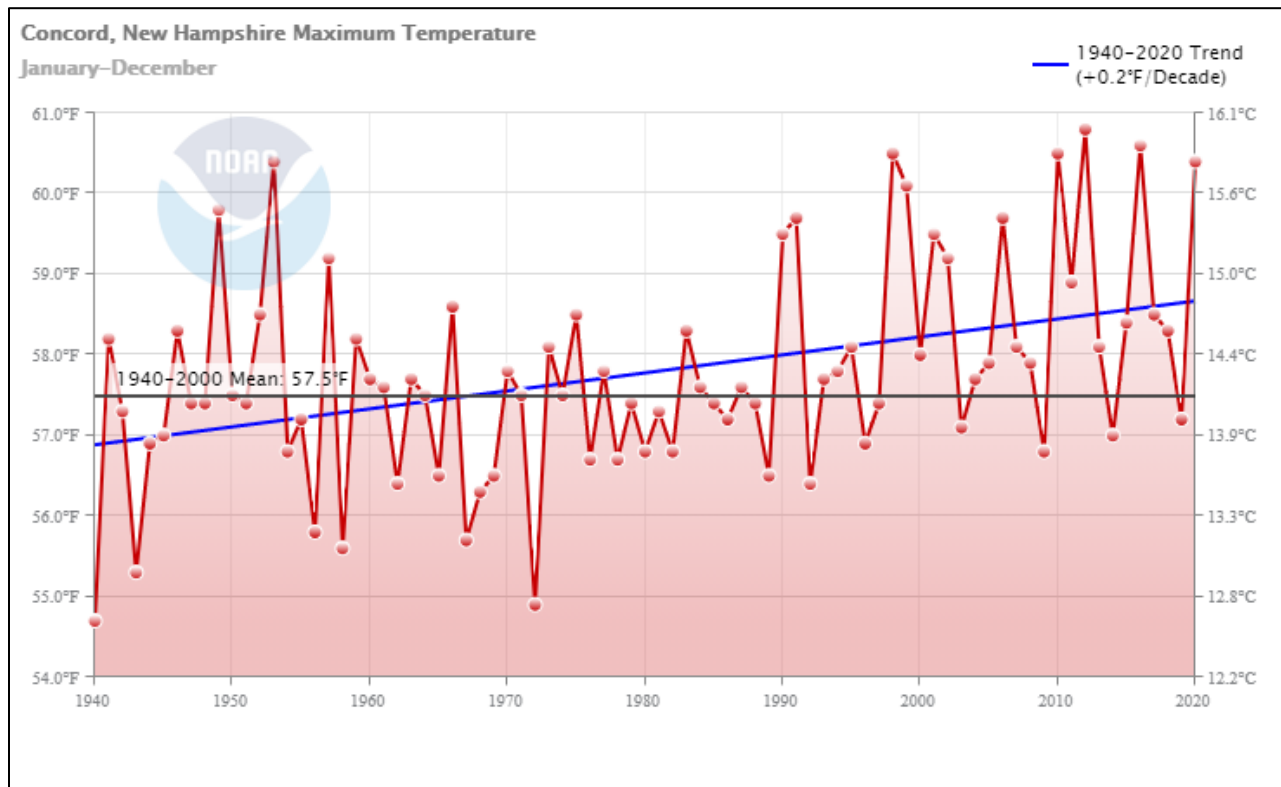
Source: National Oceanic and Atmospheric Administration, last accessed online 03-31-21

Figure 25 displays the *maximum* average temperatures between **1940-2020**, with a mean (average) of **57.5° F** annually. In **1940**, highest *maximum* average temperature was **54.7° F** while in **2020** the highest *maximum* was **60.4° F**. The lowest *maximums* were **54.7° F** in **1940**, **54.9° F** in **1972**, **55.3° F** in **1943**, **55.6° F** in **1958**, **55.7° F** in **1967** followed by **55.8° F** in **1956**. The highest *maximums* in Concord were **60.8° F** in **2012**, **60.6° F** in **2016**, **60.5° F** in **1998** and **2010**, **60.4° F** in **1953** and **2020**, followed by **60.1° F** in **1999**. Eight (**8**) of the top **10** highest *maximums* have occurred since **1990** during the **80-year** data span. These numbers indicate the hottest temperatures in the Central NH Region are growing warmer.

The **+0.2° F** trendline per decade results in a **+1.6° F** increase in the maximum average temperatures.

Figure 25

Maximum Average Temperatures for Concord, 1940-2020

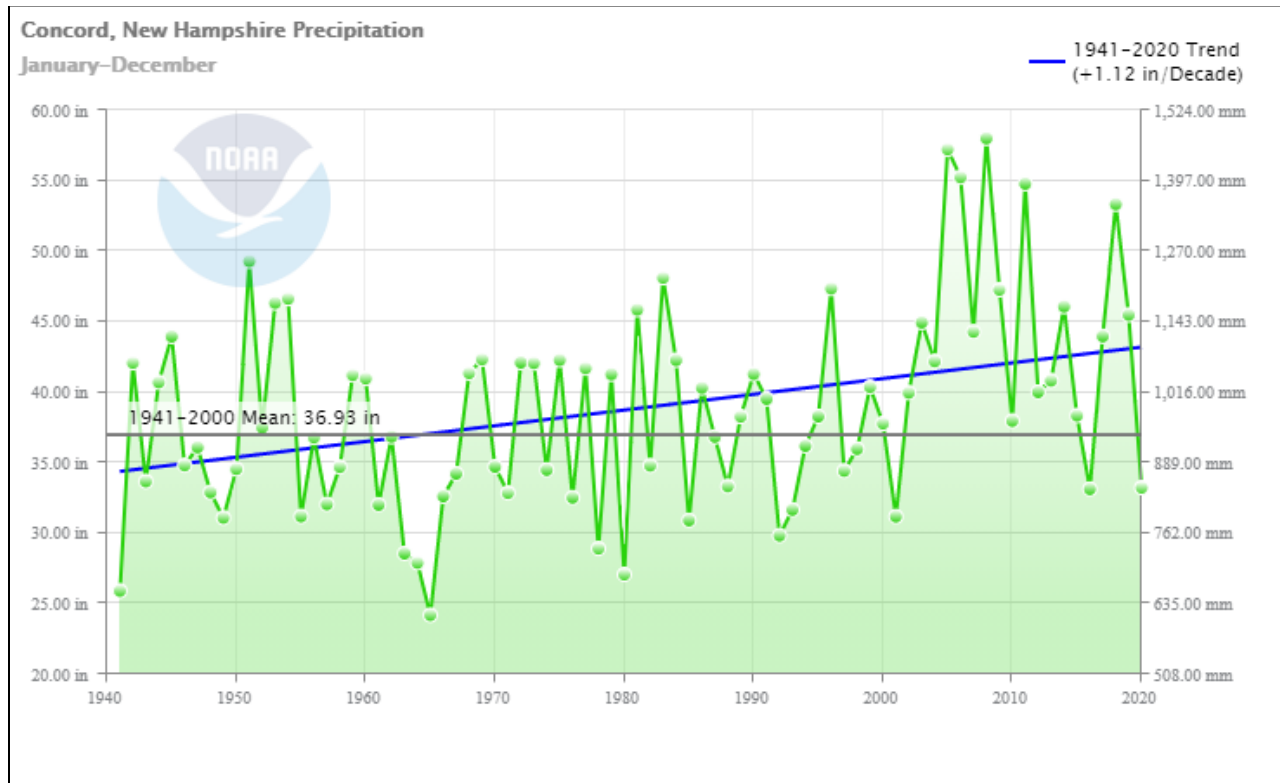


Source: National Oceanic and Atmospheric Administration, last accessed 03-31-21

For precipitation (rain) changes, **Figure 26** displays Concord's average annual Jan-Dec precipitation rates between **1941** and **2020**. Varying seasonal rainfall amounts continue over the decades. The mean annual precipitation during this period is **36.93"** annually. In **1941**, the amount of precipitation was **25.91"** while in **2020** the precipitation totaled **33.23"**. The wettest year in Concord was **2008** at **58.00"**, **2005** at **57.22"** and **2006** at **55.24"**, **2011** at **54.78"**, **2018** at **53.33"**, followed by **1951** at **49.29"**. The years with the least amount of rainfall were **1965** at **24.19"**, **1941** at **25.91"**, **1980** at **27.07"**, **1964** at **27.90"**, **1963** at **28.56"**, followed by **1978** at **28.91"**.

The trend line serves the same purpose to illustrate an increase of **1.12"** in precipitation per decade, or about a **+8.9"** increase in the annual average precipitation during this **80-year** period from **1941-2020** in Concord. Concord will have experienced similar conditions.

Figure 26
Average Annual Precipitation for Concord, 1941-2020



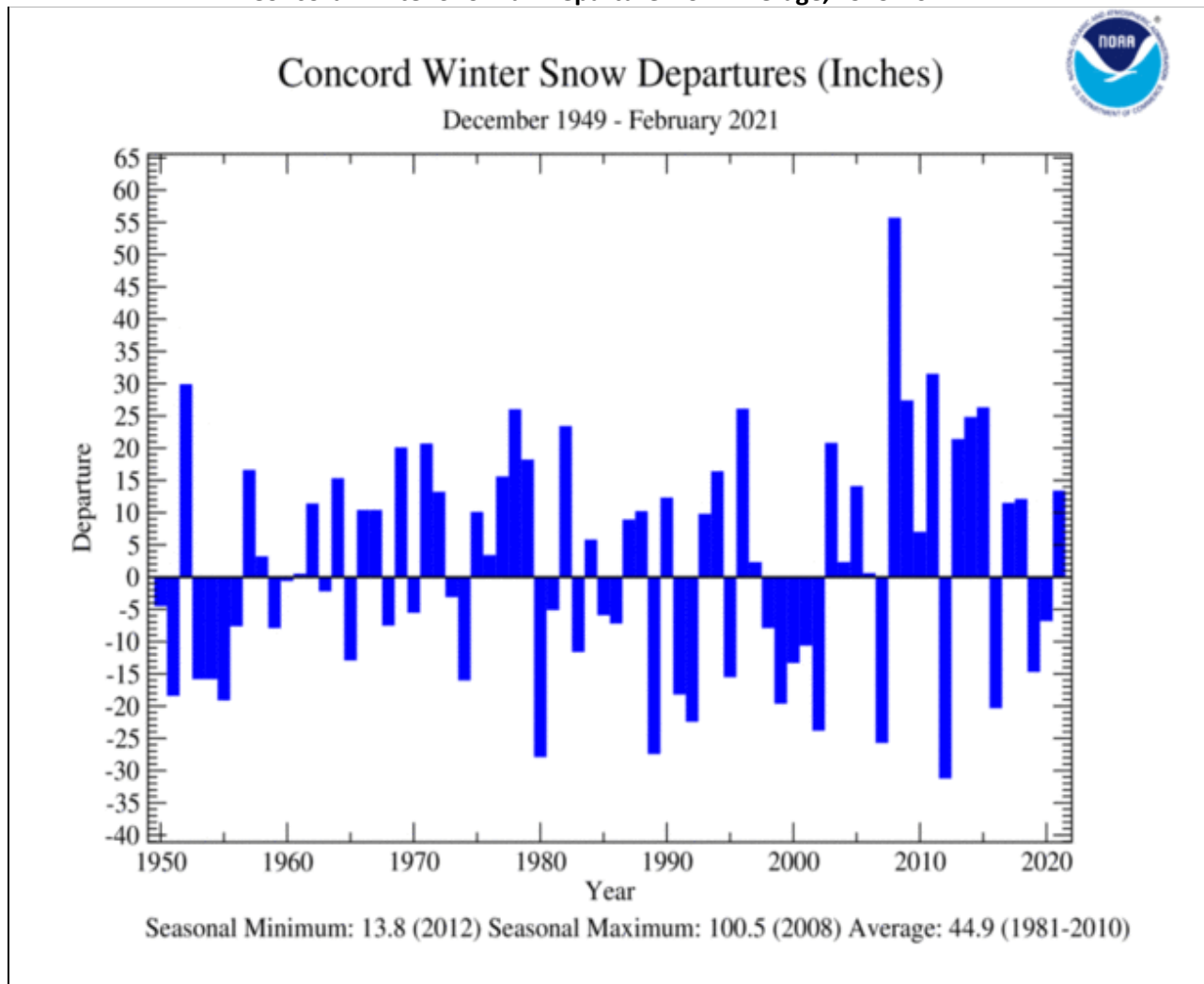
Source: National Oceanic and Atmospheric Administration, last accessed 03-31-21

Displayed in **Figure 27** is the departure from normal snowfall instead of actual inches per year, using a “30-year normal” period as the baseline, which for **1981-2010** is **44.9”** of snowfall annually in Concord.

The amount of recent annual snowfall has significant departures from normal. From **Jan-Dec 2020**, **58.2”** of snowfall occurred, which is **13.3”** higher than what normally falls (**44.9”**). Since **1949**, the year with the highest amount of snowfall was **2008** with **100.5”** and the lowest snowfall was **13.8”** in **2012**.

Figure 27

Concord Winter Snowfall Departure from Average, 1949-2021



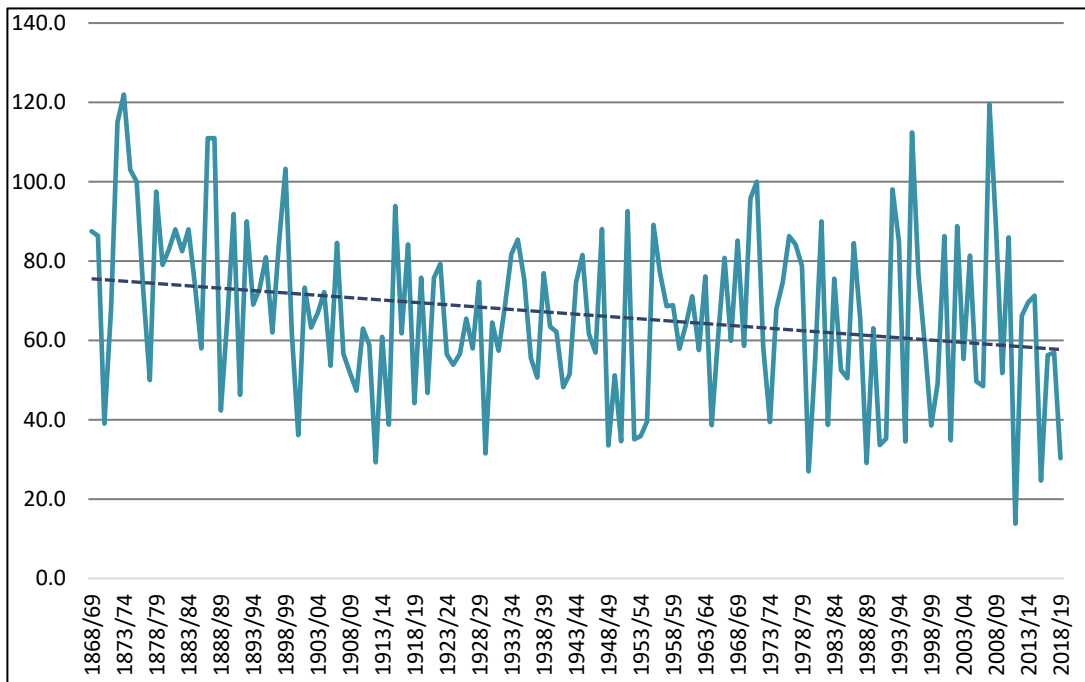
Source: National Oceanic and Atmospheric Administration, National Climate Report February 2021

<https://www.ncdc.noaa.gov/sotc/national/202102/supplemental/page-5>

<https://www.ncdc.noaa.gov/monitoring-content/sotc/national/2021/feb/Concord.gif> last accessed 03-31-21

The National Oceanic and Atmospheric Administration (NOAA) seasonal snowfall totals were compiled by CNHRPC for Concord, where snowfall data gathering began in **1868**. **Figure 28** displays the snowfall every **5** years and includes a trendline that indicate annual seasonal snowfall has decreased by nearly **20"** since **1868**. The years with the highest snowfall accumulations were **1873/74 (122.0")**, **2007/08 (119.5")**, **1872/73 (115.0")** and **1995/96 (112.4")**. The years of lowest accumulations were **2011/12 (13.8")**, **2015/16 (24.7")**, **1979/80 (27.0")**, and **1988/89 (29.1")**.

Figure 28
Seasonal Snowfall Totals for Concord, 1868-2019



Source: National Oceanic and Atmospheric Administration Data as compiled by CNHRPC, 03-19

Five (5) of the top 10 lowest snow accumulations occurred since 1990. The **2018/19** season ended with **30.3"**, ranking **6th** out of **151** years of records. Concord is geographically close to Concord (5 miles) and likely shares similar snowfall accumulation trends over time.

IMPACTS OF CLIMATE CHANGES IN SOUTHERN NEW HAMPSHIRE

This climate data may certainly be relevant to the entire Central NH Region which includes the City of Concord. The Central NH region climate summation is that the **temperature is getting warmer**, the **precipitation is increasing**, and the **snowfall is decreasing** 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 in the future.

The Southern NH Climate Change Assessment, formally entitled *Climate Change in Southern New Hampshire: Past, Present, and Future, 2015* by Climate Change Solutions of New England under the University of New Hampshire, reviewed current climate conditions and projected future conditions of Southern New Hampshire under potential low and high emission scenarios. The Central NH Region and the City of Concord are within southern New Hampshire. The past and future Southern NH climate overview is illustrated in

Figure 29.

As a result of anticipated extreme weather continuing and climate changes in Central NH and Concord, consideration should be given for potential impacts to the community. Several new issues are considered, including public health, natural environment disruption, declining forest health, fewer recreational opportunities, risks to the built environment, transportation system maintenance, aging stormwater infrastructure, decreasing water resources and changing food and agriculture, which may result from climate change. For more information on these topics, refer to the *Central NH Regional Plan 2015*.

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 in the future?

- Summers will be hotter: 16-47 days above 90°F
- Winters will be warmer: 20-45 fewer days below 32°F

RAINFALL

What have we seen since 1970?

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

What can we expect in the future?

- 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 in the future?

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

Source: UNH Climate Solutions of New England, 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 City'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 Woolly Adelgid, Emerald Ash Borer, Red Pine Scale, future likely Lantern Moth infestation of maple trees.
- 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. Dam operators may quickly release water without notification to municipalities.

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 be impacted by flooding and cannot perform their function.
- Blocking of water can lead to flooding of the area and roadways, potentially 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.
- Drainage systems which include stormwater collected together with sewage can enhance localized flooding, contaminate water supplies, and threaten 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 Concord. Consideration should be given to applicable items during the development and update of the **Hazard Mitigation Plan**, as Actions are completed, and as new Actions are developed for the **Mitigation Action Plan**.

Concord's Hazard Vulnerability Changes Since the 2017 Plan

The locations of where people and buildings are concentrated now or where new lands may be developed have been considered as compared to the changing locations of potential natural hazards in order to best mitigate potential property damage, personal injury or loss of life. These factors assist the community with determining whether Concord's vulnerability to natural hazard events has changed in any way since the **2017 Plan**. Facilities and their locations with vulnerabilities to specific natural hazards are listed in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**.

There have been population and housing increases over the last **5** years from **2 COMMUNITY PROFILE**, but aging citizens and individuals with limited access and functional needs require more services and assistance. Traffic continues to increase within the City because of the US 3, US 202, NH 9 and NH 132 commuter routes through Concord. The need for volunteers increases annually as fewer younger people are joining City Boards and Committees and finding new people volunteer to serve is difficult. Existing volunteers typically continue their services for many years. Membership in the Capital Area Fire Mutual Aid Compact (CAFMAC) Dispatch has enabled faster emergency response for Fire Department and emergency medical needs. The City has access to the Central NH Hazardous Materials Response Team and the Central NH Special Operation Unit for special incidents, which creates more training opportunities available. Membership in the Capital Area Public Health Network enables organized public health assistance while membership in the NH General Services Mutual Aid program enables shared General Services-Highway labor and vehicles from across the State during times of need.

THE CITY'S STATEMENTS OF VULNERABILITY CHANGE

2024

Natural Disasters Vulnerability The City's overall vulnerability to natural disasters **is believed to have STAYED THE SAME over the last 5 years**. Factors considered include steady population growth and aging population, the continuing climate and weather events. These factors are offset by less road flooding, less debris and faster damage repair, regular infrastructure improvements and upgrades, more housing and business development, and good preparation and mitigation to date. The weather conditions and climate are changing, but the impacts Concord have not been significant between **2017-2022**.

Changing Climate

The City is experiencing increasing temperatures, more rain, less snow, and storms are bigger. The frequency of torrential downpours has increased which impacts the **Merrimack River, Soucook River, Contoocook River**, and the **Turkey River**, brooks, and waterways, often washout or erode portions of gravel roads, ditches, and drainage systems. Yet floods have not recently reached the **100-year** storm event level. The rain

that is unable to run off in the cold months or during the torrential downpours washes out some of the **217** miles of Town and urban maintained roads, mostly ditches. Increased traffic accidents result from the weather and road conditions.

More rain is falling more quickly in downpours, and although the roads are mostly good now, washout issues remains the same. Tree debris remains the same because of Eversource and Unitil trimming activity. The City upgraded culverts underneath roads and is enrolled in an MS4 stormwater regulation program yet has been experiencing more **drought** conditions as opposed to **flooding** over the last five years.

As a community with large, forested areas, a significant future concern to Concord is the large die-off of trees and street trees which cool the sidewalks, serve as carbon storage, maintain a healthy local hydrologic cycle (tree transpiration), and guard against erosion on the hills to the roads. Many forests are conservation lands with public recreational trails and lack of trees may result in a lower economy for Concord. Hazardous trees or tree limbs fall onto utility lines and roadways during windy or winter conditions.

The unpredictable weather since the last Plan has brought some significant or damaging weather events to aging infrastructure (roads, bridges, stormwater, water, sewer, parks, sidewalks, trees, and City services). Infrastructure upkeep is expensive to maintain. The City is **investing in significant stormwater** infrastructure upgrades throughout the City between **2023-2032**. This should help to serve existing and future population and housing growth under the Capital Improvements Program (CIP).

City Demographics and Housing Changes

The City understands the changing population characteristics in Concord. The more affordable housing in manufactured housing parks, older multi-unit housing, condominiums, and apartment buildings attracts people with fewer discretionary resources because of their lower pricing and nearby services. There is a low inventory of single family homes for sale in the City and very few rental units available. The younger generation leaves the local school system for college and greater employment opportunities in other States. Adult children sometimes return to the City after completing their college degrees, at least until they find permanent jobs. This in-migration of young college-educated professionals (Millennial Generation) are moving back to Concord to live with parents because of extremely high housing costs.

There is a higher demand for Accessory Dwelling Units (ADU) on single family homes, where adult children (Generation X) share living space with their parents (Baby Boomer Generation), usually with the parents in the ADU. Additional housing developments containing smaller, multi-family units have been approved and constructed (or should be approved in the future) to fulfill certain housing needs, such as people over 55 years in age or for workforce (affordable) housing. These housing units are in high demand,

are listed at market rate, and both the elderly/retired and young families compete for this housing.

Residents are aging and the need for community services increases, although trends have been noted that people who have lived in Concord for decades may wish to move to assisted or independent living services. There is little housing availability to downsize to the 55+ housing units or to single-level, ranch style homes. The City offers emergency Fire services, emergency medical services, and Police services seven days per week with 24 hours per day availability. Concord continues to have a strong volunteer ethic for City Committees and Boards and organizations.

The area of highest density in Concord is Downtown and Main Street area. However, Concord contains several neighborhoods of dense development around the City, including NH 9 Loudon Road/Concord Heights, and US 3 (Fisherville Road)/Penacook. The entire City is surrounded by wooded areas and forests and a large percentage of the City's 64 square miles is permanently protected open space. The wildfire threat is present as is debris impacted infrastructure from severe wind events and winter weather events. Several major rivers are close enough to pose a flooding threat to populated areas, although floodwater runoff from rapid snowpack melt, debris impacted infrastructure (culverts) or severe storms can occur in locations outside of the floodplain. The populated areas experience wind events and snow and ice events which sometimes result in electricity failure, downed tree limbs, and debris impacted infrastructure (roads). Lightning may pose a threat to the churches and other tall buildings especially in the Downtown due to their height.

These areas of high density in the City host large, underserved communities. Nearly 50 apartment complexes and multi-unit housing complexes are located in Concord, in addition to about 10 manufactured housing parks and multiple senior housing complexes. Of major concern are those areas of the City that contain a high number of vulnerable people - those who do not speak English well, or are aged 55+, or are disabled, or those people supported by medical assistance. There is a need for additional services for these vulnerable people during a severe weather event or natural disaster. Some of the most concentrated areas should be examined to determine their relation to natural hazards. See [Map 4 Series Potential Hazards and Losses](#) for more information.

Economic Changes

Years when the economy is good, housing growth will occur as may new business development. In the City are dozens of active commercial and industrial businesses, along with an unknown number of home-based businesses. A diverse tax base enhances funding for long-term mitigation planning projects. Rural paved roads and conservation

land trails are used for bicycling and walking and to enhance the sense of community and public health. Bike races and running 5K races are often held during the warm weather weeks to support humanitarian causes.

Concord residents can commute **20** minutes to work in Manchester. Today, the option to telecommute is growing stronger. There are many local employment opportunities available in Concord, although many workers commute using I-93 and I-89 to access Lebanon, Manchester, Plymouth, and greater Boston metro area locations.

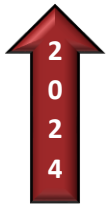
Infrastructure Changes

With a growing older population, the City of Concord may be challenged to raise taxes for mitigation projects. City taxes are high, and higher increase might price out the elderly and disabled who have fixed incomes. **The ability of the infrastructure to meet the City's remains difficult.** For instance, limited outside funding is available to upgrade the City's roads (**217** miles). Mitigation Actions were developed for many aspects of City infrastructure, and over the last **5** years, there has been a push to set these projects (especially stormwater grades) within the City's CIP and to integrate with existing projects.

The City has an active paving program to ensure City roads are patched, paved or rehabilitated after winter weather causes potholes and frost heaves. Bridges might be the most difficult and expensive infrastructure to meet current safety standards. Concord has **5** City red listed bridges, but the high upkeep and rehabilitation costs are difficult to fund even with 75/25 federal funding or 80/20 State funding for high priority bridges.

Overall Natural Hazards Vulnerability

Despite these risks, **Concord is also better protected from natural hazards now than in the past.** These protections arise from select infrastructure and service improvements to past vulnerable areas which were identified and mitigated where feasible by the General, Emergency Management, Police Department, Fire Department, and City Administration. The City is assisted by the State of New Hampshire and holds memberships agreements with organizations and neighboring towns for mutual aid. Balancing the changing climate and potential for hazard events, **Concord's overall natural hazards vulnerability has STAYED THE SAME over the last 5 years.**



Human and Technological Disasters Vulnerability The City's overall vulnerability to human and technological incidents **is believed to have INCREASED over the last 5 years** with the potential for significant technological escalation in the future. Although the City **is better protected than in the past** through partnerships and best practices, updated SOPs, regular Information Technology (IT) improvements to combat human hazards, dedicated Information Services staff, and tightened informational technology services and updates protecting data, the City has an ongoing struggle to contain the many facets of human and technological hazards. The City must stay in a reactive position to these events instead of a proactive position due to costs, staffing, and its "wait and see" approach: as technology improves, Concord will wait to see how it operates before making the purchase or effort.

Human Hazards Vulnerability

Political partisanship has divided Concord residents between 2017-2022, much more than previous periods. Many divisive political protests have been held at the Statehouse and at organizations and businesses. Loss tolerance is being exhibited. These events require additional response from City Departments to ensure civil disturbance does not occur on a wide scale, and arrests do occur at these protests.

Human hazards are unpredictable to a large degree, but preparedness can enable faster, more appropriate emergency response. The Concord School District, Merrimack Valley School District, and private schools conduct active threat drills (2x per year), fire drills (10x year), and bus evacuation drills periodically during normal operation years. The District likely reviews its Emergency Operations Plan and procedures annually. The City emergency response (Emergency Management, Fire, Police, Emergency medical services) often participates in municipal drills and the School drills. All emergency response personnel regularly participates in the newest training related to human hazards, at least during non-pandemic years.

The Fire Department call volume and Police Department call volume have increased since **2017**. More human hazards have been experienced in the City, but none that are especially alarming. At the Concord local and private Schools, the increased use of social media is believed to increase the volatile situations and bullying handled by emergency response personnel responding to an increase in mental health crisis calls by younger residents. Homelessness has increased, based on the calls to remove larger encampments from private property.

Stress levels in the community have increased as noticed by Departments and the School District. The COVID-19 pandemic has helped to polarize residents by decisions

mandated for health and safety. Mental health and substance abuse issues need to be addressed. Higher stress can result in serious human hazard events such as active threat, kidnapping, hostage situations, civil disturbance, or public harm.

Technological Hazards Vulnerability

The City has a shortage of cybersecurity personnel, a situation most New Hampshire communities face. One well-placed cyberattack can shut down core City or School District operations. The City's core record and financial business software operates "in the cloud" with multiple redundant backups available as a safeguard. Most Department files are saved to a local server and backed up to the cloud. The City has an Information Technology Department that maintains the data, hardware, and software in Concord and provides tech assistance to City staff. Concord's website is hosted by CivicPlus and offers a suite of options including the traditional webpages.

The City system has counter measures against most cyberattack because the technology is automated under highly secure software and hardware. One area lacking is the historical cemetery records at Blossom Hill Cemetery and the City is aware of this vulnerability and has added several projects to the CIP to correct the issue. Concord School District schools' staff and students have intercommunication websites and software, as does Merrimack Valleys.

While the City and School cybersecurity has increased, like anti-phishing and malware installation, new technological hazards will continue to be developed and utilized and may be directed toward Concord, which is not anticipated to be able to keep pace with advanced, changing technological risk. Valid concerns include City database and website hacking although Departments have redundant back-up systems to the cloud by using outside software providers. While use of technology increases efficiency, the increased reliance on cell phones, electronics, electricity and technology also makes Concord's population and Schools more vulnerable to the effects of cyberattacks. Of concern would be the water and wastewater treatment facility programs, although they also have redundant systems.

Overall Human and Technological Hazards Vulnerability

The City itself is **better protected** from human hazards by partnerships among City Departments, Concord School District, mutual aid agreements, and emergency response and membership with the Capital Area Mutual Aid Fire Compact (CAMACF), but protests and civil disturbance can easily occur. The City and School District operations can be halted through cyberattack. With the human and technological factors considered, **the City's vulnerability to these hazards has INCREASED** and is anticipated to continue increasing to **2029** and perhaps indefinitely.

FUTURE DEVELOPMENT IN CONCORD

Many homes and multi-family housing units were newly constructed since the **2017 Plan**. Concord is accessible via I-89, I-93, US 202, US 3, NH 9, NH 13, & NH 132 as well as many local or connector roads. Residents are aging and employed adults either work from home or commute within Concord, or to Keene, Hooksett, Manchester, or Lebanon or points within or beyond. Since much of the easily developable land in the City has already been built or subdivided, future developments may occur on lots built on backlands, near **wetlands** or **steep slopes**, or in-fill development. **Floods, landslides, erosion**, and **fires** could occur in these potential residential areas. **Severe winter weather, storms** and **wind events** on these hilly locations will bring trees down on roadways, interrupt **power and communication** services and will **flood** ditches and **wash out** roads.

Several large businesses are located in Concord and many new subdivisions are anticipated, such as the former Employment Security six-story building into apartments on Main Street, the Exit 17 Hoit Road and Storrs Street commercial developments, the 192 apartments on Langdon Avenue, the Rail Yards housing and commercial development, 123 two-bedroom apartments near Pembroke Road and Sheep Davis Road, 54 apartments in Penacook on the former tannery site, 42 units of affordable housing on Village Street in Penacook. The Planning Board has heard proposals for 16 single family homes on Abbott Road and 20 homes on Shaker Road. The large Garvins Falls section of land off Exit 13 is planning for 266 residential units and convenience stores on one of its vacant lots.

Infill development between existing built areas could guide residential and light commercial development as mixed-use in the community. Many conservation easements protect some of Concord's land from development. **Large-scale commercial** and **mid- to large scale residential developments** are expected to occur in Concord in the future. Some multi-unit housing infill development may be seen on US 3 and NH 3A.

The risk of **Merrimack, Soucook, Contoocook, or Turkey River flooding** is always present. Most of Concord's development is on a higher elevation than the **Merrimack River** or is buffered by open lands. The most remote City paved locations are not protected against severe impacts of **wildfire** and **lightning**, and all wildland urban interface housing could be vulnerable to **wildfire, severe winter weather, storms**, and **flooding of local roads**. There remains the potential for subdivisions in the future when the lots change hands to younger generations ("legacy parcels") if the largest parcels are not placed under conservation. Large vacant lots (50 acres+) are rare. Conservation land is highly preferable by the City.

When developments come before the Planning Board, potential hazards including **flooding, fire, traffic accidents**, and **evacuation** are regularly considered. A Technical Review Committee and the developers try to solve the problems before a project is brought to the Planning Board to be approved. The existing roads and bridges experiencing **erosion** and **flooding** will need to be upgraded for additional usage. The City will continue to grow and change, and attention should be focused on the hazards any new development could face during the consideration process. Techniques to mitigate identified hazards could be undertaken before the facilities are sited and constructed.

The main natural hazards for this community remain **wildfire, flood, severe wind events, severe winter weather, debris impacted infrastructure** (trees down on powerlines and trees/powerlines down on roads), **aging infrastructure** and **utility failures**. The City will need to ensure City services are not eclipsed by the needs of new development. Any future development in the City could be vulnerable to the various natural hazards identified previously. A few agricultural operations are present. New (or replacement) buildings and infrastructure and potential future development appear in **APPENDIX A Critical and Community Facility Vulnerability Assessment**.

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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 **Concord Hazard Mitigation Plan 2017**.

The identification of Critical and Community Facilities within Concord 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 Concord 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 2022 assessing database 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 Concord from flooding and other natural hazards are provided using the methods described in the chapter. The City's participation in the National Flood Insurance Program (NFIP) offers a way for individuals to obtain insurance coverage for flooding. The City'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 City 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 personnel in the Concord City Department facilities, the City Offices, Fire and Rescue Stations, Green Street Police Department, General Services, Libraries, Recreational Facilities, and the Transfer Station provide the services necessary for coordinating everyday activities of property owners and for emergency response. Other critical partners such as the School Districts provide essential services. Maintained roads, dams, and bridges are required for safe operation during both normal times and hazard events. Utilities or utility features such as cisterns, culverts, dry hydrants, telecommunications towers, phone and internet switching stations, gas lines, water & sewer lines, and electric transmission lines are included because of the essential communication and utility services provided, and their significant impact on Concord residents when they fail. Other **Critical Facilities** would include educational facilities and medical facilities.

Many critical facilities are located in Concord. 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. However, the assessed structure valuation does not reflect actual structure replacement (rebuilding) which would likely far exceed the valuations in many cases. 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 City Facilities include:

Blossom Hill Office and Maintenance Building (Needed for burial operations), Broadway Fire Station, Central Fire Station, City Hall, Concord Public Library, Fire Department Headquarters, Fire Training Grounds, General Services Department, Heights Fire Station, Manor Fire Station, Police Headquarters, White Park Maintenance Building (Equipment maintained for parks and cemetery divisions).

Assessed structure (only) valuation for these essential City facilities totals \$26.7m.

Essential Government Facilities include:

Meldrim Thompson Office Park East, Merrimack County Court House/Offices, NH Department of Health and Human Services, NH Department of Transportation, NH Homeland Security and Emergency Management, NH Legislative Office Building, NH Military Reservation, NH State Fire Training Facility, NH State House, NH State Office Park South, NH State Police Headquarters, NH State Prison, NH Supreme Court, Shea Farm, US Federal Building, Vital Records & Health Stats.

Assessed structure (only) valuation for these essential governmental facilities totals \$296.2m.

Transportation Facilities include:

Concord Airport, Concord Airport / NHSP Aviation, Concord Area Transit, Concord Coach Lines (Bus), Concord Coach Lines Maintenance Facility, Concord Hospital Heliport, Concord School Bus Transportation Dept., Merrimack Valley School District, NH Civil Air Patrol, NH National Guard Heliport.

Assessed valuation for most of these transportation facilities totals \$4.5m.

Utilities include:

BB&M NE Southern Railroad, City Sewer Mains, City Water Mains, Comcast (Cable) Communications Equipment, Consolidated Communications, Consolidated Communications Central Switching Station, Fairpoint Warehouse, Powerline Corridors, PSNH Substation 1, St. Paul's Central Heating, Tennessee Gas Pipeline, Until- Concord Electric Office, Until Substations 14-LA, 15-WP, 16-TB, 1-BR, 21-ST, 22-IW, 23-MO, 24-HA, 2-WC, 3-GU, 4-PE, 6-PL, & 8-HO, Wastewater Pump Station (Merrimack River), Wastewater Pumping Station (Penacook), Wastewater Treatment Plant (Concord), Wastewater Treatment Plant (Penacook), Water Storage Tanks Heights, Penacook, Snow Pond, & West Concord, Water Storage Tank and Pump Station, Watter Supplies Audubon Society of NH, Bancraft Products, Inc., Camp Spaulding, Contoocook River Recharge, Jimmie's Seafood Restaurant, Kids Kampus, Makris Lobster Pool, Penacook Lake, Shaker Road Child Care Center, Treatment Plant, Youth with a Mission (Wells #1 & #2), & Contoocook River, Water Treatment Plant, Water Well Fields, Wheelabrator Trash to Energy Incinerator. Most of these structures do not have assessed valuations.

Assessed structure (only) valuation for some of these utility structures totals \$44.3m.

