

**TOWN OF CONCORD  
SELECT BOARD MEETING  
APRIL 3, 2023 | 6:00 PM**

**TOWN HOUSE, 22 MONUMENT SQUARE**

**Join Zoom Meeting**

**<https://us02web.zoom.us/j/88129990077?pwd=TFRLNk56TmRnSjl4SEhySTZ5Y3Z2QT09>**

Meeting ID: 881 2999 0077

Passcode: 500454

Dial In Toll-Free: 833 928 4610

**AGENDA**

#	Time*	Agenda Item
1.	6:00 PM	<u>Executive Session</u> under G.L. c. 30A, § 21(3) to discuss threatened litigation regarding the Town's Diversity, Equity, and Inclusion Commission where meeting in an open meeting may have a detrimental effect on the litigating positions of the Town (if the chair so declares).
2.	6:30 PM	Consent Agenda <ul style="list-style-type: none"> <li>• Meeting Minutes: March 27, 2023</li> <li>• One Day Liquor License for Military Friends Foundation for Wine &amp; Malt Beverages Only for the Tough Ruck Marathon on April 16, 2023 from 12:00 PM to 7:00 PM at the Fenn School, 580 Monument Street</li> <li>• Town Accountant Warrant: March 30, 2023</li> <li>• Proclamation for Ellen Garrison Day on April 14, 2023</li> </ul>
3.		Town Manager's Report
4.		Chair's Report
5.	6:45 PM	Concord Independent Battery – 2023 Approvals
6.	6:50 PM	Application for a Change of Manager for Concord Market at 77 Lowell Road
7.	7:00 PM	Joint Meeting with the Board of Assessors to Discuss Residential Exemption and Review of Clause 41 C ½
8.	8:00 PM	2022 Hazard Mitigation Plan Approval
9.	8:20 PM	Continued Discussion and Vote Recommendations of Annual Town Meeting Warrant Articles and Assign Speakers for Various Articles
10.	9:00 PM	Committee Nominations <u>Bruce Freeman Rail Trail Advisory Committee:</u> Brian Crouse of 49 Indian Pipe Lane for a term to expire May 31, 2026  <u>Concord Housing Authority:</u> Bernice Fousek of 115 Stow Street at Peter Bulkeley Terrace for a first term as the Tenant Member from May 1, 2023 to May 31, 2028
11.		Committee Appointments <u>Battle Road Scenic Byway Committee:</u> Nancy Nelson of 1695 Lowell Road for a second term from May 1, 2023 to May 31, 2026  <u>Board of Assessors:</u> Brendan O'Neill Kemeza of 30 Davis Court for a second term from May 1, 2023 to May

		<p>31, 2026</p> <p><u>Bruce Freeman Rail Trail Advisory Committee:</u> Adrienne Boardman of 110 Hillcrest Road for a second term from May 1, 2023 to May 31, 2026, Dorcas Miller of 75 White Avenue for a second term from May 1, 2023 to May 31, 2026, and Nathaniel Welch of 1141 Stow Street for a second term from May 1, 2023 to May 31, 2026</p> <p><u>Concord Cultural Council:</u> Arthur Rogers of 30 Elsinore Street for a second term from May 1, 2023 to May 31, 2026</p> <p><u>Concord Housing Development Corporation:</u> Lee Smith of 1836 Main Street for a second term from May 1, 2023 to May 31, 2026</p> <p><u>Conservation Restriction Stewardship Committee:</u> Annemarie Altman of 247 Laws Brook Road for a second term from May 1, 2023 to May 31, 2026</p>
12.	9:05 PM	Correspondence
13.	9:10 PM	Select Board Liaison Reports
14.	9:20 PM	Public Comment
15.	9:30 PM	Adjournment

*\*Times are approximate and subject to change*

<b>Current Board and Committee Vacancies</b>
Agricultural Committee – Associate Member
Bruce Freeman Rail Trail Advisory Committee
Cemetery Committee
Commission on Disability
Comprehensive Sustainability and Energy Committee
Concord 2025 Executive Committee
Conservation Restriction Stewardship Committee
Council on Aging
Diversity, Equity, and Inclusion Commission
Financial Audit Advisory Committee
Historic Districts Commission – Associate Member
Municipal Light Board
PEG Access Advisory Committee
Personnel Board
Planning Board
Pollinator Health Advisory Committee
Transportation Advisory Committee
Trustees of Donations
West Concord Advisory Committee
West Concord Junction Cultural District
Zoning Board of Appeals – Associate Member

**Town of Concord  
Select Board  
Minutes  
March 27, 2023**

Pursuant to notice duly filed with the Town Clerk, the Concord Select Board convened in a meeting both via Zoom and in person at 22 Monument Square on March 27, 2023 at 6:30 PM.

Present were: Matthew Johnson, Chair; Terri Ackerman, Clerk; Henry Dane, Mary Hartman

**Call to Order**

Select Board Chair Matthew Johnson called the meeting to order at 6:30 PM.

**Legislative Update from State Senator Mike Barrett**

State Senator Mike Barrett appeared before the Select Board to provide a legislative update. Senator Barrett began with an update on the 250<sup>th</sup> American Revolution Anniversary Celebration, stating that there was a regional meeting last Friday, March 24, 2023 to discuss the state aid that would be available for local events. Senator Barrett continued that Governor Healey's Administration has committed \$2,000,000.00 for funds for the celebration through a FY23 supplemental budget, though there was an administrative error, so the funds may end up in the Fiscal Year 2024 budget instead. More money from the state is still needed and private sector fundraising will also be key. Senator Barrett stated that he is feeling positive about the Governor's commitment to the celebration, but that there are always unknowns in the legislative process.

Senator Barrett transitioned to other legislative updates, such as the continuance of remote meetings for municipalities through 2025 and the fossil fuel-free infrastructure pilot program that Concord will participate in.

Mr. Dane asked a question regarding the Home Rule petitions to provide funding for affordable housing.

Senator Barrett responded that several communities have submitted similar Home Rule petitions, so he believes the legislature may pass a statewide bill and each community can accept by local option.

Ms. Ackerman thanked Senator Barrett for his work in the community.

Senator Barrett noted that he is still advocating for the Town and neighboring communities of Hanscom Airfield and that rather than the airfield increasing their flight capacity with additional hangars, he would like to see the airfield be a national model for the transition to electric aviation.

Ms. Ackerman noted that after 11:00 PM, there is an additional fine for flights due to noise and asked if a similar model could be implemented for fossil fuel jets.

Senator Barrett responded that while this is a positive idea, Massport would have to agree to the fines.

**Annual Town Meeting Public Hearing continued from Monday, February 27, 2023**

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Upon a motion duly made and seconded, it was UNANIMOUSLY **voted:** to resume the Public Hearing from Monday, February 27, 2023 for Annual Town Meeting Warrant Article 5 – New Classification and Compensation Plan for Regular Status Positions and Article 6 – Amend Classification and Compensation Plan for Regular-Status Positions.

Elizabeth Cobbs and Bill Mrachek, Co-Chairs of the Personnel Board, appeared before the Select Board to present on Annual Town Meeting Warrant Article 5 – New Classification and Compensation Plan for Regular Status Positions and Article 6 – Amend Classification and Compensation Plan for Regular-Status Positions. The full presentation and final draft of the Classification and Compensation Plan from GovHR are included in the Select Board meeting packet.

Ms. Hartman asked if the Personnel Board has received feedback from staff on the Classification and Compensation Plan.

Ms. Cobbs responded that there was a reconsideration period with staff regarding the plan. Most requests for reconsideration will not impact the integrity of the plan.

Ms. Hartman noted that the starting salaries in the range are in the 85<sup>th</sup> percentile and asked what percentile our actual salaries are in.

GovHR Chief Executive Officer, Joellen Cademartori, appeared before the Select Board and responded that the salaries presented are a range and not the actual salary because they don't know the staff members' tenure, performance, or market conditions at the time of hire.

Ms. Ackerman asked how many article reconsideration changes or amendments are anticipated at Town Meeting.

Ms. Cademartori responded that only a handful of these changes or amendments are anticipated.

Ms. Ackerman asked about staff reconsiderations and the future of the plan.

Ms. Cobbs responded that the plan is foundational yet dynamic and should be assessed annually.

Chair Johnson asked if there is any data regarding the increase from former salary midpoints to the proposed salary midpoints.

Ms. Cademartori responded that data on the increase in midpoints was not specifically collected, but that all midpoints have likely increased.

Chair Johnson noted that most of the salary ranges recommended are above comparable communities. He questioned why we want to be in the 85 percentile of these communities that are already top tier in the state.