Communication Facilities include:

2 Pillsbury Street LLC Antenna/Tower, Associate Enterprises inc Antenna/Tower, AT&T Wireless Services/Cingular Wireless/Telecorp Realty LLC Antenna/Tower, AT&T Wireless Services/Cingular Wireless/Telecorp Realty LLC Antenna/Tower, Capital Area Mutual Aid Fire Compact (CAMAFC), Capital Broadcasting INC DBA WKXL AM Broadcasting Tower , Capital Broadcasting INC/ DBA WKXL AM Broadcasting Tower, Capital Broadcasting INC/ DBA WKXL AM Broadcasting Tower, Capital Center for the Arts/Nextel Communications Tower/Antenna, Cellco Partnership (dba Verizon Wireless) Antenna/Tower, Cellco Partnership (dba Verizon Wireless) Antenna/Tower, Cingular Wireless Antenna/Tower, Cingular Wireless Tower/Antenna, Cingular Wireless/ Tower Resource Management, Inc. Antenna/ Monopole, Cingular Wireless/ Tower Resource Management, Inc. Antenna/ Monopole, City of Concord Tower, City of Concord Tower/Antenna (located in the Town of Pembroke, NH), City of Concord, NH COMF Antenna/Tower, City of Concord NH Fire Headquarters/ Sprint/Nextel Antenna/Tower, City of Concord/ NH Water Department Antenna/Pole, Concord Hospital Broadcast Tower/ Antenna Structure, Concord VDR Tower (Aircraft), ConcordTV (Television), Consolidated Communications of Northern New England (13 sites), Crown Atlantic Company, LLC Crown Communications/ Dapergolas, John Tower/Antenna, Fire Station (City of Concord, NH) Antenna/Tower, Fire Station (City of Concord, NH) Roof Mounted Antenna/Tower, Fire Station Tower / Antennas, Hodges Development Corp Antenna/Tower, Hodges Properties Inc Antenna/Tower, Independent Wireless One, Independent Wireless One/West Tower Communication/US Cellular Antenna & Equipment, M & P Partners LP/Reit Mngmnt/Omipoint Tower/

Antenna, Miskoe, William & Sylvia/Granite State Public Radio Tower, Miskoe, William & Sylvia/US Cellular Antenna, Nextel Antenna, Nextel Communications/Green Mountain Communications tower/ antenna, NH Dept. of Resources & Economic Development (State of NH) Antenna/Tower, NH Public Radio Inc Broadcast Tower, NH Public Radio Inc Broadcast Tower, NH RSA 2 partnership Pole/Antenna, NH State Police (State of NH) Antenna Structure, NH State Police (State of NH) Building Mast, NH State Police (State of NH) Roof Top Building Mast, NH State Police/ Fish & Game (State of NH) Antenna, NH State Police/ NH State Hospital OEM Roof Top Antenna , NHPR (Radio), PFP Associates LTD Partnership Antenna/Tower, Pillsbury LLC/Tower Resource Management II Antenna, Police Headquarters Antenna/Tower (City of Concord, NH)/Former use of Police- Currently Inactive , Police Radio Site (City of Concord, NH) Antenna/Tower, Public Safety-Central Fire Station (City of Concord) Antenna/Tower, Sprint Spectrum Antenna/Tower, Sprint Spectrum LP (4 sites), Sprint Spectrum LP Cell Antenna/Tower (3 sites), Sprint Spectrum/ Bechtel Telecommunications Tower/ Antenna, St. Paul's School Cell Tower Array, Star Granite Co. Tower/ Antenna, Telecorp Realty, Telecorp Realty LLC Antenna & Radio Equipment, Telecorp Realty LLC Antenna & Radio Equipment, Telecorp Realty LLC/Cingular Wireless/Omnipoint Communications/Purchase Realty Trust Antenna, Tower Amy J, Tower Resources for Cingular Wireless, US Cellular Monopine Tower, US Cellular Tower/Antenna, US Cellular/ Holland & Knight LLP Antenna, US Cellular/KJK Wireless Equipment/Monopole, US Cellular/KJK Wireless Tower, Verizon NE Inc Transformer, Verizon New England, Inc., Verizon, Northern New England Tel Ops/ Chamberlin Construction Antenna/Tower, Verizon Wireless Antenna, Verizon Wireless/ Todd White Flag Pole/Equipment, Verizon Wireless/Eastern Communications Tower, Verizon Wireless/Ocean builders Tower/ Antenna, Voicestream Wireless, WEVO Radio/Roland Paquette Equipment, Wireless Communication Companies Tower/ Antenna, Wirelessco LP Tower/ Antenna, Wirelessco LP Tower/ Antenna, WKXL (Radio), WNHI – 93.3 FM (Radio), WSPS (Radio), WVNH – 91.1 FM (Radio). Communications equipment is not assessed by the City. **Assessed structure (only) valuation for these essential facilities totals N/A because the values are not available.**

Dams include:

2 High Hazard (H) Dams: 051.013 Penacook Lake Dam (City of Concord), 051.025 Turkey Pond Dam (St. Pauls School) **2 Significant Hazard (S) Dam:** 051.002 York Dam Contoocook River (NHDES), 051.006 Penacook Upper Falls Dam (Briar Hydro Assoc.); **6 Low Hazard (L) Dam-** 051.012 Lower St. Pauls School Pond Dam (St. Pauls School), 051.021 Turtle Pond Dam (City of Concord), 051.028 Hoit Road Marsh Dam (NHF&G), 051.043 Rolfe Canal Gate Structure (NHDES), 051.046 Rolfe Canal Penstock Intake Dam (Briar Hydro Assoc.), 051.062 Sheep Davis Rd. Dam (City of Concord); and **Non-Menace Dams:** D051.004 Briar Pipe Dam (Briar Pipe Assoc), D051.011 Cider Mill Dam (Smith), D051.016 Snow Pond Dam (City of Concord), D051.017 Fisk Hill Pond (St Pauls School), D051.018 Thayers Pond Dam (Everett), D051.019 Quarry Dam (Swenson Granite Co Inc), D051.023 Farm Pond (Farnum Hill Orchard), D051.026 Farm Pond (Dutton), D051.027 Recreation Pond (Davis), D051.030 Farm Pond Dam (Meinecke), D051.033 Fort Eddy Pond Dam (NH DOT), D051.034 Reflecting Pond (Chubb Lifeamerica), D051.036 Farm Pond (Unknown), D051.037 Farm Pond Dam (Ekstrom), D051.040 Copoco Recreation Pond Dam (Copoco Swim Club Inc),

D051.041 Woods Brook Dam (City of Concord), D051.053 Lewis Farm Pond (Meinecke), D051.056 Beaver Meadow Golf Course Pond (City of Concord), D051.057 Beaver Meadow Brook (City of Concord), D051.063 Integra Drive Det Pond (Gold Eagle Contracting), D051.064 Hitchcock Clinic Det Pond (Dartmouth Hitchcock-Concord). No assessed valuations are available.

Estimated structure (only) repair values for these dams total \$10.5m.

Bridges include:

23 CITY BRIDGES: 040/090 US 3, Village St. over Contoocook River, 045/085 Washington St. over Mill Outlet, 048/082 Washington St. over Canal Inlet, 053/071 Island Rd over Canal Inlet, 053/139 Hoit Road over Hayward Brook, 069/052 Horse Hill Rd. over Contoocook River, 070/117 Sewalls Falls Rd. over Merrimack River, 130/019 Currier Rd. over Ash Brook, 135/025 Shenandoah Dr. over Ash Brook, 140/113 Commercial St. over Wattanummon Brook, 142/113 Delta Dr. over Pedestrian Walkway, 160/103 NH 9 (Loudon Rd.) over Storrs St., PAR, 163/111 NH 9 WWII Veterans Memorial Bridge (Loudon Rd) over Merrimack River, 173/071 Langley Parkway Pedestrian Walkway, 180/100 US 3, Water St. over PAR, 183/156 North Pembroke Rd. over Soucook River, 185/104 US 3 (Manchester St) over Merrimack River, 190/067 Iron Works Rd over Turkey River (Redlisted), 193/027 Birchdale Rd over Bela Brook, 200/015 Hooksett Turnpike over Bela Brook, 135/025 Shenandoah Dr over Ashbrook, 137/124 Portsmouth St. Over Millbrook, 173/071 Langley Parkway Pedestrian, New City Bridge on Alder Creek Drive.

51 STATE BRIDGES: 041/121 US 4 over NHRR, 041/123 US 4 WB (Hoit Rd) over I-93, US 4 WB, 042/121 I-93 SB, US 4 Ramp over NHRR, 059/127 NH 132 over Hayward Brook, 062/123 I-93, US 4 NB over Hayward Brook, 066/121 I-93, US 4 SB over Hayward Brook, 068/121 I-93, US 4 SB over Sewalls Falls Rd, 068/122 I-93, US 4 NB over Sewalls Falls Rd, 125/118 West Portsmouth St. over I-93, US 4, 136/116 I-93, US 4 SB over Merrimack River, 136/117 I-93, US 4 NB over Merrimack River, 139/116 I-93, US 4 over Wattanummon Brook, 142/116 Delta Dr. over I-93, US 4 (Redlisted), 147/028 US 202, NH 9 over Ash Brook (Redlisted), 150/107 US 202 over NHRR, Constitution Ave (Redlisted), 152/104 US 202 over PAR, 152/107 I-93 SB On-Ramp over NHRR, Constitution Av, 152/108 I-393, US 4, US 202 over I-93 (Redlisted), 152/115 I-393, US 4, US 202 over Pedestrian Underpass, 153/149 I-393, US 4, US 202W Portsmouth St, 154/121 I-393, US 4, US 202 over Fort Eddy Rd, 154/123 I-393, US 4, US 202 over Merrimack River, 154/150 I-393, US 4, US 202 E over Portsmouth St, 156/138 NH 132 (Eastside Dr) over I-393, US 4, US 202, 160/188 NH over Soucook River, 161/184 I-393m US 4, US 202W over Soucook River, 162/184 I-393, US 4, US 202E over Soucook River, 163/024 I-89 SB over Stickney Hill Rd, 163/106 I-93, FEE TPK over NH 9 (Loudon Rd), 164/024 I-89 over Stickney Hill Rd, 164/167 NH 106 over I-393, US 4, US 202, 165/029 I-89 EB over Turkey Pond, 165/177 NH 9 over I-393, US 4, US 202, 166/029 I-89 NB over Turkey Pond, 167/029 Recreation Trail over Turkey Pond, 167/042 I-89 over Recreation Trail, 175/051 I-89 SB over Silk Farm Rd, 176/051 I-89 NB Silk Farm Rd, 180/063 NH 13 over Turkey River, 181/055 I-89 SB over NH 13, 182/055 I-89 NB over NH 13, 184/103 I-93, FEE TPK over US 3, Manchester St, 187/036 NH 13 over Turee Brook, 188/029 NH 13 over Bela Brook, 198/146 NH 106 over Soucook River, 201/096 FEE TPK, I-93 SB over Hall St, 201/097 FEE TPK, I-93 NB over Hall St, 203/088 NH 3A over I-93, FEE TPK, 203/89 I-93, FEE TPK SB over BMRR, 203/090 I-93, FEE TPK SB over BMRR, 215/124 US 3 over Soucook River.

1 PRIVATE BRIDGE: 163/056 Dunbarton Rd. Over Turkey River (St Pauls).

Estimated structure (only) rehabilitation values for these bridges total \$224.1m.

Medical Facilities include:

Concentra Medical Center, Concord Family Medicine, Concord Family Vision Center, Concord Hospital, Concord Hospital at Horseshoe Pond, Concord Metro Treatment Center, Concord OB-GYN, Concord Orthopedics, Concord Otolaryngology, Convenient MD, Crossroads Family Medicine, Dartmouth-Hitchcock Clinic, Equality Health Center, Eye Center of Concord, Family Tree Health Care, Granite State Pain Associates, HealthSouth Rehabilitation Hospital, Memorial Medical Office Building, New Hampshire Hospital, Penacook Family Physicians, Pillsbury Medical Office, Pleasant Street Family Medicine, St. Pauls Infirmary.

Assessed structure (only) valuation for these medical facilities total \$213.2m.

Schools include:

Abbott Downing School, Beaver Meadow School, Bishop Brady High School, Broken Ground School, Capital Christian School, Christa McAuliffe School, Compass Academy, Concord Christian Academy, Concord High School, Granite State College, Merrimack Valley High School, Merrimack Valley Learning Center, Merrimack Valley Middle School, Mill Brook School, New Hampshire Technical Institute, NH Fire Academy, NH Police Academy, Parker Academy, Parker Academy, Penacook Elementary, Rundlett Middle School, Second Start, Shaker Road Private School (K-8), St. John Regional School, St. Paul's School, Trinity Baptist Church Private School K-12, University of New Hampshire Law Center, White Farm, Wood Side School @ St. Pauls, Woodside School.

Assessed structure (only) valuation for these schools total \$230.3m.

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. Informational (INFO:) statements are included from HMC discussion. See **APPENDIX A CRITICAL AND COMMUNITY FACILITIES VULNERABLE ASSESSMENT** for the referenced Tables:

Essential Facilities Table

- Old buildings such as the Fire Stations, City Library, Fire Dept Headquarters, City Hall, 3d floor of the Police Department, may be not be up to current seismic and wind load building code requirements.

- ⦿ The City Hall Annex is not sprinklered so may be vulnerable to fire. The City has just completed retrofitting sprinkler systems at the Broadway, Heights and Manor Fire Stations. Central Station is not yet sprinklered.
- ⦿ INFO: About two dozen City Facility Building Conditions Assessments were developed 2020-2022 to identify vulnerabilities.
- ⦿ INFO: Rundlett Middle School structural assessment in RFS Engineering April 2021, to include emergency generator.

Essential Government Facilities Table

- ⦿ Older State buildings may not be up to current seismic, fire suppression and wind building codes. The State is aware of their buildings and costs. City has no ability to require enhancements.
- ⦿ INFO: State Legislature may have passed 2018 building codes which would apply to future construction but does not apply to existing buildings unless renovating or expanding. Legislative Office Building garage may have falling debris. Has 3 years before it needs to be repaired. NH Lawmakers deliberated on the \$35 million and passed bill to remove garage.

Transportation Facilities Table

- ⦿ Concord Airport has older hangar buildings that could be subject to failure by earthquake, all wind events, and winter weather snow load on the roof.
- ⦿ There is not an emergency backup generator at the Airport in the event of power failure. Nashua may be able to assume traffic control.
- ⦿ INFO: The Concord Municipal airport serves as a NWS/NOAA weather monitoring station and its facilities have been upgraded for protection from the elements since the time it was built.
- ⦿ INFO: Concord School Buses are parked between the Combined Operations & Maintenance Facility on North State Street. Shared with general services facility. (no issue with winter conditions)

Utilities Table

- ⦿ The City's water supply is susceptible to flooding and drought. Water is pumped from the Contoocook River into Penacook Lake (since 1981) to help maintain levels.
- ⦿ Although the facilities are modern (1980s), the Hall Street Wastewater Treatment Facility is constructed in the Merrimack River floodplain but has been elevated and is not in danger of flooding. Penacook WWTF is an older facility and is within the Merrimack River floodplain but has been elevated and is not in danger of flooding. (No Condition Assessments completed of these two facilities. 125 Hall St. was quite close to flooding during the Mother's Day floods in 2006. The plant itself is built on pilings well above the flood level, but our shop is at grade. Water never made it into the building but was close

enough that it was briefly inaccessible and vehicles were moved to the higher ground at the plant. The plant is covered by on-site back-up power.

- ⊙ The age of many of the City's storm drains dates to the 1880s and are made of brick and clay. Aging infrastructure at least 100 years old.
- ⊙ The Downtown and Penacook Village may be particularly vulnerable to storm drain flooding because of undersized pipes in these oldest areas of the City.
- ⊙ No Concord hospital area drainage improvements in the past five years since 2017.
- ⊙ Unutil presented at City Council / EMS meeting about a large upgrade & modernizing of poles.
- ⊙ Need for more cable broadband internet bandwidth and fiber optic infrastructure.
- ⊙ INFO: The Concord Steam power plant closed in 2021.
- ⊙ INFO: The City's Aquifer Ordinance includes an area overlay of the City wells; they are working with Pembroke respectfully to protect both community's aquifer interests.

Communication Facilities Table

- ⊙ Wind, lightning, ice are major problems on communications towers (Kearsarge Tower in Warner), impacts infrastructure in Concord and the communities it serves.
- ⊙ Mutual Aid communications building is subject to weather impacts (newest building in the complex is 1966), such as lightning, heavy snow loads and earthquake.
- ⊙ INFO: Concord Fire Department hosts Capital Area Mutual Aid Fire Compact (CAMAFC) for 21 communities and the towers are located throughout the Central NH region, including Plausawa Hill in Pembroke, Pat's Peak in Henniker and Oak Hill in Loudon. Concord's Fire Headquarters Tower at Administration campus is very important hardline to Simulcast. Partners: Tri-Town, Central NH Haz Mat Team, Lakes Region Redundancy Dispatch.

Dams Table

- ⊙ A Penacook Lake High Hazard dam feeds into Rattlesnake Brook spillway. During the 2006 floods, at 278 North Street, water jumped the spillway and channeled water through the Mill Place West apartment building. Flooding on this brook could significantly damage infrastructure and property and endanger lives below the breach. North State Street and its utilities under the road (water, sewer, gas) could be destroyed as well as neighborhood homes.

Bridges Table

- ⊙ Both City redlisted 163/111 NH 9 (Loudon Road) over Merrimack River bridges and 190/067 Iron Works Road over Turkey River bridge are scheduled in the CIP for replacement before the 2029 Plan.
- ⊙ State redlisted bridges 152/108 Bow-Concord I-393/US 4/US 202 over I-93 to be reconstructed in 2026, 154/121 Bow-Concord I-393/US 4/US 202 over Fort Eddy Road to

be reconstructed in 2026, 150/107 Bow-Concord US 202 NHRR constitution Ave to be reconstructed in 2026, 147/028 Concord US 202/NH 9 over Ash Brook to be reconstructed in 2029 (culverts), 165/029 Concord I-89 SB over Turkey Pond to be reconstructed in 2029, 166/029 Concord I-89 NB over Turkey Pond to be reconstructed in 2029, 142/166 Bow-Concord Delta Drive over I-93/US 6 to be reconstructed in 2026.

- ⦿ INFO: New bridges in Concord - Birchdale St, Hooksett Tpke, Washington St, Alder Creek, Portsmouth St were culverts replaced by bridges.

Medical Facilities Table

- ⦿ The access to Concord Hospital/DHMC is flood prone on Warren Street, Clinton Street, and Pleasant Street. The City lost access to Hospital during 2006 floods; people in need of services needed to drive the long way around to obtain help. Completing Langley Parkway would provide this necessary secondary access in case the Hospital streets were flooded.
- ⦿ Concord Hospital's Urgent Care facility on Commercial Street and the Convenient MD Urgent Care Facility on Loudon Road are both in the floodplain; the roads could be flooded when care is necessary. The new Concord Hospital Penacook Family Practice on Crescent Street, next to the Contoocook River (old tannery site), is adjacent to the floodplain.
- ⦿ Power failure from any natural hazard could limit services at medical facilities unless health care providers had emergency generators.
- ⦿ Supply chain issues from 2020-2022 and beyond remain a challenge for PPE, but also critical medical supplies, medications, groceries, gas, and other essential goods and services. Supply chain backlogs on critical equipment, like ambulances, generators, etc.
- ⦿ Medical facilities could face an active threat and require immediate assistance and evacuation or shelter in place. Medical facilities as an active target of threat could equate to no services available and damage to facilities.
- ⦿ Mass casualty victims and their families could overwhelm or strain resources and services. During a traumatic event, mental health services will be necessary. Already a shortage and lack of funding for mental health services.
- ⦿ INFO: Concord Hospital has three generators on campus leading to central power bank. Power is redistributed to wherever power is needed. Generators powered by diesel with underground storage tanks maintained by the Hospital. With this generator system, they can go about 7 days with power reserved.

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

CULVERT UPGRADES

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 City infrastructure in good condition. A table of culverts in need of upgrade does not appear on the [Critical and Community Facility Vulnerability Assessment \(APPENDIX A\)](#) nor with the [Aging Infrastructure](#) technological hazard or with the other critical facilities.

The City of Concord inventories the location and condition of hundreds of culverts in the rural area and many miles of stormwater systems. General Services maintains multiple City culverts daily (debris removal, clearing, repairs) and attempts to keep pace with necessary culvert upgrades. They use software systems to track their assets and conditions. For culverts requiring more work than annual operating budgets permit, these culverts are placed into [Concord’s 10-Year 2023-2032 Capital Improvements Program \(CIP\)](#) to ensure the project gets funding. The City has been unofficially divided into **13** subcatchment drainage areas and most of the old stormwater pipes are anticipated to be upgraded between **2023-2032**. The budget amounts are set aside to be allocated to whichever Subcatchment area is in greatest need of improvement each year. The projects in [Table 33](#) are not specifically designated as Actions within the [Mitigation Action Plan](#) but are incorporated into the City’s CIP.

Table 33

CIP #83 Storm Water Improvements to City Subcatchment Areas and Budgeted Funding

Other CIP#	Subcatchment Area of Drainage Facilities	Location	Projects Allocated	CIP Budgeted Year	Total \$ Budgeted in CIP
	Fisherville Road	Fisherville Road area, includes wide network of local streets (Bog Road to Beaver Meadow Brook watershed)	Horseshoe Pond	2023	\$150,000
	Heights	Concord Heights area, includes wide network of local streets (East Side Drive to Soucook River, Loudon Road-Merrimack Road)	No projects allocated	2024	\$0
	Hoit Road	Mountain Road, Sanborn Road, Hoit Road	No projects allocated yet	2025	\$500,000
571	I-93/Horseshoe Pond	Horseshoe Pond, Upper Auburn Street, Washington Street to Merrimack River, Commercial Street	No projects allocated yet	2026	\$1,000,000
	Concord Hospital	Concord Hospital, Bow Brook Watershed (Langley Parkway to Outfalls to Turkey River, Upper West Concord)	No projects allocated yet	2027	\$1,000,000

5 COMMUNITY VULNERABILITY ASSESSMENT AND LOSS ESTIMATION

Other CIP#	Subcatchment Area of Drainage Facilities	Location	Projects Allocated	CIP Budgeted Year	Total \$ Budgeted in CIP
	Oak Hill	Oak Hill, Oak Hill Road, East Concord Village, Loudon Town line	No projects allocated yet	2028	\$1,500,000
	Penacook	Penacook, Along Route 3, Boscawen Town line, Contoocook River, Merrimack River	No projects allocated yet	2029	\$1,500,000
	Downtown "Terrible Trapezoid"	Downtown, Washington Street, Auburn Street to Merrimack River, Perley Street, South Main Street, Manchester Street.	No projects allocated yet	2030	\$1,500,000
	Turkey River	Turkey River area, Clinton Street, St Paul's School, Iron Works Road, South Street	No projects allocated yet	2031	\$1,500,000
	Washington Street	Washington Street, between Horseshoe Pond and Terrible Trapezoid (Downtown), North of Center Street	No projects allocated yet	2032	\$1,500,000
	West Concord	West Concord, Penacook Street West, Carter Hill, West Parish, Hutchins Street	Budgeted Cost 2023-2032		\$13,150,000

Source: 2017 Hazard Mitigation Plan, CIP 2023-2033

A summary of the aged stormwater and sewer pipes from Engineering Division, as of June 2022:

- ⊙ Stormwater pipes- 1869< 1900 stormwater pipes 110,227 feet 653 segments. 1900-1922 stormwater pipes 21,704 feet; 155 segments. Total: 131,931 feet, 808 segments.
- ⊙ Sewer pipes- 1897-1899 sewer pipes: 28,188 feet; 153 segments. 1900-1922 sewer pipes: 10,822 feet; 70 segments. Total: 39,010 feet; 223 segments.

ROAD DETAILS

The City of Concord has about **287.34** total miles of roadway including **191.41** miles of City maintained roads (both paved and unpaved roads), **25.84** miles of Class IV Urban City maintained, and **0.92** miles unmaintained (Class VI) roads. General Services Department maintains **217.3** miles of City-owned roads. There are nearly **70** miles of State highways in Concord maintained by the NH Department of Transportation. The mileage of private roads was unavailable from this source. The City's road mileage, classification, and linear feet per capita are displayed in **Table 34**.

Table 34
City Road Length and Classification

Concord Roads Legislative Classification	Total Length in Miles	Percentage of Road Network	Linear Feet Per Capita (43,976)
Class I (State Primary Highway)	58.40	20.3%	7.0
Class II (State Secondary Highway)	10.78	3.8%	1.3
Class III (State Recreational)	0.0	0.0%	0
Class IV (Urban Maintained)	25.84	9.0%	3.1
City Paved (City Maintained)	191.41	66.6%	23.0
Rural paved (City Unmaintained)	0.92	0.3%	0.1
Private	0.0	0.0%	0
Totals	287.34	100.0%	----

Source: NHDOT Mileage by Town and Legislative Class, released 2021

The City of Concord is overall responsible for over **217.3** miles of City and Urban Maintained roads, nearly all of which are paved. On a per capita basis (Census **2020** population of **43,976**), there are **26.08** feet of City-maintained roadway per resident. This **26.08** linear feet per capita is broadly smaller than the surrounding communities' linear feet per capita.

Some of these City-owned roads run through the more rural areas and have significant elevation changes. Other local roads and private roads are dead-end roads or cul-de-sacs with only one way in and one way out. Concord residents mostly reside in distinct areas within the Downtown, Heights, Penacook, North End and South End, West Concord, East Concord, Concord Hospital Area and within neighborhoods, apartments or condominiums, subdivisions, and within cul-de-sacs, and along main City roads in single family homes with acreage. When street trees and powerlines fall onto roads, or during flooding conditions, sheltering in place would be optimal for self-sufficient homes and apartments for **72** hours.

Community Facilities

The **Community Facilities** inventoried in **APPENDIX A** are generally vulnerable to disasters and in need of careful consideration. Some facilities contain vulnerable populations, other community facilities are neighborhoods, roads with many homes or roads with only one access, places where people gather, the economic assets of the community, buildings or sites that contain the history of the city, or facilities which 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, and perhaps the first check, during a hazard event disaster.

Vulnerable Populations: Multi-Unit Housing include:

Alton Woods (384 apartments), Abbott Village (80 units), Beaver Meadow Village (46 apartments), Bienvenue (10 condos), Boucher Apartments (16 apartments), Briar Pipe Apartments (77 apartments), Brickstone Commons/Morningstar (172 apartments), Caleb Group (36 built, 30 more to be built next year) (Formerly Penacook Tannery), Canterbury Meadows Townhouse (60 apartments), Capitol Plaza/Crutchfield Apartments (105 apartments), CATCH Housing (42 multi family), Centerstone Residence (60 apartments), Cirillo Apartments (9 apartments), Cobblestone Pointe Senior Village (140 apartments), Concord Commons Condominiums (60 apartments), Concord Gardens/Royal Gardens (300 apartments), Concord Park North (36 apartments), Cranmore Ridge (200 apartments), Eagles Bluff (63 apartments), East Side Village/Eastern Ave Apartments (30 apartments), Edgewood Heights (120 apartments), Endicott Hotel Apartments (24 apartments), Family Village 1 (5 apartments), Family Village 2 (5 apartments), Farmhouse apartments (29 apartments), Fire House Block Apartments (68 apartments), Flatley (65 apartments), Florence V. Hodges Apartments (50 apartments), Franklin Square (60 apartments), Friedman Court I & II (86 apartments), GAA Plaza/Alosa Rentals (58 apartments), Havenwood (113 apartments), Heritage Heights (186 apartments), Hillside View Apartments (108 apartments), Hollis Commons Apartments (600 apartments), Horseshoe Pond Place (77 apartments), Island Shores Condominiums (265 apartments), Kennedy Apartments (82 apartments), Mast Yard West Condominiums (144 apartments), McKenna's Purchase Condominiums (148 apartments), Meadow Brook Apartments (120 apartments), Menino Place (45 apartments), Mill Place West (21 apartments), Mulberry Village Condos (60 apartments), Oak Bridge Condominiums (180 apartments), Oak Creek (72 apartments), Ormond Street Apartments (21 apartments), Parkview Place (76 apartments), Parmenter Place (25 apartments), Pembroke Place Apartments (113 apartments), Penacook Place (150 apartments), Perley Place (11 apartments), Pinewood Village Apartments (68 apartments), Pleasant View Retirement Home (72 apartments), Prescott Place Apartments (72 apartments), Prescott Street Apartments (18 apartments), Regency Hill Estates (95 apartments), Riverhill Condos (28 apartments), Salisbury Green Apartments (226 apartments), South Concord Meadows (180 apartments), The Pines Apartments (66 apartments), The Rail Yard – under construction (200 apartments), The Vineyards of Concord (120 apartments), Tuscany Village (20

Townhomes), Village at Thirty Pines (90 apartments), Vineyard Terrace (24 apartments), William Haller Apartments (50 apartments), Willow Crossing (24 apartments), Windsor Estates (18 apartments).

Assessed structure (only) valuation for these multi-unit housing facilities total \$489.0m.

Vulnerable Populations: Manufactured Housing Parks include:

Alosa's Mobile Homes (65 homes), Concord Terrace (139 homes), Crestwood Estates/Jensen's Inc. (320 homes), Fisherville Co-op (56 homes), Foxcroft Estates (117 homes), Green Acres Mobile Homes/Valley Stream Estates (119 homes), Green Meadows Manufactured Home Park (108 homes), Neighboring Pines (22 homes), Princess Mobile Homes (6 homes), Riverview Landing (86 homes).

Assessed structure (only) valuation for these manufactured housing park facilities total \$29.7m.

Vulnerable Populations: Congregate Care Facilities include:

Cobblestone Point, Granite Ledges of Concord, (70 bed/units), Granite State Independent Living, Harris Hill Nursing Home (80 beds/units), Havenwood-Heritage Heights (226 beds/units) ,Hospice Care at Concord Hospital (10 beds/units), John H. Whitaker Assisted Care (66 beds/units), Neuro International, Pleasant View Center (174 beds/units), Presidential Oaks (290 beds/units), The Birches at Concord (53 beds/units).

Assessed structure (only) valuation for these vulnerable congregate care facilities totals \$83.3m.

Vulnerable Populations: Child Care Facilities include:

After School Program – Abbott-Downing School (82 students + 13 staff), After School Program – Beaver Meadow School (38 students + 6 staff), After School Program – Broken Ground School (110 students + 12 staff), After School Program – Christa McAuliffe School/Concord Boys and Girls Club (70 students + 6 staff), After School Program – Concord High School, (98 students + 7 staff), After School Program – Mill Brook School, (40 students + 8 staff), After School Program – Penacook Elementary School/Penacook Community Center, (30 students + 3 staff), After School Program –Rundlett Middle School, (95 students + 7 staff), City Wide Community Center (100 Students + 13 staff), Concord Boys and Girls Club, (220 students + 30 staff), Concord Family YMCA Child Center, (126 students + 28 staff) , Concord Head Start, (114 students + 32 staff), Concord High School Child Care Center at Abbott-Downing School, (13 students + 3 staff), Discovery Village Early Learning Center (17 students + 4 staff) , Early Learning NH, East Side Learning Center, (250 students + 32 staff) , Eastman School, Emerson School for Preschoolers, (52 students + 4 staff), Inspiring Minds Childcare, Leap Pre-School, Little Learners Family Center, Merrimack Valley Day Care, (50 students + 5 staff), Merrimack Valley DC @ Eagles Bluff, (24 students + 4 staff), Merrimack Valley DC @ Jennings Dr., (18 students + 2 staff), Merrimack Valley DC @ NH Hospital, (20 students + 4 staff), NHTI Child & Family Development Center , (62 students + 20 staff), Penacook Community Center, (30 students + 3 staff) , Presidential Oaks Children's Center (25 students + 5 staff), Second Start, (110 students + 55 staff), Second Start, (20 students + 7 staff), Shaker Road Child Care Center, (54 students + 10 staff) , The Children's Place, (80 students + 5 staff), The Early Enrichment Center, (65 students + 14 staff), The Learning Center @ Concord Hospital, (120 students + 27 staff), The Tot Spot, (43 students + 7 staff) , Woodside @ St. Paul's School, (57 students + 17 staff), Woodside School, (126 students + 20 staff).

Assessed structure (only) valuation for these childcare facilities total \$164.8m.

Vulnerable Populations: Public Assistance Facilities include:

American Red Cross, Ascentria Care Alliance, Centerpoint Church Food Pantry, Christ the King Food Pantry, Colonial Arms Rooming House, (21 beds/units), Community Action Program, Concord Coalition to End Homelessness Resource Center (added shelter), Concord Housing Authority, Concord Human Services, DCYF (DHHS) , Families in Transition, (10 beds/units), Families in Transition, (6 beds/units), First Congregational Church Food Pantry, Friendly Soup Kitchen, Friends Emergency Housing, (30 beds/units), Friends of Forgotten Children, Immaculate Conception Church Food Pantry, Labbe Rooming House, McKenna House Shelter/Group Home, (42 beds/units), Oakstream Rooming House, Oakstream Rooming House – South Street, (14 beds/units), Oakstream Rooming House – Warren Street, (15 beds/units), Rape and Domestic Violence Shelter , (7 beds/units), Rollins Street Rooms, (9 beds/units), Salvation Army, St. John’s Church Food Pantry, St. Paul’s Church Food Pantry, State of NH Welfare (TANF) (APTD), Stearns Rooming House, (11 beds/units), United Church of Penacook (Food Pantry/Soup Kitchen), Waypoint, West Congregational Church (Food Pantry/Soup Kitchen), Whitfield House, (11 beds/units), Women, Infants, and Children (WIC).

Assessed structure (only) valuation for these public assistance facilities totals \$36.8m.

Economic Assets include those employing a large number of people or contributing to the local economy:

BUSINESSES: Airport Road Industrial Area, Banks Chevrolet-Cadillac-Oldsmobile Inc (250 employees), Beede Electric, Capitol Shopping Center Area, Concord Center (100 employees), Concord Hospital Complex Area, Concord Litho Group (122 employees), Concord Monitor (109 employees), D’Amante Drive Commercial Area, Exit 17 Industrial Area, Fort Eddy Road Commercial Area, Gateway Commercial Area, Granite State College (80 employees), Hall Street Industrial Area, Heights Industrial/ Commercial Area, Hood Plant (147 employees), Horseshoe Pond Development Area, Hoyt Electric (37 employees), Interchange Development – commercial, office, restaurant, grocery, King’s Plaza (formerly) Area, Lincoln Financial (400 employees), Locke Road/Exit 16 Industrial/Commercial Area, Loudon Road Commercial Area, Manchester Street Commercial Area, NH State Office Park East Area (~5100 employees), NH State Office Park South Area (~3425 employees), NH Technical Institute (184 employees), Opportunity Corridor (Downtown), Pitco, Sam’s Club (140 employees), St. Paul’s School (350 employees), Terrill Park Drive Area, The Concord Group Insurance Companies (210 employees), Thirty Pines Area, University of NH Law Center (70 employees), Wal-Mart (310 employees).

AGRICULTURAL OPERATIONS: Lewis Farm, Generation Farm, Rossview Farm, Maple Tree Farm, Apple Hill Farm, Carter Hill Orchard, Rockey Ole Farm, Morrill Farm Dairy, Local Harvest, Northeast Organic Farming Association of NH (NOFA-NH), Seeds of Hope, SHARA Vineyards. See also **Hazardous Materials** facilities.

Assessed structure (only) valuation for these economic asset facilities totals \$1.22b.

Hazardous Materials Facilities include:

7-Eleven, AASF/National Guard, Advanced Recycling, American Brake Service, Angelo's Concord Car Care, ASA Automotive Supply Assoc., AT&T Broadband, AT&T Wireless, AT&T Wireless, AT&T Wireless, Automotive Supply Associates (NAPA Auto Parts), B&G Sheet Metal, Beauregard Equipment, Beaver Meadow Golf Course, Beede Electric, Bow Finishing Co., Boyce Highlands, Bradford Networks, Brownfield Site, Capital Offset Co. Inc.- VACANT, Capitol Farms, Carter Hill Orchard, CED-Twin State Electric Supply, Chadwick-Baross Western Division, Cohen Steel Supply, Comcast of Concord, Comfort Inn, Concord Airport, Concord Coach Lines, Concord Country Club, Concord Hospital, Concord Hospital at Horseshoe Pond, Concord Irving Heating Oil, Concord Litho Group, Concord Monitor, Concord Paper & Chemicals, Concord Photo Engraving, Concord Water Treatment Facility, Crown Castle, 7-Eleven, Cumberland Farms, Cumberland Farms, Cumberland Farms, Cumberland Farms, Duncraft, East Concord Mobil, Eastern Analytical, Electropac, Energy North Propane, Evans Printing, Everett Arena, Exxon Station, Consolidated Communications (4 sites), Grand Central Printing, Guinard's Texaco, Hannaford, Encompass Health Rehab Hospital of Concord, F.W. Webb, Hess Gas Station, Hoyt Electrical, HP Hood LLC, Irving Oil, Johnny Prescott & Son Oil Co, Inc., Johnson & Dix Fuel Corp., LAD Welding and Fabrication, Loudon Rd. Sunoco, Lowes Of Concord, NH, Manchester St. Sunoco, Market Basket, Market Basket, Melexis, Merrill's, Merrimack Sheet Metal, Mobil Service Station, Liberty Utilities LNG Training Facility, NE Motor Freight, New England Positioning Systems, NH Bureau of Radiological Health, NH Dept of Transportation, NH Dept. of Environmental Services, NH Dept. of Public Health Labs, NH Fire Academy, New Hampshire Hospital, NH National Guard, NH State Police Forensic Lab, NH Technical Institute, NHTI Police Standards, Nitco Northeast Delta Dental, Pan Am Railway/ Maine Central Railway/ Boston & Maine Railway, Penacook Fiber and Tannery Building, Praxair Surface Technologies, Prompto 10-Minute Oil Change, PSNH Oak Hill Substation, Regional MFG Specialists INC, Riverhill Market, Sabbow & Co, Inc – NH Wilbert Vault, Sam's Club, Sanels Auto Parts, Schwan's Sales Enterprises Inc., Seacoast Scaffold & Equipment, Sears Auto Center, Shaw's Supermarket, Shaw's Supermarket, Shell Service Station, Shell Service Station, Snow Dump Site Airport Road, Snow Dump Site Loudon Road, South Main Mobil, Sprint Inc., St Paul's (Bulk #6 Heating Fuel Storage), St Paul's (Heating Plant), St. Paul's (Hockey Rink), St. Paul's (Science Lab), St. Paul's Anhydrous Ammonia Systems, Star Granite Co., State of NH DOT Sign Shops, Stowe-Woodward Co., Swenson Granite Co., Tennessee Gas Line Dump Station, Tennessee Gas Pipeline, The Home Depot, Thermal Technology, Thirty Pines Market, Transformer Services Inc (TSI), Unitil, W.D. Matthews Machinery Co., W.E. Aubuchon, Wheelabrator, White Farm, White Mountain Imaging, Woodpro, WWTP, WWTP #1, WWTP#2, WWTP#3, WWTP#4, WWTP#5. See also **Economic Assets**, **Essential City Facilities**, and **Essential Governmental Facilities** tables.