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Ms. Lafleur responded that it has been standard practice for the town to have the salary ranges in the 85<sup>th</sup> percentile and that while the study on benefits has not yet been started, there is a general sense that the town's benefits, such as health insurance, are less than other comparable communities.

Mark Howell of 668 Annursnac Hill Road appeared before the Select Board and voiced concern regarding the timeframe to implement the plan, regarding the Fair Labor Standards Act, and how in his experience with Information Technology positions, the applicant pool is not just from comparable communities, but regional and from the private sector as well. Mr. Howell continued that regarding the standard practice of salary ranges being in the 85<sup>th</sup> percentile, he believes this standard is something that should be determined by the Personnel Board.

Human Resources Director, Amy Foley, appeared before the Select Board and responded that she is not concerned about the timeframe to implement the plan. Ms. Foley continued that more analysis will be performed regarding the Fair Labor Standards Act in coming weeks.

Ms. Cobbs added that the Personnel Board still needs to discuss its philosophy regarding salary ranges.

Ned Perry of 362 Bedford Street appeared before the Select Board and noted that in the past, the town has prided itself with providing salaries that are top in the state, especially for senior staff members. Mr. Perry continued and asked if there will be a 3% increase in salary for all staff members.

Ms. Lafleur responded that the next phase of the plan will be to determine the implementation policy, but that she anticipates a 3% increase in salary for all staff members and there may be additional increases based on merit.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to close the Public Hearing for Annual Town Meeting Warrant Article 5 – New Classification and Compensation Plan for Regular Status Positions and Article 6 – Amend Classification and Compensation Plan for Regular-Status Positions.

**Consent Calendar Discussion for Annual Town Meeting with Town Moderator**

Town Moderator, Carmin Reiss, appeared before the Select Board to present a draft Consent Calendar for Annual Town Meeting. The full draft is included in the Select Board meeting packet. Ms. Reiss noted that while the Select Board has not voted recommendations on all articles yet, if there is not a unanimous vote on an article that is currently on the draft Consent Calendar, it will be removed. (Article 43 was later removed---see below)

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to approve the Consent Calendar as included in the Select Board meeting packet.

**Massachusetts 250<sup>th</sup> American Revolution Anniversary**

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Commission Update from Mike Lawson**

Agenda item tabled to a further meeting.

**Concord 2025 Executive Committee Update**

Mr. Dane introduced the topic of the Concord 2025 Executive Committee update. Jennifer Schunemann, Concord 2025 Executive Committee Communications Subcommittee member, appeared before the Select Board to present on current plans and estimated financials for the 250<sup>th</sup> Anniversary Celebration. The full presentation is included in the Select Board meeting packet.

Mr. Dane referenced Senator Barrett's discussion earlier this meeting, noting that funding assistance from the state will be hard to predict so the town should not count on it at this stage. Mr. Dane added that the Concord 2025 Executive Committee will also be working with the Public Ceremonies and Celebrations Committee throughout planning.

Ms. Hartman asked a question regarding estimated revenue from the celebration.

Ms. Schunemann responded that the estimates included in the presentation were conservative estimates, but that she does not think that the town should take a conservative approach with infrastructure for the celebration. Ms. Schunemann continued that she believes that revenues from meal taxes will increase, but noted that there are capacity limits in town with lodging and other aspects of tourism. Ms. Schunemann added that the presentation included in tonight's meeting packet was put together in a short amount of time and that she would be willing to perform a deeper analysis.

Ms. Ackerman noted that she does not favor the use of \$500,000 of ARPA funding for the celebration, although she might consider a smaller amount, and that she also thinks that the Committee should be more ambitious with its fundraising goals. Ms. Ackerman added that the Committee should create a handout or presentation for Town Meeting, even if Article 25 does not get moved, as it would be beneficial for the residents to understand the 3-year plan.

Ms. Hartman asked about alternative funding options for Article 25.

Town Manager Kerry Lafleur clarified that she did not suggest that ARPA funding be used for the article, but just that she would not oppose it. Ms. Lafleur continued that there is a possibility that there could be additional Free Cash to be used for the article, but that she requests more time to investigate this.

Mr. Dane noted that if it becomes clear that Free Cash is available for the article, they will move it at Town Meeting.

**Continue Discussion and Vote of Recommendations for Annual  
Town Meeting Warrant Articles**

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Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 2 – Hear Reports.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 3 – Meeting Procedure.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 7 – Use of Free Cash.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 24 – Light Plant Expenditures and Payment in Lieu of Taxes.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 27 – Community Preservation Act – Rescind and Reappropriate Funds.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 38 – Solid Waste Disposal Fund Expenditures.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 39 – Sewer System Expenditures.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 40 – Sewer Improvement Fund Expenditures.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 41 – Water System Expenditures.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 42 – Authorize Expenditure from PEG Access and Cable-Related Fund.

After discussion, it was agreed that the Board needs more information on Article 43, which the Town Manager plans to present at an upcoming meeting. There was a consensus to remove Article 43 from the Consent Calendar.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 44 – Authorize Expenditure of Revolving Funds Under Massachusetts General Laws Chapter 44, Section 53 E 1/2 .

Upon a motion duly made and seconded, it was UNANIMOUSLY

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**voted:** to recommend affirmative action on Article 5 – New Classification and Compensation Plan for Regular-Status Positions.

Chair Johnson opened the discussion on Article 26 – Community Preservation Committee Appropriation Recommendations.

Diane Proctor, Chair of the Community Preservation Committee, appeared before the Select Board to provide an update on Article 26, noting that for Item E regarding Warner’s Pond, the Committee supports moving \$550,000.00 toward dredging and/or removing the dam. She added that the state could provide additional funding if the dam is removed, but that would be on a reimbursement basis.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to recommend affirmative action on Article 26 – Community Preservation Committee Appropriation Recommendations.

Chair Johnson opened the discussion on Article 10 – DEI Director. Chair Johnson noted that there is already \$75,000.00 allocated in the budget to hire a consultant to perform similar work and also aid the town in taking its next steps toward hiring a DEI Director. Chair Johnson continued that the town should consider a regional position for the DEI Director, which has worked well for the Regional Housing Services Office. Chair Johnson suggested that the Board present an amendment on the floor at Town Meeting and report its recommendation of the article then.

**Approve 2229 Main Street Advisory Task Force Charge**

Ms. Ackerman opened the discussion on the 2229 Main Street Advisory Task Force charge. The full charge is included in the Select Board meeting packet. Ms. Ackerman continued that along with the highlighted change in the charge included in the packet, she would like to increase the membership from 7 to 9 members.

Ms. Hartman noted that the charge membership should also include a member with a background in economic development.

Ms. Ackerman concurred.

Upon a motion duly made and seconded, it was UNANIMOUSLY  
**voted:** to approve the 2229 Main Street Advisory Task Force charge as highlighted in the Select Board meeting packet and to increase the membership from 7 to 9 members, one with background in economic development.

**Consent Agenda**

- Meeting Minutes: February 27, 2023
- Proclamation for the 125<sup>th</sup> Anniversary of Concord Municipal Light Plant

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- Gift Acceptance of Recreation Scholarship Funds in the amount of \$2,940.00 raised from the raffle at the Concord Recreation Department's Annual Shamrock Ball
- Tour Guide License for James Nager
- One Day Liquor License for Wine and Malt Beverages Only for 51 Walden Incorporated at 51 Walden Street for the Pops Roof Fundraiser on Friday, April 14, 2023 from 8:00 PM to 11:00 PM
- One Day Liquor License for All Alcoholic Beverages for Julia Elliott at the Nashoba Brook School Discovery Barn for the Thoreau Elementary Social on Friday, April 1, 2023 from 7:00 PM to 10:00 PM
- Liquor License Extension of Hours Requests for Nashawtuc Country Club at 1861 Sudbury Road:
  - Sunday, April 9, 2023 for service of alcohol to begin at 10:00 AM for an Easter Brunch
  - Sunday, May 14, 2023 for service of alcohol to begin at 10:00 AM for a Mother's Day brunch
  - Sunday, December 3, 2023 for service of alcohol to begin at 10:00 AM for a Holiday Brunch

Upon a motion duly made and seconded, it was UNANIMOUSLY **voted:** to approve the Consent Agenda.

**Town Manager's Report**

Town Manager Kerry Lafleur presented a Weekly Operations Report for the week ending March 26, 2023. The full report is included in the Select Board meeting packet.

**Chair's Report**

Chair Johnson reported that upcoming events in the next month include the Patriots Day Parade on Monday, April 17, 2023 and an event for Holocaust Remembrance Day on Sunday, April 23, 2023.

**Committee Nominations**

There were no committee nominations.

**Committee Appointments**

Upon a motion duly made and seconded, it was UNANIMOUSLY **voted:** to appoint Susan Spinale McCrory of 59 Lee Drive to the Concord 2025 Executive Committee for a term to expire December 31, 2026.

**Correspondence**

Chair Johnson acknowledged the correspondence in the Select Board meeting packet.

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**Select Board Liaison Reports**

Chair Johnson reported on:

- School Strategic Plan Committee – Final meeting to discuss the metrics that will be used to measure the strategic plan
- Goodwin Forum – Encouraged individuals to think about something they can do to make Concord a more welcoming community

Ms. Ackerman reported on:

- Bruce Freeman Rail Trail Regional Meeting of the Friends – Going to meet quarterly moving forward
- 250<sup>th</sup> American Revolution Anniversary Celebration Regional Meeting
- Personnel Board – Preparation for the continued Annual Town Meeting Public Hearing
- Hanscom Meeting

Mr. Dane reported that he has been working frequently with the Concord 2025 Executive Committee, which is in collaboration with several other boards and committees.

Ms. Hartman reported on:

- Municipal Light Board – Discussed Annual town Meeting Article 22 – Municipal In-Town Solar Generation Task Force and they plan to propose an amendment at Town Meeting.
- Attended the Honored Citizen Ceremony for Phebe Ham
- Diversity Equity and Inclusion Commission Community Coffee on affordable housing – Chair of the Concord Municipal Affordable Housing Trust Keith Bergman discussed the parcel at 91B Main Street and that it may be beneficial for the town to send a letter to Representative Lori Trahan regarding a discounted price of the parcel for affordable housing

**Public Comment**

Ellen Quakenbush of 206 Prairie Street appeared before the Select Board to voice concern about the principles adopted by the Public Ceremonies and Celebration Committee for inclusion in parades and urged the principles to be revised with the inclusion of public input.

Stephan Bader of 7 River Road appeared before the Select Board and noted that in relation to Ms. Hartman's comments on the parcel at 91B Main Street, the parcel is owned by the state, but that the state acquired the parcel using federal highway funds, which is where the requirement that the parcel be sold at a value reflecting market price comes from.

Mark Howell of 668 Annursnac Hill Road appeared before the Select Board and noted that the second Finance Committee Public Hearing materials are not posted on the Town website.

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Adjournment**

Chair Johnson adjourned the meeting.

**Meeting Packet:** <https://concordma.gov/3302/March-27-2023>

**Meeting Recording:** <https://www.youtube.com/watch?v=hr7BScFP3hU>



**PAID**

**TOWN OF CONCORD**  
**APPLICATION FOR ONE DAY SPECIAL LICENSE**  
**FOR THE SALE OF WINES & MALT BEVERAGES/ALL ALCOHOLIC BEVERAGES**

Fee: \$75.00/per day - One Day All Alcoholic and/or Wines & Malt Beverages Only Amount Paid \$ 75.00

The undersigned hereby applies for a One Day Special License in accordance with the provisions of the Statutes relating hereto:

NAME: (please print) Sarah Sweeney  
COMPANY or organization: Military Friends Foundation  
ADDRESS: 212 Humphrey St., Swampscott, MA  
TELEPHONE: 1-84-HELP-VETS  
DATE(S) APPLIED FOR: April 16, 2023  
EVENT: Tough Ruck Marathon  
HOURS OF OPERATION: 12 PM - 7 PM  
PREMISES TO BE LICENSED: Fenn School  
ADDRESS OF PREMISE LICENSED: 580 Monument St, Concord, MA

License is for the Sale of: All Alcoholic Beverages   
Wines & Malt Beverages Only   
Wines Only   
Malt Beverages Only

The Licensed Activity or Enterprise is: For Profit   
Non-Profit

**RECEIVED**  
**MAR 28 2023**  
**TOWN OF CONCORD**  
**TOWN MANAGER'S OFFICE**

Are the bartenders TIPS or equivalently trained? Yes  No   
Will there be people in attendance that are under the age of 21? Yes  No   
Is this the first one day special license secured by this organization? Yes  No

If no, number of consecutive years licensed? Since 2016 (except 2020/2021)

Will there be more than 100 people in attendance? Yes  No  due to COVID event was not held)  
If yes, the applicant agrees to contact the Police Department to determine whether traffic control coverage is necessary. The traffic control coverage is provided at the expense of the applicant.

By exercising the privileges of this license in serving persons with alcoholic beverages, the licensee is potentially exposed to significant liability for injuries and damages to the persons served or to others who are injured or damaged by the persons served. Your acceptance and exercise of this license will be deemed to be acknowledgment that you are aware of this potential liability. You are encouraged to discuss the risks associated with exercising your privileges of the license and the precautions appropriate to avoid injuries, damage and liability to others with your legal advisor. The Town of Concord, and the Board of Selectmen, acting as the Local Licensing Authority, shall not be liable to the licensee or others if injury or damage shall result from the exercise of the license.

Signature of Applicant: [Signature] Date: 3/25/2023

**TOWN OF CONCORD  
Board of Selectmen**

**One Day Special Licenses**

**TIPS TRAINING (OR EQUIVALENT)**

Applicant Name:	Military Friends Foundation
Location of Event:	Fenn School
Date of Event:	April 16, 2023

The Board of Selectmen require that any event for which they issue a One Day Special License the alcohol must be served by a TIPS trained or equivalent bartender.

TIPS training cards or the equivalent must accompany this application. These must show the photo and name of the bartender and must be current. If a photo is not on the TIPS training card, then a copy of a valid driver's license with a photo should be included as well. Proof of TIPS credential must be provided before this application is voted on by the Board of Selectmen.

**TOWN OF CONCORD  
Board of Selectmen**

**One Day Special Licenses**


**Under 21 Policy**

The Town of Concord Board of Selectmen assumes that there may be guests or attendees under 21 at any event. Therefore this policy must be adhered to for all events.

Applicant Name:	Military Friends Foundation
Location of Event:	Fenn School
Date of Event:	April 16, 2023

Applicants agree to check the ages of all guests at the door. If a person is under the age of twenty-one, his/her hand will be stamped to indicate that the person is underage to the bartender.

I certify that Concord's Under 21 policy requirement for the event stated in this application will be followed.

Signature of Applicant:	
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**MASSACHUSETTS DRIVER'S LICENSE**

ISS: 03/09/2020  
 EXP: 04/14/2025

CLASS: DM REST: NONE

**LIPPERT**  
 LISA ANN  
 21 JONES TER  
 APT 1  
 STOUGHTON, MA 02072-3060

*Lisa Lippert*

**tips** eTIPS On Premise 3.1 **CERTIFIED**

Issued: 6/14/2022 Expires: 6/14/2025  
 ID#: 5741954

Lisa A Lippert  
 96 Monk St Apt 2  
 Stoughton, MA 02072-2602

For service visit us online at [www.gettips.com](http://www.gettips.com)

**MASSACHUSETTS COMMERCIAL DRIVER'S LICENSE**

ISS: 05/17/2022  
 EXP: 11/02/2023

CLASS: EM REST: PS

**CODY**  
 PATRICIA ANN  
 122 SUMNER ST  
 STOUGHTON, MA 02072-3404

*Pat A Cody*

**tips** eTIPS On Premise 3.1 **CERTIFIED**

Issued: 02/04/2022 Expires: 02/04/2025  
 ID#: 5042970

Patricia A Cody  
 122 Sumner St  
 Stoughton, MA 02072-3404 USA

**MASSACHUSETTS DRIVER'S LICENSE**  
 NOT FOR FEDERAL ID

ISS: 11/02/2018  
 EXP: 11/04/2023

CLASS: D REST: NONE

**LARGE**  
 CAROL A  
 46 SCHOOL AVE  
 STOUGHTON, MA 02072-2849

*Carol A. Large*

**tips** On-Premise **CERTIFIED**

Issued: 03/06/2023 Expires: 03/06/2026  
 Certificate #: 04-000028271407

Carol Ann Large  
 46 School Ave  
 Stoughton MA 02072

COMMONWEALTH OF MASSACHUSETTS  
TOWN OF CONCORD  
SELECT BOARD

**PROCLAMATION**

**HONORING APRIL 14<sup>TH</sup> AS ELLEN GARRISON DAY**

**WHEREAS** Ellen Garrison was born in Concord on April 14, 1823, granddaughter of Patriot of Color Ceasar Robbins, who served in the American Revolution and was most likely at the North Bridge on April 19, 1775; and

**WHEREAS** Ellen was the daughter of formerly enslaved man Jack Garrison and her mother, Susan Garrison, who became a founding member of the Concord Female Anti-Slavery Society; and

**WHEREAS** Ellen was educated in Concord Public Schools in Monument Square and her activism began early, learning about racial discrimination; and

**WHEREAS** Ellen continued her mother's anti-slavery activism, as a teacher in the Freedman's Schools during Reconstruction and in her commitment demanding civil rights for all, signing petitions to make her voice heard and practiced her activism on the streets of Concord, at a Baptist church in Boston, and in the Freedman Schools of Rhode Island, Maryland, North Carolina, and Kansas; and

**WHEREAS** Ellen lived a life dedicated to the struggle for civil rights until her passing in an anti-slavery community in Pasadena, California, where she is buried with anti-slavery activists;

**NOW THEREFORE** We, as the Select Board of the Town of Concord, Massachusetts, on behalf of Concord's employees, committees, community partners, and citizens, do hereby recognize April 14, 2023 as Ellen Garrison Day, honoring this native daughter of Concord and her connection to those who fought for freedom.