Assessed structure (only) valuation for these hazardous material facilities totals \$630.3m.

Churches include:

Abundant Life Ministries, Blazing Star Eureka Lodge, Centerpoint Church, Child Evangelism Fellowship, Church of Christ, Church of Jesus Christ of Latter Day Saints, Concord Bible Fellowship, Concordia Lutheran Church, Destiny Christian Church, Dormition of the Theotokos Orthodox, East Congregational Church,

Episcopal Diocesan House, Faith Tabernacle Church, First Church of Christ Scientist, Gospel Light of God, Grace Episcopal Church, Granite State Baptist Church, Holy Trinity Greek Orthodox Church, Immaculate Conception Church, Immaculate Heart of Mary, Immanuel Community Church, Jehovah's Witnesses Kingdom Hall, Living Hope Community Church, New Chapel (SPS), Old Chapel (SPS), Salvation Army, Seventh-Day Adventist Church, South Congregational Church, St. John's Church, St. Paul's Church, Temple Beth Jacob, Trinity Baptist Church, Unitarian Universal Church, United Baptist Church, United Church of Penacook, Wesley United Methodist Church & First Congregational Church, West Congregational Church, Word of Life Christian Fellowship.

Assessed structure (only) valuation estimates for church facilities totals \$74.4m.

Cemeteries include:

Beth Jacob Cemetery, Blossom Hill Cemetery, Calvary Cemetery, Catholic Portion of Woodlawn Cemetery, Hardy Cemetery, Horse Hill Cemetery, Maple Grove Cemetery, Millville Cemetery, NH Hospital "Meadow" Cemetery, Old Fort Cemetery, Old North Cemetery, Penacook Calvary, Pine Grove Cemetery, Soucook Cemetery, Stickney Hill Cemetery, Woodlawn Cemetery.

Assessed structure (only) valuation for church facilities estimates for cemeteries totals \$12.4m.

Historic Sites and Buildings include:

2 1/2 Beacon Street (NRHP), Bank of NH Theater (Old Concord Theatre), Beaver Meadow Brook Archaeological Site (NRHP), Blossom Hill Cemetery and Chapel (NRHP), Bridges House (Governor's Mansion), Capitol Center for the Arts, Carrigan Commons, Carter Hill Orchard, Chamberlin House (NRHP), Chase Block, Concord City Hall, Concord Civic District (NRHP), Downtown Historic Area, Eagle Hotel (NRHP), Eagle Stable Complex, Eastman Street Historic Area, Emery's Tavern, Endicott Hotel (NRHP), Farrington House (NRHP), Fire Department Headquarters, Franklin Pierce (UNH School of Law), Gas House, Gov. Frank West Rollins House (aka Governor's Mansion) (NRHP), Henry J. Crippen House (NRHP), Leavitt Farm (NRHP), Lewis Downing Jr. House (NRHP), Mary Baker Eddy Historic House, Merrimack County Bank (NRHP), Merrimack County Court House (NRHP), Millville School (NRHP), Morrill Brothers Building, Museum of NH History, Nathaniel Rolfe Barn, NH Division of Historical Resources, NH Historical Society, NH Records and Archives, NH Savings Bank Building (NRHP), NH State House, NH State Library, NH Supreme Court, North Main Street Historic District, Old Post Office – LOB (NRHP), Penacook Historic Area, Phenix Hall, Pierce Manse, Pleasant View Home (NRHP), Reuben Foster House and Perley Cleaves House (NRHP), Rossvie Farm, Sheraton Building, St. Paul's School Complex Area, Upham-Walker House (NRHP), West Congregational Church, White Farm (NRHP), White Park (NRHP). See also **Recreational Sites** and **Gathering Sites** tables.

Assessed structure (only) valuation for these historic facilities totals \$124.5m.

Recreational Sites of both land and buildings include:

Beaver Meadow Golf Course, Beaver Meadow Park, Bicentennial Square, Concord Country Club, Contoocook Park, Eagle Square, Everett Arena / Skate Park, Fletcher-Murphy Playground, Garrison Park,

Grappone Park, Healy Park, Keach Park, Kimball Park, Kiwanis Waterfront Park, McKee Square, Memorial Field, Merrill Park, Reed Park, Riverside Park, Rolfe Park, Rollins Park, Russell Martin Park, Sanell Park, Sewalls Falls State Rec. Area, Terrell Park/Rotary Park + new dog park, Thompson Play Lot, West Street Play Lot, White Park, William P. Thompson Playground, Winant Park. Some of these sites could be **Economic Assets** to the City even if the land is untaxable. Only some structure valuations were available, so often just land value was used. See also **Gathering Sites** table.

Assessed structure (only) valuation for these historic facilities totals \$31.0m.

Gathering Sites of both land and buildings include:

Abbott Village Club House, American Legion #21 (90 people), American Legion #31 (~100 people), Annicchiarico Theater, Bank of NH Stage (need occupancy info ~1,000 people), Bektash Shriner's Temple (~700 people), Bishop Brady High School (~720 people), Camp Spaulding (~192 people), Canterbury Meadows Community Bldg, Capitol Center for the Arts (~1,899 people), City Auditorium (~986 people), City Wide Community Center (~1,000 people IT backup for City services, emergency pickup location for multiple schools, designed to house City offices if Green Street is impacted, but no generator on site), Community Players Bldg, Concord (Green St) Community Center (~667 people), Concord Boys and Girls Club (~865 people), Concord Country Club (~332 people), Crestwood Community Center (~180 people), Eagles Club (~220 people), East Side Community Center, Everett Arena (~1,679 people), First Baptist Church Recreation Fields, Grappone Conference Center (~1,544 people), Green Street Community Center (Previously used as shelter - equipped with generator), IBEW Hall (~558 people), Kimball Jenkins Carriage House (~226 people), Knights of Columbus (~125 people), Main Street Conflagration Area, Masonic Temple (~166 people), McAuliffe-Shepard Discovery Center (~1,464 people), Merrimack Lodge at White Park (Former Skate House) (~65 people), Moose Club (~95 people), NH Fire Academy, NH National Guard Armory (~680 people), NH State House, NHTI Farnum Hall, Odd Fellows Hall (~226 people), Penacook Community Center (~369 people), Racquet Club of Concord, Regal Cinema (~1,874 people), Salvation Army (~277 people), Snowshoe Club, St Paul's Blass Club House, St Paul's Gymnasium (~726 people), St Paul's Hockey Center (~1,602 people), St Paul's Memorial Hall (~866 people), St Paul's Tracy Memorial Theatre, VFW Post 1631 (~99 people), West Street Ward House (~192 people), YMCA of Concord (~300 people). Some of these sites can be **Economic Assets** to the City even if the land is untaxable, or **Recreation Sites**. Most structure valuations were available.

Assessed structure (only) valuation for the recreational facilities for land and/or structures totals \$101.4m.

Future Development includes both residential and commercial development potential in Concord. There are several APPROVED/UNBUILT developments or potential developments according to the Planning Board: 70 Pembroke Ave, Brookline (129 apts) – approved, CATCH Sheep Davis (46 apts), Club 55, Hoit Rd SD, Manchester Street, Rivco, State Forensic Hospital, Whitney Road Development.

POTENTIAL: Angela Way, Garvins Falls, South/North Opportunity Corridor, Whitney Road Extension.

Assessed valuation for the Future Development sites (LAND) is not available.

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. See **APPENDIX A CRITICAL AND COMMUNITY FACILITIES VULNERABLE ASSESSMENT** for the referenced Tables:

Vulnerable Populations: Schools Table

- ⊙ Mass evacuations of schools could be problematic; snowloading on roofs, natural gas leak, watermain break, flood could be the most likely causes for mass evacuation. 27 buses are available for quick response to send students home. Schools have undergone massive security upgrades.
- ⊙ The local private schools, universities & colleges face the same security and mass evacuation issues. Have behavioral and threat assessment teams should try to identify threats before occurrence.
- ⊙ Some public and private schools would not meet current building codes for earthquake and severe wind events. Three new elementary schools have been built in the last 5 years are believed to not meet these codes.
- ⊙ Parts of the NH Technical College school and property are in the floodplain and could be flooded by the Merrimack River or rapid snowpack melt. Evacuations of staff and faculty would also be necessary.
- ⊙ Possibility of active shooter or active threat continues to be a concern among all agencies and first responders.

Vulnerable Populations: Multi-Unit Housing Table

- ⊙ Old mill buildings such as Horseshoe Pond Place, Briar Pipe, Mill Place West plus Pleasant View can have structural issues subject to earthquakes, flooding, wind and snow loading. Some do not have fire suppression.
- ⊙ Excessive heat and cold temperatures can have a negative effect on occupants without air conditioning or who cannot afford heating.
- ⊙ Community Gardens are located in the Floodplain at NHTI, and in Penacook behind Historical Society behind Penacook Street), Clinton Street gardens, Birch Street. New immigrants rely on grown foods as their main food source.

Vulnerable Populations: Manufactured Housing Parks Table

- ⦿ Green Acres and Riverview Landing are subject to flooding from the Merrimack River and Fisherville Co-op is subject to flooding from Beaver Meadow Brook.
- ⦿ All manufactured homes are vulnerable to wind events and severe winter weather (snow, ice load), but particularly homes older than 2006.

Vulnerable Populations: Congregate Care Facilities Table

- ⦿ Flooding can occur at Horseshoe Pond Place which resides in the floodplain with limited drainage capacity. Lightning, severe winds, severe winter weather, and storms can cause power failure.
- ⦿ Excessive heat is a concern for occupants of those facilities without air conditioners.
- ⦿ Presidential Oaks is over 100 years old and may be subject to earthquakes, severe wind events, severe winter weather (snow).

Vulnerable Populations: Child Care Facilities Table

- ⦿ Public health is a great concern at childcare facilities. If an event occurred, school operations could be suspended, children kept at home and isolated to prevent transmission.
- ⦿ Some of these facilities might have restricted access (flooding, fire) when parents will try to get to their children.

Vulnerable Populations: Public Assistance Facilities Table

- ⦿ Getting emergency services to public assistance facilities or evacuating people/goods from public assistance facilities could be problematic if flooding, severe rainstorms, severe winter weather or snowstorms occur.
- ⦿ Public health is a great concern at public assistance facilities. If an event occurred, operations could be suspended, people to be sheltered in place and isolated to prevent transmission.

Economic Assets Table

- ⦿ Disruption of economic assets can have a negative impact on employment and income for large numbers of people, requiring additional social services.
- ⦿ The NH State Office Parks may not have continuity of operations plans (COOPs) during natural disasters.

Churches Table

- ⦿ Houses of worship are an important community, historical, and cultural resource and they are irreplaceable should lightning, severe winter weather or severe wind events occur to damage the buildings.

5 COMMUNITY VULNERABILITY ASSESSMENT AND LOSS ESTIMATION

- ⊙ Several faith organizations provide key community support services and vulnerable members of the community would lose a key resource if damaged by fire, earthquake or lightning.
- ⊙ South Church was struck by lightning recently with minor damage.

Cemeteries Table

- ⊙ Cemeteries are a crucial community and historical resource and many grave markers are very old and in brittle condition subject to natural disasters such as severe winds, tree debris, snow loads.
- ⊙ Blossom Hill Cemetery regularly suffers from vandalism, where headstones are spray-painted, displaced and sometimes broken; mausoleum break-ins also occur.
- ⊙ Road drainage issues at Blossom Hill. Over the past couple of years, the increased heavy rain events have caused several roads to wash out due to poor underground/ under road drainage. These increased events are causing several roads to become dangerous, with drainage systems that date back to the early and mid-1900's.

Hazardous Materials Table

- ⊙ Farm stores (Agway on Route 106) can be especially subject to fires and lightning because of the pesticides and fertilizers on site.
- ⊙ Fires at hazardous materials facilities create detrimental air quality to thousands of Concord residents (like Stratham Tire fire, April 2022).
- ⊙ Wildfire, heavy snowload and earthquake could create significant life safety hazards at the historic White Farm during their auctions (~300 people).

Historic Sites & Buildings Table

- ⊙ In addition to their historic value, many of these resources house key government and nonprofit operations which would be displaced if severe winter weather (ice storms), wildfire, severe wind events, impeded traffic/evacuation, utilities and communications (COOPs).
- ⊙ The age of these structures makes them more vulnerable to destruction by fire, earthquake, and other natural hazards.
- ⊙ The downtown conflagration area is filled with historic multi-story buildings (brick, wood) and is vulnerable to fire (lightning) because of age and proximity to one another. Evacuation problems may result as well as difficulty responding adequately to such a congested area.
- ⊙ The Gas House is structurally unsound; if an earthquake, heavy snow load or wind events occur, portions of the building might collapse.

Recreation Sites Table

- ⊙ Poor drainage at Memorial Field complex has caused the facility to be closed for several days each summer.
- ⊙ Beaver Meadow Golf Course has had many reported tornado- like and microburst events occurring on the green. White, Rollins, Merrill and Rolfe Parks have reported many microburst events during past couple of years.
- ⊙ Open area parks are hazardous during lightning strikes and thunderstorms.
- ⊙ Heely Park (Basin St, Exit 13) and Reed Park (Hall) are subject to severe Merrimack River flooding and the riverbank is subject to erosion. Terrill Park has lost several feet due to erosion from the river.
- ⊙ Merrill Park Pond earth dam washed out during Mother's Day storm (2006) and the pond now does not hold water. The stream through the park is overgrown so during heavy rain events, the water backs up. The area is becoming a bog that is becoming breeding area for mosquitos and insects.

Places of Assembly Table

- ⊙ Places of assembly are a key component of the health and vitality of community organizations which would be negatively impacted if they are lost or damaged.
- ⊙ Some of the facilities (West Street Ward House) are historical buildings and are vulnerable to severe winter weather effects such as snowloading.
- ⊙ The NH State House could be subject to lightning strikes with its gold leafing and high spires and severe winter weather, hurricane & wind events, and earthquake could compromise its structural stability.

Future Development Table

- ⊙ Many of the residential properties for sale along Bog Road and Borough Road are subject to flooding and resulting property damage.
- ⊙ Cobblestone Point, 65+ older independent living, 140 units are behind Home Depot in the wooded area and could be subject to wildfire.
- ⊙ Tannery site has been mitigated; underground material was removed through EPA grants.

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 Concord. This section estimates City-wide structure/building damage in City 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 Concord 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. Concord 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 City 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. The City's Community Development-Engineering Division houses a robust GIS system. Official map generation is undertaken by staff. GIS Specialists developed and updated the maps of the **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 **October 2022** is **14,938**. Using Concord's valuation data, **the total assessed value of all residential and non-residential structures ONLY in Concord (\$4,967,071,574)** is the basis for loss estimation calculations. *Land and utilities are not included here.*

Potential Building Dollar Losses by SFHA Flooding

Using geographic information system (GIS) technology, parcels with buildings within the floodplain were identified using Concord's online digital tax maps that contained City's assessing data. A visual survey reviewed the map/lot numbers along with those parcels with buildings that appeared to be within the floodplain limits, according to the **2017 Plan's** data collection. **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. **Table 33** summarizes this data, identifying **720** primary buildings by type potentially located in the SFHA. *Land value, building contents value and infrastructure were not considered in these calculations.*

Table 36
Building Value in the Special Flood Hazard Areas (SFHAs)

Building Type	Number of Buildings	% of Entire Bldg Type in City	Total Value of Buildings in SFHA	Average Replacement Value
Single Family Homes	297	3.0%	\$78,509,750	\$264,343
Multi-family Homes	29	2.2%	\$10,002,700	\$344,921
Manufactured Homes	193	18.4%	\$11,829,500	\$61,293
Non-Residential Building <i>retail, commercial, non-profit, government, etc</i>	201	10.3%	\$451,093,300	\$2,244,245
Totals	720	----	\$551,435,250	-----

Sources: City Assessing Database 10-22 address matching with 2017 plus visual survey of Vision Appraisal maps and floodplain areas

In **Table 36**, digital analysis and human interpretation identified **297** single family residential homes, **29** multi-family homes, **193** manufactured homes, and **201** non-residential buildings as potentially situated within the Special Flood Hazard Areas (SFHAs). As the City's total number of **2020** housing units is estimated at **19,085**, about **2.7%** of Concord's residences seem to be located in a floodplain area. The average replacement value is **\$264k** for a single-family home or **\$345k** for a multi-family home, **\$61k** for a manufactured home, or **\$2.2m** for a non-residential building in the SFHA. The total value of all buildings in the Special Flood Hazard Areas from this analysis is about **\$551m**.

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, land destruction, and the contents of structures are not included in these building damage estimates.

Table 37 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 37

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	\$78,509,750	\$38,469,778	\$21,982,730	\$15,701,950
Multi-Family Homes	\$10,002,700	\$4,901,323	\$2,800,756	\$2,000,540
Manufactured Homes	\$11,829,500	\$5,796,455	\$3,312,260	\$2,365,900
Non-Residential Building retail, commercial, non-profit, government, etc	\$451,093,300	\$221,035,717	\$126,306,124	\$90,218,660

Sources: See **Table 33**; FEMA

If **all 297** single family homes were damaged by a **Two-Foot Flood (20% Damage)**, the dollar damage to the *buildings* could be **\$15.7m** while an **Eight-Foot Flood (49% Damage)** could cause **\$38.5m** in *building* damage. If **all 29** multi-family homes identified in the SFHA were damaged by a **Two-Foot Flood (20% Damage)**, the damage could be **\$2.0m** for *buildings* only, while an **Eight-Foot Flood** could cause **\$4.9m** in *building* damage. If **all 193** manufactured homes identified in the SFHA were damaged by a **Two-Foot Flood (20% Damage)**, the damage could be **\$2.4m** for *buildings* only, while an **Eight-Foot Flood** could cause **\$5.8m** in *building* damage. If **all 201** non-residential business buildings in the SFHA were damaged by a **Two-Foot Flood**, the dollar damage to the *buildings* only could be **\$90.2m**, while an **Eight-Foot Flood** could cause **\$221.0m** in *building* damage. Dollar damage estimations vary according to the standard percentages of damage levels associated with flooding levels set by FEMA.

Table 38 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 38

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	\$264,343	\$129,528	\$74,016	\$52,869
Multi-Family Homes	\$344,921	\$169,011	\$96,578	\$68,984
Manufactured Homes	\$61,293	\$30,033	\$17,162	\$12,259
Non-Residential Building <i>retail, commercial, non-profit, government, etc</i>	\$2,244,245	\$1,099,680	\$628,389	\$448,849

Sources: See **Table 33**; FEMA

One (1) single family home averages **\$53k** when damaged by a **Two-Foot Flood** while an **Eight-Foot Flood** could cause **\$130k** in *building* damages only. One (1) multi-family home compares at **\$69k** for a **Two-Foot Flood** in *building* damages only and at **\$169k** for an **Eight-Foot Flood**. One (1) manufactured home compares at **\$12k** for a **Two-Foot Flood** in *building* damages only and at **\$30k** for an **Eight-Foot Flood**. One (1) non-residential building in the SFHA is could have **\$449k** in *building* damages for a **Two-Foot Flood**, while experiencing **\$1.1m** in *building* only damages for an **Eight-Foot Flood**.

Although not an accurate assessment, these dollar damage ranges for **Inland Flooding** in the designated 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 SFHAs.

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 City. **The City's assessed value of all residential, commercial, and industrial structures in Concord is \$4,967,071,574 (no land) on 14,983 parcels.** Disaster damages are often illustrated in the following section utilizing a percentage range of city-wide building damage. At **19,085** housing units in Concord counted in the preliminary **2020** US Census, any type of disaster impacting **10%** of Concord housing units would yield about **1,909** damaged homes.

The inventory of City 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 city 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. Following are potential building-only dollar damages from select natural hazards.

Drought

Drought is often declared on state-wide or region-wide basis, and sometimes by individual towns. 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, agriculture and forestry operations would be most affected and the risk of wildfire increases.

As physical damage is usually isolated to specific locations, the effects of potential disasters at certain facilities could be researched utilizing the City assessor's database for valuation on targeted land. Agricultural and forested lands may be among the most affected by drought. Many farm operations have been inventoried in Concord. People who rely on private well water have found their dug wells running dry in **2015-2016** and again in **2018** and **2020-2022** and have needed to dig bedrock wells. Agricultural operations run the risk of high damage from **drought** which also brings economic consequences. In Concord, these areas include maple tree crops, livestock, produce, orchards, tree farms and hay fields. Conservation land forests in the City are also susceptible to loss and fire during **drought** conditions. The City uses Penacook Lake for municipal water, and when the water level drops, water from the Contoocook River is pumped in to replenish supply.

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

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 could be susceptible to structural damage. Large facilities or historic buildings including many governmental buildings and churches, the manufactured housing parks, Main Street Downtown area, and the densely populated locations are particularly at risk because of building sizes, building age, and/or their large numbers of people contained within.

Loss of infrastructure or other community buildings or highways could result in fewer services available to residents or reduce the ability to evacuate. 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 of Boscawen, Concord, Webster, Hopkinton (Contoocook), Henniker, Hillsborough, Salisbury, and Warner (Davisville) hosts frequent epicenters of deep earthquakes.

With a scenario range of **0.5%** to **1%** of buildings damaged throughout the City, an **earthquake** or **landslide** could potentially cause up to **\$24.8m** to **\$49.7m** in building-only damage costs, not including contents, infrastructure, or land.

Extreme Temperatures

Excessive heat and **extreme cold** can harm property, such as landscaping and agriculture, or infrastructure. 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. Conversely, extreme cold can cause hypothermic conditions. In this manner, neither extreme heat nor cold is measurable for dollar damage.

Concord has many vulnerable populations, including public, private, and charter Schools, multi-family neighborhoods, manufactured housing parks, remote neighborhoods on cul-de-sacs, and more. The detailed inventory of **Vulnerable Populations** is available from Appendix A, and City staff are appraised of most large units. Accessory dwelling units, apartments, and duplexes are more difficult to track. Regularly updated inventories can be used by emergency responders to ensure susceptible people remain healthy. The City Multi-Generational Community Center on Concord Heights could be used as a warming or cooling shelter, as can the Green Street Community Center. Dollar damage estimates are not feasible for **extreme temperature** hazards.

High Wind Events or Tropical and Post-Tropical Events

The high wind event storms include the **wind events**, **flooding** and **lightning**, but can also just be simply severe winds, downbursts, tornadoes, or hurricanes. 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, which are more readily damaged by downbursts, tornadoes and hurricanes. These storms typically cover most of, if not the entire, City, as **winds** and **storms** are large enough and blow through to impact multiple New Hampshire counties. High wind events could be particularly fierce in areas along the Merrimack River, Contoocook River, Soucook River, Turkey River, Main Street Downtown Area, and at higher elevations. Conservation lands, and consequently, the extensive City trail system, can be similarly impacted. The City typically clears trees from the same roads each storm (wind, snow, ice, etc).

With a scenario range of **1%** to **5%** of buildings damaged by wind events throughout the City, a high wind event could potentially cause up to **\$49.7m** (for more localized **downburst**, **high winds** and **hail**, or **tornadoes**) to **\$248m** (for more damaging and widespread **tropical storms and hurricanes**) in building-only damage costs, not including contents, infrastructure, or land.

Lightning

Damage caused by **lightning** would not be City-wide because it typically strikes in smaller areas. Few places in Concord 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 conflagrations in high density multi-family neighborhoods around the wildland urban fire interface areas, manufactured housing parks, cul-de-sac neighborhoods; high elevations; densely populated buildings including the schools; historic buildings, churches, private homes; and businesses. City and State Facilities located in Concord are necessary for governmental function and provision of basic services.

The City's utilities, including powerlines, high tension powerlines, telecommunications tower, switching stations, telephone lines and broadband cable internet service, gas lines, water and wastewater facilities and their software control systems, as well as the municipal and School computer systems, are vulnerable to **lightning strike**. Tall buildings could be vulnerable without lightning rods. The City's open spaces like public parks, ballfields and pools are especially vulnerable to lightning.

With a scenario of **0.5%** of buildings damaged throughout the City, a **lightning strike** could potentially cause up to **\$24.8m** in building-only damage costs alone, not including contents, infrastructure, land, or additional damage through fire spreading.

Public Health

Dollar damage estimates are not feasible for public health hazards, with such a variety of potential issues, locations, and populations.

River Hazards

Ice jams on the **Merrimack River, Contoocook River, Soucook River, Turkey River** or one of the brooks would be a major cause of **flooding** in the future. Woody material causing **debris impacted infrastructure** may be more likely to impact bridges than ice jams, especially any the structurally deficient State or City bridges. Several bridges or roads span across the rivers, named brooks and many unnamed brooks. Small brooks culverts and drainage systems offer additional opportunity for ice jams, debris blockage, and more. The **2023-2032 NH Department of Transportation Ten Year Plan (TYP)** provides many examples of basic cost estimates bridge replacement and rehabilitation.

This average figure of **\$750,000** can be used for one (1) local bridge *replacement* in Concord 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 **\$500,000**.

Another way to view potential **river hazard** damages is if half (149) of the 297 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 **\$7.9m** in *building* damage costs.

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 Concord 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 Concord, wooded and forested sections vulnerable to tree fall, include the entire City. 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 City, **severe winter storms** could potentially cause up to **\$49.7m to \$248m** in building-only damage costs.

Solar Storms and Space Weather

Dollar damages to structures are not measurable from solar winds, radio blackout, or geomagnetic storms. These hazards impact utilities such as communication systems, electric grids, and technology. The City, School, municipal drinking water infrastructure, Wastewater Treatment Facility, State, county and federal buildings, Capital Area Fire Mutual Aid Compact towers and antennas, Concord Airport, broadcasting services, and state and county repeater technology are vulnerable to **solar storms**. Impacts could include computer hardware and software systems, emergency response dispatch systems, electricity, internet, satellite dishes, and software programming interruption that upkeeps essential functions. Although solar storms are natural hazards, dollar damage estimates are not feasible for solar storms and space weather.

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 the City are often remote locations and difficult to access by emergency vehicles. Subdivisions in remote hilltop locations and on private, cul-de-sac or non-City maintained roads are especially vulnerable.

The extensive public access City conservation lands and their trails offer wonderful recreational opportunities for residents and visitors. Forests and woodlands are particularly vulnerable to **wildfire** because accidental human-caused fires could occur. Remote fires might not be reported until they become large enough to be spotted. 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. As developable land continues to push against the existing wildland urban interface, wildfires could prove extremely damaging.

With a scenario of **1.0%** of buildings damaged in the City, a **wildfire** could potentially cause up to **\$49.7m** in *building-only* damage costs, not including contents, infrastructure, or land.

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 Concord 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/why/why-buy-flood-insurance>.

The initial identification of Concord's Flood Hazard Boundary Maps was produced in **September 1979**, and later the first Flood Insurance Rate Maps (FIRM) were developed on **March 4, 1980** and included the Special Flood Hazard Areas (SFHAs). The City entered the regular phase of NFIP membership on **this date**. Concord's first Flood Insurance Study (FIS) was produced in **September 1979**. No amended FIS or FIRMs were developed for the City until over four decades later, consistent with other Central NH Region communities.

In the present day, Concord's effective FIRMs are digital (DFIRMs) dated **April 19, 2010** as is the Merrimack County Flood Insurance Study (FIS) which includes Concord (community #330110); individual community FIS are no longer being developed. These **2010** newest documents were adopted by the City, supersede all previous NFIP documentation, and are placed into the City Zoning Ordinance. **Table 39** summarizes the historical background of the City's NFIP effective dates.

Table 39
NFIP History of Concord – Effective Dates

FIS Version		Flood Insurance Study (FIS)	Flood Insurance Rate Maps (FIRMS)
Original Concord		September 1979	March 4, 1980
Update Concord		August 3, 1999	August 3, 1999
Current Merrimack County		April 19, 2010	April 19, 2010
Preliminary Merrimack County, NH	33013CV001B	October 12, 2022	October 12, 2022
Preliminary Merrimack County, NH	33013CV001C	May 25, 2023	May 25, 2023

Source: FEMA Merrimack County Flood Insurance Study (FIS) Table 9 & Bibliography, 2010;
Preliminary 2022 & 2023 Merrimack County FIS

The Preliminary **October 12, 2022** Merrimack County Flood Insurance Study (FIS) contains some revised Digital Flood Rate Insurance Maps (FIRMs) for Concord but it is not yet effective, so it remains notable but not included within the table. Further, a new May 25, 2023 Merrimack County FIS was produced for the western half of Merrimack County. As of December 11, 2023, neither FIS have been approved. **SEE 4**

HAZARD IDENTIFICATION AND RISK ASSESSMENT section **INLAND FLOODING** on **page 196** for more detailed information.

FLOOD INSURANCE STUDY
FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 4

**MERRIMACK COUNTY,
NEW HAMPSHIRE**
(ALL JURISDICTIONS)

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
ALLENSTOWN, TOWN OF	330103	NORTHFIELD, TOWN OF	330118
ANDOVER, TOWN OF	330104	PEMBROKE, TOWN OF	330119
BOSCAWEN, TOWN OF	330105	PITTSFIELD, TOWN OF	330120
BOW, TOWN OF	330107	SALISBURY, TOWN OF	330121
BRADFORD, TOWN OF	330106	SUTTON, TOWN OF	330122
CANTERBURY, TOWN OF	330108	WARNER, TOWN OF	330123
CHICHESTER, TOWN OF	330109	WEBSTER, TOWN OF	330236
CONCORD, CITY OF	330110	WILMOT, TOWN OF	330124
DANBURY, TOWN OF	330111		
DUNBARTON, TOWN OF	330202		
EPSOM, TOWN OF	330112		
FRANKLIN, CITY OF	330113		
HENNIKER, TOWN OF	330114		
HILL, TOWN OF	330214		
HOOKSETT, TOWN OF	330115		
HOPKINTON, TOWN OF	330116		
LOUDON, TOWN OF	330117		
NEW LONDON, TOWN OF	330230		
NEWBURY, TOWN OF	330226		

REVISED: **PRELIMINARY**
10/12/2022

FLOOD INSURANCE STUDY NUMBER
33013CV001B
Version Number 2.6.3.6

 **FEMA**

2022 Table 1: Listing of NFIP Jurisdictions with DFIRM Panels (Concord only)

Concord, City of	330110	01070003, 01070006	33013C0318E, 33013C0319E, 33013C0336F, 33013C0337F, 33013C0338E, 33013C0339F, 33013C0343F, 33013C0345F, 33013C0365F, 33013C0506E, 33013C0507E, 33013C0510F, 33013C0526F, 33013C0527F, 33013C0530F, 33013C0531F, 33013C0532F, 33013C0533F, 33013C0534F, 33013C0540F, 33013C0541F, 33013C0542F, 33013C0551F, 33013C0552F, 33013C0553F, 33013C0561F	

FLOOD INSURANCE STUDY
FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 4

**MERRIMACK COUNTY,
NEW HAMPSHIRE**
(ALL JURISDICTIONS)

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
ALLENSTOWN, TOWN OF	330103	NORTHFIELD, TOWN OF	330118
ANDOVER, TOWN OF	330104	PEMBROKE, TOWN OF	330119
BOSCAWEN, TOWN OF	330105	PITTSFIELD, TOWN OF	330120
BOW, TOWN OF	330107	SALISBURY, TOWN OF	330121
BRADFORD, TOWN OF	330106	SUTTON, TOWN OF	330122
CANTERBURY, TOWN OF	330108	WARNER, TOWN OF	330123
CHICHESTER, TOWN OF	330109	WEBSTER, TOWN OF	330236
CONCORD, CITY OF	330110	WILMOT, TOWN OF	330124
DANBURY, TOWN OF	330111		
DUNBARTON, TOWN OF	330202		
EPSOM, TOWN OF	330112		
FRANKLIN, CITY OF	330113		
HENNIKER, TOWN OF	330114		
HILL, TOWN OF	330214		
HOOKSETT, TOWN OF	330115		
HOPKINTON, TOWN OF	330116		
LOUDON, TOWN OF	330117		
NEW LONDON, TOWN OF	330230		
NEWBURY, TOWN OF	330226		

REVISED: **PRELIMINARY**
5/25/2023

FLOOD INSURANCE STUDY NUMBER
33013CV001C
Version Number 2.6.3.6

 **FEMA**

2023 Table 1: Listing of NFIP Jurisdictions with DFIRM Panels (Concord only)

Concord, City of	330110	01070003, 01070006	33013C0318F, 33013C0319F, 33013C0336F, 33013C0337F, 33013C0338F, 33013C0339F, 33013C0343F, 33013C0345F, 33013C0365F, 33013C0506F, 33013C0507F, 33013C0510F, 33013C0526F, 33013C0527F, 33013C0530F, 33013C0531F, 33013C0532F, 33013C0533F, 33013C0534F, 33013C0540F, 33013C0541F, 33013C0542F, 33013C0551F, 33013C0552F, 33013C0553F, 33013C0561F	

CONCORD NFIP STATISTICS

In **Table 40** 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 the City. Four snapshots in time, one from each of Concord's **Hazard Mitigation Plan** versions, display the number of NFIP policies in force and paid loss statistics between **January 2006 – April 2023**, the last date of accessible data.

Table 40
History of NFIP Policy and Paid Loss Statistics

Report Date	Policies in Force	Insurance in Force	Number of Paid Losses Since 1980	Total Losses Paid Since 1980	Type of Current NFIP Policies in Force			
					Single Family	2-4 Family	Other Residential	Non-Residential
Jan 2006	84	\$18,317,600	15	\$13,355				
Mar 2011	120	\$27,718,400	36	\$232,736				
Dec 2016	106	\$26,261,600	36	\$232,736				
Apr 2023	82	\$21,529,000	33	\$193,845	45	3	14	20

Source: Concord Hazard Mitigation Plans
NH Office of Planning and Development Floodplain Management Office April 2023

From **Table 40**, in **January 2006**, **84** properties in Concord were covered by NFIP flood insurance and **15** claims had been paid since **1980**. In **2011** after the **2005-2008** severe flooding events, the number of policies increased to **120** with **36** total flood insurance claims (losses) paid. By **Dec 2016**, policies had decreased to **106**, but no further losses had been paid. By **April 2023**, Concord property owners had **86** flood insurance policies in place.

Normally, the number of policies would fluctuate, influenced by the number of current severe flooding events, recent changes in flood insurance regulation, the higher cost of insurance, uncertainty about exact floodplain location, mortgage requirements, the changing real estate market, and assumptions that flood insurance is unnecessary if one's property is outside of the floodplain. Since there has been no recent severe flooding, fluctuation did occur in Concord and is remaining consistent.

Table 40 also illustrates that while the property owners anywhere in the entire City of Concord are eligible to purchase flood insurance for their property, only **82** properties out of the **14,938** total parcels in the entire community are insured against flooding. As described previously, a total of **720** parcels with homes and non-residential buildings which may seem to be at least partially situated in the Special Flood Hazard Areas (SFHA) could be flooded in the future.

*Assuming the **82** NFIP policy properties are within the SFHA, then **11%** of buildings in the floodplains are insured against flooding.*

Virtually all of Concord's buildings and properties are uninsured for when the next flooding event occurs. **Inland Flooding** conditions can occur anywhere in the community due to runoff, debris impacted infrastructure (culverts), drainage overflow, rapid snowpack melt, road washouts, beaver dam breaks, heavy rains, etc. which are not limited to the floodplain (SFHAs) areas and are not covered by homeowner's insurance or any other insurance than National Flood Insurance Program (NFIP) flood insurance. Buildings and properties are also vulnerable to **River Flooding** from the **Merrimack, Soucook River, Contoocook River**, and the **Turkey River**.

Flood hazards between **2005-2008** are described in more detail in the previous **2017 Plan** along with graphics and maps. Concord's **Turkey River** and **Soucook River Fluvial Geomorphology Assessment Maps** and **Fluvial Erosion Hazard Belt Maps** are attached to this **2024 Plan** to remind the community of the potential risky areas during widespread inundation flooding.

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 **1979**.

As of **April 2018**, Concord had a total of **3** remaining repetitive loss properties according to records kept by the Federal Emergency Management Agency and supplied by the NH Office of Planning and Development (NH OPD). Floodplain policy information is considered private. This data was specially requested from NH OPD to update this Plan. NH OPD can no longer provide specific information related to address or building type (residential types, non-residential, etc) and can only provide aggregate data for the Plan update. To obtain specific policy data from FEMA for the address and building data, the Town must complete Personally Identifiable Information (PII) forms stating a strong reason for the data request. This publicly aggregated data for Concord as of **April 2023**. By **2023**, a total of **3** repetitive loss properties remain in Concord. This information is summarized in **Table 41**.