Proclaimed this 3<sup>rd</sup> day of April 2023



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**Concord Select Board**



Concord, Massachusetts 01742

March 30, 2023

Town of Concord  
22 Monument Square  
PO Box 535  
Concord, MA 01742  
Attn: Kerry Lafleur, Town Manager

Re: Application for Permission to Fire the Town of Concord Cannons at the 2023 Town Celebrations and Ceremonies on the following dates:

- April 8<sup>th</sup>, 9 AM – Battery Test Fire, Old Manse Field
- April 8<sup>th</sup>, 1 PM - Meriam's Corner exercises
- April 17<sup>th</sup> 9 AM – Patriots Day Parade
- April 19<sup>th</sup> 6 AM - Dawn Salute, Old Manse Field
- May 30<sup>th</sup> - Memorial Day – 9AM – Rideout Field, 11AM – Monument Sq.
- Nov 11<sup>th</sup> – Veterans Day – 8AM -Sleepy Hollow Cemetery

Dear Kerry,

As is the process for the Concord Independent Battery, I am writing to you per the terms of the contract between the Town and the Battery to request the Select Board permission to fire the Towns Cannon at the various events for 2023.

As in the past, we will reach out to you for additional requests (when & if they come).



Concord, Massachusetts 01742

Enclosed with this request to fire the cannon are the documents as required by the contract.

1. Master Training records for Active Battery Members from 1 April 2022 through April 2, 2023. (we will have 2 additional training sessions by April 17)
2. Copy of the Certificate of Liability Insurance showing the coverage for the Town of Concord and the Concord Independent Battery.
3. Concord Public Ceremonies and Celebrations Committee calendar to fire at the Town's 2023 events (taken from the PCCC web page (3/22/23)).
4. Copies of the Commonwealth of Massachusetts canon Firing Permits issued by the Town of Concord Fire Department & Fire Officials Contacts & DCR Permit
5. Copies of the signed Alcoholic Beverage and Controlled Substance Abstinence Agreements signed by each of the Active Battery Members and listed on the Master Training Record.
6. Listing of Active Battery Members with current Cannon Licenses issued by the Department of Public Safety.
7. Copy of the Borescope Inspections performed on 11 March 2021.
8. Listing of the current Indemnity agreement on file with and for the Town of Concord.

Give me a call or drop me an email if there are any questions.

Thank you and best regards,

Philip Kenney

President, Concord Independent Battery

[pkenny21@gmail.com](mailto:pkenny21@gmail.com)

cc: Peter Myette – Captain, CIB

John Thompson – Secretary, CIB

Shannon McAndrew – Sr. Admin Assistant to the Town Manager, Town of Concord

**MASTER TRAINING Hrs - UPDATED 3/31/23 - Additional Training Held on 4/1/23 & 4/8/23 - Add'l 5 Hours to be added**

Battery Hours 2022-2023	2022 /2023 Hours	Postion	4/9/22 Test fire	4/9/22 Merriams Corner	4/18/22 Pat's Day	4/19/22 Dawn Salute	May 31 Rideout Sleepy, Knoll, St Bernard	9/17/22 Castle Island	11/11/22 Vets Day	12/7/22 Lenox Funeral	2/22/23 Training	3/1/23 Training	Honor	3/22/23 Train
													Citizen 3/18	
Arena	Mr John	0	6										No Hrs	
Barker	Mr. Charles W.	3	6			3								
Beeuwkes	Mr Reinier	24	1,2,3,	3	4		6		3	2	2	2	2	2
Brown	Mr. David C.A.G.	0	4,5,											
Brown	Mr. Mark E.	22	3,4	3	4	3	6	4			2			
Capobianco	Mr Eugene	8	1,5,				6					2		
Crampton	Mr. Andrew S.	5	2,3,4						3		2		2	
Cunningham	Mr. Dudley	20	3,4,		4	3	6		3		2		2	2
Cullum	Mr Drew	6	Guard,								2	2	2	2
Daly	Mr Mark	29	2,3, 5	3	2	3	6	4	3	2	2	2	2	2
Durkin	Mr Matt	18	2,3,4,	3	2	4	3				2	2	2	2
Eaton	Mr. David G.	0	2,5,											
Eaton	Mr. Robert G.	15	1,2	3	2	4	3		3					
Finigan, Jr.	Mr. James E.	26	4,6		4	3	6	4	3	2	2	2		
Hennessy	Mr. Peter M.	0												
Hirsch	Ms. Laura	0	Guard											
Kenney	Mr. Philip B.	29	Traine	3	2	4	3	2	4	3	2	2	2	2
Lawrence	Mr. Michael	0												
Macone	Mr. Douglas J.	31	Gunne	3	2	4	3	6	4	3	2	2		2
Mahoney	Mr Ryan	21	3,5,6	3	2	3	6		3		2	2	2	
Maslowski	Mr Taylor	22	6,Guar			4	3	6	4	3	2			
McGarry, Jr.	Mr. John J.	27	2,	3	2	3	6	4	3		2	2	2	2
Myette	Ms. Abigail L.	18	2,3,	3		4	6		3		2			
Myette	Mr. Peter C.	28	Captai	3		4	3	6	4		2	2	2	2
Palmer	Mr. Patrick H.	29	1,2,5,	3	2	4	3	6	4	3	2	2		2
Robart	Mr Cory L.	19	2, 4,	3	2	4	6				2	2		
Robinson	Mr. Peter	0	Guard											
Roddy, Jr.	Mr. Gilbert M.	0	2											
Smith	Mr. Lowell S.	17	1, 2,6,	3	2	4			4		2	2		
Smith	Mr. Thomas	4	6			4								
Snay	Mr. Mark	0	1, 2,											
Snay	Mr. Christopher	7	1, 2			4				3				
Sullivan	Mr. Gregory T.	23	1,3,4	3	2	4	3		4	3	2			2
Thompson	Mr. John A.	25	1,2	3	2	4	3	6		3	2	2		2
Welsh	Mr. John C.	21	2,3,5,6	3	2	4	3			3		2	2	2
Williams	Mr. Christopher	20	2, 3, 5			4	3		4	3	2	2		2





# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
12/15/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an **ADDITIONAL INSURED**, the policy(ies) must have **ADDITIONAL INSURED** provisions or be endorsed. If **SUBROGATION IS WAIVED**, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).


<b>PRODUCER</b>  Lockton Affinity, LLC P.O. Box 874952 Kansas City, MO 64187-4952	CONTACT NAME: Lockton Affinity, LLC	
	PHONE (A/C, No, Ext): 844-401-9444	FAX (A/C, No): 913-652-7589
E-MAIL ADDRESS:		
<b>INSURER(S) AFFORDING COVERAGE</b>		<b>NAIC #</b>
<b>INSURER A:</b> Acceptance Indemnity Insurance Company	20010	
<b>INSURER B:</b>		
<b>INSURER C:</b>		
<b>INSURER D:</b>		
<b>INSURER E:</b>		
<b>INSURER F:</b>		

**COVERAGES**                      **CERTIFICATE NUMBER:**                      **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> OTHER:	X		LOC-GL-0004039-00	03/01/2022	03/01/2023	EACH OCCURRENCE \$ <b>1,000,000</b> DAMAGE TO RENTED PREMISES (Ea occurrence) \$ <b>250,000</b> MED EXP (Any one person) \$ <b>5,000</b> PERSONAL & ADV INJURY \$ <b>1,000,000</b> GENERAL AGGREGATE \$ <b>1,000,000</b> PRODUCTS - COMP/POP AGG \$ <b>1,000,000</b> \$
	<b>AUTOMOBILE LIABILITY</b> <input type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	<input type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB OCCUR <input type="checkbox"/> CLAIMS-MADE DED      RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below		Y/N <input type="checkbox"/> N/A				<input type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EAEMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

<b>CERTIFICATE HOLDER</b>  Trustees of Reservations 572 Essex St. Beverly, MA 01915-1530	<b>CANCELLATION</b>  SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE 
--	--



**March 6, 2023**

**Press Release: Concord Independent Battery 2023 Schedule**

**The Concord Independent Battery announces its 2023 Schedule in coordination with Concord's Public Ceremony's & Celebrations Committee.**

Honored Citizen Ceremony at Harvey Wheeler Center Sunday, March 19, 2023 at 2:00 pm

Concord Independent Battery Test Fire Old Manse Field, April 8, 2023 – 9:00 AM

Meriam's Corner Parade/Exercise Saturday, April 8, 2023 at 1:00 pm

Patriot's Day Monday, April 17, 2023 at 9:00 am

Dawn Salute at Old Manse Field Wednesday, April 19, 2023 at 6:00 am

Memorial Day

Monday, May 29, 2023 at 9:00 am – Rideout Field 11:00 am – Monument Square

Veterans Day, Sleepy Hollow Cemetery – 8 AM, November 11, 2023

The Concord Independent Battery is an IRS 501(c) (3) charitable organization

*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*

TEST FIRE 4/8/23

OLD mansc



Concord Fire Department  
209 Walden Street  
Concord, MA 01742  
978-318-3488

City or Town: Concord

Issue Date: 03/06/23

Certificate of Competency: 000253  
Start date:

Permit Number: CMF-23-0003

In accordance with the provisions of 527 CMR § 1.00 S 65.11 and NFPA Standards

Additional Regulations Cited:

this permit is granted to PATRICK (TACK) PALMER

(Full Name of Person, Firm, or Corporation)

for:

at: 269 MONUMENT ST, Concord, MA 01742

Restrictions: CFD EMS DETAIL REQUIRED

Fee Paid:

Permit expires on: 04/09/23

Signature/Title Officer Granting Permit:

Dave Nichols

Head of Fire Department:

Thomas M. Judge

This Permit must be Conspicuously posted upon the premises

*Merriams Corner*  
*4/2/23*



Concord Fire Department  
209 Walden Street  
Concord, MA 01742  
978-318-3488

City or Town: *Concord*

Issue Date: *03/06/23*

Certificate of Competency: *000253*  
Start date:

Permit Number: *CMF-23-0004*

In accordance with the provisions of 527 CMR § 1.00 S 65.11 and NFPA Standards

Additional Regulations Cited:

this permit is granted to *PATRICK (TACK) PALMER*

(Full Name of Person, Firm, or Corporation)

for:

at: *11A OLD BEDFORD RD, Concord, MA 01742*

Restrictions: *CFD EMS DETAIL REQUIRED*

Fee Paid:

Permit expires on: *04/09/23*

Signature/Title Officer Granting Permit:

*Dave Nichols*  
Dave Nichols

Head of Fire Department:

*Thomas M. Judge*  
Thomas M. Judge

This Permit must be Conspicuously posted upon the premises

**PATRIOTS DAT 4/18**



Concord Fire Department  
209 Walden Street  
Concord, MA 01742  
978-318-3488

City or Town: Concord

Issue Date: 03/06/23

Certificate of Competency: 000253  
Start date:

Permit Number: CMF-23-0002

In accordance with the provisions of 527 CMR § 1.00 S 65.11 and NFPA Standards

Additional Regulations Cited:

this permit is granted to PATRICK (TACK) PALMER

(Full Name of Person, Firm, or Corporation)

for:

at: 269 MONUMENT ST., Concord, MA 01742

Restrictions: CFD EMS DETAIL REQUIRED

Fee Paid:

Permit expires on: 04/18/23

Signature/Title Officer Granting Permit:

Dave Nichols

Head of Fire Department:

Thomas M. Judge

This Permit must be Conspicuously posted upon the premises



Concord Fire Department  
209 Walden Street  
Concord, MA 01742  
978-318-3488

~~FEET FIRE~~  
Drawn Salute 4/19/23

City or Town: *Concord*  
Issue Date: *03/06/23*

Certificate of Competency: *000253*  
Start date:

Permit Number: *CMF-23-0001*

In accordance with the provisions of 527 CMR § 1.00 § 65.11 and NFPA Standards

Additional Regulations Cited:

this permit is granted to *PATRICK (TACK) PALMER*

(Full Name of Person, Firm, or Corporation)

for:

at: *269 MONUMENT ST., Concord, MA 01742*

Restrictions: *CFD EMS DETAIL REQUIRED*

Fee Paid:

Permit expires on: *04/20/23*

Signature/Title Officer Granting Permit:

*Dave Nichols*  
Dave Nichols

Head of Fire Department:

*Thomas M. Judge*  
Thomas M. Judge

This Permit must be Conspicuously posted upon the premises



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/31/2023

Name: Gilbert M. Roddy, Jr.

Signature: Gilbert M. Roddy, Jr.

The Concord Independent Battery is an IRS 501(c) (3) charitable organization

*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

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Date: 24 Jan 2023

Name: DAVID BROWN

Signature: [Handwritten Signature]

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

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Date: 1/24/2023

Name: John McGarry

Signature: 

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/24/23

Name: Chris Williams

Signature: Chris Williams

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

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Date: 1/24/23

Name: MARK J DALY

Signature: Mark J Daly

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

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Date: 1/24/2023

Name: Dodley Cunningham

Signature: [Handwritten Signature]

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## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

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Date: 1/24/23

Name: Ryan Mahoney

Signature: [Handwritten Signature]

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## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

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Date: 1/24/23

Name: PETER C MYETTE

Signature: *Peter C Myette*

The Concord Independent Battery is an IRS 501(c) (3) charitable organization

*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/24/23

Name: John Walsh

Signature: [Handwritten Signature]

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/24/23

Name: Abigail Myette

Signature: *Abigail Myette*

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/23/27

Name: Reimer Beawker

Signature: R Beawker

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/24/2023

Name: Robert G. Eaten

Signature: Robert G. Eaten

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/24/2023

Name: LOWELL J. SMITH

Signature: 

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/24/23

Name: Andrew Crampton

Signature: [Handwritten Signature]

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1-24-2023

Name: Mark Brown

Signature: [Handwritten Signature]

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1/24/2023

Name: Douglas Macone

Signature: *Douglas Macone*

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## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 1-24-23

Name: E Capobianco

Signature: [Handwritten Signature]

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*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2023 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

Date: 2/22/2023

Name: Andrew Robert Cullum

Signature: 

The Concord Independent Battery is an IRS 501(c) (3) charitable organization

*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2022 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

2-22-23

Date

Matthew Durkin

Name - Print



Signature

The Concord Independent Battery is an IRS 501(c) (3) charitable organization

*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



## 2022 Battery Alcoholic Beverage & Controlled Substance Abstinence Agreement

The undersigned Battery Member hereby agrees not to ingest alcoholic beverages or any controlled substance within twenty-four (24) hours prior to participating on an assigned Battery Gun Crew in the "live" firing of the ceremonial cannons owned by the Town of Concord, be it a ceremonial or practice firing.

2/22/2023

Date

Cory Robert

Name - Print

[Signature]

Signature

The Concord Independent Battery is an IRS 501(c) (3) charitable organization

*Concord Independent Battery, P.O. Box 1804, Concord, MA 01742*



PO Box 1804 Concord MA 01742

### Cannon Licenses Status as of 3/18/2023

Charlie Barker	CN-000242	3/12/26
Rein Beeuwkes	CN-000243	5/14/26
Dave Brown	CN-0004488	3/22/26
Dudley Cunnningham	CN-000245	6/25/26
Doug Macone	CN000085	7/21/25
Peter Myette	CN-000250	9/11/25
Tack Palmer	CN-000253	2/26/26
Tish Hopkins	CN-000247	12/29/26
Gibbs Roddy	CN-000254	7/28/26
John Welch	CN-000256	8/15/26
Abby Myette	CN-004545	5/8/25

Source: Commonwealth of Mass – Dept of Public Safety



DEPARTMENT OF THE ARMY  
U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND  
ARMAMENTS CENTER  
PICATINNY ARSENAL, NEW JERSEY 07808-5000  
BENET LABORATORIES DIRECTORATE  
WATERVLIET, NEW YORK 12180-4000

On 11 March 2021, Mr. Theodore Pollak and Mr. Jason Foglietta, using Zistos® high resolution video borescoping equipment, performed a borescope evaluation of two 19th century model 1841 six-pound cannon, identified as Cannon Serial number 1 and 2, located in the Gun House in Concord, Massachusetts.