Table 41

Number of Repetitive Loss Properties

Building Type	Number of Repetitive Loss Properties as of 04-23	Repetitive Losses Total Since 1980	Total Paid Repetitive Losses Since 1980
Single Family	2	--	--
2-4 Family	0	---	---
Other Residential	0	---	---
Non-Residential	1	---	---
Total Properties	3	7	\$41,992

Source: NH Office of Planning and Development (NH OPD) on behalf of FEMA, April 2023

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. Should repetitive losses occur, the City could consider participating in voluntary property acquisition (“buyouts”) which would eliminate the threat to several homes by incorporating newly vacant land into the City’s flood storage capacity.

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 Concord

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 Planning and Development (NH OPD) identified Concord as a repetitive loss community, which is based upon **Table 38** data, Concord is classified as a Tier 1 community. For a Tier 1 community that has experienced repetitive losses, a new CAV should be undertaken every five years or if there is a severe flooding event. For towns without any repetitive losses, they are classified as Tier 2 where a telephone call may be made to the Town every 5-10 years or otherwise as needed when so classified. The City contains **3** repetitive loss properties and o remains a Tier 1 community.

Four rivers run through or adjacent to Concord, **Contoocook River**, **Turkey River**, **Soucook River**, and **Merrimack River**. A high risk of future flooding is present.

A NH Office of Energy and Planning representative conducted a Community Assistance Visit in Concord with City staff on **July 22, 2009**. The representative reviewed the ordinance and regulations, administration and enforcement, floodplain maps and study, and the City's floodplain management program, biennial report data. Procedural recommendations were made, including all development in the Special Flood Hazard Area requires a permit, keeping elevation certificates on file, and not making flood zone determinations for lenders or insurance agents. Minor problems with the floodplain management regulations or process were rectified.

Although the City seems to be currently in compliance with the NFIP, another CAV could be scheduled at any time or when the next severe flood event occurs in Concord. When the next severe flood occurs, a CAV should be made by NH OPD to request a review of zoning compliance procedures and the contents of the Floodplain Development Ordinance, Subdivision Regulations and Site Plan Review Regulations.

Floodplain Development District Ordinance

The City of Concord has a Floodplain Development District (**Flood Hazard Overlay District**) that has adopted all the required FEMA revisions to its ordinance.

The City's first adoption of flood zone management was based on a study of the Merrimack River from the Bow town-line to the Sewalls Falls Dam performed by the Army Corp of Engineers and was adopted in **1973 or 1974**. The Federal Emergency Management Study (FEMA) and the Federal Insurance Administration (FIA) conducted additional flood insurance studies that were presented to the City of Concord in **September 1979** and in **August 1999**. The goal and purpose of the studies were to examine the risks and relevance of flooding risks to Concord. The two FEMA studies examined the three major rivers in Concord, the Soucook, Contoocook, and Merrimack in terms of their history of flooding, geography of the areas along their banks, and seasonal changes. The **1999** FEMA study also included the Turkey River, Little Turkey Pond, Great Turkey Pond the Hoyt Road Marsh, plus Hayward, Hackett, Snow's and Mill Brooks. This study used the compiled information and converts it into flood insurance criteria. FEMA and FIA also promoted the local and state governments to adopt floodplain management programs (dams for flood controlling, etc.).

Floodplain zoning ordinance revisions occurred in **March 2008** to correct and add language and in **2010**, when the City adopted the new FEMA effective Digital Flood Insurance Rate (DFIRM) maps and Merrimack County Flood Insurance Study dated **April 19, 2010**. Subsequent **Flood Hazard District** revisions were added over the years, lastly in **October 2019**.

In the Concord Code of Ordinances, Chapter 28 Zoning Ordinance, Article 28-3-2 Overlay Districts, **Flood Hazard (FH) District** is the section regarding floodplains in the zoning ordinance. The City's Ordinances include regulations that exceed those of the NFIP. For instance, development outside the floodway must be raised by at least two feet to the base flood elevation on the FIRM along the Merrimack River, and for all other floodplains, at least one foot of elevation is necessary. Permitted and prohibited uses are listed for development in the SFHA.

5 COMMUNITY VULNERABILITY ASSESSMENT AND LOSS ESTIMATION

The **2022** Concord **Flood Hazard (FH) District** regulations contains the elements requested to date by FEMA and the NH Office of Planning and Development's Floodplain Management Program. The FH Overlay District Map is available online on the [City's website](#). An excerpt of the **Flood Hazard District** is displayed in **Figure 30**.

Figure 30

Latest Article 28-3-2 Flood Hazard District Zoning Ordinance

The screenshot shows the Concord, NH Zoning Ordinance website. The sidebar on the left lists various codes and ordinances, with '28-3-2 - Flood Hazard (FH) District' highlighted. The main content area displays the text of Article 28-3-2, which includes the purpose of the FH District, authority for the FH District, limits of the FH District, and uses prohibited in the FH District.

28-3-2 - Flood Hazard (FH) District.

(a) *Purpose of the FH District.* The FH District is established for the following purposes:

- (1) To reduce the hazards of floods in the interest of the public health, safety, and welfare;
- (2) To protect floodplain occupants from losses from flood damage;
- (3) To protect the public from the burden of extraordinary financial expenditures for flood control and relief; and
- (4) To protect the capacity of floodplain areas to absorb, transmit, and store runoff.

(b) *Authority for the FH District.* The FH District is established in accordance with the provisions of RSA 674:41, Innovative Land Use Controls, and the National Flood Insurance Act of 1968. Wherever a conditional use permit is authorized in this Section, the authority to administer or grant conditional use permits shall be vested in the Planning Board.

(c) *Limits of the FH District.* The FH District, as displayed on the Zoning Map pursuant to [Section 28-2-3\(b\)](#), The Zoning Overlay District Maps, of this ordinance [] shall include the following areas within the City:

- (1) *Floodway.* Within the FH District, and as shown on the FIRM as the floodway, the area that includes the channel of the watercourse and adjacent land that must be reserved in order to discharge flood waters without increasing the water surface elevation.
- (2) *One Hundred (100) Year Floodplains.* Within the FH District, the area which will be subject to a flood that has a one (1) percent chance of being equaled or exceeded in any given year. The one hundred (100) year floodplain is designated as Special Flood Hazard Areas (SFHA) subject to inundation by the one (1) percent annual flood as shown on the FIRM.
- (3) *Five Hundred (500) Year Floodplains.* Within the FH District, and as shown on the FIRM as Zone X (Other Flood Areas), the area immediately adjacent to the one hundred (100) year floodplain which will be subject to a flood that has a two-tenths (0.2) of a percent chance of being equaled or exceeded in any given year.

(d) *Uses Prohibited in the FH District.*

- (1) *Uses Prohibited in the Floodway.*
 - a. Buildings;
 - b. The above-ground or underground storage of buoyant, flammable, toxic, hazardous, or explosive chemicals or materials;
 - c. The dumping of waste materials;
 - d. The installation of a well intended as a source for potable water; and
 - e. The installation of an on-site subsurface disposal system.
- (2) *Uses Prohibited in the One Hundred (100) Year Floodplains.*
 - a. Any dwelling unit, or building, or structure designed for residential purposes, except in those areas that are the subject of a pending request for a Conditional Letter of Map Revision (CLOMR) filed with FEMA or subject to a CLOMR issued by FEMA, such that the area in question is removed from the One Hundred (100) Year Floodplain as a result of the map revision. No building permits shall be issued until a CLOMR has been issued by FEMA. No Certificates of Occupancy shall be issued until a Letter of Map Revision (LOMR) has been issued by FEMA.
 - b. The storage of toxic or hazardous materials;
 - c. The dumping of waste materials; and
 - d. The installation of a well intended as a source of potable water.
- (3) *Uses Prohibited in the Five Hundred (500) Year Floodplains.*
 - a. The storage of toxic or hazardous materials.

(e) *Conditional Use Permits Required for Encroachments in the Floodway.*

- (1) *Circumstances Under Which a Permit May Be Granted.* The Planning Board may grant a conditional use permit allowing construction of a structure not designed for human occupancy, or the placement of fill, or the placement of other encroachments in the floodway, to issuing a permit, the Planning Board shall attach conditions to the permit including

Source: Section of Concord Zoning Ordinance December 2023

https://library.municode.com/nh/concord/codes/code_of_ordinances?nodeId=TITIVZOCO

NFIP Familiarity in Concord

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 City staff and volunteers in top form. In order to reduce flood risks, the Zoning Administrator, Building Inspector, City Assessor, City Administrator, City

Planner, volunteer Planning Board members, and other City 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 (NH HSEM) or the NH Office of Planning and Development (NH OPD) 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](#) Independent Study current training course index for flood claims and evaluations: <https://training.fema.gov/is/searchis.aspx?search=NFIP>.

An essential step in mitigating flood damage is City and property owner participation in the NFIP. Concord should work to consistently enforce NFIP compliant policies to continue its participation in this program. City staff field 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 issue is to have a survey completed of the property to complete a Certificate of Elevation to keep on file at the City 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 City to ensure future flood maps are corrected.

When possible, City staff should try to promote flood insurance to property owners in the City; only **21** properties out of the **14,938** parcels in Concord might be 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 City's website at <https://www.concordnh.gov/>.

NFIP SUBSTANTIAL DAMAGE/SUBSTANTIAL IMPROVEMENT

A goal of National Flood Insurance Program (NFIP's) is to reduce flood risk after a flood event occurs. The program does this through substantial damage/substantial improvement rules. Whenever a structure in the FEMA Special Flood Hazard Area (1% chance flood, or 100-year floodplain) has been damaged by any origin (flood, fire, tornado, blizzard, etc.), the community is responsible for determining whether or not the cost of repairs to the structure is equal to or exceeds 50% of the market value of the structure. If it is, then the entire structure must be brought into compliance with the current building code.

Substantial damage/substantial improvement determinations allow communities to require owners of structures built before the community joined the NFIP (before September 1979 for Concord) to comply with current construction standards. Communities are responsible for making substantial damage/substantial improvement determinations and notifying property owners.

In Concord, the Code Administration Office (<https://concordnh.gov/322/Code-Administration>) which includes the Building Department and Zoning Departments is responsible for making substantial damage/substantial improvement determinations. The Code Administrator, Chief Building Inspector, and Zoning Administrator (Local Floodplain Administrator) can perform this duty. The City participates in training offered by the Association of State Floodplain Managers to keep apprised of NFIP floodplain management.

Currently, there are adequately trained staff to undertake these determinations. The Zoning Administrator will work closely with Code Administration staff and Assessing Office staff to make necessary determinations. Future goals include obtaining staff certification for Floodplain Administration.

The process for determination of substantial damage/substantial improvement in Concord is as follows:

- The City asks for the cost of improvements on all building permit applications. It calculates a replacement cost as part of the Assessing records in addition to the assessed value. These figures are used as the basis for determinations.
- If an appraisal is supplied by the applicant, that appraisal is evaluated by the Zoning Administrator with assistance from the Assessing Department. If there is no appraisal the City utilized the square footage costs provided for through the International Building Code (IBC) and through local industry knowledge.
- The City relies on FEMA P-758 as a guide when making substantial damage/substantial improvement determinations. This is helpful when applying the standards of the City's Flood Hazard Overlay District.
- Before or after a flooding event, the City initially communicates substantial damage/substantial improvement requirements to property owners by email. While e-mail is a primary source of information dissemination to individual property owners, final determinations are made in writing to the owner and any known representatives.

One of the fundamental duties of the Zoning Administrator is public assistance/education. The standards of the Article 28-3-2 Flood Hazard (FH) District Overlay are available online in the City's Code of Ordinances at

https://library.municode.com/NH/Concord/CODES/Code_of_Ordinances?nodeId=TITIVZOCO_CH28ZOOR_ART28-3OVDI_28-3-2FLHAFHDI. It is the Zoning Administrator's role to assist the public in understanding the standards. Standard informational and "Helpful Handouts" are available on the City's website.

Association of State Floodplain Managers

<https://www.floods.org>

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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 **Concord Hazard Mitigation Plan Update 2024**.

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 POTENTIAL ACTION EVALUATION** and **8 MITIGATION ACTION PLAN**.

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 the City; 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 **2017 Hazard Mitigation Plan**; and Future Improvements to the Capability.

FOUR CAPABILITY ASSESSMENT TABLES

Planning and Regulatory

- Plans and Planning Documents
- Building Codes, Permitting, Inspections
- Land Use Ordinances, Regulations

Administrative and Technical

- Administrative Programs, Policies, Mutual Aid Agreements, Partnerships, Operations, Procedures
- Staff and Volunteers
- Technical Skills, Training, Drills
- Assets, Security, Resources (Specialized Equipment)

Financial Resources

- Financial Programs or Funding Resource for Hazard Mitigation Projects
- Future Financial Resources to Explore for Haz Mit Projects

Education and Outreach

- Public Outreach Program, Educational Activity, Notifications

City Capabilities and Review of Existing Plans

A summary of the items within the four Capability tables is provided here to offer a portrait of resources Concord 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 City'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 City Departments and the School District as related to hazard mitigation are detailed within the following tables. Because the City Administrator serves as the Emergency Management Director and the Fire Chief serves as the Emergency Management Coordinator, there is much departmental overlap and shared responsibilities among the capabilities.

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**. Several additional, non-City documents are also utilized by the community and have a positive relationship to the **Hazard Mitigation Plan 2024**. These non-City documents support the work Departments and volunteers are undertaking, and they support the hazard mitigation goals, objectives, and/or Actions in this Plan within the following **6 CAPABILITY ASSESSMENT** 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:	
BI/CE	Building Inspection/Code Enforcement
CA	City Administration, City Council <i>City Administrator is EMD</i>
CC	Conservation Commission
CCTV	Concord Community Television
CD	Community Development Department (Planning, Engineering, and GIS)
EM	Emergency Management Coordinator <i>Fire Chief is EMC</i>
FD	Fire and Rescue Department
GS	General Services Department
IT/IS	Information Technology/Services
LI	Libraries
PD	Police Department
PR	Parks & Recreation Department
EN	Engineering and GIS
PRI	Private or Non-City
CSD	Concord School District
MVSD	Merrimack Valley School District
WTF	Wastewater Treatment Facility
WW	Water Treatment Infrastructure
	Other
Primary Mitigation Department	

PLANNING AND REGULATORY CAPABILITIES

The planning and regulatory capabilities displayed in **Table 43** are the plans, policies, codes, and ordinances that reduce the risks or impacts of hazards. There are **3** categories: **Plans and Planning Documents; Building Codes, Permitting, and Inspections;** and **Land Use Ordinances, Regulations, and City Ordinances**. Most of the documents listed below are the City's documents, but others are School, local, regional, state and federal which support the City's hazard mitigation goals, objectives, and/or Actions.

Table 43

Planning and Regulatory Capabilities

Latest Adoption or Version Date / Latest Revised ?	Capability Assessment: Planning and Regulatory Resources	Description Related to hazard mitigation planning and coordination	Location of Capability Entire City or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2017) / How Did Dept Use Capability?	Future Improvements to Capability/ Wish List for the Future?
CONCORD PLANS AND PLANNING DOCUMENTS							
June 2017	CD Open Space Plan	Makes recommendations for preservation of open space and identifies land for future preservation	Residential Open Space District	High	CD-Planning	Adopted June 2017	Implement recommendations, purchase select parcels for open space areas
To be updated 2023-2024	CD City 2030 Master Plan	Identifies goals and objectives of the City regarding land use, transportation, open space, economics, housing. The Master Plan has nearly a dozen individual topical Master Plans that can be updated separately.	Entire	High	CD-Planning	Used by Planning Department during operations. Reviewed chapter for updates and began consideration of new 2030 Concord Master Plan	Update the MP to include the three Rivers, make recommendations related to natural hazards, place funds into the CIP for projects
To be updated 2028	CD Concord Airport Master Plan 2006	The purpose of the Airport Master Plan is to identify and inventory existing conditions, predict future aviation demands, and develop a plan to remedy existing deficiencies and anticipate future needs	Concord Municipal Airport	High	CD-Engineering	Used by City during operations. Have evaluated but not needed to update since demographics did not rate as high for safety improvements to airport	Update scheduled for 2028. Fund the hangar, building, and runway improvement in the CIP

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Through 2022	CSD Public Elementary Schools Emergency Operations Plans (1 for each School)	Plans detail staff and admin responses to natural disaster and human events	1. Christa McAuliffe, 2. Abbott-Downing, 3. Beaver Meadow, 4. Penacook Elementary 5. Mill Brook, 6. Broken Ground	High	Concord School District	Updated annually before each school year	Revise each EOP annually to current needs, consult with City emergency services, prepare drills
Through 2022	CSD/MVSD Public Middle Schools Emergency Operation Plans	Plans detail staff and admin responses to natural disaster and human events	1. Rundlett Middle School, 2. Merrimack Valley Middle School	High	Concord School District	Updated annually before each school year	Revise each EOP annually to current needs, consult with City emergency services, prepare drills
Through 2022	CSD/MVSD Public High School Emergency Operation Plans	Plans detail staff and admin responses to natural disaster and human events	1. Concord High School 2. Merrimack Valley High School	High	Concord School District	Updated annually before each school year	Revise each EOP annually to current needs, consult with City emergency services, prepare drills
March 2015	EM Emergency Operations Plan	City of Concord Emergency Operations Plan was adopted in 2015. Has Hazard specific annexes, Wind Events, Wildfires, Terrorist Acts, Earthquake.	Entire	High	Emergency Management	No changes. Review in process. 2020 update stalled due to COVID.	Update EOP about every two years. Working on an exercise schedule with HSEM. Update contact and resources lists
May 2018	EM EOP ESF-6 Mass Care and Shelter	Updated ESF-6 (Emergency Support Function), Mass Care/Shelters portion in conjunction with the Capital Area Public Health Network	Entire	High	Emergency Management	CAPHN Regional Shelter Plan updated May 2018	Participate in the development of CAPHN plans and activities.
April 2017 TBD Update 2022	EM Hazard Mitigation Plan Update 2017	FEMA-approved Plan to mitigate the risk of natural hazards	Entire	High	Emergency Management	Update began 04/2022 to be complete by 12/2022	Complete regular updates to Action Plan annually, other sections.

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Through 2022	PRI Private School Emergency Operations Plans	Provides staff and students with several response methods to critical incidents ranging from armed intruder to natural disasters	1. Bishop Brady, 2. St. Paul's School, 3. Concord Christian Academy, 4. Parker Academy, 5. Washington Street School, 6. Shaker Road School	High	Private School Boards, assistance of City Emergency Management	Private schools keep their Emergency Operations Plans current	City Emergency staff should request copies of the newest EOPs, revisit the individual schools, and participate in EOP update and staff training opportunities
June 2015	EM Soucook River Addendum to the Hazard Mitigation Plan	Study by the NH Geological Survey and compiled by CNHRPC. Plan described conditions of the river, developed maps and actions developed by City.	Soucook River	Moderate	Emergency Management	No changes. Available for use but no hazards occurred that required this.	Evaluate the Assessment and consider undertaking relevant Actions
June 2015	EM Turkey River Addendum to the Hazard Mitigation Plan	Study by the NH Geological Survey and compiled by CNHRPC. Plan described conditions of the river, developed maps and actions developed by City.	Turkey River	Moderate	Emergency Management	No changes. Available for use but no hazards occurred that required this.	Evaluate the Assessment and consider undertaking relevant Actions
October 2016 TBD	FD Facility Pre-Incident Plans Program	City wide program of facility preplans. Each of the 20 field officers is responsible for updating 4 per year (about 80 per year). Some facilities include those of the Appendix A- CCFVA. Have about ~300 Plans in program.	Entire	High	Fire Dept	The Pre-incident plans program stalled prior to COVID and is a Dept. priority to start again	This stalled program will be reinvigorated with the changeover to new software c. Dec 2022
March 2015 June 2018	FD Hazard Specific Annex for Wind Events (EOP)	March 2010 event spawned the development of the newest Plan based on national standards. More generic. Some overlap between the EOP Hazard Specific Annex.	Entire	Moderate	Emergency Management	No Changes / Available for use but no hazards occurred that required this.	Add provision for handling downbursts and tornados.

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June 2015 June 2018 Update in process 09-22	GS Water Treatment Plant Vulnerability Assessment Report and Emergency Response Plan	On file with NH DES and EPA. Plans provide continuity of operations during an emergency at the facility	Water Treatment Facility at Penacook Lake	High (low level of application)	Water Superintendent	Available for use, but not hazard events occurred which would trigger use of Plan. Update in process 09-22	Update contact information with NH DES and EPA. Revise in 3 years.
June 2015 but Revised Annually	GS Wastewater Treatment Plant Vulnerability Assessment Report and Emergency Response Plan	On file with NH DES and EPA. Plans provide continuity of operations during an emergency at the facility	Wastewater Treatment Plant on Hall Street	High (low level of application)	Water Superintendent	Available for use, but not hazard events occurred which would trigger use of Plan.	Update contact info to reflect Current Operations Protocols and Contact. Est. Completion One year
2022	PR Recreation Master Plans	Park master plans are online and city q drive under park and rec. GIS shows what is built in each of the parks	City Parks	High	Parks and Recreation	Updated individual park master plans. New Citywide Community Center completed in 2018	Review and revise park master plans and complete recommendations
2020-2021	All City Departments and Facilities "Facility Conditions Assessment"	Over a two year timespan, nearly every City building was assessed by the HL Turner Group to determine building upgrades, safety issues, site evaluation, HVAC, plumbing and electrical, lighting, drainage, ADA compliance, and more.	All City Buildings	High	All City Depts	Facility conditions assessments were completed for nearly every City building	Follow recommendations to get problems into the CIP or Department budgets for to enable upgrades
CONCORD BUILDING CODES, PERMITTING, INSPECTIONS							
April 19, 2010	CD FEMA Flood Insurance Rate Maps	Adopted by City, used for Merrimack River, Soucook River, Contoocook River, Turkey River, streams, brooks	Floodplains	High	Community Development	New preliminary Oct 2022 DFIRMS and a draft Oct 2022 FIS are available for	Review preliminary DFIRMS and compare to the 2010. Note any substantial

Latest Adoption or Version Date / Latest Revised ?	Capability Assessment: Planning and Regulatory Resources	Description Related to hazard mitigation planning and coordination	Location of Capability Entire City or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2017) / How Did Dept Use Capability?	Future Improvements to Capability/ Wish List for the Future?
						review. City used the 2010 maps during planning and public assistance	deviations and provide feedback to RiskMap program
2009	CD International Building Code 2009 Edition	Widely used building code provisions related to best residential, commercial, and industry codes and inspections.	Entire	Moderate	CD- Code Administration	Codes used during permitting process, but they are 2009 version	The 2018 code should be adopted and applied immediately
2018	FD Fire Codes 2018 Edition	Provides regulations to safeguard people and property from the effects of hostile building fires	Entire	High	Fire Dept	Actively working to change the ordinance to adopt to 2018 Life Safety/Fire Codes as the State of NH has just moved to them.	Revise and update City codes when new State codes become available every 3 years.
CONCORD LAND USE ORDINANCES, REGULATIONS							
Oct 2019	CD Zoning and Planning Regulations to Reduce Flood Risk: Flood Hazard District	d use of Zoning and Planning Regulations, specifically floodplain / floodway regulations, aquifer protection, wetlands and drainage regulations.	Entire	High	CD- Planning and Code Enforcement	Used by Planning Department during operations, revised to apply additional standards	Update as needed per DES and FEMA, update to accommodate changes to finalized DFIRMS (after 2022 prelims)
Through 2022	CD Traffic Regulations to Reduce Blockage of Transportation Network	Traffic Regulations to ensure that roadways have adequate traffic flow and level of service so emergency responders are not delayed. Article 17-4, 17-5	Entire	High	CD- Planning	Used by Planning Department, Police Dept during normal operations	Update after the new 2030 Master Plan transportation section is completed
Through 2022	CD Zoning and Planning Regulations to Reduce Landslides	Erosion control Planning Regulations, specifically steep slope regulations, and bluff setbacks Article 28-4-4	Entire	High	CD- Planning	Used by Planning Department during normal operations	Possible revision to buffer to bluff regulations to account for all steep slopes

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	and Erosion Risk						and not only those adjacent to water bodies.
Through 2022	CD Aquifer Protection Ordinance	Aquifer Protection Zoning District Restricts/regulates hazardous materials in proximity to potable groundwater supplies. Reduces groundwater contamination risk.	Over Aquifers	High	CD-Planning	Used by Planning Department during normal operations	Revise Zoning Map and regulations as needed in response to updated information on hazardous materials and best management practices.
Adopted 2022	CD Planning Form Based Zoning Code	Public education and engagement process 2018-2022 leading to adoption of zoning regulations based on character of neighborhoods	Entire	High (untested)	CD Planning, Planning Board, City Enforcement	New code developed between 2018 and 2022	Apply code and evaluate effectiveness, revise if needed
Jan 2020	CD Engineering Construction Standards and Details	Lays out criteria for construction of streets, sidewalks, sanitary sewer systems, water systems, stormwater drainage, landscaping, utilities, erosion& sedimentation control, traffic management, etc in one document.	Entire, Public Rights of Way	High	CD-Engineering	Developed in 2020 to be used by both City and developers. Letter of revision June 2021 as addendum	Apply the standards to determine revisions to include in next version along with the noted standard addendums
Nov 2022	FD Regulations to Reduce Fire Risk	Use of Code and Regulations to assist the Fire Department with access to help reduce the risk of fire from natural hazards. Separate regulations for RV parks, inspections, fire hazards, hydrants, and more	Entire	High	Fire Dept and Code Enforcement and Planning Division	Followed fire protection regulations, updated through Nov 2022	Update as needed per Fire prevention best practices and planning needs

Source: Concord Hazard Mitigation Committee

ADMINISTRATIVE AND TECHNICAL CAPABILITIES

The administrative and technical capabilities in **Table 44** include policies, mutual aid agreements, partnerships, standard operating procedures, training, 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: **Administrative Programs, Policies, and Partnerships; Technical Skills, Training and Drills;** and **Assets, Security and Resources.**

Table 44

Administrative and Technical Capabilities

Latest Adoption or Version Date/ Latest Revised ?	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire City or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2017) / How Did Dept Use Capability?	Future Improvements to Capability/ Wish List for the Future?
CONCORD ADMINISTRATIVE PROGRAMS, POLICIES, MUTUAL AID AGREEMENTS, PARTNERSHIPS, OPERATIONS, PROCEDURES							
Through 2022	CD Policy - Reduction of Impact Fee for Contaminated Property in NH Brownfields Program	To encourage cleanup and redevelopment of contaminated properties, the City created an incentive whereby an impact fee for a contaminated property will be reduced if the property is enrolled in the NH Brownfields Program.	Opportunity Corridor	High	CD-Planning	Penacook Tannery brownfields site cleaned, new construction of housing and medical center 2015-2022	Evaluate any potential remaining areas in the city for potential qualification of program
2018-2028	CD Reviewed Drainage Areas of Previously Impacted Areas and Prepare Capital Plan for Mitigation of Any Potential Future Flooding	Recent experience from the May 2006 flooding discovered deficiencies in the City's aged infrastructure. To address these deficiencies, engineering services would be used to analyze and prioritize repairs before another flood impacted the City.	Entire	High	CD-Engineering	Stormwater systems evaluated and placed into CIP as 13 different drainage basins. Placed funding for each into the CIP starting in 2018	Fund the CIP for stormwater improvements annually, upgrade drainage and stormwater annually through 2028
Summer 2021	EM Emergency Sustainability/ Mass Vaccination at NHTI POD	Coordinate with NHTI for Emergency Sustainability (PD). NHTI is the primary location for the Mass Vaccination Clinic for the Concord Catchment area. In partnership with	Entire City, Underserved Areas	High	Emergency Management	COVID showed that this plan needed to be revamped. Mass vaccination was done through State of	Update lessons learned during COVID with Capital Area Public Health Network

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		Capital Area Public Health Network				NH/military at mall site.	
September 2022	FD Capital Area Fire Mutual Aid Compact	Participate with the Capital Area Fire Mutual Aid Compact. 24 agencies. Concord has dispatched resources during several recent events around the State.	Entire City, and resources to other communities	High	Fire Dept	Town of Weare added Sept. 2022	Change to new Tyler CAD software to update center abilities. Continue to ensure the Compact has an active exercise schedule and mutual aid drills, and that the communications center supports subscribers.
October 2016	FD Central NH Hazardous Materials Response Team	Participate in regional Hazardous Materials Response Team. Covers 53+ communities.	Entire	High	Fire Dept	New members and equipment added to team. Created a more active training schedule.	participate in exercise schedule.
March 2010	FD Windstorm Preparation Procedures	Following February 2010 windstorm, the after action report (AAR) reported a number of steps to improve emergency response procedures and the recommend adoption of model procedures which align with best practices for storm response.	Entire	Moderate	Fire Dept	No changes, have not yet had another incident to apply	Further build out wind event response in EOP.
July 2022	FD Standard Operating Guidelines (SOGs)	Haz Mat response, tactical procedures, active shooter incidents, water rescue, rural and urban fire tactic policies, mass casualty, state prison response.	Entire	High	Fire Dept	Started the large project of reviewing all response policies in July 2022 to ensure they are up to date with equipment and best practices.	Revise to reflect best practices and as changes in industries appear
September 2021	FD	Participate with the NH Federation of Mutual	Entire	Moderate	Fire Dept	New statewide mobilization	Ongoing training and

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	NH Federation of Mutual Aid's Statewide Mutual Mobilization Program	Aid's statewide mutual aid program. City participates in the update. The plan is for moving resources to the State to handle major fire and other emergencies.				plan adopted in 2021.	exercises in statewide mobilization plan.
Late 2016, certification updated	FD Mass Decontamination Policy and Program	Maintain a Mass decontamination policy and program. City can perform quickly. Every fire fighter is decontaminated. Large amount of time and resources put toward the program.	Entire	High	Fire Dept	No changes. Have not needed to use this plan since last update.	Refresher training for all FD employees.
Dec 2019	FD Response Policy for All Potential Incidents 2019	Response Policy for all potential incidents, updated in 2019. Specifies the level of resources committed to several potential incidents. The plan is the most revisited in the FD. Very detailed	Entire	High	Fire Dept	Updated in 2019, reviewed annually	Actively reviewing all response plans with new staffing profile coming as of Oct 1, 2022.
October 2016	FD Hazardous Materials Response Plan & Inventory	Hazardous Materials Response plan and Inventory from Central NH Regional Haz Mat team, a group of 30-40 municipalities. Most nearby communities are members, program housed at Concord Fire Dept.	Entire	High	Fire Dept	Document nominally updated by CNHREPC, much more work is needed. Stalled during pandemic, no staff available to lead Comm and plan revision	Fire Dept staff should reconvene the CNHREPC and begin materials revision. Consider a paid position and seek funding.
2015	FD Response Policy for State Prison Incidents	Response Policy for State Prison incidents	NHSP	High	Fire Dept	This stable procedure was followed when needed. NH DOC and CFD worked closely during COVID to ensure not exposing this vulnerable population. The plan did	review with NH DOC & update for changes

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						not need any modifications.	
2016	FD Mass Casualty Incidents Policy	Department policy on Mass Casualty Incidents, updated along with active shooter	Entire	High	Fire Dept	No changes. Did not need to implement. One reported incident was stabilized quickly before it could be implemented.	Annually review and update.
July 2022	FD Emergency Recall of Personnel Program	Maintain a program for emergency recall of personnel	Entire	High	Fire Dept	Updated to reflect a new labor grade. Also in a trial period of a simplified process.	modify as technology evolves. Simplify the multistep process.
Oct 2020	FD Suspicious Package Protocols	Suspicious package protocols. Also adopted by Police Dept	Entire	High	Fire Dept	Adopted State of NH Suspicious Package Protocol, last Updated in 2020	Review annually and forward suggestions to State Fire Marshal office.
2016 Update in process 09-22	GS Snow Removal Policy	Snow Removal Policy, 21 plow routes, Anti-icing pre-treatment procedures. Routes are on City website.	Roadways	High	Highway & Utility Superintendent	Followed snow removal operations. Update in process 09-22	Conduct yearly review of plow routes and evaluate removal policy criteria
2016 Update in process 09-22	GS Emergency Highway Mobilization Process	On-call Highway foreman mobilize staff to respond appropriately. Work with other emergency personnel; Police, Fire, Util Electric. Yearly update of contact information	Roadways	High	Highway & Utility Superintendent	Followed highway mobilization ops. Update in process 09-22	Conduct yearly review of emergency mobilization policy
2016 Update in process 09-22	GS Emergency Water Mobilization Process	On-call Water foreman mobilize staff to respond appropriately. Work with other emergency personnel; Police, Fire. Notify the affected parties	City of Concord	High	Highway & Utility Superintendent	Followed emergency water mobilization ops. Update in process 09-22	Conduct yearly review of emergency water mobilization policy
2016	GS Emergency Fire and	On-call Highway foreman mobilize staff to respond appropriately. Water	City of Concord	High	Highway & Utility	Followed traffic accident mobilization	Conduct yearly review of crash

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Update in process 09-22	Traffic Accident Mobilization Process	foreman assist with water needs. Work with other emergency personnel; Police, Fire			Superintendent	ops Update in process 09-22	mobilization policy
2016 Update in process 09-22	GS Emergency Flooding Mobilization Process	On-call Highway foreman mobilize staff to respond appropriately. Work with other emergency personnel; Police, Fire	City of Concord	High	Highway & Utility Superintendent	Followed flood mobilization ops. Update in process 09-22	Yearly update of contact information. Ensure response materials are on hand
2016 Update in process 09-22	GS Emergency Equipment for Severe Weather	Emergency equipment available to respond; generators, barricades, variable message boards, sand bags, etc.	City of Concord	High	Equipment and Highway & Utility Superintendents	Rotated supply of emergency equipment according to protocol. Update in process 09-22	Refresh supplies for severe weather
Summer 2016	GS Culvert Condition GPS Inventory	Engineering Services has visited all 18 inch and larger culverts in the city. Conditions, locations, and pictures are documented with the inventory. Updated in summer 2016 by interns.	Citywide	High	City Engineer, General Services Director	Many large culverts replaced including Alder Creek Drive in 2021, Hoit Road in 2021.	Complete the inventory of all smaller culverts in rural areas. Add culvert upgrades to CIP and apply for DOT funding
Through 2022	GS Penacook Lake Dam (High Hazard) Responsibility	General Services has control of the dam at the Lake, with a mitigation plan and yearly inspection process in place. 1-2 other dams are licensed by the City. No particular dam response plan.	Penacook Lake Reservoir	Moderate	General Services Director	EAP is updated every 3 years. City has all dam EAPs on file with General Services. Reservoir serves as main public drinking water source	Maintain awareness of drought conditions and wet conditions to raise and lower Penacook Lake water supply
Jan 2022	PD Mutual Aid Compacts	Have mutual aid compacts with the surrounding police department to provide for additional police officers if needed.	Entire	High	Police Dept	MUAs with some communities have been updated since the last Plan.	Update the mutual aid compacts as needed. Covered under Limits of Authority-General Orders.

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June 2022	PD Tactical Team Unit Mutual Aid Agreements	Our Tactical Team Unit has signed an agreement with all the other regional and local Special Response Teams to provide for additional Tactical Teams if needed	Entire	High	Police Dept	Replaced the command vehicle in 2019	Increase training time to be more in line with NTOA standards.
Sep 2017	PD General Order on Evacuation GO 13-1	Department General Order for Evacuation of our Watch Commander office and dispatch center to go to Merrimack County Sheriff's Office. They have similar order to use our facility if needed.	Entire	High	Police Dept	No change. Backup facility regularly checked, computers replaced 2022.	Update the Plan and exercise on a regular basis.
After 2017	IS / IT Information Recovery Plan	An Information Recovery Plan has been developed.	All City Facilities	High	Information Services Director	Plan updated since 2017. Instituted redundant backup systems, offsite cloud data	Make improvements in back up data at physical remote sites
After 2017	IS Data Resource Protection Plan Action COMPLETED 2011	The City's data is critical to the City, county, and state. Much of the City's data is irreplaceable, such as the City Clerk's vital records. Robust protection of digital resources	All City Facilities	High	Information Services Director	Constantly updated to protect City data. Kept pace with changing technology	Much of the paper data needs to be converted to digital mediums. There needs to be a plan for archiving and maintaining this data.
Through 2022	LI Free Wi-Fi Services	All Libraries and branches provide free wifi services to guests through the buildings. Chromebooks are available for library users for two-hour checkouts	Penacook and City Libraries (Green Street and Heights)	High	Library Director	Technology and services are updated regularly. Some programs need a library card but wifi is available without	Move more databases online, provide a greater online presence of media for patrons
Nov 2008 Update in process 09-22	PD General Order on Motor Vehicles	General Order on Motor Vehicles Pursuits and apprehending fleeing suspects. Updated on 11/30/08.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Continue to evaluate new technologies for safely arresting

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	Pursuits and Suspect Apprehension						suspects and implement as proven
February 2007 Update in process 09-22	PD General Order on Unusual Occurrences	General Order on handling Unusual Occurrences. Updated on 02/17/07.	Entire	High	Police Dept	PD uses Policy during normal operations .Update in process 09-22	Allocate more training time and funding resources
January 2002 Update in process 09-22	PD General Order on Aircraft Accidents	General Order on handling Aircraft Accidents. Last Updated 01/13/2002.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
November 2001 Update in process 09-22	PD General Order on Fire Scenes	General Order on handling Fire Scenes. Last Updated 11/25/2001.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
January 2002 Update in process 09-22	PD General Order on Hazardous Material Incidents and WMD Training	General Order on Hazardous Material Incidents and continuous training on Weapons of Mass Destruction as part of in-service training. GO Last Updated 01/13/2002 and training is done yearly on basic WMD.	Entire	High	Police Dept and Career Development Unit	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
January 2002 Update in process 09-22	PD General Order on Concord Hospital Disasters	General Order on responding to Concord Hospital Disasters. Last Updated 01/13/2002.	Concord Hospital and entire city	High	Police Dept and Hospital Admin	PD uses Policy during normal operations. Update in process 09-22	Schedule training exercise at Concord Hospital.
January 2002 Update in process 09-22	PD General Order on COBRA Incidents	General Order on dealing with COBRA incidents (Chemical, Ordinance, Biological and Radiological Incidents). Last Updated 01/13/2002.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
February 2010 Update in process 09-22	PD General Order on Mass Casualty Incidents	General Order on Mass Casualty incidents. Updated on 02/2010.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources

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Nov 2010 Update in process 09-22	PD General Order on Emergency Preparedness	General Order on Emergency Preparedness. Updated on 11/22/2010.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
January 2002 Update in process 09-22	PD General Order on Civil Disturbances	General Order on Civil Disturbances. Last Updated 01/13/2002.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
October 2010 Update in process 09-22	PD General Order on Flood Control Emergencies	General Order on Flood Control Emergencies. Update on 10/3/10.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
September 2010 Update in process 09-22	PD General Order on Blackouts and Power Outages	General Order on Blackouts and Power Outages. Updated on 09/12/2010.	Entire	High	Police Dept	PD uses Policy during normal operations. Update in process 09-22	Allocate more training time and funding resources
Oct 2020	PD General Order on Bomb Threats and Bomb Disposal Incidents	PD General Order on Bomb Threats and Bomb Disposal Incidents. Orig 04/19/1991	Entire	High	Police Dept	PD uses Policy during normal operations. October in Oct 2020/	Resume grant funded responder training to New Mexico Tech. or similar program
Used during COVID 2020-2022	PD Mass Vaccination Clinic Procedure	Mass Vaccination Clinic for the Concord Hospital catchment area. Has been developed and submitted for approval to NHHSEM but have not received plan back for approval	Entire	High	Police Dept, with Concord Hospital and Health and Human Services	Mass vaccinations occurred at the Sears in the Mall (NH National Guard) Loudon Motor Speedway (State) during COVID-19 2020-2022	Consider whether any mass vax program should include PD Officer training or whether should be left to CAPHN, National Guard and State
July 2020	PD Use of Force Policy	Being respectful of all life and public welfare, personnel follow	Entire	High	Police Department	New policy to ensure correct behaviors are followed for	Evaluate and revise policy as needed

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		guidelines for deadly and nondeadly force				every unique situations	
June 2018	PR Community Center Reunification Plan	After construction of Citywide Community Center, Parks and Recreation worked with Concord School District to use the Center as the reunification location during emergency situations at Beaver Meadow Middle School, Broken Ground School and Mill Brook School (elementary)	Community Center	High untested	Parks and Recreation with Concord School District	Newly developed plan in June 2018 just prior to COVID, has not yet been tested	Hold a drill or tabletop exercise with the Fire and Police Depts and these schools to ensure feasibility of the reunification plan
CONCORD TECHNICAL SKILLS, TRAINING, AND DRILLS							
Current as of 09-22	CD GIS Maps and Database Available to All City Staff	Have GIS on desktop, laptop and website for access to maps and data about anything that has a fixed location in the city. GSD, FD, and Police have implemented vehicle locator systems	Entire	High	CD Engineering	Regularly kept maps up to date, posted on website for the public, made available to all staff on all city computers, desktops, mobile vehicles in easy to use format	Update the maps available to the public on the City website, prepare database changes along with revised and new maps
Current as of 09-22	CSD Drills and Lockdowns	Must have 10 fire drills per year, 2 must be lockdown. All Schools must meet this. Most have their own lockdown and fire drills monthly. Work closely with Police Dept and Resource Officer. Changing tactics at each school, different scenarios & disasters to address.	CSD Elementary Schools, CSD Rundlett Middle & High Schools	High	CSD School Principals	Drills and lockdowns practiced during COVID years 2020-2021, health protocols followed during in-person learning	Prepare a full day of real-time drill and response
100 people	FD All Hazards Exercise Drills	Have completed several full-scale drills, but in the last few years have been focusing on table top and functional drills. Last full scale drill may have been	Entire City	High	Fire Department/ Police Department	No Change. Have not needed to implement.	Tabletop drill for FD and PD command staff for unified command

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		State House dirty bomb scenario in 2008.					practice. Full scale drill for both organizations.
2016 upgrade	FD ImageTrend Elite Reporting System	ImageTrend Elite enables the City and State to better collect, analyze and provide feedback on a wide range of medical quality control and quality improvement initiatives.	Entire	High	Fire Dept	Tied reports from Fire/EMS to GIS through ArcGIS. Has increased data analytic ability.	Monitor and update reporting system procedures
July 2022	FD Current Computer Response and Reporting Programs-ALOHA, CAMEO, Tier II	Electronic Computer programs for CAMEO, ALOHA, Tier II reporting	Entire	High	Fire Dept	Purchased a license for Tier II reporting for the EOC to assist with emergency mitigation abilities.	Tabletop / Full scale HazMat drills
August 2022	FD Enhanced Security at Fire Department Facilities	Several incidents of breaking and entering, and theft would be deterred or prevented by improving security at the stations. Prevention and deterrence methods would be minimal compared to the cost of losing critical equipment that could impact homeland security.	Fire Department Facilities	High	Fire Dept	New training grounds facility has work underway for security cameras and badge access control that is tied into the existing city security system.	Upgrade HQ to have badge access control. Consider incorporating this into new stations / upgrade existing stations as money is available.
Through 2022	GS Off-Premises Data Storage for Water and Wastewater Treatment Plants	Off-premises facility for storage of copies of critical data and 24/7 access during emergencies. The hot-site provides backup and houses a redundant server/client environment. SCADA software COMPLETED Water – in July 2010 WW – in July 2009	Water and Wastewater Treatment Plants	High	General Services Director	GS uses Cusing backup services, has both remote off site data backups as well as cloud systems. City network has its own fiber optic connection	As technology evolves, evaluate software systems and data storage solutions

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Through 2022	PD Member of the NH Information and Analysis Center (NHIAC)	This relationship will ensure information and intelligence will be shared at a regional and cross functional level. Preventative monitoring and high-level coordination, threat assessments, international information provided. (IAC - Action COMPLETED October 2010)	Entire City	High	Police Dept	Provided and used data and metrics, supported the report of suspicious activity	Assign a staff member to this program
Current as of 09-22	MVSD Drills and Lockdowns	Must have 10 fire drills per year, 2 must be lockdown. All Schools must meet this. Most have their own lockdown and fire drills monthly. Work closely with Police Dept and Resource Officer	5 Elementary Schools & MVSD Middle & High Schools, Learning Center	High	MVSD School Principals	Drills and lockdowns practiced during COVID years 2020-2021, health protocols followed during in-person learning	Hold additional training with emergency responders, update procedures
CONCORD ASSETS, SECURITY, AND RESOURCES (SPECIALIZED EQUIPMENT)							
FD- #3 generators PD- #2 generators GS- #2 generators	FD/EM/PD/GS All Dept Portable Generators	FD- 2 on tower trucks, 1, on heavy rescue. PD - In tactical van. GS – mobile in vehicles.	FD- 2 on tower trucks, 1, on heavy rescue. PD - In tactical van. GS – mobile in vehicles.	High	Department Heads	No changes, maintained as needed	Purchase new upgraded portable generators as needed
FD- #90 portables, #30 mobiles, #4 base stations + dispatch enter (CAFMAC)	FD Digital Radios	Purchased 90 radios to replace older ones. Need be programmed. Receive analog signals	4 Stations – Manor, Central, Broadway Headquarters,	High	Fire Department	Radios are programmed and in service. No other changes since last update.	Radios are all set for now, replacements as needed
GS- #20 portables, #140+ mobiles	GS Digital & Analog Radios	Analog portables, limited communication with fire and Police. Vehicles have digital capability	Entire City	High	GS Director	Mobiles continuously upgraded as new vehicles	Purchase digital portable radios for

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						are obtained, new portables are digital	interoperability. Upgrade to meet new technologies
2018 #2 dispatch stations	FD Capital Area Fire Compact Communications System	Area wide communications capability for Compact Towns and backup for Lakes Region communications center. ~28,000 calls in 2021. Dispatch center	Fire Headquarters Building	High	FD Communications Director	Communication center was renovated and new console installed. Backup dispatch console installed a new training grounds.	upgrade CAD software and keep up with technological changes.
6 land lines	FD Dedicated Phone Lines and Cellular Phones For Use in Emergencies	Provide communications infrastructure for emergency operations. Action COMPLETED May 2006	EOC at Fire Department	High	Emergency Management	Periodic maintenance and testing / no other changes.	Maintain latest technology and ensure it has access to prioritized public safety bandwidth. Outfit training grounds with backup EOC infrastructure.
#3 boats	FD Boat Inventory	Maintain an inventory of Boats within the Department. City lost the spare boat but it actively working on retooling the entire fleet with the recently available FY23 boat CIP money.	Entire	High	Fire Dept	Several calls per year, resulting in the use of rescue boats.	Standardize the fleet with the same type of boat that can be used on the entire river. Secure funding to be able to purchase a spare boat setup.
2019	FD Utility Vehicle (UTV)	Off-road UTV used for various emergencies on city trails in located in the woods. Can also be used for event coverage. Has wheels and snow tracks.	Entire city, mutual aid area.	High	Fire Dept.	Acquired new asset. It has been used on several emergency calls.	Period maintenance and purchase of accessories as needed to expanded response potential.

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#5 Engines, #2 ladders, #3 forestry units	FD Fire Engines (Apparatus)	5 Engines, 2 ladders, 3 forestry units	Entire City, Mutual Aid area	High	Fire Dept	Updated inventory of vehicles since last Plan.	Replace fire engines / forestry trucks according to current CIP replacement schedule.
#~1,000	GS Sandbags	Purchased sandbags in mid-2000s in response to flooding events	General Services	Low	General Services Director	No new bags purchases, but no floods occurred resulting in their use	Need more for all Departments and to replace older, fraying bags
As of 09-22	IS/IT City Communication Technology	IS handles all communications in the City, including phone, cellular, modem, fiber optic, and wireless.	All City Facilities	High	Information Services Director	Updated equipment and software. Trained personnel, laid fiber optic.	Upgrade software and keep up with technological changes.
PD - #1 base station at Hospital	PD Radio Transmitter at Concord Hospital	Radio transmitter/ repeater available for emergencies. The PD can coordinate with Concord Hospital to ensure d usability. Action COMPLETED Summer 2010	Concord Hospital	High	Police Dept	No changes-completed project. Base station upgraded but still open for use	Work with Concord Hospital to obtain other communications equipment as needed
PD- #75 portables, #35 mobile radios, #4 base stations	PD Digital Radios	Received new radios with greater number of bands through EMPG grant. Have interoperability to dispatch for Merrimack County	Base stations cover the city	High	GS Communications Technician	Received new radios with greater number of bands	Radios are regularly upgraded/replaced, some items /parts are backordered
2013	PD Bearcat Rescue Vehicle	Resource dedicated to the Central NH Special Operations Unit. Could have lifespan of 20 years if kept indoors	20 member communities in Central NH	High	Police Department	Vehicle has been used several times, logged in. Maintained	Maintain, practice training, drills, make available to surrounding Mutual Aid communities

Source: Concord Hazard Mitigation Committee

FINANCIAL CAPABILITIES

The financial resources in **Table 45** available for hazard mitigation projects are a sampling of those the City 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), City Capital Improvements Program (CIP) Project Funding, Department Operating Budgets, state and federal grant like the NH Department of Transportation grants. There are **2** categories, **Financial Programs or Funding Resources**; and **Potential Funding Programs** for hazard mitigation projects.

Table 45
Financial Capabilities

<u>Latest Adoption or Version Date/ Latest Revised ?</u>	<u>Capability Assessment: Financial</u>	<u>Description</u> Related to hazard mitigation planning and coordination	<u>Location of Capability</u> Entire City or Selected Areas	<u>Level of Effectiveness</u>	<u>Responsibility</u>	<u>Changes Since Last Haz Mit Plan (2017) / How Did Dept Use Capability?</u>	<u>Future Improvements to Capability/ Wish List for the Future?</u>
CONCORD FINANCIAL PROGRAM OR FUNDING RESOURCE FOR HAZARD MITIGATION PROJECTS							
Jan 2021	CA NHDES-US EPA Brownfields	City was awarded federal cleanup funding for the Main Street New Hampshire Employment Security Property. This project focuses on addressing hazardous building materials, primarily asbestos and universal wastes,	Main Street	High	City Administration	Project initiated in 2022 to ensure the site is more attractive to developers	Monitor other properties which might use this matching program
2023-2033	CD City Capital Improvements Program (CIP) Project Funding	Sets aside funds for large equipment/ projects for most Departments	Entire City	High	Comm Devt- CIP Committee	Updated associated costs and projects for annual 10-year update	CIP is annually updated and could include expensive or long-term hazard mitigation projects
2023-2033	CD-EN NH DOT Bridge Program 80/20	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.	Bridges	Low	Community Development - Engineering	Raised funds for bridge replacement when state funds become available: Sewalls Falls, Loudon Road, North Pembroke Road, Iron Works	Place bridges on list several years before expected failure – State not accepting new projects for the next 8 years or so (past 2030)
Through 2022	CD Impact Fees for New Development	Fees assessed for new development to offset costs for transportation for residential (not	New development in Entire City	High	Planning Board	Assessed Recreation, Transportation Fees for new	Invest impact fees back into public parks and streets,

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	t (29.2 Public Capital Facilities IFO)	commercial), and recreation improvements.				housing & development. School Fees no longer assessed. Reductions for building in Central Business Performance District	street trees. Inform City residents where the funds are spent
Annual budget allocated July 2022	FD Fire Department Operating Budget	Budget can contain funding for outreach programs. Often pay for training courses, wildland fire gear, protective clothing and fire supplies, search and rescue (windstorm) /shoring equipment.	Entire City	High	Fire Department	Purchase new software (yet to be implemented) to expand community information sharing and data collection. Implemented a fourth ambulance and staffing to start Oct 1, 2022.	Use FD Operating Budget to finance future hazard mitigation improvements
2016	FD Assistance to Fire Fighters Grant 90/10	208,850 for sprinklering (3 stations) and fire alarm upgrades (4 fire stations). 483,516 for new SCBA equipment (~100)	Stations, Entire City	High	Fire Department	Did not use the capability since the last Plan.	Periodically review funding for firefighter health and safety and equipment upgrades
February 2013 (last used)	GS 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. utilize the FEMA funding to help recover from declared disasters.	Entire City	High	General Services, with City Admin	Used for PA-B Protective Measures	Utilize the FEMA PA program to help with declared disaster costs
Through 2022	GS Operating Budget	Budget can contain funding for culvert and drainage infrastructure improvements	Entire City	High	General Services	Upgraded culverts, bridges and stream crossing, stormwater infrastructure upgrades, maximized	Use GS Operating Budget to finance future hazard mitigation improvement, undertake the

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						grant match programs	identified stormwater upgrades in the CIP through 2033
Through 2022	GS User Fees for Water, Sewer	Portions of water and sewer user fees are set aside to upgrade infrastructure.	Portion of the City has service (Downtown & Penacook)	High	General Services	Upgraded water and wastewater infrastructure with user fees	Make ongoing improvements to water and sewer infrastructure. Use new technologies to inventory.
CONCORD FUTURE FINANCIAL RESOURCES TO EXPLORE FOR HAZ MIT PROJECTS							
Not yet used as of Oct 2022	FD Fire Mitigation Assistance (FMA) Grant 75/25	Available to States, local governments, for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands, which threaten such destruction as would constitute a major disaster. May include expenses for field camps; equipment use, repair and replacement; tools, materials and supplies; mobilization and demobilization activities.	Conservation Lands, Rural Areas, Wildland Urban Interface areas	High	Fire Department	Grant program has not yet been used	Evaluate potential projects for grants

Source: Concord Hazard Mitigation Committee

EDUCATION AND OUTREACH CAPABILITIES

In **Table 46**, identifying City Departments have **Public Outreach Programs, Educational Activities and Notification** 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 46

Education and Outreach Capabilities

<u>Latest Adoption or Version Date / Latest Revised ?</u>	<u>Capability Assessment: Education and Outreach Programs</u>	<u>Description</u> Related to hazard mitigation planning and coordination	<u>Location of Capability</u> Entire City or Selected Areas	<u>Level of Effectiveness</u>	<u>Responsibility</u>	<u>Changes Since Last Haz Mit Plan (2017) / How Did Dept Use Capability?</u>	<u>Future Improvements to Capability/ Wish List for the Future?</u>
CONCORD PUBLIC OUTREACH PROGRAM, EDUCATIONAL ACTIVITY, NOTIFICATIONS							
Through 2022	CA City Website	Used by multiple City Depts, available to residents and visitors, hosts Zoning amendment changes, City alerts, sign up notifications. Vendor is City CivicPlus and various modules. New City programs initiated and publicized with the support of the website	Entire City, General Public	High	City Administration	Updated regularly with announcements, agendas, meeting notices, more, outreach and emergency warnings.	Make improvements to City website to accommodate user needs. Investigate the use of other CivicReady modules. Promote the public outreach venues: Notify Me, Alerts, City Manager's Newsletter, etc. Include a severe weather warning on homepage & alert
Jul 2022	CTV Education and Outreach	Works with the City Public Information Officer to develop messaging and videos for broadcast stations and the City's school media / website Headquarters in Concord High School. Works on central messaging with City PIO. Concord TV Board of Directors (financial oversight)	Entire City	High	CTV Staff	Was active between 2017-2022, created multiple PSAs on different topics related to mitigation. City hired a PIO since 2017, so CCTV works with PIO instead of different depts.	Work with City to locate additional funding sources (now funded through franchise fees). Identify and utilize additional methods for messaging.

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Latest Adoption or Version Date / Latest Revised ?	Capability Assessment: Education and Outreach Programs	Description Related to hazard mitigation planning and coordination	Location of Capability Entire City or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2017) / How Did Dept Use Capability?	Future Improvements to Capability/ Wish List for the Future?
July 2022	CTV Disaster Preparedness PSAs	Distribute federal PSAs are part of scheduled programming. Received through the Ad Council. Disaster preparedness PSAs run on the broadcast. Also broadcasts live streaming on CCTV website. May be available on Roku if not a cable subscriber. Stream on City's YouTube page.	Entire City	Moderate	CTV Staff	Must search for PSAs. Ran PSAs daily on cable starting in 2019.	Develop hyperlinks on the CCTV website for the PSAs, align with hazard mitigation planning goals.
Current as of 10-22	FD/PD/GS/LI /Public Info Officer Recreation Department Facebook Page, Twitter, YouTube	City Facebook Page communication to engage the public, provide up to the moment information. About Waste Plant meters, leaf removal, leaking toilets, downtown snow removal, water conservation	Entire City, General Public	High	Individual Department Heads	Use Facebook and Twitter to engage social media for emergency and outreach messaging. Added a Public Information Officer since 2017	Utilize and update City Facebook pages and the City Website to provide constant information.
August 2022	FD/PD/ Depts Education and Outreach Programs	Several Depts All stations open to tours. Outreach to 2 nd grade classrooms each year. National Night Out, first week of August, planned by the PD but benefits FD & GS. Premiere event for safety education: introduces crime prevention, safety, community agencies (MADD, CAPHN, Hospital, military) & guests, ambulance service.	Entire City, General Public, NNO at Rollins Park	Moderate	Police Department	Open houses held annually, as is the classroom visits. Night Out is also annual event. Reduced public education due to COVID and staffing. Added Public info Officer	Maintain the current program administration, which is extremely successful. Expand public education through Fire Prevention division.
Sep 2022	GS Household Hazardous Waste Disposal	Household hazardous material disposal program twice per year permits disposal of dangerous materials at	Everett Arena	Moderate	Transfer Station	Held HHW disposal in Sep 2022, planning for Apr 2023	Provide annual household hazardous waste disposal day service at

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		the Arena: propane tanks, dried paint cans, waste oil, waste antifreeze, batteries, tires					Transfer Station, advertise annual events better to reach more residents
2014	IT Website Module for Emergency Communications	People can sign up to receive emergency notification emails or texts.	Entire City, General Public	High	Information Technology	Module still used for sign up since 2017	Upgrade module for newer platform and technology apps
3 officers total, FT	PD School Resource Officer (SRO)	Police presence in the school environment can handle discipline issues in school, encourages children to behave in appropriate manners, counseling, assaults.	Concord High and MVSD	High	Police Department	Program and officer status in schools has increased since 2017	Add another officer to Rundlett Middle School to provide better coverage.

Source: Concord Hazard Mitigation Committee

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7 PRIOR ACTION STATUS

The **Hazard Mitigation Plan Update 2017** provided a basis to begin Action development, many of which originated from prior **Plans**. A review of the **2017** Actions is provided by the Hazard Mitigation Committee, determining which Actions have been **Completed**, **Deleted**, or **Deferred** to the **2024 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. Actions developed, evaluated and implemented across Hazard Mitigation Plans accommodate existing, new, and future development (buildings and infrastructure). To accommodate the **2017 Plan's deferred** Actions in addition to the **New** Actions from the **2024 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**

Actions which were **Completed** from the **2017 Plan** are listed in **Table 43** along with completion dates.

Actions which were **Deleted** from the **2017 Plan** might have been no longer necessary or a priority to the City, no longer relevant to the City'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 Concord's activities. Deleted Actions are listed in **Table 44**.

Actions which were **Deferred** from the **2017 Plan** are still important to the City 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 45** and have been re-prioritized with the **New** Actions in the **Mitigation Action Plan**.

Changes in priority of the **Deferred 2017** Actions occurred over the last five years. The **2017 Plan** used the **12-36 Priority Score enhanced STAPLEE** system while the **2024 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 *City Emergency Operations Plan*. The mitigation Actions are those which are carried forth in this **2024 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 <i>City Hazard Mitigation Plan</i> .
Preparedness	Short Term	Action assists or supports planning, protective activities, public education, training and exercise. ↳ Best suited for <i>City Emergency Operations Plan</i> .
Response, Recovery, Other Related	Short Term	Action supports preventative, response, recovery-related, repeated or deferred maintenance activities. ↳ Best suited for <i>City Emergency Operations Plan</i> .

HAZARDS CONSIDERED

With **23** individual hazards evaluated in this Plan, it is not always practical to list each one when describing location vulnerabilities or solutions. In many cases, listing the more encompassing main hazard categories from chapters **3 GOALS AND OBJECTIVES** and **4 HAZARD RISK ASSESSMENT**, which are **Flood, Wind, Fire, Extreme Temperature, Earth, Technological** and **Human**, should accurately define the issues of most of the identified Actions or locations. Using these hazard categories would often better accommodate the situation in their broadness. The categorized hazards have also been used in the **APPENDIX A Critical and Community Facilities Vulnerability Assessment** but tailored when necessary.

In some cases, further hazard detail at a specific location or to describe an Action is necessary. When needed, the specific hazards addressed in this **Hazard Mitigation Plan** could be utilized, such as **Erosion** from the *River Hazards* category, **Storm** (generally applying to warm weather, all-encompassing storms) or **Tree Debris** from the *Wind* category, **Excessive Heat** from the *Extreme Temperature* category, or **Communications** from the *Long Term Utility Outage*, to provide the specific information needed to understand certain issues in Concord.

Therefore, when the main hazard categories of **Flood, Wind, Fire, Extreme Temperature, Earth, Technological** and **Human** are not precise enough, one or more of the specific **23** hazards evaluated may be utilized for greater accuracy.

Review of 2017 Actions

The **2017 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), 2011* became standardized and tailored by each FEMA Region over the years.

Concord's mitigation Actions from the **2017 Plan**, which included Actions from the City'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**. Over the previous Plans, the Actions numbers denoted by years were recorded as such. Actions from **2004** which were **Completed** or **Deleted** and identified as such in the **2017 Plan** were not given numerical identifiers (**#NA**).

HMP	Action # Range	
2007 Plan	#01- 2007 to	#34- 2007
2012 Plan	#35- 2012 to	#115- 2012
2017 Plan	#116- 2017 to	#131-2017
2024 Plan	#132- 2024 to	#181- 2024

A total of **6** mitigation Actions have been **Completed** from the previous **Hazard Mitigation Plans** as shown in **Table 47**. This includes **4** Actions most recently **Completed** between the **2017 Plan** and **2024 Plan**.

Table 47
Completed Mitigation Actions

Priority Score (2017)	Action Number	Action	Completed By Date	Who is Responsible	Approx \$ Cost	Natural Hazards Addressed
COMPLETED AFTER 2024 Plan (from CHAPTER 8)						
		See Chapter 8 – Add completed Actions				
COMPLETED BY 2024 Plan						
44	#35-2012	Continue to Enforce Floodplain Regulation in the Zoning Ordinance for Protection from the Floodway (CD)	Sep 2022 – MOVE TO CAP ASSMT	Community Development - Planning Division/Code Enforcement	\$0	River, Flood, Erosion
44	#36-2012	Continue to Enforce Building Codes to Reduce Wind & Snow Load Damage that	Sep 2022 – MOVE TO CAP ASSMT	Community Development - Code Enforcement	\$0	Wind, Tropical/Post-Tropical, Winter, Tree Debris

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Completed By Date	Who is Responsible	Approx \$ Cost	Natural Hazards Addressed
		Leads to Structure Collapse (CD)				
44	#40-2012	Update the Floodplain Development Zoning Ordinance to Comply with NFIP Requirements and Planning Board Recommendation (CD)	Sep 2022 – MOVE TO CAP ASSMT	Community Development Planning Board	\$0	River, Flood, Erosion, Fluvial Erosion and Channel Movement
44	#85-2012	Continue to Enforce Road and Driveway Slope Subdivision Regulation Standards to Reduce Potential for Erosion and Road Washout (CD)	Sep 2022 – MOVE TO CAP ASSMT	Community Development-Planning/Engineering	\$0	Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Flood, Fluvial Erosion, Landslide, Bank Erosion & Bed Scouring, Rapid Snow Pack Melt
44	#98-2012	Continue to Enforce City Requirements for Underground Utilities to Mitigate Severe Wind and Winter Weather Event Damage (CD)	Sep 2022 – MOVE TO CAP ASSMT	Community Development-Planning/Engineering	\$0	Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Aging Infrastructure
39	#65-2012	Continue to Enforce Municipal Fire Alarm and Fiber Optic Network Regulations to Prevent Failure of Regional Fire Alarm System (FD)	Sep 2022 – MOVE TO CAP ASSMT	Fire Department, assisted by Information Technology	Annual Costs of \$50,000 to \$100,000	Communications Failure, Utility Outage, Aging Infrastructure, Lightning, Winter, Wind, Tropical/Post-Tropical
COMPLETED BY 2017 Plan						
12	#01-2007	Locate a Backup Operation Center for Water and Wastewater Treatment Plants (IT). Sites are presently operated via remote.	Water – in July 2010 WW - in July 2009	General Services	\$200,000	Flood, River, Fluvial Erosion, Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Sabotage, Aging Infrastructure
12	#02-2007	Create Off-Premises Data Storage for Water and Wastewater Treatment Plants (IT)	Water – in July 2010 WW - in July 2009	General Services	Included in Backup Operation Center above	Flood, River, Fluvial Erosion, Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Sabotage, Aging Infrastructure
32	#03-2007	Review Drainage Areas of Previously Impacted Areas and Prepare Capital Plan for Mitigation of Any Potential Future Flooding (HMC)	July 2010	Community Development	\$300,000	Flood, River, Fluvial Erosion, Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Sabotage, Aging Infrastructure

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Completed By Date	Who is Responsible	Approx \$ Cost	Natural Hazards Addressed
35	#04-2007	Prepare a Flood Action Plan for the Wastewater Treatment Plants (GS)	2009	General Services	Staff Time	Flood, River, Fluvial Erosion, Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Sabotage, Aging Infrastructure
36	#05-2007	Present Revisions to Subdivision Regulations for Residential Sprinkler Systems in New Homes As Appropriate (FD)	June 2010	Community Development	Staff Time	Fire, Lightning, Wildfire
36	#06-2007	Install a Radio Transmitter at Concord Hospital (PD)	Summer 2010	Police Department	\$70,000	Communications Failure, Utility Outage, Aging Infrastructure
33	#07-2007	Enhance Security at Fire Department Facilities (FD)	2007	Fire Department	\$100,000	Human Hazards, Public Health
33	#08-2007	Develop Aquifer Protection Ordinance (CD)	April 2010	Community Development	\$15,000	Flood, River, Fluvial Erosion, Storms, Wind, Tropical/Post-Tropical, Winter, Hazardous Materials Spill, Public Health (Water Quality)
36	#09-2007	Provide GIS Software (CD-GIS)	Spring 2010	Community Development – Information Services	Staff Time	All Natural Hazards
31	#10-2007	Implement TEMSIS Reporting System (FD)	2007	Fire Department	Staff Time	Communications Failure, Utility Outage, Aging Infrastructure, Lightning, Winter, Wind, Tropical/Post-Tropical, Crash, Public Health (Medical), EMS
36	#11-2007	Secure Dedicated Phone Lines and Cellular Phones For Use in Emergencies (FD)	May 2006	Fire Department	\$15,000	Communications Failure, Utility Outage, Aging Infrastructure, Lightning, Winter, Wind, Tropical/Post-Tropical, Crash, Public Health (Medical), EMS
36	#12-2007	Establish a System for Public Notification and Information During a Disaster (PD)	May 2006	Police Department	\$35,000	Flood, River, Communications Failure, Utility Outage, Lightning, Winter, Wind, Tropical/Post-Tropical
36	#13-2007	Develop a Coordinated Plan For Responding to Storms (FD)	2007	Fire Department	Staff Time	Flood, River, Communications Failure, Utility Outage, Lightning, Winter, Wind, Tropical/Post-Tropical, Dam
33	#14-2007	Develop a Plan to Protect the City's Data and Resources (HMC)	2011	Community Development – Information Services	\$50,000	Cyber, Utility Failure

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Completed By Date	Who is Responsible	Approx \$ Cost	Natural Hazards Addressed
33	#15-2007	Establish a Relationship with an Intelligence Fusion Center	October 2010	Police Department	\$0	Cyber, Utility Failure
33	#16-2007	Enhance the Asset GIS Layers to Enable Instant Database Access for Use During Emergency Response	December 2006	Community Development – Information Services	\$2,000	All Natural Hazards
35	#17-2007	Coordinate with NHTI for Emergency Sustainability (PD) through the Capital Area Public Health Network	January 2010	Police Department	Staff Time	Public Health
33	#18-2007	Adopt Public Health Objectives from the Capital Area Public Health Plan (HMC)	September 2009	Fire Department	Staff Time	Public Health
36	#35-2012	Enforce Continued Floodplain Regulation (CD) with the ZO for Protection from the Floodway	Repeated and Continued during 5-year Plan duration	Community Development	Staff Time	River, Flood, Erosion, Fluvial Erosion and Channel Movement
36	#36-2012	Enforce Building Codes to Reduce Wind Load Damage (CD) to Reduce Structure Collapse	Repeated and Continued during 5-year Plan duration	Community Development	Staff Time	Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Sabotage, Aging Infrastructure
36	#40-2012	Update the Floodplain Development Zoning Ordinance to Comply with NFIP Requirements and Planning Board Recommendation	Repeated and Continued during 5-year Plan duration	Planning Board	Staff Time	River, Flood, Erosion, Fluvial Erosion and Channel Movement
29	#50-2012	Update Stormwater Management System at Bow Brook and South Street and Sunset Avenue	September 2013	General Services	\$118,325	Flood, Erosion, Bank Erosion and Channel Movement
29	#58-2012	Update Stormwater Management System at Tanner Street and Village Street (Penacook)	November 2015	Community Development	\$337,205	Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Sabotage, Aging Infrastructure
35	#65-2012	Enforce Municipal Fire Alarm and Fiber Optic Network (FD) Connection to Prevent	Repeated and Continued during 5-	Fire Department	Annual Costs of \$50,000 to \$100,000	Communications Failure, Utility Outage, Aging Infrastructure, Lightning, Winter, Wind, Tropical/Post-

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7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Completed By Date	Who is Responsible	Approx \$ Cost	Natural Hazards Addressed
		Failure of Fire Alarm System	year Plan duration			Tropical, Crash, Public Health (Medical), EMS
33	#85-2012	Enforce Road and Driveway Slope Subdivision Regulation Standards (CD) to Reduce Potential for Erosion and Road Washout	Repeated and Continued during 5-year Plan duration	Community Development	Staff time	Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Flood, Fluvial Erosion, Landslide, Bank Erosion & Bed Scouring, Rapid Snow Pack Melt
30	#98-2012	Enforce City Requirements for Underground Utilities (CD) to Mitigate Severe Wind and Winter Weather Event Damage	Repeated and Continued during 5-year Plan duration	Community Development	Staff time	Storms, Wind, Tropical/Post-Tropical, Winter, Tree Debris, Aging Infrastructure

Source: Concord Hazard Mitigation Committee

P = Project Partially Completed – Appears in [2024 Mitigation Action Plan](#)

The pink highlighted rows indicate the **11** total **Deleted** Actions in **Table 48** from previous **Hazard Mitigation Plans** which will not be incorporated into the **2024 Plan** as **Deferred** Actions. Many of the recent Actions were **Deleted** because they were preparedness, response or recovery items and more appropriately belonged in the City's **Emergency Operations Plan**.

Table 48
Deleted Mitigation Actions

Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
DELETED AFTER 2024 Plan (from CHAPTER 8)						
		See Chapter 8 – Add deleted Actions				
DELETED FROM 2024 Plan						
39	#49-2012	Develop and Implement a Sprinkler Ordinance for the Conflagration Areas to Reduce the Risk of Fire (FD/PD)	Sep 2022	Community Development, assisted by Fire Department	\$6 Million	Project is unrealistic (had been revised to installing sprinkler systems into city buildings from CIP, all of those were done)
35	#109-2012	Review Regulations to Consider Tree Breaks During the Plan Review Process to Reduce the Impact of Wildfire (CD)	Sep 2022	Emergency Management and Fire Department	\$0	Project was unrealistic
47	#118-2017	Upgrade Stormwater Management Systems at the <u>Fisherville</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$1,500,000	Project was incorporated into another activity
47	#119-2017	Upgrade Stormwater Management System at the <u>Heights</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$3,500,000	Project was incorporated into another activity
47	#120-2017	Upgrade Stormwater Management System at the <u>Hoit Road</u> Subcatchment Area to Eliminate Potential for Flooding, Erosion and Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$600,000	Project was incorporated into another activity

City of Concord, NH Hazard Mitigation Plan Update 2024

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Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
47	#121-2017	Upgrade Stormwater Management System at <u>Horseshoe Pond</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$2,000,000	Project was incorporated into another activity
47	#122-2017	Upgrade Stormwater Management System at the <u>Hospital</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$1,500,000	Project was incorporated into another activity
47	#123-2017	Upgrade Stormwater Management System at the <u>Oak Hill</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$3,000,000	Project was incorporated into another activity
47	#124-2017	Upgrade Stormwater Management System at the <u>Penacook</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$2,000,000	Project was incorporated into another activity
47	#125-2017	Upgrade Stormwater Management System at the <u>Trapezoid</u> Drainage Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$4,000,000	Project was incorporated into another activity
47	#126-2017	Upgrade Stormwater Management System at the <u>Turkey River</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$750,000	Project was incorporated into another activity
47	#127-2017	Upgrade Stormwater Management System at <u>Washington</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$1,500,000	Project was incorporated into another activity
47	#128-2017	Upgrade Stormwater Management System at <u>West Concord</u> Subcatchment Area to Eliminate Potential for Flooding and Erosion to Cause Roadway Failure	Sep 2022	Community Development - Engineering, assisted by General Services	\$750,000	Project was incorporated into another activity

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
	#105-2012	Implement Natural Fire Breaks in Areas of High Concern to Reduce Wildfire and Lighting Damage (FD)	Sep 2022	Fire Department	\$200,000 annually for about 5 years	Action was unrealistic
DELETED FROM 2017 Plan						
30	#19-2007	Install Remote Monitoring System at Penacook Lake Dam (PD)	June 2011	General Services	\$5,000	Was modified and incorporated into another Action.
24	#20-2007	Encourage Floodproofing of Residential Structures in the Floodplain	June 2011	Community Development	\$2.8 million	Was not financially feasible as stated and was modified and incorporated into another Action.
36	#21-2007	Incorporate Police Department Mass-Call Back (PD)	June 2011	Police Department	Staff and \$2,500	Duplicates existing efforts.
35	#22-2007	Target the Response for Accident Events on Selected Roadways (HMC)	June 2011	Police Department	Staff Time	Duplicates existing efforts.
34	#23-2007	Enhance General Order on Flooding (PD)	June 2011	Police Department	Staff Time	Was modified and incorporated into another Action.
36	#24-2007	Develop 911 Public Notification Procedures (TF)	June 2011	Police Department	Staff Time	Duplicates existing efforts.
35	#25-2007	Create Public Notification System for Wildfires (PD)	June 2011	Fire Department	\$30,000	Duplicates existing efforts.
32	#26-2007	Conduct ICS Training for All City Departments (FD)	June 2011	Fire Department	Staff Time	Is a duplicate Action.
35	#27-2007	Encourage Flood Preparedness (GS)	June 2011	General Services	\$10,000	Was modified and incorporated into another Action.
36	#28-2007	Develop a Plan for Minimizing Tree and Brush Buildup Near Utility Lines, Multi-Residential Facilities, and Private Residences Constructed on Slopes (FD)	June 2011	Fire Department	Staff Time	Duplicates existing efforts.
36	#29-2007	Review Equipment Availability for Ice and Snow Events (GS)	June 2011	General Services	Staff Time	Was modified and incorporated into another Action.
34	#30-2007	Identify and Plan for Ice Jams (TF)	June 2011	General Services	Staff Time	Was not relevant to the City's situation.
33	#31-2007	Ensure that Selected Businesses Provide	June 2011	Fire Department	Staff Time	Could not realistically be undertaken.