Based on our evaluation, as well as our knowledge and experience in performing numerous bore evaluations, and our experience in the inspections of black powder armament over the years, it is our opinion that the cannon liners are in good condition. The cannon bores (liners) are free of burrs, cracks, distortions, and mutilations. Based on a restriction of firing black powder blanks only through these cannon, it is our opinion that these cannon are in sound firing condition.

Theodore Pollak  
Mechanical Engineering Technician  
Artillery Product Engineering Branch  
Benet Laboratories

Jason Foglietta  
Engineering Technician  
Artillery Product Engineering Branch  
Benet Laboratories

## 2023 MASTER AAA & Hold Harm List

Battery 2022-2023		Position(s)	AAA	Hold Harmless
Barker	Mr. Charles W.		In Active	✓
Beeuwkes	Mr Reinier	1,2, Range	✓	✓
Brown	Mr. David C.A.G.	4,5, Trainer	✓	✓
Brown	Mr. Mark E.	3,4	✓	✓
Capobianco	Mr Eugene	1, Guard	✓	✓
Crampton	Mr. Andrew S.	2,3,4	✓	✓
Cunningham	Mr. Dudley	1,4	✓	✓
Cullum	Mr Drew	2, Range	✓	NEW Member
Daly	Mr Mark	1,2,5	✓	✓
Durkin	Mr Matt	3,4, Guard	✓	✓
Eaton	Mr. David G.	2,5, Guard	In Active	✓
Eaton	Mr. Robert G.	1,2	✓	✓
Finigan, Jr.	Mr. James E.	4,6 Guard	✓	✓
Hennessy	Mr. Peter M.	In Active	✓	✓
Hirsch	Ms. Laura	Guard	✓	✓
Kenney	Mr. Philip B.	Trainer	✓	✓
Lawrence	Mr. Michael	In Active	✓	✓
Macone	Mr. Douglas J.	Gunner	✓	✓
Mahoney	Mr Ryan	3,5,6 Guard	✓	✓
Maslowski	Mr Taylor	6,Guard	✓	✓
McGarry, Jr.	Mr. John J.	2, Gunner	✓	✓
Myette	Ms. Abigail L.	2, Guard	✓	✓
Myette	Mr. Peter C.	Captain	✓	✓
Palmer	Mr. Patrick H.	1, Gunner	✓	✓
Robart	Mr Cory L.	2, 4, Guard	✓	✓
Robinson	Mr. Peter	Guard	✓	✓
Roddy, Jr.	Mr. Gilbert M.	2	✓	✓
Smith	Mr. Lowell S.	1,6	✓	✓
Smith	Mr. Thomas R. S.	In Active	✓	✓
Snay	Mr. Mark	1, 2, Guard	✓	✓
Snay	Mr. Christopher R.	1, 2 Guard	✓	✓
Sullivan	Mr. Gregory T.	1,3,4	✓	✓
Thompson	Mr. John A.	1,2 Guard	✓	✓
Welsh	Mr. John C.	2,3,6	✓	✓
Williams	Mr. Christopher	2, 5	✓	✓

## Change of Manager

- ✓ • Manager Application
- ✓ • CORI Authorization
- ✓ • Vote of the Entity
- ✓ • Proof of Citizenship (Manager must be U.S. citizen)
- ✓ • Payment Receipt

RECEIVED  
MAR 14 2023

TOWN OF CONCORD  
TOWN MANAGER'S OFFICE

by SM

# Payment Confirmation

## YOUR PAYMENT HAS PROCESSED AND THIS IS YOUR RECEIPT

Your account has been billed for the following transaction. You will receive a receipt via email.



FILING FEES-RETAIL	Concord Market LLC	\$200.00
		<b>\$200.00</b>

Total Convenience Fee: \$0.35

Date Paid: 3/14/2023 10:07:48 AM EDT

Total Amount Paid: \$200.35

### Payment On Behalf Of

License Number or Business Name:  
Concord Market, LLC

Fee Type:  
FILING FEES-RETAIL

### Billing Information

First Name:  
Elizabeth

Last Name:  
Akehurst-Moore

Address:  
77 Lowell Road

City:  
Concord

State:  
MA

Zip Code:  
01742

Email Address:  
elizabeth@theconcordmarket.com



The Commonwealth of Massachusetts  
 Alcoholic Beverages Control Commission  
 95 Fourth Street, Suite 3, Chelsea, MA 02150-2358  
 www.mass.gov/abcc

**RETAIL ALCOHOLIC BEVERAGES LICENSE APPLICATION  
 MONETARY TRANSMITTAL FORM**

**AMENDMENT-Change of Manager**

APPLICATION SHOULD BE COMPLETED ON-LINE, PRINTED, SIGNED, AND SUBMITTED TO THE LOCAL LICENSING AUTHORITY.

**ECRT CODE: RETA**

Please make \$200.00 payment here: **ABCC PAYMENT WEBSITE**

PAYMENT MUST DENOTE THE NAME OF THE LICENSEE CORPORATION, LLC, PARTNERSHIP, OR INDIVIDUAL AND INCLUDE THE PAYMENT RECEIPT

ABCC LICENSE NUMBER (IF AN EXISTING LICENSEE, CAN BE OBTAINED FROM THE CITY)

ENTITY/ LICENSEE NAME

ADDRESS

CITY/TOWN

STATE

ZIP CODE

For the following transactions (Check all that apply):

- |  |   |   |   |
|--|---|---|---|
| <input type="checkbox"/> New License                                   | <input type="checkbox"/> Change of Location   | <input type="checkbox"/> Change of Class (i.e. Annual / Seasonal)         | <input type="checkbox"/> Change Corporate Structure (i.e. Corp / LLC) |
| <input type="checkbox"/> Transfer of License                           | <input type="checkbox"/> Alteration of Licensed Premises  | <input type="checkbox"/> Change of License Type (i.e. club / restaurant)  | <input type="checkbox"/> Pledge of Collateral (i.e. License/Stock)    |
| <input checked="" type="checkbox"/> Change of Manager                  | <input type="checkbox"/> Change Corporate Name  | <input type="checkbox"/> Change of Category (i.e. All Alcohol/Wine, Malt) | <input type="checkbox"/> Management/Operating Agreement               |
| <input type="checkbox"/> Change of Officers/<br>Directors/LLC Managers | <input type="checkbox"/> Change of Ownership Interest<br>(LLC Members/ LLP Partners,<br>Trustees) | <input type="checkbox"/> Issuance/Transfer of Stock/New Stockholder       | <input type="checkbox"/> Change of Hours                              |
|  | <input type="checkbox"/> Other <input type="text"/>   |   | <input type="checkbox"/> Change of DBA                                |

THE LOCAL LICENSING AUTHORITY MUST SUBMIT THIS APPLICATION ONCE APPROVED VIA THE ePLACE PORTAL

**Alcoholic Beverages Control Commission  
 95 Fourth Street, Suite 3  
 Chelsea, MA 02150-2358**



**The Commonwealth of Massachusetts  
Alcoholic Beverages Control Commission  
95 Fourth Street, Suite 3, Chelsea, MA 02150-2358  
www.mass.gov/abcc**

**AMENDMENT-Change of Manager**     **Change of License Manager**

**1. BUSINESS ENTITY INFORMATION**

Entity Name	Municipality	ABCC License Number
Concord Market LLC.	Concord	89265-PK-0244

**2. APPLICATION CONTACT**  
The application contact is the person who should be contacted with any questions regarding this application.

Name	Title	Email	Phone
James B. White	Attorney	jimwhite@elawcorporation.com	978-371-3344

**3A. MANAGER INFORMATION**  
The individual that has been appointed to manage and control of the licensed business and premises.

Proposed Manager Name	Steven David Collins	Date of Birth	8-1-1997	SSN	029807748
Residential Address	331 Tyngsboro Road Apt. 5 Dracut MA 01850				
Email	steve@theconcordmarket.com	Phone	978-471-0100		
Please indicate how many hours per week you intend to be on the licensed premises	45+	Last-Approved License Manager	Manuel G. Rodriguez		

**3B. CITIZENSHIP/BACKGROUND INFORMATION**

Are you a U.S. Citizen?  Yes     No    \*Manager must be U.S. citizen

If yes, attach one of the following as proof of citizenship US Passport, Voter's Certificate, Birth Certificate or Naturalization Papers.