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
		Emergency Plans to the City (TF)				
28	#32-2007	Develop Buffer Regulations for Homes and Developments (FD)	June 2011	Community Development	Staff Time	Duplicates existing efforts.
33	#33-2007	Develop a Public Notification System for Significant Storms (FD)	June 2011	Fire Department	Staff Time	Duplicates existing efforts.
32	#34-2007	Enact Public Notification System for Floods (PD)	June 2011	Fire Department	Staff Time	Duplicates existing efforts.
36	#37-2012	Secure City Hall (PD)	December 2016	City Manager	\$25,000 + \$5,000	Is a preparedness, response or recovery Action
36	#38-2012	Install Security Monitoring System of Water Treatment Facility (PD)	December 2016	General Services	\$30,000	Is a preparedness, response or recovery Action
36	#39-2012	Install Security Monitoring System of Waste Water Treatment Facility (PD)	December 2016	General Services	\$100,000	Is a preparedness, response or recovery Action
36	#41-2012	Undertake Penacook Lake Dam Monitoring and Maintenance (GS)	December 2016	General Services	Staff Time	Is a preparedness, response or recovery Action
35	#42-2012	Enhance Security to Concord High School (Non-City) (PD)	December 2016	Concord School Department	\$100,000	Is a preparedness, response or recovery Action
34	#43-2012	Install a Surveillance System at City Facilities (IT)	December 2016	General Services	\$100,000	Is a preparedness, response or recovery Action
33	#44-2012	Enhance Security at Memorial Field (PD)	December 2016	General Services	\$30,000	Is a preparedness, response or recovery Action
33	#45-2012	Improve Building Security of Beaver Meadow Golf Course (Non-City) (GS)	December 2016	Parks and Recreation	\$25,000	Is a preparedness, response or recovery Action
33	#46-2012	Undertake Roadway Monitoring and Maintenance Caused by City Dams (GS)	December 2016	General Services	Staff Time	Is a preparedness, response or recovery Action
32	#47-2012	Enhance Security at Unutil Substations (Non-City) (PD)	December 2016	Emergency Management & Unutil Facilities Director	\$200,000	Is a preparedness, response or recovery Action
30	#48-2012	Continue to Maintain Zoning Setback Regulations for Tall Structures (CD)	December 2016	Community Development	Staff Time	Is a preparedness, response or recovery Action
29	#51-2012	Update Stormwater Management System at Concord Heights	December 2016	General Services	\$514,690	Was incorporated into another project or different Action
29	#52-2012	Update Stormwater Management System at Ormond St, Christian Ave,	December 2016	General Services	\$2,198,174	Was incorporated into another project or different Action

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
		Oriole Rd, East Side Dr and Partridge Rd				
29	#53-2012	Update Stormwater Management System at West Sugarball Road to Outfall on Merrimack River	December 2016	General Services	\$146,960	Was incorporated into another project or different Action
29	#54-2012	Update Stormwater Management System at Concord Hospital, South of Redington Road/West of Fruit Street	December 2016	General Services	\$603,900	Was incorporated into another project or different Action
29	#55-2012	Update Stormwater Management System at Charles Street and Contoocook River	December 2016	General Services	\$63,580	Was incorporated into another project or different Action
29	#56-2012	Update Stormwater Management System at Pleasant Street and Miller's Brook	December 2016	General Services	\$22,044	Was incorporated into another project or different Action
29	#57-2012	Update Stormwater Management System at Merrimack Street and Bye Street	December 2016	General Services	\$614,020	Was incorporated into another project or different Action
29	#59-2012	Update Stormwater Management System at Noyes Street near Harvard Street	December 2016	General Services	\$63,580	Was incorporated into another project or different Action
29	#60-2012	Update Stormwater Management System at Rumford Street between Penacook Street and Jennings Street	December 2016	General Services	\$148,225	Was incorporated into another project or different Action
29	#61-2012	Update Stormwater Management System at Low Area at Borough, Washington and Fowler Triangle	December 2016	General Services	\$424,050	Was incorporated into another project or different Action
26	#62-2012	Upgrade Radio System in Merrimack Valley High School (Non-City) (PD)	December 2016	Police Department and Merrimack Valley School System	\$20,000	Is a preparedness, response or recovery Action
36	#63-2012	Enhance Security System of Police Headquarters (PD)	December 2016	Police Department	\$15,000	Is a preparedness, response or recovery Action
35	#64-2012	Increase Direct Communications Among Departments and Non-City Entities (FD)	December 2016	Emergency Management	Staff Time	Is a preparedness, response or recovery Action
34	#66-2012	Develop Fire Dispatch Back-up Plan (FD)	December 2016	Fire Department	\$20,000	Is a preparedness, response or recovery Action

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Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
31	#67-2012	Continue to Update Contact Information for Ice Storm Response (GS)	December 2016	General Services	Staff Time	Is a preparedness, response or recovery Action
29	#68-2012	Maintain Dispatch Software and Hardware to Allow For AVL Capability and Priority Dispatching (FD)	December 2016	Fire Department	\$150,000	Is a preparedness, response or recovery Action
24	#69-2012	Enhance the Security of WKXL (PD)	December 2016	Police Department	Staff Time	Is a preparedness, response or recovery Action
24	#70-2012	Enhance the Security of WNHI (PD)	December 2016	Police Department	Staff Time	Is a preparedness, response or recovery Action
36	#72-2012	Require Incident Command System (ICS) Training for City Personnel (PD)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
36	#73-2012	Execute Mock Drills for Civil Disturbances (PD)	December 2016	Police Department	\$30,000	Is a preparedness, response or recovery Action
34	#74-2012	Develop Policies for Ensuring State of Storm Readiness (FD) to	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
33	#75-2012	Undertake More Tabletop Exercises (FD)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
32	#76-2012	Maintain GIS Software to Utilize Hazard Mitigation Maps in Emergency Response Vehicles (TF)	December 2016	Community Development	Staff Time	Is a preparedness, response or recovery Action
32	#77-2012	Execute Mock Drills for Technological Disasters (IT)	December 2016	Police Department	\$50,000+	Is a preparedness, response or recovery Action
32	#78-2012	Require NIMS Training for All Key Staff (GS)	December 2016	General Services	\$5,000	Is a preparedness, response or recovery Action
32	#79-2012	Develop Coordinated Response to NH Military Reservation Emergencies (PD)	December 2016	Police Department	Staff Time	Is a preparedness, response or recovery Action
29	#80-2012	Conduct Hazardous Materials Operations Training for All City Departments (FD)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
25	#81-2012	Participate in NFIP Training	December 2016	Director of Building Services	Staff Time	Is a preparedness, response or recovery Action
24	#82-2012	Develop Coordinated Response to NH State Prison Disturbance (PD)	December 2016	Police Department	Staff Time	Is a preparedness, response or recovery Action
23	#83-2012	Provide Ongoing GIS Training (CD-GIS)	December 2016	Community Development-GIS	Staff Time	Is a preparedness, response or recovery Action

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7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
36	#84-2012	Develop and Implement a Response Plan for Special Operations Incidents (FD)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
33	#86-2012	Update the 2005 Emergency Operations Plan (FD)	December 2016	Emergency Management	Staff Time	Is a preparedness, response or recovery Action
32	#87-2012	Update GIS Critical Facilities Layer (CD-GIS)	December 2016	Community Development-GIS	Staff Time	Is a preparedness, response or recovery Action
32	#88-2012	Devise Badge System for City Facilities (IT)	December 2016	Police Department	\$250,000	Is a preparedness, response or recovery Action
32	#90-2012	Develop a Plan to Protect City Clerk's Records (TF)	December 2016	City Clerk	\$100,000	Is a preparedness, response or recovery Action
32	#92-2012	Develop Windstorm Preparation Procedures	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
32	#93-2012	Update General Orders for Procedures as Needed (PD)	December 2016	Police Department	Staff Time	Is a preparedness, response or recovery Action
31	#94-2012	Adopt the Capital Area Public Health Plan and Mass Vaccination Plan (TF)	December 2016	Fire Department, Police Department	Staff Time	Is a preparedness, response or recovery Action
31	#95-2012	Enhance or Relocate the City's EOC (FD)	December 2016	Emergency Management	1.5 million	Is a preparedness, response or recovery Action
31	#96-2012	Maintain a Contingency Plan for City Hall Operations (TF)	December 2016	City Manager	Staff Time	Is a preparedness, response or recovery Action
31	#97-2012	Improve an Alternative Communication Plan (IT)	December 2016	IS	\$500,000	Is a preparedness, response or recovery Action
30	#99-2012	Review Material Availability for Ice and Snow Events (GS)	December 2016	General Services	Staff Time	Is a preparedness, response or recovery Action
30	#100-2012	Ensure Staff and Equipment Preparedness for Ice, Snow, and Wind Events (GS)	December 2016	General Services	Staff Time	Is a preparedness, response or recovery Action
30	#101-2012	Review and Document Ice, Snow, and Wind Storm Response Procedures (GS)	December 2016	General Services	Staff Time	Is a preparedness, response or recovery Action
30	#102-2012	Develop an Action Plan in Response to a Major Fire (GS)	December 2016	General Services	Staff Time	Is a preparedness, response or recovery Action
30	#103-2012	Utilize Resources of Concord Trailways During an Emergency (PD)	December 2016	Fire Department	\$30,000	Is a preparedness, response or recovery Action
30	#104-2012	Submit a Plan For a Full-Time Position for a Dedicated Emergency	December 2016	Emergency Management	130,000 annually	Is a preparedness, response or recovery Action

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Deleted Date	Who is Responsible	Approx \$ Cost	Why Deleted? The Action...
		Management Director/Coordinator (FD)				
29	#106-2012	Identify Inaccessible Areas and Develop a Plan for Tanker Access (FD)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
29	#107-2012	Implement Pre-Construction Plan Review Process for Hazardous Materials Plan for All Properties within the Floodplain (TF)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
28	#108-2012	Develop a Plan to Improve Radio Coverage City-wide (FD)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action
28	#110-2012	Coordinate Increased Security with Concord Airport (PD)	December 2016	Police Department	\$100,000	Is a preparedness, response or recovery Action
28	#111-2012	Implement an Enterprise Resource System to Support City Services (FD)	December 2016	Finance Dept	1.75 million	Is a preparedness, response or recovery Action
27	#112-2012	Install Backup Power Sources for City Facilities (IT)	December 2016	General Services	\$275,000	Is a preparedness, response or recovery Action
26	#113-2012	Implement a Snow Drift Fencing Program (TF)	December 2016	General Services	Staff Time + \$2,000	Is a preparedness, response or recovery Action
25	#114-2012	Require Designation of Snow Storage Areas on Site Plans (CD)	December 2016	Community Development	Staff Time	Is a preparedness, response or recovery Action
24	#115-2012	Assess the Need for a Plan For Development in Urban Interface Areas (FD)	December 2016	Fire Department	Staff Time	Is a preparedness, response or recovery Action

Source: Concord Hazard Mitigation Committee

The tan highlighted rows in **Table 49** indicate the **6 Deferred** mitigation Actions from the **2017 Plan** which also appear in the forthcoming **2024 Plan's Mitigation Action Plan**. Many **Action** titles were revised to update the Action and to reflect the new focus on mitigation although the principle for each remains the same. The **Approximate Cost** may rise. They will all be reevaluated to accommodate **2024** standards in later sections.

Table 49

Deferred Mitigation Actions

Priority Score (2017)	Action Number	Action	Deferred Date	Who is Responsible	Approx \$ Cost	Why Deferred? Because...	Hazards Addressed
35	#116-2017	Evaluate the Overlap Between the 2015 Fluvial Erosion Hazard (FEH) Zone and the Existing Shoreland Protection Zone for the Soucook River and Turkey River (FGA) After the Next Master Plan Update to Reduce the Impact of Flood and Erosion	Sep 2022	Emergency Management, Community Development-Planning (Zoning)	\$0	Other Actions took higher priority (Master Plan work)	River, Flood, Fluvial Erosion, Landslide/ Bank Failure
35	#89-2012	Encourage the Installation of Sprinkler Systems at Concord Gardens and Royal Gardens Multi-Unit Housing to Reduce the Risk of Lightning and Fire	Sep 2022	Fire Department	\$0	Other Actions took higher priority	Wildfire, Lightning, Fire
35	#91-2012	Inform Property Owners of Funding Resources for Fire Alarm System Upgrades at All Multifamily Developments to Reduce the Risk of Lightning and Fire	Sep 2022	Fire Department, Public Information Officer	\$0	Other Actions took higher priority	Wildfire, Lightning, Fire
35	#130-2017	Purchase Lightning Rods and Grounding Panels for Installation on Tall, Older City Buildings and the City Airport to Reduce the Risk of Lightning Damage	Sep 2022	Emergency Management with Community Development-Engineering	\$250,000 - \$500,000	Other Actions took higher priority	Lightning
44	#71-2012	Develop NFIP Public Awareness Program and Publicize the	Sep 2022	Emergency Management and Fire	\$2,000	Other Actions took higher priority (low	Flood, Rapid Snow Pack Melt, Severe Storms (Rain)

City of Concord, NH Hazard Mitigation Plan Update 2024

7 PRIOR ACTION STATUS

Priority Score (2017)	Action Number	Action	Deferred Date	Who is Responsible	Approx \$ Cost	Why Deferred? Because...	Hazards Addressed
		Availability of Flood Insurance to Reduce the Impact of Future Flooding Events		Department, Public Information Officer		flood hazard over last decade)	
40	#129-2017	Educate the Public about the Implications of Soucook River & Turkey Fluvial Geomorphic Assessment to Reduce the Risk of Erosion and Impacts of Flooding	Sep 2022	Emergency Management and Fire Department with Public Information Officer	\$2,000	Other Actions took higher priority (low flood hazard over last decade)	Flood, Fluvial Erosion, Landslide, Bank Erosion & Bed Scouring

Source: Concord Hazard Mitigation Committee

P = Project Partially Completed – Appears in [2024 Mitigation Action Plan](#)

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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 Concord 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 City 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 **2024 Plan**, most of the **Capability Assessment's Future Improvements** activities were not utilized as Actions since they are more appropriate for the City'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 City 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 Concord.

Several uncompleted **Deferred** (2017) Concord mitigation Actions have been carried forward into the **2024 Plan** with the updates to the evaluation, cost, prioritization, etc.

ACTION MATRIX

A listing of **6 Deferred** mitigation Actions from **2017** and **50 New** mitigation Actions from **2023** important to the City of Concord 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 with this practice beginning in this **2024 Plan**. The **2024 Actions** begin where the prior Actions left off, **#132- 2024** through **#181- 2024**. 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 2017** Actions and the **New 2024 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.

Concord's Mitigation Action Plan 2024

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 1-4 Series** of the **Hazard Mitigation Plan 2024**, the **Mitigation Action Plan** shown in **Table 50 Planning and Regulatory**; **Table 51 Structure and Infrastructure**; **Table 52 Natural Systems Protection**; and **Table 53 Education and Outreach** should be able to guide future hazard mitigation efforts in the City through an annual implementation process.

Six **(6) Deferred** Actions from **2017** and **50 New** Actions from **2024** combine to develop the **56** Actions of the **2024 Mitigation Action Plan**. The **Deferred** Actions' cells are highlighted in tan.

PROJECT PHASES

Some of the Actions are anticipated for completion after the 5-year lifespan of this **2024 Plan**. Long Term Actions (Years **4-5** of the Plan's lifespan) may often run several years beyond **2028**. For these Actions, a series of Phases will be identified, each representing a 5-year lifespan of the Plan. For example, a **Long Term Phase 1 of 3** Action indicates that through **2029**, **5** years of the project are expected to be worked on, plus an additional **10** years (two more 5-year Plan lifespans) of the project are expected.

Long Term (4-5 Years of the Plan)

Phase 1 (**5** Years – lifespan of the current Plan)

Phase 2 (**10** Years – **2** lifespans of the Plan)

Phase 3 (**15** Years – **3** lifespans of the Plan)

MITIGATION ACTION PLAN

The **Actions** (projects) for the City to work on and/or complete over the duration of this Plan include:

Table 50
Local Planning and Regulation Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
#116-2017	Evaluate the Overlap Between the 2015 Fluvial Erosion Hazard (FEH) Zone and the Existing Shoreland Protection Zone for the Soucook River and Turkey River (FGA) After the Next Master Plan Update to Reduce the Impact of Flood and Erosion	<u>Long Term 4-5 Years</u>	54	Emergency Management, Community Development- Planning (Zoning)	\$0	Ordinance limits future development along the designated fluvial erosion hazards areas ("zones"), providing setbacks from the river that result in the protection of life, property and infrastructure. Any FEH consideration would be done after the new Master Plan is developed and after the Form Based Code Zoning Ordinance is adopted. As part of the site plan process, City requires them to move existing and proposed improvements out of the bluff buffer and revegetate. As other properties redevelop, the Planning Board will undertake measures to require existing improvements to be moved out of the bluff buffer, not allowing proposed improvements in the buffer, and revegetating. This is how the Site Plan Regulations and bluff buffer ordinance are being utilized to address erosion issues along the Soucook. Zoning - #599 CIP 2026	River, Flood, Fluvial Erosion, Landslide/ Bank Failure	Soucook River, Turkey River	Cost is for volunteer and staff time in-kind labor.	N/A
#132-2024	Update the City Master Plan to include a Three Rivers Study (CIP #563) to Reduce the Impact of Flood and Erosion	<u>Medium Term 3-4 Years</u>	64	Community Development - Planning	\$300,000 + (Transportation may be more	CIP #563 for 2024-2025. River Study first one piece of the Master Plan, then 2025 update of Master Plan. There have been incremental changes in zoning and land use in the City and	River, Flood, Fluvial Erosion, Landslide/ Bank Failure	Soucook River, Turkey River, Merrimack River	Cost is contractor to update the entire Master Plan \$250,000 with \$50,000	CIP

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
					expensive	state, and significant purchases of conservation land in the City since the writing of the Master Plan in 2008. new vision for the City's relationship with the Merrimack, Contoocook, and Soucook Rivers. The Three Rivers Study will focus on identifying new economic development, transportation, housing, recreation, and conservation goals for the rivers, based on technical analysis and public outreach. Overall demographic changes and economic and real estate trends in Concord, makes it important to review the land use, housing, and economic development recommendations of Master Plan.			for the Three Rivers.	
#133-2024	Obtain the Newest Dam Emergency Action Plans (DEAPs) and Inundation Maps for High and Significant Hazard Dams to Reduce the Risk of Injury and Damage from Flood and Dam Breach	<u>Short Term</u> <u>1-2 Years</u> <u>then</u> <u>Ongoing</u>	71	Emergency Management	\$0	A Penacook Lake High Hazard dam feeds into Rattlesnake Brook spillway. During the 2006 floods, at 278 North Street, water jumped the spillway and channeled water through the Mill Place West apartment building. Flooding on this brook could significantly damage infrastructure and property and endanger lives below the breach. North State Street and its utilities under the road (water, sewer, gas) could be destroyed as well as neighborhood homes. FD has the latest DEAPs and inundation maps – share with GS, EM, PD .	Dam, River, Flood, Aging Infrastructure		Cost is for in-kind staff and volunteer labor.	N/A

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						Retaining walls have been added.				
#134-2024	Encourage the Property Managers of Multi-Unit Housing to Post "You are Here" Emergency Evacuation Maps in Each Housing Unit and on Every Floor to Reduce the Risk of Injury from Hazards Requiring Evacuation	<u>Short Term</u> <u>1-2 Years</u> <u>then</u> <u>Ongoing</u>	58	Fire Department	\$0	Old mill buildings such as Horseshoe Pond Place, Briar Pipe, Mill Place West plus Pleasant View can have structural issues subject to earthquakes, flooding, wind and snow loading. Some do not have fire suppression. (when would this occur – during annual inspection? COA issuance?).	Flood, Evacuation, Electric Outage	Multi-Unit Housing (Floodplain priority)	Cost is for in-kind staff and volunteer labor.	N/A
#135-2024	Convene the Ad Hoc Heat Advisory Panel and Develop a Plan to Address Excessive Heat Impacts on the City's Infrastructure and Population, Especially Elderly and Underserved Groups	<u>Short Term</u> <u>1-2 Years</u>	55	Emergency Management with Health Office	\$0	Excessive heat and cold temperatures can have a negative effect on occupants without air conditioning or who require heat. Will focus activities in centers with A/C, hold activities to encourage people to come out during hot days. With the Heat Panel model, may be able to address Extreme Cold as well. Partners include City Depts, In-Town, CCTV, HealthENH, Refugee Success, religious partners, and others. CCTV plays various FEMA messaging in different languages. The Concord School District could assist. Conduct outreach to the homeless populations.	Extreme Temps (Heat & Cold)	Citywide	Cost is for in-kind staff and volunteer labor.	N/A
#136-2024	Encourage the Development of Generator-Run Small Community Office Co-working Space at the	<u>Long Term</u> <u>4-5 Years</u>	45	Emergency Management coordinate with Parks	\$250,000	Focus on existing Community Centers, existing City buildings - Green Street, Heights (Citywide Multi Generational Facility) and Beaver Meadow Golf Course	Winter, Wind/Tropical, Utility Outage	Citywide Multi Generational Facility and Beaver Meadow Golf	Citywide Multi Generational Facility and Beaver Meadow Golf	Funded through CIP, Emergency

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
	Citywide Multi-Generational Facility and Beaver Meadow Clubhouse to Maintain Economic Sustainability During Severe Winter and Wind Events (PUBLIC)			and Recreation, Concord School District, MVSD		Clubhouse (may include a generators in CIP renovations). With advance planning and coordination, School buildings could be used as shelter is needed – High School gym could serve as a heat shelter, Middle School, Mill Brook, Abbott Downing, Christa McAuliffe all have generators and have some space. Merrimack Valley School District could also be used. West Street Ward House does not have a generator or facilities even with CIP. Disruption of economic assets, including during prolonged disasters can have a negative impact on employment and income for large numbers of people, requiring additional social services. Areas that may benefit from small community offices spaces with wireless network include Penacook, Main Street, Loudon Road, Regional Drive. The City may be able to set aside or help find funding for the projects. 100kw generators for buildings of that size range from \$75,000 to \$100,000 for all costs.		Meadow Golf Course Clubhouse	Course Clubhouse (may not have a generators. 50% would be \$125000	Management Performance Grant (EMPG 50/50%)
#137-2024	Encourage the Development of Small Community Office Co-working Space at Large or Vacant Facilities	Medium Term 3-4 Years	54	Emergency Management coordinate with Comm Devt,	\$0	Seek large private businesses to enable use of their facilities by the public during disasters. Include Grappone Center, Lincoln Financial, Steeplegate Mall. Disruption of economic assets,	Winter, Wind/Tropical, Utility Outage, Solar	Grappone Center, Lincoln Financial, Steeplegate Mall,	Cost is for in-kind staff and volunteer labor.	N/A

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
	Across the City to Maintain Economic Sustainability During Severe Winter and Wind Events (PRIVATE)			Chamber of Commerce, Public Information Officer		including during prolonged disasters can have a negative impact on employment and income for large numbers of people, requiring additional social services. Areas that may benefit from small community offices spaces with wireless network include Penacook, Main Street, Loudon Road, Regional Drive. If businesses do not have a generator, the City can help find funding for the projects. 100kw generators for buildings of that size range from \$75,000 to \$100,000 for all costs.		Other Large Business Spaces		
#138-2024	Develop a Program to Assess and Mitigate Potential Wildfire Damage in Future Development's Wildfire/Wildland Urban Interface (WUI) Areas	Medium Term 3-4 Years	66	Fire Department with Emergency Management, City Forester (Conservation Commission), Community Devt-Planning	\$10,000	Many vulnerable populations (seniors, underserved) are located within wooded areas. The latest example is Cobblestone Point, 65+ older independent living, 140 units are behind Home Depot in the wooded area and could be subject to wildfire. Conservation Commission (City Forester is paid under Cons Comm) goals may be counter to Fire Department WUI goals. Already in place - (Pine barren proscribed burn by DES and State Div of Forests and Lands. Code revisions might need to occur, may take a little while to revise (the 2022 draft has been completed, may not currently contain this recommendation). Remove dead	Wildfire, Lightning, Fire	Future Developments, Perhaps Current Development	Cost is for the City Forester's time, TBD.	Conservation Commission

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						vegetation, cut back some trees to create space between structures and vegetation, etc.				
#139-2024	Identify Climate Resiliency Strategies for City infrastructure, Buildings, and Facilities to Reduce the Impact of Climate Change	Long Term 4-5 Years	60	Emergency Management with Community Devt- Planning & Engineering, include General Services Depts for feasibility	\$0	Checklist/ strategies or guidelines (like found within a Climate Resiliency Plan - from the NH Seacoast communities) could help protect against natural disasters (buildings, infrastructure, transportation) to be more self-sustaining such as stormwater management. Identify better strategies for existing mechanisms and educate ourselves on better ways to do common tasks. One action could include solar panels on city buildings to run critical systems. General Services would help implement the Plan. Electric vehicle infrastructure is within the CIP. Options could include a Committee or staff work. Consider strategies for new private development as a secondary priority. Regulations can be updated as best management practices are obtained and reviewed. Ideas could be placed into the CIP for funding.	Climate Change, Flood, Wind/ Tropical, Extreme Temp, Solar	City infrastructure, buildings, and facilities	Cost is for in-kind staff and volunteer labor.	N/A
	ADD NEW ACTION HERE									
	ADD NEW ACTION HERE									

Source: Concord Hazard Mitigation Committee

Table 51

Structure and Infrastructure Projects

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
#89-2012	Encourage the Installation of Sprinkler Systems at Concord Gardens and Royal Gardens Multi-Unit Housing to Reduce the Risk of Lightning and Fire	Long Term 4-5 Years	55	Fire Department	\$0	FD works with owners to encourage installation of fire sprinklers at these locations. Structures are too old to fall under the multi-family sprinkler regulations; a few hundred people live in these apartment buildings.	Wildfire, Lightning, Fire	Concord Gardens, Royal Gardens (Heights)	Cost covers supplies, hardware and labor to is privately borne. City staff costs to implement are staff hours	Costs borne by owners of facilities
#91-2012	Inform Property Owners of Funding Resources for Fire Alarm System Upgrades at All Multifamily Developments to Reduce the Risk of Lightning and Fire	Medium Term 3-4 Years	63	Fire Department, Public Information Officer	\$0	FD works with owners to encourage installation of fire alarms at these locations. Structures are too old to fall under the multi-family fire alarm regulations; thousands of people live in these apartment buildings. Identity whether Individual Assistance Grant Program would be eligible for multi-unit property owners.	Wildfire, Lightning, Fire	Citywide	Cost covers supplies, hardware and labor to install the sprinkler system; City staff costs to implement	Costs borne by owners of facilities
#130-2017	Purchase Lightning Rods and Grounding Panels for Installation on Tall, Older City Buildings and the City Airport to Reduce the Risk of Lightning Damage	Long Term 4-5 Years, Phase 1 of 2	60	Emergency Management with Community Development-Engineering	\$250,000 - \$500,000	Some tall, older structures downtown may not have lightning protection and will benefit from installation of a lightning rod. Purchased and installed by private contractors paid by the City and/or grant funding. Airport Master Plan is being redone, and along with that updated infrastructure will be undertaken within the next 10 years (2032). The terminal building will be rebuilt in 2026 after 2024 design and permitting. One critical hangar at 83 Airport	Lightning	Downtown, Conflagration area, Airport, Penacook	Cost is for purchase and installation of 10-20 rods by private contractor at about \$25,000 each for the City buildings. The priority is for the City Airport hangar.	Airport would not be funded in CIP until late, find an alternate funding source for Airport hangar lightning rod. CIP would be necessary

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						Road has City alarms, equipment, and fuel which lightning regularly hits. In September, lightning took out half of all runway lights. (Only 2 City places in Concord, City Hall & Auditorium and the Penacook Public Library have protection)				for other City Buildings
#140-2024	Upgrade Loudon Road Bridge over Merrimack River to Reduce Impact of Flood, Ice, Erosion and Debris (CIP #588)	Short Term 1-2 Years	69	Community Development - Engineering	\$21,356,000	CIP #588 for 2023-2024. Red listed City bridge 163/111 NH 9 (LOUDON ROAD) over Merrimack River. Full reconstruction, design is underway.	River, Winter, Flood, Debris, Erosion, Aging Infrastructure	Loudon Road, Bridge Street, Merrimack River, Exit 14	Cost to City is 20% of project cost \$21,356,000.	NH Bridge Fund 80%
#141-2024	Upgrade Iron Works Road Bridge over Turkey River to Reduce Impact of Flood, Ice, Erosion and Debris (CIP #602)	Long Term 4-5 Years, Phase 1 of 2	66	Community Development - Engineering	\$2,200,000	CIP #602) Red listed City bridge 190/067 Iron Works Road over Turkey River. In the CIP for 2027 (long term) – some minor repairs in 2021, major work in 2027. (CIP #602)	River, Winter, Flood, Debris, Erosion, Aging Infrastructure	Iron Works Bridge	Cost is for design, permitting, and materials, and reconstruction of of bridge	CIP
#142-2024	Improve White Park's Maintenance Building for Modernization and Safety Including Protection from Lightning (under CIP #51)	Short Term 1-2 Years	67	Parks & Recreation	\$1,945,000	Related to CIP #51. Parks Maintenance Building at White Park has numerous safety issues based on the building report completed by City. No HVAC system, no equipment lift, electrical, prone to lightning, and poor staff facilities. Improvements are funded in the City's CIP budget in FY23	Lightning	White Park	Cost does not include lightning protection, only the CIP #51 project.	CIP
#143-2024	Upgrade the Aging Ventilation System and Exhaust Fans of the Fire Administration Buildings to Reduce	Short Term 1-2 Years	66	Fire Department	\$71,000	Ventilation system improvements for the Fire Administration Buildings from Building Assessments	Health, Aging Infrastructure	Fire Administration Building	Cost is for \$55,000 for replacement of controller system and \$16,000 of	Fire Department Operating Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
	Health and Safety Impacts to Workers and Visitors.								repair to pumps, pipes, antifreeze etc.	
#144-2024	Construct New Central Fire Station to Increase Efficiency and Reduce Response Time to Fires, Wildfires, Crashes, and Haz Mat Incidents (CIP #594)	Long Term 4-5 Years, Phase 1 of 2	57	Fire Department	\$14,000,000	CIP #594 for 2027. The current facility is nearing the end of its useful life and lacks sufficient area for expansion to accommodate additional vehicles, or larger apparatus, as might be needed in the future. A new facility would enable better respond to current and future growth in these areas of the community.	Earthquake, Wind/Tropical, Winter, Fire, Public Safety	Central Fire Station	Cost is to Design, construct, and furnish a new fire station in North State Street with new materials and furnishings.	CIP
#145-2024	Consider a New Fifth Fire Station in Concord (Conceptual) to Increase Efficiency and Reduce Response Time to Fires, Wildfires, Crashes, and Haz Mat Incidents	Long Term 4-5 Years, Phase 1 of 2	56	Fire Department	\$50,000	(consider CIP #583, but not funded through this item). A new facility would provide for improved fire service for the easterly portions of the City, as well as respond to current and future growth in these areas of the community. Emergency services response times and levels of service for East Concord will remain unchanged. In CIP for 2028 (20-year bond). Currently, these are conceptual discussions. Move to 5 stations & apparatus, or are 4 stations appropriate with the renovations? Much discussion and decisions to be made in early 2023.	Wind/Tropical, Winter, Fire, Public Safety	To be determined	Cost is to a consultant study to evaluate feasibility.	CIP #583
#146-2024	Implement Stormwater System Improvements Throughout the City	Long Term 4-5 Years, Phase 1 of 3	64	Community Development - Engineering	\$10,150,000	CIP #83. Improve the City's stormwater drainage system to meet regulatory requirements and prioritize upgrades and repairs. 20-Year bond. High	Flood, Winter (melt), Extreme Temps, Wind/	City Drainage Catchment areas: Fisherville	Cost is for design, permitting, and materials, and construction of	CIP

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
	to Reduce Flood Risks (CIP #83)					priority for the City to separate the last remaining stormwater drains that collect in the wastewater system drains with their own pipes.	Tropical & Rain Storms	Rd, Heights, Hoit Rd, Horseshoe Pond, Concord Hospital, Oak Hill, Penacook, Trapezoid (South Downtown), Turkey River, Washington St, West Concord	upgraded stormwater infrastructure.	
#147-2024	Implement Horseshoe Pond Area Drainage Improvements to Reduce Flood Risks (CIP #571)	Long Term 4-5 Years	66	Community Development - Engineering	\$100,000	CIP #571. Flooding at the intersection of I-393 / North Main Street / Boutin Street intersection has resulted in property damage and traffic hazards. Provides long-term solution to drainage problem and eliminates ongoing property damage, including the vicinity of Kimball Jenkins School of Art. Design of final improvements to connect drainage systems near the Kimball Jenkins School of Art to future Storrs Street North Extension to be constructed between Storrs Street and Constitution Avenue as further described in CIP #18. Subject to acquisition of portions of Pan Am Northern Rail Line Corridor	Flood, Winter (melt), Extreme Temps, Wind/ Tropical & Rain Storms	I-393/ North Main Street/ Horseshoe Pond Drainage Area	Cost is for design, permitting, and materials, and construction of upgraded stormwater infrastructure.	CIP

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						between Horseshoe Pond Lane and Storrs Street.				
	ADD NEW ACTION HERE									
	ADD NEW ACTION HERE									

Source: Concord Hazard Mitigation Committee

Table 52
Natural Systems Protection Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
#148-2024	Install a Cistern at the Oak Hill Trail System for Fire Suppression to Reduce the Impact of Lightning, Wildfire, and Fire	Long Term 4-5 Years	46	Fire Department with Conservation Commission and Trails Committee	\$30,000	Develop a plan to install cisterns or dry hydrants near the City's most remote recreational trail systems at strategic places like trailheads or water sources. Start with a cistern at the Oak Hill Trail System at the trailhead. About 10%+ of the city is outside of the hydrant district. The 90% are under a City Ordinance that requires hydrants to be maintained. Cisterns may be a possibility for the 10% outside City water, tank is a 30,000 gallon tank. Boosting the water availability could reduce City and resident insurance costs.	Fire, Lightning, Wildfire	Oak Hill	Cost is for 1 cistern at 30,000 gallons.	CIP item
#149-2024	Evaluate and Develop an Alternative Source Water Plan for the Merrimack River to the Supply Municipal Water to Reduce the Impacts of Drought	Long Term 4-5 Years, then Ongoing	65	General Services - Water Dept	\$0	The City's water supply is susceptible to flooding and drought. Currently, water is pumped from the Contoocook River into Penacook Lake (since 1981) to help maintain levels. General Services maintains the pumping stations. Idea is a general through for future water quantity. General Services maintains a 10-year Water Master Plan which was just revised. Now, the Merrimack River is being considered as a secondary water source. On a 10 year cycle, the three sections of the Water Master Plan are updated, with one section of MP	Drought, Health (Water Quality), Water Supply (Quantity)	Merrimack River, Contoocook River, Broad Cove Pumping Station, Penacook Lake	Cost is for staff and volunteer in-kind labor, with no additional costs for the evaluation.	CIP and Water User Fees

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						being updated at a time on a 3-year cycle. The 3 MP sections: Source Water System was just updated, Water Distribution System is currently being updated, Water Treatment Plan will be updated after. The Merrimack River initiative is new, but the Source Water topic is ongoing. Currently, it has not been necessary to impose mandatory water restrictions. Four 4 City wells in Pembroke in their Aquifer Protection Zone are available as emergency standbys (not in use).				
#150-2024	Place a Secondary Communications Tower at 109 Old Turnpike Road New Fire Training Facility (Backup EOC) near Concord Airport to Enable Redundant Communications during Severe Weather and Disaster Events	Medium Term 3-4 Years	48	Fire Department , with CAMAFC	\$100,000	Wind, lightning, ice are major problems on communications towers (Kearsarge Towers owned by NHSP & DNCR in Warner, Lakes Region Fire Dispatch also uses them), impacts infrastructure in Concord and the communities it serves. Main Tower used by Concord is Plausawa Hill in Pembroke but Fire Dept headquarters Tower is most important. Headquarters tower on FD admin campus, hardlines to broadcast center. Simulcast system works wonderfully Cables were recently replaced to stabilize tower. When there is a comms issue, a ping is heard. Ice dish not aligned well, no need for action item. City owns headquarters tower &	Wind/ Tropical, Winter, Lightning, Human	Old Turnpike Road	Cost is for the construction and materials for a new communication s tower.	City CIP, and/or CAMAFC costs

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						rents space to others. Challenge is that the airport is nearby (FAA regulated height), so the tower may not be prudent until evaluations of what type of equipment is needed. May be incorporated into the Compact.				
#151-2024	Install and Monitor an Automated River Gage on the Turkey River Bridge on Iron Works Road to Provide Early Warning of Flood and Reduce the Risk of Flood and Erosion Damage and Injury (See CIP #602)	<u>Long Term</u> <u>4-5 Years</u>	66	Emergency Management with US Geological Survey assistance	\$10,000	Automated river gages provide advance warning of flood conditions. The Turkey River has had a history of flooding with high economic damages. USGS could be a partner and may be able to help with funding. Turkey River gage and monitoring priority is higher than one at the Merrimack River because of proven damages. Project in 2027 with CIP #602	River, Flood, Winter, Wind/Tropical (Rainstorms), Erosion	Turkey River at Iron Works Road	Cost is for 1 gage installed, but there may be annual maintenance fees.	City Special Project, USGS partner
#152-2024	Install and Monitor an Automated River Gage on the Merrimack River between NHTI and East Side Drive/NH 132 to Provide Early Warning of Flood and Reduce the Risk of Flood and Erosion Damage and Injury	<u>Short Term</u> <u>1-2 Years</u>	61	Emergency Management with US Geological Survey assistance	\$10,000	There is no river monitoring system between Franklin Falls and Concord until the Merrimack River bridge at NH 9/Loudon Rd.) The Merrimack River floodplain has a history of moderate flooding and this area is highly populated. There is a need for an automated river gage between Franklin and the Loudon Road/NH 9 bridge. NHTI has a visual monitoring system on the banks, have GIS maps of the area. Will patrol when the weather is rainy. River monitoring gage between Hazen Drive and NHTI. NHTI unofficially monitors river height. For	River, Flood, Winter, Wind/Tropical (Rainstorms), Erosion	Merrimack River at East Side Drive	Cost is for 1 gage installed, but there may be annual maintenance fees.	City Special Project, USGS partner

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						Mother's Day Flood in 2006, City activated reverse 911 for the first time. Used a fire fighter to watch the height of the river and dispatched firefighter to go door to door. Merr & Cont Rivers have not yet overtopped their banks in recent history.				
#153-2024	Implement Crime Deterrence Procedures and Equipment in City Cemeteries including Blossom Hill to Reduce the Risk of Vandalism and Other Crimes (see CIP #587)	<u>Long Term</u> <u>4-5 Years</u>	61	Parks and Recreation Department	\$2,000	CIP #587. Try to get vandalism deterrence into #587. Blossom Hill Cemetery regularly suffers from vandalism, where headstones are spray-painted, displaced and sometimes broken; mausoleum break-ins also occur. Parks and Recreation maintains, often have CIP items in the budget. CIP projects for 2023 facility needs assessment and projects for Blossom Hill Cemetery in 2024. Repair large stone retaining wall is scheduled for 2024 that failed in 2016 due to freeze/thaw. In 2021 another large section of retaining wall started showing signs of failure at Blossom Hill. Small pond and dam at Blossom Hill are showing signs or failure and should be evaluated going forward. Increase directed presence of patrols in City Cemeteries including Blossom Hill by targeting dates (days of week) times and location these occur and triggering and installing	Vandalism (Human), Wind/Tropical, Winter	Blossom Hill Cemetery https://us.eufy.com/products/t81241w1?variant=41497302859962&ref=pd_live_button	Cost is 10 remote feed battery-operated or solar cameras, overlapped coverage and placed in places into hard to reach places, about \$200 per camera with accessories. Posted signage (can be done through Corrections Industries) to alert people of recording. (Signage may be seasonal and low-cost, replaced annually) May need to clear storage data periodically, or monthly fees to	Parks and Recreation Operating Budget or Expenditures for Upgrades under CIP #587

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						video surveillance and signage to deter vandalism or other crimes			store data in the cloud.	
#154-2024	Design & Construct a Safe Room for Storage of Paper Cemetery Records at Blossom Hill Cemetery (CIP #587 2028) to be Impervious to Severe Weather such as Lightning, Flood, Wind/Tropical, Winter and Fire (CIP #587)	Long Term 4-5 Years, Phase 1 of 2	58	Parks and Recreation Department	\$250,000	CIP #587 in 2028. In FY23, City funded a project to review and recommend building improvements for the following in Blossom Hill: Office, three equipment storage buildings, Chapel. All buildings date back to early 1900s and have structural, electrical, and other issues and size limitations for today's equipment. Project CIP 2028 design & construct building to house cemetery records at Blossom Hill (CIP). Move all records to an online system that allows people to research information at home and will help preserve the information forever.	Wind/Tropical, Winter, Lightning, Flood, Human, Fire	Blossom Hill Cemetery	Cost is for permitting, design, materials, labor, equipment.	CIP
#155-2024	Fund a Study to Review and Improve Drainage Systems and Dams at Blossom Hill and Concord Calvary Cemeteries to Reduce the Impact of Flood and Erosion (CIP #587)	Long Term 4-5 Years, Phase 1 of 3	61	Parks and Recreation Department	\$200,000	CIP #587 in 2028. Fund a study to review and improve drainage systems (pipes, catch basins etc.) and dams at Blossom Hill and Concord Calvary Cemeteries. Road drainage issues at Blossom Hill. Over the past couple of years, the increased heavy rain events have caused several roads to wash out due to poor underground/under road drainage. These increased events are causing several roads to become dangerous, with drainage systems that date back to the early and mid-1900's.	Flood, Erosion, Winter, Wind and Rain Storms	Blossom Hill Cemetery	Cost is for permitting, design, materials, labor, equipment.	CIP

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
#156-2024	Help Secure Funding to Renovate the Historic, Privately Owned Gas House Structure to Existing Code to Reduce the Risk of Damage from Earthquake, Snow, High Wind Events	<u>Short Term</u> 1-2 Years <u>to Long Term</u> 4-5 Years	61	City Council with City Gasholder Committee	Unknown	The Gas House is structurally unsound; if an earthquake, heavy snow load or wind events occur, portions of the building might collapse. Owned by Liberty Utilities. Emergency stabilization of the Gas House necessary. City Gasholder Committee (with 3 members of City Council) is looking to find funding and public/private partnerships, fundraising has been done. Save our Gasholder Group working on fundraising.	Earthquake, Human (Vandalism)	Gas House	Cost is for in-kind staff and volunteer labor.	N/A
#157-2024	Renovate the Beaver-Meadow Golf Course Building to a Community Center to Existing Code to Reduce the Risk of Damage from Earthquake, Snow, High Wind Events (CIP# 107)	<u>Long Term</u> 4-5 Years	57	Parks and Recreation Department, Financial Department	Get from CIP	CIP #107. City-owned Beaver Meadow Golf Course has had many reported tornado- like and microburst events occurring on the green. Looking to upgrade the clubhouse building – budget committee. long term 4-5 years, a 2024 project.	Earthquake, Wind/ Tropical, Winter, Lightning, Human	Beaver Meadow Golf Course	Cost is for for permitting, design, materials, labor, equipment. Extra funds (\$100,000+) would be necessary to purchase and install a generator.	CIP
#158-2024	Redesign Public Space between Kiwanis Park to Terrill Park Along the East Side of Merrimack River, Include Erosion Control and Additional Emergency Access (CIP# 60)	<u>Long Term</u> 4-5 Years	66	Parks & Rec, General Services, Merrimack River Greenway	\$70,000	CIP #60. Heely Park (Basin St, Exit 13), Reed Park (Hall) and Kiwanis Parks, Terrill Park are subject to severe Merrimack River flooding and the riverbank is subject to erosion. Terrill Park has lost several feet due to erosion from the river. Kiwanis Park will be redesigned in FY23 with improvements scheduled in	River, Flood, Erosion	Heely Park (Basin St, Exit 13), Reed Park (Hall) and Kiwanis Parks, Terrill Park along	Cost is for paving a new trail in 2027 is \$70,000.	CUP

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						future years of the CIP. Bank erosion control and additional emergency access. Ensure vegetative barriers are placed on riverfront properties. Natural vegetative barriers were removed behind Fort Eddy Plaza, now subject to erosion. Design and permitting is in 2025 (MP 2023), 2027 lot improvements, etc. 2028 covered pavilion.		Merrimack River		
#159-2024	Restore Merrill Park Pond and Its Stream Flow to Ensure Adequate Drainage and Reduce the Risk of Mosquito-Borne Illnesses (CIP #359)	Long Term 4-5 Years	62	Parks & Recreation	\$605,000	Included in CIP #359 (does not include dam restoration). Merrill Park: Pond Dam and stream through Merrill Park. Earth dam washed out during Mother's Day storm (2006) and the pond now does not hold water. Pond is becoming a bog that is becoming breeding area for mosquitos and insects. The stream through the park is overgrown so during heavy rain events, the water backs up.	Dam, Flood, Health	Merrill Park	Cost is for Improvements include upgrades to the parking lot, landscaping, playing fields, the playground as well as walkways to meet accessibility standards. Does not yet include the dam or pond improvements.	CIP
#160-2024	Ensure the Historic West Street Ward House (Meeting Hall) is Considered as a CIP item for Restoration to Protect Against the Impact of Earthquake, Winter	Long Term 4-5 Years	55	General Services-Public Property	\$160,000	CIP #63 2027-2028. Historical buildings in Concord are expensive to maintain and rehabilitate without extensive private funding. Some of the facilities (West Street Ward House) are historical buildings and are vulnerable to severe winter weather effects such as	Wind/Tropical, Winter, Lightning, Human	West Street Ward House	Cost is for \$160,000 project, with \$63,000.	Bond

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
	and Wind Hazards CIP (#63)					snowloading. Ensure the West Street Ward House is considered as a CIP item for potential restoration to protect against the impact of winter and wind hazards (2028). \$160,000 project, with \$63,000. 2519000				
#161-2024	Install Electric Vehicle Charging Stations at City Owned Properties to Reduce Greenhouse Gas Emissions (CIP #636)	<u>Short Term</u> <u>- Long Term</u>	58	General Services- Public Property	\$310,000	CIP #636 in 2023-2030. Develop and implement a plan to provide electric vehicle (EV) charging stations at city-owned properties as such vehicles and equipment are added to the City fleet. EV charging stations are an important component in developing the capability to support electric vehicles within the City fleet. 2023-2030	Climate	City-Owned Properties	Cost is for permitting, design, materials, labor, equipment to install electric vehicle charging stations.	CIP
#162-2024	Construct a New Police Dept Headquarters to Enable Better Community Service and Response Time to All Incidents (CIP #643)	<u>Medium Term</u> <u>3-4 Years</u>	56	Police Department	\$27,500,000	CIP #643. Either a major renovation and expansion of the existing Police Department Headquarters located at Green Street, or development of a new Headquarters elsewhere in the community as a result of the building assessment. The current Headquarters building, which opened in 1977, has become antiquated and no longer meets the needs of the Department. During the ensuing decades, the Department has grown, and the quantity/ complexity of equipment required to provide community policing services have also evolved. The current	Historical, Wind, Winter, Earthquake	Green Street, New Development	Cost is for permitting, design, materials, labor, equipment.	CIP

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						building does not comply with current industry standards.				
#163-2024	Plant New Street Trees in the Urban Compact Area and Plant Replacement Trees to Reduce the Impact of Excessive Heat (CIP #644)	<u>Short Term 1-2 Years then Ongoing</u>	68	General Services-Highway	\$50,000	CIP #644. Department removes trees in the right of way that are declining, dead or a safety hazard. Currently there is no funding to plant trees and the industry standard is to plant 2 trees for every tree removed in the Urban Compact areas. The Department would like to start replacing trees that are removed as recommended going forward so that the tree canopy within the urbanized areas of the community will be sustainable for the future. The benefit of street trees is realized by all the residents, with cool shady areas along pavement	Drought, Extreme Temps (Heat), Health-Invasive Species	City Streets and Rights of Way	Cost is \$5,000 annually from 2023 - 2032.	General Capital Transfer
#164-2024	Construct the Recreational Merrimack River Greenway Trail along the Merrimack River to Support Multimodal Transportation, Reduce Greenhouse Gas Emissions, and Construct an Appropriate Use in the Floodplain (CIP #543)	<u>Medium Term 3-4 Years</u>	66	Parks and Recreation Department	\$11,000,000	CIP #543 in 2025. Included as a major project initiative in the comprehensive Bicycle Master Plan. intended to serve both transportation and recreation purposes, connecting villages, providing access to the River and adjacent open space, providing safe and inviting health and fitness opportunities, river access when possible. Improved recreational / transportation opportunities for non-motorized means. Increase	Climate	MRGT along Merrimack River	Cost is for permitting, design, materials, labor, equipment.	TAP Grant 80%, Donation 10% City 10%
#165-2024	Construct the Penacook Riverfront Park at Canal Street	<u>Short Term 1-2 Years</u>	67	City Manager - Operation	\$1,948,000	CIP #567 for 2023. The second river front park is a new facility to be constructed on a 2+/- acre	Flood Storage, Haz Mat Cleanup	Penacook Riverfront along	Cost is for park construction	CIP Outlay

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
	along the Contoocook River to Support Multimodal Transportation, Reduce Greenhouse Gas Emissions, and Construct an Appropriate Use in the Floodplain (CIP #567)					portion of the former Allied Leather Tannery site located at 11 Canal Street, Penacook. First conceived in the 1986 "Penacook Sense of Place" Master Plan. Coordinated with repaving of Canal Street in FY2023 (See CIP #78), to facilitate improved neighborhood connectivity to the Park. Park will revitalize underutilized public properties directly abutting the Contoocook River and create more flood storage, removing old structures. including erosion control and invasive species, clean up brownfields area (capped). Invasive to be removed is asian bittersweet. FD was asked for prescribed burning, but was unable to do so		Contoocook River	costs. Area is already capped	
#166-2024	Improve the Water System Pump Stations at Penacook Street, Broad Cove Road and Mountain Road to Reduce Impacts to Water Quality and to Maintain Water Volume During Droughts (CIP #372 2025-2032)	Long Term 4-5 Years, Phase 1 of 3	69	General Services-Water	\$1,750,000	CIP #372 in 2025- 2032. the planned improvements to the City's three pump stations, which are part of the potable water distribution system, as follows: Pump Station #3: Penacook Street, Pump Station #5: Broad Cove Road (at the Contoocook River), Pump Station #6: Mountain Road. Planned upgrades to existing stations ensures overall reliability of the water system.	Drought, Health (Water Quality), Water Supply (Quantity), Aging Infrastructure	Penacook Street, Broad Cove Road and Mountain Road	Cost is for permitting, design, materials, labor, equipment.	CIP
	ADD NEW ACTION HERE									

Source: Concord Hazard Mitigation Committee

Table 53
Education and Awareness Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
#71-2012	Develop NFIP Public Awareness Program and Publicize the Availability of Flood Insurance to Reduce the Impact of Future Flooding Events	<u>Short Term</u> 1-2 Years	56	Emergency Management and Fire Department, Public Information Officer	\$2,000	Obtain selected FEMA publications on the NFIP and make the available to residents, developers, and business owners at City Hall, Permit Office, on the City website. Public service announcement on the CTV and a static announcement in between shows	Flood, Rapid Snow Pack Melt, Severe Storms (Rain)	Citywide, Floodplain buildings	Cost is for printing and translations fees. Staff labor is in-kind. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Conservation Commission fund
#129-2017	Educate the Public about the Implications of Soucook River & Turkey Fluvial Geomorphic Assessment to Reduce the Risk of Erosion and Impacts of Flooding	<u>Long Term</u> 4-5 Years	53	Emergency Management and Fire Department with Public Information Officer	\$2,000	In connection with the findings from the Master Plan Three Rivers Study, hold targeted outreach to residents, developers, and business owners along the riverside. Public service announcement on the CTV brochures, public education presentations about proper shoreland stewardship. See 2015 Fluvial Geomorphic Assessments for detailed information.	Flood, Fluvial Erosion, Landslide, Bank Erosion & Bed Scouring	Soucook River and Turkey River property owners	Cost is for printing and translations fees. Staff labor is in-kind. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	CIP - Community Development
#167-2024	Announce the Availability and Encourage the Public to Take NOAA SkyWarn Training to Obtain an Overall	<u>Short Term</u> 1-2 Years	58	Emergency Management, Public Information Officer	\$0	The Concord Municipal airport serves as a NWS/NOAA weather monitoring station. Weather information and forecasts should be promoted on the City's website home page. People to	All Weather Hazards	Citywide	Cost is for City website postings. Concord TV can get involved for all communication	N/A

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
	Understanding of Weather Events					take educational training free on NOAA website - link			& education actions (PSAs, video, social media, bulletin boards).	
#168-2024	Educate the Public on the City's Water Supply and Private Wells, Testing Results, and Drought Impacts to Raise Awareness of Clean Water and Reduce the Impact of Flood and Droughts	Short Term 1-2 Years	58	Emergency Management with General Services, Public Information Officer	\$250	The City's water supply is susceptible to flooding and drought. Currently, water is pumped from the Contoocook River into Penacook Lake (since 1981) to help maintain levels. General Services maintains the pumping stations. Flyer or website on effects of drought and implications for city water system and wells in the future. Provide test results, drought impacts and other information beyond the annual report flyer mailed to householders.	Water Supplies, Contoocook River, Penacook Lake	Citywide	Cost is for website promotion, and/or printing of flyers. Staff labor is in-kind, including for City website postings. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget
#169-2024	Encourage Remote Working from Home for Office and Professional Workers to Help Remove People from Public Health/Severe Winter Weather/High Wind/Flood Risk Pool	Medium Term 3-4 Year	54	Emergency Management with Community Development, Public Information Officer	\$250	Project will encourage professional workers to continue to contribute to the workforce economy during severe weather events or disasters. (Economics could be damaged during long term disasters) Keep people off the road, be safe (not predicated on Actions for shared co-working spaces)	Health, Winter, Wind/Tropical, Flood	Citywide	Cost is for website promotion, and/or printing of flyers. Staff labor is in-kind. Concord TV can also get involved for all communication & education actions (PSAs, video, social	EM Budget for Public Education

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
									media, bulletin boards).	
#170-2024	Encourage Concord Residents, Visitors and Employees to Eat Local and Buy Local Products to Reduce Supply Chain Issues, Promote Self-Sufficiency and Reduce Greenhouse Gas Emissions	Medium Term 3-4 Year	57	InTown Concord, Downtown Concord, Concord Farmers Market, Greater Concord Chamber of Commerce, Penacook Farmers Market, Penacook Village Association	\$2,500	Supply chain issues from 2020-2022 and beyond remain a challenge for PPE, but also critical medical supplies, medications, groceries, gas, and other essential goods and services. Residents should be frequenting the farmer's markets (economics), purchasing goods from craftsman and local businesses where possible for overall Concord sustainability. Supply chain backlogs on equipment is an issue for both local and state. State has supply caches for medical equipment, no local caches for items. Private sector helped extensively to get medical supplies and PPE for COVID pandemic. Penacook Farmer's Market cannot find a location in the summer. Winter Farmer's Market was held in Riverhill Grange. Buy local, eat local. Concord Farmer's Market may be trying to get a permanent market on Storrs Market. The City is designing and building a new riverfront park in downtown Penacook (in FY23) at the former Tannery site. Part of the design is to hopefully include a space for the Penacook's Farmers Market. Community Gardens are in the Floodplain at NHTI, and in	Climate	Citywide	Cost is for printed flyers for promotion in local businesses. Website promotion also. Staff labor is in-kind. Concord TV can also get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget, Health Grants, CAPHN

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						Penacock behind Historical Society behind Penacock Street), Clinton Street gardens, Birch Street (on St. Paul land btw Audubon & St P), new immigrants rely on them for food sources.				
#171-2024	Engage in Public Education Campaigns to Inform Residents in Multiple Languages How to Protect Themselves and their Property from Natural Hazards and Severe Weather	Medium Term 3-4 Year	56	Emergency Management with Public Information Officer, list City refugee centers,	\$2,500	Better informed public can prepare for natural hazard events and be prepared to make sound decisions. Public outreach to residents and businesses include increased communication with public assistance facilities, multi-unit housing to warn of need the to evacuate and describe the magnitude of the flood, winter, rainstorms. Partner with Concord School District (CSD) for interpreters, approach, and Concord (CTV) – for safety and hazard protection).	Drought, Extreme Temp (Heat-Cold), Wind/Tropical, Flood, Lightning, Health, River, Winter, Solar, Wildfire	Underserved Neighborhoods, Citywide	Cost is for printing and distribution of materials translated into 6-7 languages from Action #178-2022). City website promotion. Staff labor is in-kind. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget, Health Grants, CAPHN
#172-2024	Use Existing Public Events to Inform Underserved Communities in Multiple Languages about Personal Safety and Property Protection During Natural Hazards and Storm Events	Short Term 1-2 Years	55	Emergency Management with Public Information Officer, Police Dept, Refugee Communities, Non-	\$10,000	An informative and welcome outreach for new immigrants and new residents should be conducted in multiple languages, indicating where different services are located and how to act during hazard events. Pull info from FEMA/NH Ready, other resources to get the message out to residents. Social media &	Drought, Extreme Temp (Heat-Cold), Wind/Tropical, Flood, Lightning, Health, River, Winter, Solar, Wildfire	Underserved Neighborhoods, Citywide	Cost is for translation services for 6-7 languages for materials. (Action item #177-2022). Staff labor is in-kind. Concord TV can get	Emergency Management Budget, Health Grants, CAPHN

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
				Governmental Organizations		email blitz for unit. Can also tie into existing programs, like Sep-National EM Preparedness, Oct – Fire Won't Wait, Plan Your Escape, Aug 2 - National Night Out at Rollins Park (Concord PD organization with public partners, comm org, NGO). Annual September Multicultural Event, Market Days - Sat Mornings, Midnight Merriment, National Night Out. Educators should have a presence and materials at City-wide festivals.			involved for all communication & education actions (PSAs, video, social media, bulletin boards).	
#173-2024	Talk with Manufactured Home Owners about the Necessity of Tying Down Manufactured Homes, Carports, and Propane, Natural Gas and Oil Tanks to Reduce the Risks of Wind/Tropical Storms, Floods, Winter Weather	Medium Term 3-4 Year	60	Emergency Management, Partner with Utility Companies, Big Box Stores, Public Information Officer	\$2,500	All manufactured homes are vulnerable to wind events and severe winter weather (snow, ice load). Crestwood has been replacing their units over the last few years. Additionally, unsecured propane, natural gas, and oil tanks float downstream during flood events, a very dangerous condition which has occurred on the Contoocook and Merrimack Rivers. Brochures from utility companies, FEMA, Federal Highway Admin can be used. The Fire Dept can ensure replacement homes like in Crestwood can be held to current standards when upgrading homes to reduce the risk from wind/tropical storms, floods, winter weather. Discussions could be held at community event meeting rooms at the	River, Flood, Wild/Tropical, Storms, Winter, Erosion, Haz Mat (Explosion)	Manufactured Homeowners and Property Owners along the Riverfronts (Merrimack, Turkey, Soucook)	Cost is for printed materials to be distributed by gas/oil companies, big box stores (propane tanks). Staff labor is in-kind. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						parks. Existing brochures from FEMA or local gas providers can be distributed.				
#174-2024	Provide Current and Accurate Information on Public Health Issues to Underserved Communities in Multiple Languages, including the Need for Critical Vaccinations to Reduce the Risk of Epidemics	<u>Short Term</u> <u>1-2 Years</u>	48	Emergency Management, Health Department, Public Information Officer, CAPHN	\$5,000	Outreach includes on-site or through community groups, interfacing with groups to provide information. The mobile CAPHN van onsite can go to locations such as the Friendly Kitchen and homeless resource centers for new immigrants. Partner with Capital Area Public Health Network and other organizations. Translation services will be needed.	Health	Underserved Neighborhoods, Citywide	Cost is for previously translated FEA and CDC info, plus new translations for up to 6 languages - translation services for flyers. Staff labor is in-kind. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget, Health Grants, CAPHN
#175-2024	Connect Faith-Based Organizations with Hazard Mitigation Grants to Strengthen Their Ability to Withstand Adverse Weather Conditions such as Wind/Tropical, Lightning, Earthquake and Flood	<u>Short Term</u> <u>1-2 Years</u>	65	Emergency Management, Public Information Officer	\$0	Houses of worship are an important community, historical, and cultural resource and they are irreplaceable should lightning, severe winter weather or severe wind events occur to damage the buildings. Several faith organizations provide key community support services and vulnerable members of the community would lose a key resource if damaged by fire, earthquake or lightning. Mosque	Drought, Extreme Temp (Heat-Cold), Wind/Tropical, Flood, Lightning, Health, River, Winter, Solar, Wildfire	Faith-Based Organizations	Cost is for in-kind staff labor.	Emergency Management Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						security grants should be researched and obtained.				
#176-2024	Remove Hazardous and Unhealthy Trees in Parks to Improve Safety of Park Users and Park Playgrounds/Structures to Reduce the Impact of Invasive Species and Debris Fall	<u>Short Term</u> <u>1-2 Years</u> <u>then</u> <u>Ongoing</u>	64	Parks and Recreation and General Services Department , Public Information Officer	Unknown	White, Rollins, Merrill and Rolfe Parks have reported many microburst events during past couple of years. Invasive species (emerald ash borer, woolly adelgid, red pine scale, others) have slowly killed trees and spread to others. Parks and Rec has requested funds for tree work as amount of work exceeds cities tree crew's ability. Current workload for damaged trees are above the existing tree crews' abilities and private crews should be used to help get ahead of safety issues. This type of tree removal is being done automatically in conjunction with another CIP program.	Wind/ Tropical, Winter	City Parks	Cost is for tree removal. The larger issue is finding the staff/contractors to do the work.	Parks and Recreation Budget
#177-2024	Increase Public Safety Messaging about Danger of Inclement Weather in Open Spaces and Trails and Provide Safety Actions to Reduce the Impact of Storms for Lightning, Winter, and Severe Winds	<u>Short Term</u> <u>1-2 Years</u>	60	Community Development-Planning, Conservation Commission , Public Information Officer	\$250	Open area parks are hazardous during lightning strikes and thunderstorms. All City owned parks, cemeteries and street trees are maintained by a forester/arborist. Parks & Recreation / Conservation Commission, Tree Committee produced a public service announcement about trails etiquette, COVID, preparedness - New PSA about trail safety during windstorms and lightning on CCTV. Kiosks at City parks/trails/conservation lands	Wind/ Tropical, Lightning, Storms	Citywide	Cost is for City website postings. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
						could contain information on safety and etiquette information.				
#178-2024	Conduct Outreach to Community Regarding Water Safety, Lifejacket Use and Importance of Signing Up for Swim Lessons to Reduce the Risk of Drowning	<u>Short Term 1-2 Years</u>	57	Parks and Recreation and Fire/Police Departments, Public Information Officer	\$3,000	City has 7 outdoor pools that are free for residents, plus many City parks with water access. Parks and Rec dept has received sponsorship for past couple of years for free swim lessons for resident families in need. The Parks and Rec and Fire departments also created videos and slides on water safety and lifejacket use. In 2022 both departments held a training exercise with lifeguards to show what is needed when 911 is called and how the trained lifeguards will respond and work alongside responding Fire Department staff.	Health & Safety	City Pools	Cost is for City website postings. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget, Health Grants
#179-2024	Promote Public Education and Techniques for Reducing Carbon Emissions to Reduce Local Impacts of Climate Change	<u>Short Term 1-2 Years</u>	62	Community Development, Energy Comm, PIO	\$250	Planning regulations include using native plants for landscaping, replacement of grass lawns with clover. Tax incentive for solar residential and municipal rooftop solar power. Green roofs are permitted through building permit process. Must be structurally sound to support. Voluntary measures are welcomed but there must be education on the distinction between requirement and voluntary. Techniques include roof runoff cisterns for watering gardens, rain barrels, green roofs.	Climate, Solar	Citywide	Cost is for City website postings. Staff labor is in-kind. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	Emergency Management Budget

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approx Cost to City	Description and Evaluation of Action	Hazards Mitigated?	Affected Location in City	What Cost Will Pay For	How Funded
#180-2024	Update the City website with Technology that Enables the National Weather Service/NOAA Weather Warnings to Automatically Scroll on City Homepage to Reduce the Impact of Storms (Wind/Tropical, Lightning, Flood, Winter)	<u>Short Term</u> <u>1-2 Years</u>	62	Information Technology and Emergency Management, Public Information Officer	\$0	If the technology is available, update the City website with technology that enables the National Weather Service/NOAA weather warnings (RSS feed?) to automatically scroll on the homepage. There is no way at present (09-22) to have National Weather Service/NOAA weather warnings automatically scroll on the homepage. During the redesign of the website, this feature might be able to be added. This is tentatively scheduled for 2 years' time. It is likely not to have a cost associated with it if it is at all possible. NOAA and City system may be compatible, and Storm Prediction Center.	All Weather Hazards Wind/Tropical, Lightning, Flood, Winter, Solar	Citywide	Cost is for City website postings. Staff labor is in-kind. Concord TV can get involved for all communication & education actions (PSAs, video, social media, bulletin boards).	N/A
#181-2024	Encourage the High Façade Houses of Worship to Install Lightning Mitigation Systems to Reduce the Risk of Lightning Damage	<u>Long Term</u> <u>4-5 Years</u>	60	Emergency Management, Public Information Officer	\$0	Some tall, older structures downtown may not have lightning protection and will benefit from installation of a lightning rod. Purchased and installed by private contractors paid by the City and/or grant funding.	Lightning	Downtown, Conflagration area	Cost will be borne privately. Estimated purchase and installation of 10-20 rods and grounding system by private contractor at about \$20,000 each for the City buildings.	National Historic Trust grants to houses of worship and historic buildings
	ADD NEW ACTION HERE									

Source: Concord Hazard Mitigation Committee

2017 Plan

Implementation Challenges

- ▶▶ Stormwater upgrades cost millions and take many years within the CIP to begin. Lightning protection is similar issue.
- ▶▶ Jurisdiction conflicts– many Actions related to private landowners, agencies, and historic buildings may not be accomplished by the City, these challenges might not be possible to overcome.
- ▶▶ COVID had a huge impact on Fire & EMS, which is now fully staffed for the first time in 2.5 years. 4 Emergency Management Coordinators changed over during this 5 year period. Police had been greatly understaffed, just hired 10 people to train.
- ▶▶ Ordering timeline fulfillment is long – Fire Dept tower truck takes 18-24 months from when ordered. 4th ambulance had been 18 months to delivery. Tanker truck has a long lead time.
- ▶▶ COVID impact on non-emergency City staff– focused on a few tasks directly within line of their operational guidelines. Many personnel changes during COVID or right after it ended.
- ▶▶ It was difficult to work on mitigation and outreach when staff and volunteer were tied up with responding to COVID and related.

2017 Plan

Successes (Success Stories)

- ▶▶ Continued matching of mitigation projects in the CIP with Hazard Mitigation Plan Action items.
- ▶▶ Expanded EMS capabilities with 4th ambulance.
- ▶▶ Better connection to community in 2024 Plan process (HMC & guests), online survey successful in raising awareness.
- ▶▶ Work on the Concord Master Plan supports Hazard Mitigation Plan and vice versa.

2024 Plan

improvements (Lessons Learned)

- ▶▶ City needed more than a their existing 1-page pandemic plan.
- ▶▶ Additional EMD/S personnel contributing or dedicated, PT or FT, toward Plan implementation, is required.
- ▶▶ More active implementation of the HMP with the HMC and City Councilor and/or people familiar with budgeting.

Great Mitigation 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 City Department, City staff member or volunteer. The annual balancing act to obtain enough municipal funding for priority City projects, including any mitigation projects, while keeping property taxes as low as possible will continue.

New Hampshire relies on the **payment of property taxes** and a small selection of **limited state and federal funding opportunities** to develop annual municipal operating budgets that must be approved by voters (residents and property owners) in most communities. However, Concord’s City Council serves this function with representatives elected from Concord’s Ward districts represent the residents and property owners. Our population is aging and many people are on a fixed income. Annual budgets and capital projects require voter approval (through the City Council) for new staff positions hiring and funding of large hazard mitigation projects. Limitations for Action completion exist after the Concord Hazard Mitigation Committee has developed its [Mitigation Action Plan](#):

- ✧ **City Council votes decide whether to approve new zoning ordinances** which can help mitigate hazards, and the Planning Board and Community Development Department must first be supportive of any ordinance changes.
- ✧ **City Council votes decide upon the \$ amount available to Department Operating Budgets** which often is just sustainable to enable. Voters try not to increase property taxes, which does not allow flexibility to plan ahead.
- ✧ **City Council votes decide upon expensive bonds and CIP items which may not include the [Mitigation Action Plan](#) projects**, and they may vote to not expend funds (Capital Reserve Fund) for, nor accept funds (grant) from, a mitigation project.
- ✧ **City staff have much to accomplish for their normal duties and may not consider [Mitigation Action Plan](#) projects a priority.**
- ✧ **City volunteers** are relied upon to do much of the hazard mitigation work in communities. Many volunteers are at or near retirement age and have held their positions for a decade or more. Few younger people are stepping up to take the place of exiting volunteers.
- ✧ **City Boards and Departments set their internal priorities** which may not be the same as the [Mitigation Action Plan](#) projects, including regulation revisions, education and outreach, structural improvements, etc.
- ✧ **Communities often wait years to obtain grant funding for their priority projects** like bridge or road rehabilitation, stormwater upgrades, or brownfields assessments. Most funding programs require a cash match which is where most discretionary monies and City staff time are channeled.
- ✧ **Communities do not have allocated funding for staff to review and evaluate the Plan** yearly as a Hazard Mitigation Committee, despite federal preference for this activity to occur. Many [Mitigation Actions](#) will be completed organically by local Departments and Boards instead of being led by a Hazard Mitigation Committee.

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. Despite the different ways of evaluation and prioritization shown within the **Hazard Mitigation Plan 2024**, completion of Actions may not occur within the next **5** years unless there is an urgent need such as a declared major disasters or emergency declaration (DR- or EM). A natural disaster may serve as the catalyst for project implementation and grant application.

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 City's Action *importance* priority. Instead, the STAPLEE process evaluates each Action and attempts to identify some potential barriers to its success. As revised in **2022-2023**, a score of **75** would indicate that the mitigation strategy, or Action, would be relatively among the easiest Actions to achieve from a social and ethical standpoint.

The previous Plans including the **2017 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 possible highest ranking total score of **36**.

There is more latitude in the **2024 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 damages or injuries?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect sensitive 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?
- Does the action have the funding necessary for completion?
- Does the action have the necessary staff or volunteers to undertake?
- Does the action support historic preservation?

The enhanced STAPLEE scores can range from a low of **15** to a high **75**, the highest possible ranking. Concord's **Mitigation Action Plan** STAPLEE rating is shown in **Figure 31** and includes a basic benefit-cost ranking as shown in yellow.