Have you ever been convicted of a state, federal, or military crime?     Yes     No

If yes, fill out the table below and attach an affidavit providing the details of any and all convictions. Attach additional pages, if necessary, utilizing the format below.

Date	Municipality	Charge	Disposition

**3C. EMPLOYMENT INFORMATION**  
Please provide your employment history. Attach additional pages, if necessary, utilizing the format below.

Start Date	End Date	Position	Employer	Supervisor Name
July 2022		chef	Concord Market LLC/Concord, MA	Manuel G. Rodriguez
Jan 2021	July 2022	chef	Trail's End Cafe LLC/Concord, MA	Marisa Limoli

**3D. PRIOR DISCIPLINARY ACTION**  
Have you held a beneficial or financial interest in, or been the manager of, a license to sell alcoholic beverages that was subject to disciplinary action?     Yes     No    If yes, please fill out the table. Attach additional pages, if necessary,utilizing the format below.

Date of Action	Name of License	State	City	Reason for suspension, revocation or cancellation

I hereby swear under the pains and penalties of perjury that the information I have provided in this application is true and accurate:

Manager's Signature		Date	March 13, 2023
---------------------	--	------	----------------

Start Date	End Date	Position	Employer	Supervisor Name
January 2020	January 2021	Chef	Brewer's Tap & Table Waltham MA	Alex Deamicis
September 2019	January 2020	Chef	Smythe & Dove Andover MA	Tim Spinney
December 2013	September 2019	Chef	Gibbett Hill Groton MA	Tim Spinney

THE COMMONWEALTH OF MASSACHUSETTS  
TOWN OF AVON  
OFFICE OF THE TOWN CLERK

COPY OF RECORD OF BIRTH

REGISTERED NUMBER: 1402

CHILD

Name: STEVEN DAVID COLLINS  
Date of BIRTH: AUGUST 1, 1997 Time: 3:37 AM  
Sex: MALE  
Place of Birth: BROCKTON, MA

MOTHER

Name: CAROLINE JOYCE COLLINS  
Maiden surname: GUERIN Date of BIRTH: OCTOBER 6, 1974  
Birthplace: LOWELL, MASSACHUSETTS  
Residence: AVON, MA

FATHER

Name: MATTHEW JOSEPH COLLINS  
Birthplace: BOSTON, MASSACHUSETTS  
Date of BIRTH: APRIL 15, 1972

Date of RECORD: SEPTEMBER 23, 1997

I, the undersigned, hereby certify that I am the Town Clerk of the Town of Avon; that as such I have custody of the records of births required by law to be kept in my office; I do hereby certify that the above is a true copy from said records.

Witness my hand and the SEAL OF THE TOWN OF AVON  
at Avon on this 4th day of March 2002.



V. JEAN KOPKE  
TOWN CLERK

IT IS ILLEGAL TO ALTER OR REPRODUCE THIS DOCUMENT

## APPLICANT'S STATEMENT

I, Elizabeth Akehurst-Moore the:  sole proprietor;  partner;  corporate principal;  LLC/LLP manager  
Authorized Signatory

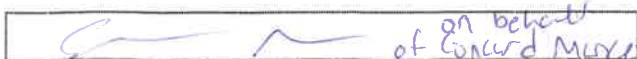
of Concord Market LLC  
Name of the Entity/Corporation

hereby submit this application (hereinafter the "Application"), to the local licensing authority (the "LLA") and the Alcoholic Beverages Control Commission (the "ABCC" and together with the LLA collectively the "Licensing Authorities") for approval.

I do hereby declare under the pains and penalties of perjury that I have personal knowledge of the information submitted in the Application, and as such affirm that all statements and representations therein are true to the best of my knowledge and belief. I further submit the following to be true and accurate:

- (1) I understand that each representation in this Application is material to the Licensing Authorities' decision on the Application and that the Licensing Authorities will rely on each and every answer in the Application and accompanying documents in reaching its decision;
- (2) I state that the location and description of the proposed licensed premises are in compliance with state and local laws and regulations;
- (3) I understand that while the Application is pending, I must notify the Licensing Authorities of any change in the information submitted therein. I understand that failure to give such notice to the Licensing Authorities may result in disapproval of the Application;
- (4) I understand that upon approval of the Application, I must notify the Licensing Authorities of any change in the ownership as approved by the Licensing Authorities. I understand that failure to give such notice to the Licensing Authorities may result in sanctions including revocation of any license for which this Application is submitted;
- (5) I understand that the licensee will be bound by the statements and representations made in the Application, including, but not limited to the identity of persons with an ownership or financial interest in the license;
- (6) I understand that all statements and representations made become conditions of the license;
- (7) I understand that any physical alterations to or changes to the size of the area used for the sale, delivery, storage, or consumption of alcoholic beverages, must be reported to the Licensing Authorities and may require the prior approval of the Licensing Authorities;
- (8) I understand that the licensee's failure to operate the licensed premises in accordance with the statements and representations made in the Application may result in sanctions, including the revocation of any license for which the Application was submitted; and
- (9) I understand that any false statement or misrepresentation will constitute cause for disapproval of the Application or sanctions including revocation of any license for which this Application is submitted.
- (10) I confirm that the applicant corporation and each individual listed in the ownership section of the application is in good standing with the Massachusetts Department of Revenue and has complied with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting of child support.

Signature:

 on behalf of Concord Market, LLC

Date:

March 13, 2023

Title:

member

**ENTITY VOTE**

The Board of Directors or LLC Managers of  Entity Name  
duly voted to apply to the Licensing Authority of  and the  
City/Town  
Commonwealth of Massachusetts Alcoholic Beverages Control Commission on   
Date of Meeting

For the following transactions (Check all that apply):

- Change of Manager
- Other

"VOTED: To authorize   
Name of Person

to sign the application submitted and to execute on the Entity's behalf, any necessary papers and do all things required to have the application granted."

"VOTED: To appoint   
Name of Liquor License Manager

as its manager of record, and hereby grant him or her with full authority and control of the premises described in the license and authority and control of the conduct of all business therein as the licensee itself could in any way have and exercise if it were a natural person residing in the Commonwealth of Massachusetts."

A true copy attest,

For Corporations ONLY

A true copy attest,

  
Corporate Officer /LLC Manager Signature

\_\_\_\_\_  
Corporation Clerk's Signature

Elizabeth Akehurst-Moore  
(Print Name) on behalf of  
Concord Market, LLC

\_\_\_\_\_  
(Print Name)



**Commonwealth of Massachusetts  
Alcoholic Beverages Control Commission  
95 Fourth Street, Suite 3  
Chelsea, MA 02150**

**JEAN M. LORIZIO, ESQ.  
CHAIRMAN**

**CORI REQUEST FORM**

The Alcoholic Beverages Control Commission ("ABCC") has been certified by the Criminal History Systems Board to access conviction and pending Criminal Offender Record Information ("CORI"). For the purpose of approving each shareholder, owner, licensee or applicant for an alcoholic beverages license, I understand that a criminal record check will be conducted on me, pursuant to the above. The information below is correct to the best of my knowledge.

**ABCC LICENSE INFORMATION**

<b>ABCC NUMBER:</b> <small>(IF EXISTING LICENSEE)</small>	89265-PK-0244	<b>LICENSEE NAME:</b>	Concord Market LLC	<b>CITY/TOWN:</b>	Concord
--	---------------	-----------------------	--------------------	-------------------	---------

**APPLICANT INFORMATION**

<b>LAST NAME:</b>	Collins	<b>FIRST NAME:</b>	Steven	<b>MIDDLE NAME:</b>	David
<b>MAIDEN NAME OR ALIAS (IF APPLICABLE):</b>		<b>PLACE OF BIRTH:</b>	Stoughton, MA		
<b>DATE OF BIRTH:</b>	08/01/1997	<b>SSN:</b>	029807748	<b>ID THEFT INDEX PIN (IF APPLICABLE):</b>	
<b>MOTHER'S MAIDEN NAME:</b>	Guerin	<b>DRIVER'S LICENSE #:</b>	545166606	<b>STATE LIC. ISSUED:</b>	Massachusetts
<b>GENDER:</b>	MALE	<b>HEIGHT:</b>	5 7	<b>WEIGHT:</b>	178
<b>EYE COLOR:</b>	blue				
<b>CURRENT ADDRESS:</b>	331 Tyngsboro Road Apt 5				
<b>CITY/TOWN:</b>	Dracut	<b>STATE:</b>	MA	<b>ZIP:</b>	01850
<b>FORMER ADDRESS:</b>	1428 Main Street Apt 215				
<b>CITY/TOWN:</b>	Fitchburg	<b>STATE:</b>	MA	<b>ZIP:</b>	01420

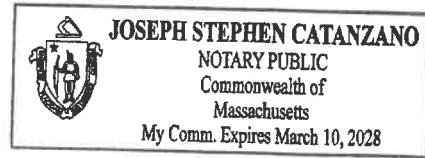
**PRINT AND SIGN**

<b>PRINTED NAME:</b>	Steven David Collins	<b>APPLICANT/EMPLOYEE SIGNATURE:</b>	
----------------------	----------------------	--------------------------------------	--

**NOTARY INFORMATION**

On this 13<sup>th</sup> day of March, 2023 before me, the undersigned notary public, personally appeared Steven David Collins  
(name of document signer), proved to me through satisfactory evidence of identification, which were Mass. Driver's License  
to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he) (she) signed it voluntarily for its stated purpose.