Figure 31
Enhanced STAPLEE Ranking of Mitigation Actions

Action Number	Does the Action..... or Is the Action.....	Reduce Damage? (or Injury)	Contribute to City Objectives? (Supported by Master Plan, CIP or current thinking/ideas?)	Meet Regulations? (If there are any)	Protect Sensitive Structures? (Buildings, roads, culverts, drainage, human-made things?)	Implement ed Quickly? (See also Action Plan for Timeframe)	Socially Acceptable? (Neighbors, residents, taxpayers like project?)	Politically Acceptable? (Public officials & decision makers like project?)	Administratively Feasible? (Paperwork, project management, permits, or grant admin can be completed?)	Technically Feasible? (Technology, technical skills, plants, or project viable?)	Have a Reasonable Cost to Benefits Gained? (Will project save \$\$ and effort in long term?)	Legal? (Or will be legal upon completion)	Support or Protect the Environment? (Natural resources or rural character, energy efficiency?)	Have the Funding? (Or can funding be obtained?)	Have Necessary Staff or Volunteers? (Can assign, hire/contract or recruit people to do work?)	Support Historic Preservation? (Sites, neighborhoods, cultural, historical character?)	Ranking Score 15-75
#116-2017	Evaluate the Overlap Between the 2015 Fluvial Erosion Hazard (FEH) Zone and the Existing Shoreland Protection Zone for the Soucook River and Turkey River (F&G) After the Next Master Plan	1	5	5	1	1	5	5	5	5	5	5	1	5	4	1	54
#132-2024	Update the City Master Plan to Include a Three Rivers Study (CIP #563) to Reduce the Impact of Flood and Erosion	1	5	5	1	3	5	5	5	5	5	5	5	5	5	4	64
#133-2024	Obtain the Newest Dam Emergency Action Plans (DEAPs) and Inundation Maps for High and Significant Hazard Dams to Reduce the Risk of Injury and Damage from Flood and Dam Breach	5	5	5	5	5	5	5	5	5	5	5	3	5	5	3	71
#134-2024	Encourage the Property Managers of Multi-Unit Housing to Post "You are Here" Emergency Evacuation Maps in Each Housing Unit and on Every Floor to Reduce the Risk of Injury from Hazards Requiring Evacuation	3	5	5	1	5	5	5	5	4	5	5	1	5	3	1	58
#135-2024	Convene the Ad Hoc Heat Advisory Panel and Develop a Plan to Address Excessive Heat Impacts on the City's Infrastructure and Population, Especially Elderly and Underserved Groups	1	5	5	1	4	5	5	4	5	5	5	1	5	3	1	55
#136-2024	Encourage the Development of Generator-Run Small Community Office Co-working Space at the Citywide Multi-Generational Facility and Beaver Meadow Clubhouse to Maintain Economic Sustainability During Severe Winter and Wind Events (PUBLIC)	1	5	5	1	1	5	3	3	5	3	5	1	3	3	1	45
#137-2024	Encourage the Development of Small Community Office Co-working Space at Large or Vacant Facilities Across the City to Maintain Economic Sustainability During Severe Winter and Wind Events (PRIVATE)	1	5	5	1	3	5	5	5	5	3	5	1	5	4	1	54
#138-2024	Develop a Program to Assess and Mitigate Potential Wildfire Damage in Future Development's Wildfire/Wildland Urban Interface (WUI) Areas	5	5	5	5	4	3	3	5	5	5	5	5	5	5	1	66
#139-2024	Identify Climate Resiliency Strategies for City Infrastructure, Buildings, and Facilities to Reduce the Impact of Climate Change	5	5	5	5	1	3	4	4	4	3	5	5	4	3	4	60
#89-2012	Encourage the Installation of Sprinkler Systems at Concord Gardens and Royal Gardens Multi-Unit Housing to Reduce the Risk of Lightning and Fire	1	5	5	5	3	3	4	5	5	5	5	1	3	4	1	55
#91-2012	Inform Property Owners of Funding Resources for Fire Alarm System Upgrades at All Multifamily Developments to Reduce the Risk of Lightning and Fire	5	5	5	4	3	3	4	5	5	5	5	1	5	5	3	63
#130-2017	Purchase Lightning Rods and Grounding Panels for Installation on Tall, Older City Buildings and the City Airport to Reduce the Risk of Lightning Damage	5	5	5	5	1	5	5	5	3	3	5	1	2	5	5	60
#140-2024	Upgrade Loudon Road Bridge over Merrimack River to Reduce Impact of Flood, Ice, Erosion and Debris (CIP #588)	5	5	5	5	4	4	5	5	5	5	5	5	5	5	1	69
#141-2024	Upgrade Iron Works Road bridge over Turkey River to Reduce Impact of Flood, Ice, Erosion and Debris (CIP #602)	5	5	5	5	2	4	5	5	5	5	5	5	4	5	1	66
#142-2024	Improve White Park's Maintenance Protection for Modernization and Safety Including Building from Lightning (under CIP #51)	5	5	5	5	5	5	5	5	5	5	5	1	5	5	1	67
#143-2024	Upgrade the Aging Ventilation System and Exhaust Fans of the Fire Administration Buildings to Reduce Health and Safety Impacts to Workers and Visitors.	5	5	5	5	3	5	4	5	5	4	5	3	2	5	5	66
#144-2024	Construct New Central Fire Station to Increase Efficiency and Reduce Response Time to Fires, Wildfires, Crashes, and Haz Mat Incidents (CIP #594)	1	5	5	3	1	4	5	5	5	5	5	3	3	5	2	57

8 MITIGATION ACTION PLAN

Action Number	Does the Action... or is the Action.....	Reduce Damage? (or injury)	Contribute to City Objectives? (or injury)	Meet Regulations? (if there are any)	Protect Sensitive Structures? (Buildings, roads, cultural, historic, human-made things?)	Implement Quickly? (or also Action Plan for Emergency)	Socially Acceptable? (or neighbors, residents, taxpayers, the project?)	Politically Acceptable? (or public officials, elected, decision makers like project?)	Administratively Feasible? (or project management, permits, or grant within can be completed?)	Technically Feasible? (or technology, technical skills, plans, or project viable?)	Have a Reasonable Cost to Benefit? (or cost-benefit ratio?)	Legal? (or will be legal upon completion?)	Support or Protect the Environment? (or natural resources or land characteristics, energy efficiency?)	Have the Funding? (or can funding be obtained?)	Have Necessary Staff or Volunteer? (or can staff, time/volunteer or recruit people to do work?)	Support Historic Preservation? (or historic, neighborhoods, cultural, historical character?)	Ranking Score 15-75
#146-2024	Consider a New Fire Station in Concord (Conceptual) to Increase Efficiency and Reduce Response Time to Fires, Wildfires, Crashes, and Hazard Incidents	1	5	5	3	1	3	4	5	5	5	5	3	5	5	1	56
#146-2024	Implement Stormwater System Improvements Throughout the City to Reduce Flood Risks (CIP #85)	5	5	5	5	1	3	3	5	5	5	5	5	4	5	3	64
#147-2024	Implement Reservoir Flood Area Drainage Improvements to Reduce Flood Risks (CIP #97)	5	5	5	5	2	3	3	5	5	5	5	5	4	5	4	66
#148-2024	Install a Chain at the Oak Hill Trail System for Fire Suppression to Reduce the Impact of Lightning, Wildfire, and Fire	3	4	5	2	1	3	3	3	3	3	5	4	2	3	2	46
#149-2024	Evaluate and Develop an Alternative Source Water Plus for the Merrimack River to the Supply Municipal Water to Reduce the Impacts of Drought	3	5	5	5	1	5	5	5	5	5	5	5	5	5	1	65
#150-2024	Place a Secondary Communications Tower at 109 Old Turnpike Road New Fire Training Facility (Backup FCC) near Concord Airport to Enable Redundant Communications during Severe Weather and Disaster Events	1	5	5	2	3	4	4	4	3	3	5	1	3	4	1	48
#151-2024	Install and Monitor an Automated River Gauge on the Turkey River Bridge on Iron Works Road to Provide Early Warning of Flood and Reduce the Risk of Flood and Erosion Damage and Injury (See CIP #602)	5	5	5	5	2	5	5	5	5	5	5	1	4	5	4	66
#152-2024	Install and Monitor an Automated River Gauge on the Merrimack River between NH71 and East Side Drive/NH 132 to Provide Early Warning of Flood and Reduce the Risk of Flood and Erosion Damage and Injury	3	5	5	5	3	5	5	5	5	5	5	1	3	5	1	61
#153-2024	Implement Crime Deterrence Procedures and Equipment in City Cemeteries Including Blossom Hill to Reduce the Risk of Vandalism and Other Crimes (See CIP #567)	4	5	5	3	2	5	5	5	4	4	5	1	5	3	5	61
#154-2024	Design & Construct a Safe Room for Storage of Paper Cemetery Records at Blossom Hill Cemetery (CIP #567) to be Impervious to Severe Weather such as Lightning, Flood, Wind/Tropical, Winter and Fire (CIP #567)	5	5	5	5	1	3	4	3	5	3	5	1	4	4	5	58
#155-2024	Fund a Study to Review and Improve Drainage Systems and Dams at Blossom Hill and Concord Calvary Cemeteries to Reduce the Impact of Flood and Erosion (CIP #567)	1	5	5	1	1	5	5	5	5	5	5	4	5	4	5	61
#156-2024	Help Secure Funding to Renovate the Historic, Privately Owned Gas House Structure to Existing Code to Reduce the Risk of Damage from Earthquake, Snow, High Wind Events	2	5	5	5	3	4	4	4	4	4	5	4	3	4	5	61
#157-2024	Renovate the Beaver Meadow Golf Course Building to a Community Center to Existing Code to Reduce the Risk of Damage from Earthquake, Snow, High Wind Events (CIP# 187)	5	5	5	5	1	2	2	5	5	4	5	4	3	3	3	57
#158-2024	Redesign Public Space between Kiwanis Park to Terrill Park along the East Side of Merrimack River, Include Erosion Control and Additional Emergency Access (CIP# 60)	5	5	5	3	4	4	3	5	4	5	5	5	5	5	3	66
#159-2024	Restore Merrill Park Pond and its Stream Flow to Ensure Adequate Drainage and Reduce the Risk of Mosquito-Borne Illnesses (CIP #359)	5	5	5	5	1	5	4	4	5	3	5	5	4	5	1	62
#160-2024	Ensure the Historic West Street Ward House (Meeting Hall) is Considered as a CIP Item for Restoration to Protect Against the Impact of Earthquake, Winter and Wind Hazards (CIP #63)	5	4	5	5	1	4	2	5	4	2	5	3	2	3	5	55
#161-2024	Install Electric Vehicle Charging Stations at City Owned Properties to Reduce Greenhouse Gas Emissions (CIP #636)	1	5	5	1	4	4	4	4	5	5	5	5	4	5	1	58
#162-2024	Construct a New Police Dept Headquarters to Enable Better Community Service and Response Time to All Incidents (CIP #643)	3	5	5	5	1	3	4	5	5	4	5	2	4	4	1	56
#163-2024	Plant New Street Trees in the Urban Compact Area and Plant Replacement Trees to Reduce the Impact of Excessive Heat (CIP #648)	4	5	5	5	5	4	5	5	4	5	5	5	4	5	2	68
#164-2024	Construct the Recreational Merrimack River Greenway Trail along the Merrimack River to Support Multimodal Transportation, Reduce Greenhouse Gas Emissions, and Construct an Appropriate Use in the Floodplain (CIP #643)	4	5	5	2	3	5	5	4	5	5	5	5	5	5	3	66
#165-2024	Construct the Penacook Riverfront Park at Canal Street along the Contooscook River to Support Multimodal Transportation, Reduce Greenhouse Gas Emissions, and Construct an Appropriate Use in the Floodplain (CIP #643)	3	5	5	5	4	5	5	4	5	4	5	5	5	4	3	67
#166-2024	Improve the Water System Pump Stations at Penacook Street, Broad Cove Road and Mountain Road to Reduce Impacts to Water Quality and to Maintain Water Volume During Droughts (CIP #572 2025, 2027)	5	5	5	5	4	5	5	5	5	5	5	5	4	5	1	69
#171-2024	Develop NHP Public Awareness Program and Publicize the Availability of Flood Insurance to Reduce the Impact of Future Flooding Events	1	5	5	3	4	5	5	4	5	4	5	1	4	4	1	56
#179-2024	Inform the public about the implications of the 2017 Saco River & Turkey River Flood Geographic Assessment to Reduce the Risk of Erosion and Impacts of Flooding	1	5	5	1	2	4	5	5	5	4	5	4	4	2	1	53
#187-2024	Announce the Availability and Encourage the Public to Take NOAA SkyWarn Training to Obtain an Overall Understanding of Weather Events	3	4	5	3	4	4	4	4	5	5	5	1	5	5	1	58
#188-2024	Inform the Public on the City's Water Supply and Private Wells, Testing Results, and Drought Impacts to Raise Awareness of Clean Water and Reduce the Impact of Flood and Drought	3	4	5	4	3	4	4	3	4	4	5	5	4	5	1	58
#169-2024	Encourage Remote Working from Home for Office and Professional Workers to Help Remove People from Public Health/Severe Winter Weather/High Wind/Flood Risk Pool	3	4	5	1	3	5	5	5	5	4	5	1	4	3	1	54
#170-2024	Encourage Concord Residents, Visitors and Employees to Eat Local and Buy Local Products to Reduce Supply Chain Issues, Promote Self-Sufficiency and Reduce Greenhouse Gas Emissions	3	5	5	1	4	5	5	4	4	4	5	2	4	4	2	57
#173-2024	Engage in Public Education Campaigns to Inform Residents in Multiple Languages How to Protect Themselves and their Property from Natural Hazards and Severe Weather	5	5	5	4	3	5	5	4	3	5	5	1	3	2	1	56
#172-2024	Use Existing Public Events to Inform Underserved Communities in Multiple Languages about Personal Safety and Property Protection During Natural Hazards and Storm Events	4	5	5	4	3	5	5	4	3	5	5	1	3	2	1	55
#173-2024	Talk with Manufactured Home Owners about the Necessity of Tying Down Manufactured Homes, Carports, and Propane, Natural Gas and Oil Tanks to Reduce the Risks of Wind/Tropical Storms, Floods, Winter Weather	5	5	5	5	4	4	4	4	5	5	5	2	3	3	1	60
#176-2024	Provide Current and Accurate Information on Public Health Issues to Underserved Communities in Multiple Languages, Including the Need for Critical Vaccinations to Reduce the Risk of Epidemics	5	5	5	1	3	3	3	3	4	4	5	1	3	2	1	48
#175-2024	Connect Faith-Based Organizations with Hazard Mitigation Grants to Strengthen their Ability to Withstand Adverse Weather Conditions such as Wind/Tropical, Lightning, Earthquake and Flood	5	5	5	4	4	4	4	5	5	5	5	1	4	5	4	65
#176-2024	Remove Hazardous and Unhealthy Trees in Parks to Improve Safety of Park Users and Park Playgrounds/Structures to Reduce the Impact of Invasive Species and Debris Fall	5	5	5	5	4	4	4	5	5	5	5	5	2	2	3	64
#177-2024	Increase Public Safety Messaging about Danger of Inclement Weather in Open Space and Trails and Provide Safety Actions to Reduce the Impact of Storms for Lightning, Winter, and Severe Winds	4	5	5	4	4	5	5	4	5	5	5	1	4	3	1	60
#178-2024	Conduct Outreach to Community Regarding Water Safety, Life Jacket Use and Importance of Signing Up for Swim Lessons to Reduce the Risk of Drowning	5	5	5	1	3	5	5	5	5	5	5	1	3	3	1	57
#179-2024	Promote Public Education and Techniques for Reducing Carbon Emissions to Reduce Local Impacts of Climate Change	2	5	5	1	4	5	5	5	5	5	5	5	5	4	1	62
#180-2024	Update the City Website with Technology that Enables the National Weather Service/NOAA Weather Warnings to Automatically Scroll on City	3	5	5	3	5	5	5	5	5	5	5	1	5	4	1	62
#181-2024	Encourage the High Fagade Houses of Worship to Install Lightning Mitigation Systems to Reduce the Risk of Lightning Damage	5	5	5	5	2	4	4	4	4	5	5	1	4	3	4	60

The Actions are also prioritized by an estimated **Action Timeframe** for completion based upon the other City 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 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 City 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.

See the Phasing explanation in the **Mitigation Action Plan** section for Actions that span beyond the **5**-year lifespan of the Plan.

COST TO BENEFIT ANALYSIS

A simple **Cost to Benefit Analysis** ranking is contained within the enhanced STAPLEE criteria as displayed in the previous **Figure**.

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 City.

Many Actions are general in nature and have the capacity to mitigate multiple types of natural hazards. From **4 HAZARD RISK ASSESSMENT**, those natural hazards rated a **LOW Concern** may not have been considered for an Action because their priority was not as important as other hazards. The **MEDIUM, HIGH, and EXTREME Concern** hazards either have generalized or targeted Actions associated with them in the **Mitigation Action Plan** or the reason why no specific or feasible Action was developed for the highest **Concerns** is described in **Table 54**.

Table 54

Committee Assessment of MEDIUM & HIGH Natural Hazards with Mitigation Actions

CONCERN	Natural Hazard	Committee Assessment of Actions
EXTREME	River Hazards	See Actions related to River, Flood, Dam, Erosion, Landslide and overall Severe Weather Storms, Winter.
EXTREME	Inland Flooding	See Actions related to Flood, Dam, Erosion, River, and Aging Infrastructure.
EXTREME	High Wind Events	See Actions related to Wind, Tropical, Tree Debris, overall Severe Weather Storms, Winter.
EXTREME	Tropical and Post- Tropical	See Actions related to Wind, Tropical, Tree Debris, overall Severe Weather Storms.
EXTREME	Public Health	See Actions related to Public Health, Health (Water Quality), Infectious, Life & Safety and general natural disaster.
EXTREME	Severe Winter Weather	See Actions related to Winter, overall Severe Weather Storms, Ice, Tree Debris, Flood, Wind/Tropical.
HIGH	Extreme Temperatures	See Actions related to Drought, Climate Change, Winter Weather, Extreme Heat.
HIGH	Lightning	See Actions related to Wildfire, Wind/Tropical (storms), Fire, Tree Debris.
HIGH	Wildfire	See Actions for Wildfire, Tree Debris, Lightning.
MEDIUM	Drought	See Actions related to Drought, Lightning, Extreme Temperatures, and Fire.
MEDIUM	Solar Storms and Space Weather	See Actions related to Extreme Temperatures, Aging Infrastructure, Utility Failure.
LOW	Dam Failure	See Actions related to River, Flood, Dam, Erosion, Landslide and overall Severe Weather Storms.
LOW	Earthquake	See Actions related to Earth, Landslide, Erosion, Earthquake, Aging Infrastructure.
LOW	Landslide	See Actions related to Earth, Landslide, Erosion, Earthquake, Aging Infrastructure.

Source: Concord Hazard Mitigation Committee

9 ANNUAL IMPLEMENTATION AND EVALUATION

The City received FEMA approval for the prior **Hazard Mitigation Plan** in **July 2017**. 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 will be considered by all City Departments, Boards, and Committees within their normal working environments. While evaluating the effectiveness of Actions in its everyday implementation, everyone will be able to contribute to the relevancy and usefulness of the Plan and to communicate with the Hazard Mitigation Committee where changes will 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 City of Concord will review, monitor, and update its new **Concord Hazard Mitigation Plan Update 2024**.

City Duties: Annual Monitoring and Update of the Mitigation Action Plan (Ch 8)

The City Council will 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 City.

The Emergency Management Director, Emergency Management Coordinator or City Council designee will continue to serve as Chair of the Committee for Hazard Mitigation meetings and will be officially appointed to such a capacity by the Board. 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 will include:

☒ Emergency Management Coordinator	☒ Transfer Station Supervisor or designee
☒ Deputy Emergency Management Director	☒ 1 City Council member
☒ City Administration	☒ 1 Planning Board member
☒ Fire Chief or designee	☒ 1 Budget Advisory Committee member
☒ Police Chief or designee	☒ 1 Concord School District Representative
☒ General Services Director or designee	☒ 1 Library Representative
☒ Community Development- Planning	☒ 1 Historical Society member
☒ Community Development- Engineering	☒ 1 Conservation Comm Representative
☒ Community Development- GIS	☒ 1 Parks and Recreation Comm Representative
☒ Code Administration	☒ Community (Stakeholders) at Large
☒ Welfare Officer/Health Officer	

Stakeholders who will be solicited to attend meetings and to participate equitably in the Plan development process include representatives from Concord School District, Library, Historical Society, NH Army National Guard, neighborhoods, local State Representatives, agricultural/farming operations, trails groups, local non-profits including the Capital Area Public Health Network, area emergency management directors, local, State or Federal agency representatives (such as NH HSEM), utility representatives, and other members of the public. This composition provides a wide spectrum of potential interests and opportunities for partnership to develop and accomplish Actions.

HMC INTERIM MEETINGS AND ACTIVITIES

This Committee will **aim to meet up to 2-4 times per year** to follow these potential future meeting activities to update the **Mitigation Action Plan** and complete the Plan's annual evaluation as displayed in **Table 55**. One way to hold HMC meetings is to meet after the regular Department head meetings for an hour to take advantage of having Department personnel already at the table, but publicly noticed.

Table 55

Hazard Mitigation Committee Preliminary Annual Future Meetings and Activities

Meeting or Activity Month	ANNUAL Preliminary HMC Interim Meeting Agenda Items and Activities
January – February	City CIP is determined for the next 10-year cycle. CIP Planning meeting is held among Departments. HMC ensures Haz Mit Actions are introduced into the CIP. Departments and Boards continues working on Plan Actions.
March – May	Committee continues update to the Mitigation Action Plan using through Departmental communication and updates the Action Status Tracking sheet . Committee provides revised copies to Department Heads, keeps original Word and Excel files accessible on City computer system. Committee checks to be sure capital hazard mitigation projects are placed in the CIP and Department operating budgets. Final budget to City Council provided in early May.
June	Annual funding is received from adopted City Budget. Committee sends Progress Report #2 to Departments for completion by beginning of July. Ensure the Annual Implementation Steps from MAIN ANNUAL HMC IMPLEMENTATION TASKS are being completed.
JULY HMC Meeting	HMC completes annual update of the Mitigation Action Plan and the associated Plan Chapter and sections . Committee informs Department Heads of Action priorities and assists with implementing the Plan. Committee prepares Annual Evaluation of the Plan .
July - September	Implement the Mitigation Action Plan and begin revisions of necessary Plan sections. With HMC help, Department Heads will be working on Actions . Obtain a semi-annual Mitigation Action Progress Report for each Action .

Meeting or Activity Month	ANNUAL Preliminary HMC Interim Meeting Agenda Items and Activities
September - December	Begin planning for next year's budget. Committee to assist Department Heads with their budget requests to include Action Plan items, and to determine which Action Plan items will be funded within the City budget. HMC continues assistance to Departments for Action Plan items and will provide 1 Department Mitigation Action Progress Report #1 for each Action to respective Departments for completion by beginning of December . Committee begins to update the Action Status Tracking Sheet using the returned Progress Reports. HMC assists City Council and City Manager with getting their mitigation projects funded and written into budgets. Action implementation continues.
DECEMBER HMC Meeting	Determine budget funding requirements. Committee continues to update the Action Status Tracking Sheet from Department/Board progress on their Actions . HMC attends City budget meetings and suggests budget items for Action implementation. Committee determines Action Plan items to pursue for next year, including \$0 cost items. Committee attends City Manager meetings scheduled through January to champion Action item funding. Outline what is needed to be introduced into the CIP at the January CIP Planning meeting.

Sources: Concord Hazard Mitigation Committee

For each of the Hazard Mitigation Committee implementation meetings, the Emergency Management Director (or Staff Coordinator) will invite other Department members, Board and Committee members, City Staff, Concord School District representatives, Stakeholders, and other participants of the **2024 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 Concord, and will be posted on the City of Concord website at <https://www.concordnh.gov/>.

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, will be retained and compiled for inclusion into **APPENDIX C**.

The Emergency Management Director and Department heads will work with the City 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), City Operating Budgets, and other funding methods.

PLEASE REFER BACK TO **8 MITIGATION ACTION PLAN Great Mitigation Projects... and the Realities of Project Implementation in New Hampshire** to understand the nature and complexity of the NH's reliance on volunteers, how our local governments work, and the constant need for funding that may inhibit the review and evaluation of the **Hazard Mitigation Plan** and completion of its **Mitigation Actions** on an annual basis as described here.

City Duties: Annual Implementation and Evaluation of the Plan

This Hazard Mitigation Plan will be reviewed, revised to current standards and will be adopted by the City and formally approved by FEMA every five years. This five-year, comprehensive Plan update project has been funded through a FEMA hazard mitigation planning grant to date and is facilitated by CNHRPC. Yet, there are numerous activities the City, through the Hazard Mitigation Committee or individual Boards and Departments, will undertake to implement the Action list and perform minor section updates to the Plan each year between now and the Plan's lapse in **2029**.

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 **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 51**. The primary implementation tasks are to be completed depending on when the City prepares and receives its yearly operating budgets and warrant articles.

MAIN ANNUAL HMC IMPLEMENTATION TASKS

The rolling list of the Hazard Mitigation Committee's annual main tasks to update and implement the Plan sections will include:

1. Document New Hazard Events that Occurred in the City.

- ➔ Redo Hazard Identification and Risk Assessment (**CHAPTER 4** HIRA Table in Plan, HIRA file) ratings for natural hazards.
- ➔ Add new events to Local and Area History of Disaster and Hazard Events (**CHAPTER 4** Local History Table in Plan).
- ➔ Submit photos of events to add to the **APPENDIX** Photographic History file.

2. Coordinate Annual Completion of Priority Mitigation Actions by Assigning to Departments.

- ➔ **APPENDIX B** Mitigation Action Progress Report file.

3. Ensure Departments Acquire Funding for Actions & Document the Status of Priority Actions.

- ➔ **APPENDIX B** Mitigation Action/Project Status Tracking file.

4. Evaluate Effectiveness of the Plan Each Year.

- ➔ **APPENDIX B** Plan Evaluation Worksheet file.

5. Request Semi-Annual Progress Reports from Departments & Update Status File.

- ➔ **APPENDIX B** Mitigation Action/Project Status Tracking file.

6. Update Mitigation Action Plan, Reprioritize Actions for Current Year, Update Supporting Plan Sections.

- ➔ Update Mitigation Action Plan (**CHAPTER 8** Tables in Plan), place **Completed** or **Deleted** Actions into respective **CHAPTER 7** Prior Action Status Tables in Plan.
- ➔ Enhanced STAPLEE Prioritization (**CHAPTER 8** Figure in Plan, STAPLEE file).
- ➔ Update other sections as needed/if time permits including:
 - **CHAPTER 5** Critical and Community Facilities (narrative in Plan, Tables in file, and **APPENDIX A**),
 - **CHAPTER 5** Problem Statements narrative in Plan,
 - **CHAPTER 5** Culverts to Upgrade Table in Plan,
 - **CHAPTER 6** Capability Assessment Tables in Plan,
 - and more.
- ➔ Make note of everything added/changed in the **2024 Plan** for so we can track the adjustments and copy them over into the new **2029 Plan** update! The latest approved format and content will be different than the **2024 Plan**.
- ➔ Remember to invite the Stakeholders and public to all meetings, take minutes as needed, and keep PDF copies of publicity. Add to **APPENDIX C Meeting Information**.

7. Send Interim Files to CNHRPC & Repeat.

- ➔ Email copies of Agendas, meeting publicity, meeting minutes, Action Prioritization, Action Evaluation, other revised Plan files, and the revised Hazard Mitigation Plan itself to CNHRPC staff salexander@cnhrpc.org for archival and preparation for the next 5-year Plan update in **2029-2030**.

Figure 32 is a graphic display of the repeating annual interim activities of the Hazard Mitigation Committee to update and implement the **Hazard Mitigation Plan 2024 Actions** and while preparing for the **2029 Plan Update**.

Figure 32
Annual Interim Plan Implementation, 2024-2029



ANNUAL INTERIM IMPLEMENTATION FILES 2024-2029

To get the permanent Hazard Mitigation Committee started on its activities during the Interim Update Meetings, **APPENDIX B Evaluation and Implementation Worksheets** are provided. These example working documents include administrative and organizational Word and Excel format files, draft Agendas, a Mitigation Action Progress Report, a file to track the progress of Actions to completion, and a file to evaluate the effectiveness of the Plan (a way to make notes for future improvement). These documents are only a starting point for Towns to help guide implementation during the interim years of Plan approval (**2024**) through Plan lapse (**2029**). Contact [CNHRPC](mailto:salexander@cnhrpc.org) at 603-226-6020 or at salexander@cnhrpc.org for information about implementation assistance.

COMMITTEE ORGANIZATION AND PUBLICITY DOCUMENTS

-  City Council: Motion & [Permanent] Hazard Mitigation Committee Membership
-  Interim Meeting Publicity- Template Press Release and Public Notice Meeting Poster

MEETINGS & WORKING WITH THE MITIGATION ACTIONS

-  Example Agenda for Interim Meeting 1 with recommended task list
-  Example Agenda for Interim Meeting 2 with recommended task list
-  Mitigation Action Status Tracking Sheet
-  Mitigation Action Progress Report for Departments (optional)
-  Annual Hazard Mitigation Plan Evaluation Worksheet

The next **5**-year full Plan update will evaluate the Actions in the same manner, add new Actions, and will fulfill a complete update of the **Hazard Mitigation Plan** according to [*FEMA Local Mitigation Planning Policy Guide 2023*](#) standards and [*NH State Hazard Mitigation Plan 2023*](#) guidance.

Implementing the Plan through Existing Programs

In addition to work by the Hazard Mitigation Committee and City Departments, several other mechanisms exist which will ensure that the **Concord Hazard Mitigation Plan Update 2024** 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.

OVERALL IMPLEMENTATION PROGRESS THROUGH LOCAL PLANNING MECHANISMS SINCE THE 2017 PLAN

As a successful, growing community, the City of Concord has a comprehensive network of plans, processes, champions, regulations, and budgets to ensure its local objectives, projects and budgets are fulfilled. The **Concord Hazard Mitigation Plan 2024** is a tool for community betterment which works most effectively when partnering with existing planning mechanisms. Since the original **2007 Plan**, the overall integration and importance of the **Concord Hazard Mitigation Plan** into existing City planning mechanisms continues to grow.

Although the **2017 Plan** was not adopted into Planning Board's latest **Master Plan 2030**, the opportunity will exist for incorporation of the **2024 Plan** into the updated Master Plan(s). The **Capital Improvements Program 2023-2032** has been recently updated and its projects influence new funding for Departments, including the General Services funding that includes individual stormwater drainage area upgrades in the **Mitigation Action Plan**. The **Zoning Ordinance** was revised annually since **2017** and continues to encourage natural systems protection (see **6 CAPABILITY ASSESSMENT**). The **Subdivision and Site Plan Review Regulations** will be revised as a result of the new Master Plans before the **2029 Plan**. These regulations indirectly support hazard mitigation planning principles (such as excavation regulations, fire and emergency access, driveway standards, drainage, landscaping, erosion, etc.) that support all versions of the **Plan**. Annual budgets for Emergency Management have been very small but may be able to increase to consider the **Hazard Mitigation Plan** findings.

Moving forward, City Boards and Departments have room for further improvement of the **Hazard Mitigation Plan's** incorporation into existing planning mechanisms. For several of these planning programs, a summary of the **Process to Incorporate Actions** as noted below offers ways for the **2024 Plan** to be utilized.

2023-2025 UPDATED MASTER PLANS, PERIODIC

The **20/20 Vision Concord Master Plan** adopted in **2001** and the updated **Master Plan 2030** adopted in **2008** are being updated by the City as individual component Master Plans over several years. These include the overall Concord Master Plan, Energy Master Plan, Historic Resources Master Plan, Sewer &

Water Maser Plan, Penacook Vision Plan, Main Street Design Guidelines, Airport Master Plan, Open Space Master Plan, Park Master Plan, Opportunity Corridor Master Plan, Bicycle Master Plan, and Pedestrian Master Plan. The Master Plan is anticipated to be updated between **2024-2025** for most components. A new Three Rivers Master Plan which studies the Merrimack River, Soucook River, and Contoocook River is anticipated to be completed by **2025**. The **Hazard Mitigation Plan 2024** could be adopted as an Appendix or a new component to the City **Master Plan**. The Master Plan influences the Zoning Ordinance Codes and the Land Development Regulations (Subdivision Regulations, Site Plan Review Regulations, Excavation Regulations) along with the **10-Year Capital Improvements Program 2023-2032**. These documents are used by local land use boards and staff to guide growth and development of Concord.

*To support mitigation efforts, the Planning Board will consider adopting the **Hazard Mitigation Plan 2024** as a separate Chapter or component to its Master Plan in accordance with **RSA 674:2.II(e)**.*

The **Hazard Mitigation Plan** will be presented to the Planning Board by the City Planner and Emergency Management Director after FEMA's **Formal Approval**. The HMC could wait until the new Master Plan is adopted for a better chance of success. The Plan can be considered for adoption after a duly noticed public hearing, just as any typical Chapter of a Master Plan. In addition, Actions and concerns from the Plan can be integrated into the Master Plan.

Process to Incorporate Actions

The Hazard Mitigation Committee will present the approved **Hazard Mitigation Plan** to the Planning Board within **3** months of the Board's adoption into the new Master Plan, for adoption as a component of 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.

2024-2033 CAPITAL IMPROVEMENTS PROGRAM, ANNUAL

Concord revises and approves its **600**-page **Capital Improvements Program (CIP)** every year, with the last version covering **2023-2032** as adopted in **2022**. The CIP is used by Departments and is thoroughly reviewed and updated each year by the City Administration for approval by City Council. The HMC would like to ensure that Actions identified in the **Hazard Mitigation Plan Update** requiring capital improvements funding will be inserted into the annual **Capital Improvements Program** for the

appropriate project year. Any Capital Reserve Funds for such items as road & bridge improvements will be identified where appropriate as addressing projects in the **Hazard Mitigation Plan Update**.

Process to Incorporate Actions

The Hazard Mitigation Committee (HMC)'s representative to City Administration will oversee the process to begin working with the CIP Committee and staff to incorporate the various Hazard Mitigation Plan projects into the updated CIP. As the CIP is amended each year, the representative from the Hazard Mitigation Committee will be appointed to sit on the CIP Committee or the HMC will submit CIP Project Applications to ensure the mitigation projects are addressed as part of the CIP update process. A new Capital Reserve Fund for Hazard Mitigation Projects could be considered.

DEPARTMENT OPERATING BUDGETS, ANNUAL

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. City Departments and Staff have rigorous job functions that demand their undivided attention to the tasks required to run their respective Departments. Additions to the workload to accommodate the Actions can put a strain on their ability to serve the public during performance of their normal job duties. When possible, Concord Departments and staff will be able to prioritize their tasks to work on **Hazard Mitigation Plan Update 2024** Actions. The in-kind staff work performed is assumed under the Operating Budget for that particular Department. The Emergency Management Department could benefit from a higher annual budget.

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 Departments 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 City staff members' normal work duties. Staff or volunteers will attempt to follow the **Action Time frame** as a guideline for completion. A yearly review of the **Mitigation Action Plan** by the Hazard Mitigation Committee will re-prioritize the Actions, and the members can report on their progress, asking for assistance or more time as needed. **By connecting planned City of Concord improvement projects to specific projects and objectives of the Hazard Mitigation Plan Update 2024**, the Departments can utilize their resources more effectively.

Continued Public Involvement

On behalf of the Hazard Mitigation Committee, the Emergency Management Coordinator and City Administration will be responsible for ensuring that City Departments and the public have adequate opportunity to participate in the planning process for **Hazard Mitigation Plan Updates**. Administrative staff will again 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 City volunteer Board and Committee Chairs and City Department heads;

- ✧ Provide personal invitations to abutting community emergency management directors of neighboring communities surrounding Concord;
- ✧ Provide personal invitations to the major businesses, agencies, neighborhoods, non-profits, and other entities listed previously in **9 ANNUAL IMPLEMENTATION AND EVALUATION**;
- ✧ Post public meeting notice flyers and press releases on the City's website at <https://www.concordnh.gov/> on the City's online calendar on the same site, and place agendas and meeting materials on a Hazard Mitigation Committee webpage (off the Emergency Management section).
- ✧ Post meeting notices in the Concord City Hall, outside on the City Bulletin Board, at the Library, at the local schools, and at local business(es);
- ✧ Submit media releases to the Concord Monitor (a paid, regional daily newspaper serving over **40** communities around the Concord area) and other free, regional weekly newspapers serving Central region NH communities (online newspapers and newsletters have unpredictable longevity).

In addition to previous suggestions for invitations to Hazard Mitigation Committee update meetings, review **APPENDIX A Critical and Community Facilities Vulnerability Assessment** Tables: Vulnerable Populations, Economic Assets and Recreational and Gathering Sites for further stakeholder opportunities. The NH Homeland Security and Emergency Management Field Representative for Concord will be invited. The City 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 Concord will be considered for direct invitation for MITIGATION, which is a transparent process. EMERGENCY OPERATIONS planning will have a more selective working group.

A new section of the City website dedicated to Hazard Mitigation Committee activities and the **2024 Plan** will be developed and updated with agendas, documents, maps, meeting notices and materials used by the Hazard Mitigation Committee. This online location would be an optimal place to post the final **2024 Plan** and its *Maps* and *Appendices* and to continue adding materials for annual Plan updates. Additional pages will be added for resources, information, and links to other websites for the public. Several Action Plan items which will be undertaken relate to public education and involvement and the City website would be an exemplary method of getting the word out.

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 Concord Hazard Mitigation Plan Update 2024 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 with the new or revised annual information, but they are optional. It is necessary to establish a City digital storage location for placing any new or updated hazard, Action, meeting, or Plan data over the **5-year** interim until the Plan is ready to be fully updated again. Systematic organization will facilitate annual updates and prepare for next **5-year** Plan development in **2029**.

- A Critical and Community Facilities Vulnerability Assessment ***
- B Annual Plan Evaluation and Implementation Worksheets ***
- C Meeting Information ***
- D Plan Approval Documentation**
- E Photographic History of Hazard Events ***
- F Hazard Mitigation and Severe Weather Community Survey Results ***

These Appendices should be reviewed and updated minimally each year*. It is also highly recommended to update **4 HAZARD RISK ASSESSMENT Table 13 Local and Area Hazard Event and Disaster History** to maintain a record of the disasters, hazards, and impacts to Concord. See **9 ANNUAL EVALUATION AND IMPLEMENTATION** and **Figure 31** for details.

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11 MAPS

The existing **16** detailed Maps were fully updated during the development of the **Concord Hazard Mitigation Plan Update 2024** by the City of Concord Engineering Division GIS staff. Data from the previous Plan maps were used, new standardized data layers and unique data layers were used, and Hazard Mitigation Committee members added their own knowledge of sites and hazard events.

Plan Update 2024 Maps

Map 1 Potential Hazards illustrates potential hazard event locations in Concord 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 Concord in the past, including areas of SFHA, flooding/washout, snowmelt, dam breach, fire/wildfire, wind damage, ice damage, and more.

Map 3 - Critical and Community Facilities (Series) includes all of the infrastructure included in **Map 1 Potential Hazards** on a background of aerial photography to give readers a better, real world perspective. The locations of all critical facilities and community facilities as recorded in **APPENDIX A CRITICAL AND COMMUNITY VULNERABILITY ASSESSMENT** are displayed on the Maps. Each of these sites is numbered on a key listing the names of each facility.

Map 4 - Potential Hazards and Losses (Series) 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. This Map series provides a look into the possible future locations of natural disasters in the community.

■ **Map 1 - Potential Hazards**

■ **Map 2 - Past Hazards**

Critical and Community Facilities Series

■ **Map 3A - Critical Facilities**

■ **Map 3B - Infrastructure**

■ **Map 3C - Vulnerable Populations**

- Map 3D - Economic Assets
- Map 3E - Public Gathering Sites
- Map 3F - Historic Resources
- Map 3G - Hazardous Materials Facilities

Potential Hazards and Losses Series

- Map 4A - Critical Facilities
- Map 4B - Infrastructure
- Map 4C - Vulnerable Populations
- Map 4D - Economic Assets
- Map 4E - Public Gathering Sites
- Map 4F - Historic Resources
- Map 4G - Hazardous Materials Facilities

Fluvial Geomorphic Assessment 2015 Maps

As a result of the many flooding events and existing complications of the very dynamic Suncook River and a potential for flooding on the Soucook River the NH Geological Survey (NHGS) at the NH Department of Environmental Services (NHDES) coordinated fluvial geomorphology assessments of both rivers. Conducted by Field Geology Services who collected field data along the **Soucook River** in 2013, the lower river assessment covered river reaches in Concord and Concord, while the north covered reached in Loudon. Field Geology Services also collected field data along the **Turkey River** in 2013. The two assessments and associated maps were completed in **2015** with assistance of the CNHRPC.

The NHGS wrote an accompanying *Fluvial Geomorphology Assessment Discussion Guide* in **Spring 2015** to help communities interpret the data that was collected on by river reach. While the full **Turkey River** and **Soucook River Fluvial Geomorphic Assessments** are located in the **2017 Plan**, just the accompanying maps have been referenced in the **Hazard Mitigation Plan Update 2024**. The **2015 Fluvial Geomorphic Assessment Maps** are separate from the document to conserve space and to acknowledge the age of their data layers which might not be as relevant in **2024**.

2015 FLUVIAL GEOMORPHIC ASSESSMENT (FGA) MAPS

Turkey River

- Map 5A - Fluvial Geomorphology Features East
- Map 5B - Fluvial Geomorphology Features West
- Map 6A - Fluvial Erosion Hazard Meander Belts East
- Map 6B - Fluvial Erosion Hazard Meander Belts West

Soucook River

- Map 7A - Fluvial Geomorphology Features South
- Map 7B - Fluvial Geomorphology Features Center
- Map &C - Fluvial Geomorphology Features North
- Map 8A - Fluvial Erosion Hazard Meander Belts South
- Map 8B - Fluvial Erosion Hazard Meander Belts Center
- Map 8C - Fluvial Erosion Hazard Meander Belts North