NOTARY



**DIVISION USE ONLY**

<b>REQUESTED BY:</b>	
<small>SIGNATURE OF DCI AUTHORIZED EMPLOYEE</small>	

The DCI Identify Theft Index PIN Number is to be completed by those applicants that have been issued an Identity Theft PIN Number by the DCI. Certified agencies are required to provide all applicants the opportunity to include this information to ensure the accuracy of the CORI request process. ALL CORI request forms that include this field are required to be submitted to the DCI via mail or by fax to (617) 660-4614.

# Town of Concord

STATUTORY SENIOR AND  
RESIDENTIAL EXEMPTIONS

APRIL 3, 2023

PRESENTED BY:

THE CONCORD BOARD OF ASSESSORS

DAVID KARR CHAIRMAN

MEREDITH STONE TOWN ASSESSOR &  
STAFF

4/3/2023



FY23  
RECERTIFICATION/  
REVALUATION YEAR



# Roadmap

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In this presentation, we will examine:

- Demographics of the Town of Concord (households, age, income)
- Distribution of property value among residential properties
- Existing policies affecting the tax burden on households
- Alternatives to the existing policies
- Implementation, benefits, costs, and risks of the Residential Exemption
- Implementation, benefits, costs, and risks of Clause 41C½

# Demographics of Concord

	All ages	Age 65+
Population (2020)	18,466	3,655
Number of households (2020)	6,357	(est.) 3,080
% Home owners (2017-2021)	74.6%	
Median income (2017-2021, 2021 dollars)	\$169,335	
Median income (2012-2016)	\$138,661	\$100,000

16% of households are seniors living alone (2012-2016)

42% of senior households have income below \$75,000 (2012-2016)

Sources: <https://www.census.gov/quickfacts/concordtownmiddlesexcountymassachusetts>  
<https://cleargov.com/massachusetts/middlesex/town/concord/demographics>  
<http://www.housing.ma/concord/report>  
[https://www.rhsohousing.org/sites/g/files/vyhlif421/f/uploads/concord\\_infographic\\_final.pdf](https://www.rhsohousing.org/sites/g/files/vyhlif421/f/uploads/concord_infographic_final.pdf)

# Property values and taxes

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Distribution of property values of single-family homes:

Approximately 4% are valued under	\$700,000
Approximately 33% are valued under	\$1,000,000
50% are valued under	\$1,169,500
Approximately 66% are valued under	\$1,400,000
Approximately 94% are valued under	\$2,500,000

Under the FY2023 tax policy, all properties are taxed at \$12.96/1000 in exact proportion to the property value.

# Mechanisms for shifting the burden of property taxes

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## CURRENTLY IMPLEMENTED

Senior Means-Tested Exemption

Clause 41C (senior)

Clause 17D (senior)

Clauses 22, 22A,B,C,D,E (veteran)

Clause 37A (blind)

Clauses 18 (hardship)

## POSSIBLE TO IMPLEMENT

Split rate (residential vs. commercial)

Residential exemption (lower-valued vs. higher-valued properties, non-residents, and rentals)

Clause 41C½ (senior)

The benefits and costs of a split rate have been well-studied and will not be considered in this presentation.

# The Residential Exemption

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The Residential Exemption is a policy available to all cities and towns in Massachusetts.

Massachusetts law requires the Select Board to decide each year:

- Whether to adopt the Residential Exemption.
- If the Residential Exemption is adopted, the amount of the exemption.

In order to qualify for an exemption, a residential parcel must be the owner's principal place of residence as of January 1 in the previous fiscal year, as used for state income tax purposes.

The Residential Exemption increases the residential tax rate. It is a tax shift from the exempt portion of qualified properties to the non-exempt portions of all residential properties.

# Cities and towns with a Residential Exemption

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Barnstable	20%
Boston	35%
Brookline	20%
Cambridge	30%
Chelsea	35%
Everett	25%
Malden	30%
Mashpee	5%
Nantucket	25%
Oak Bluffs	8%
Provincetown	25%

Somerville	35%
Tisbury	22%
Truro	25%
Waltham	35%
Watertown	33%
Wellfleet	25%

Former Residential Exemptions, discontinued

Marlboro

Somerset

Weymouth

# Residential exemption example 1

Assumption: 95% of single-family homes and condos are owner-occupied

Rate set by Select Board: **30%** (minimum amount to decrease tax on the median single-family home by \$1000)

Amount of exemption (estimated from FY23 values): \$369,615

Old tax rate: \$12.96

New tax rate: \$17.68

% increase: 36.4%

## Effect on taxpayers

Full assessed value	Old tax	New tax (qualified)	Change	%	New tax (not qualified)	Change	%
700000	9072.00	5841.21	-3230.79	-35.6%	12376.00	+3304.00	+36.4%
1000000	12960.00	11145.21	-1814.79	-14.0%	17680.00	+4720.00	+36.4%
1169500	15156.72	14141.97	-1014.75	-6.7%	20676.76	+5520.04	+36.4%
1400000	18144.00	18217.21	+73.21	+0.4%	24752.00	+6608.00	+36.4%
2500000	32400.00	37665.21	+5265.21	+16.3%	44200.00	+11800.00	+36.4%

# Residential exemption example 2

Assumption: 85% of single-family homes and condos are owner-occupied

Rate set by Select Board: **22%** (minimum amount to decrease tax on the median single-family home by \$1000)

Amount of exemption (estimated from FY23 values): \$271,051

Old tax rate: \$12.96

New tax rate: \$15.72

% increase: 21.3%

## Effect on taxpayers

Full assessed value	Old tax	New tax (qualified)	Change	%	New tax (not qualified)	Change	%
700000	9072.00	6743.08	-2328.92	-25.7%	11004.00	+1932.00	+21.3%
1000000	12960.00	11459.08	-1500.92	-11.6%	15720.00	+2760.00	+21.3%
1169500	15156.72	14123.62	-1033.10	-6.8%	18384.54	+3227.82	+21.3%
1400000	18144.00	17747.08	-396.92	-2.2%	22008.00	+3864.00	+21.3%
2500000	32400.00	35039.08	+2639.08	+8.1%	39300.00	+6900.00	+21.3%

# Adoption by Oak Bluffs

---

Total residential parcels: 4628

Original estimate of number of qualifying properties: 1350

## FY2022 (first year of residential exemption)

- Exemption rate set by select board: 4%
- Exempted value: \$34,036
- Number of prequalified parcels, Nov 2021: 683 (<51% of original estimate)
- Residential tax rate with exemption: \$6.79
- Tax rate on other classes of property: \$6.76

## FY2023

- Exemption rate set by select board: 8%
- Exempted value: \$90,838
- Number of prequalified parcels, Dec 2022: 794 (<59% of original estimate)
- Residential tax rate with exemption : \$5.28
- Tax rate on other classes of property : \$5.21

# Application form

FISCAL YEAR 2023  
**RESIDENTIAL EXEMPTION**  
COMMONWEALTH OF MASSACHUSETTS  
**OAK BLUFFS**

All information on this form must be completed in full and required documentation must be attached in order for the application to be considered complete. Under statute, the application for residential exemption must be filed no later than April 1, 2023.

### STATEMENT OF FACTS

Property Address \_\_\_\_\_

1) Name(s) of record owner(s) \_\_\_\_\_

2) Name of Applicant(s) \_\_\_\_\_

3) Was parcel *owned and occupied* by you as your *domicile* as of January 1, 2022? YES \_\_\_ NO \_\_\_

NOTE: If no, please return the form but you can skip to the signature line (9) and not include any documentation.

4) **Please attach a copy of the 1<sup>st</sup> page of your most recent Federal Income Tax Return. We ask that you black out or otherwise cover your social security number and income information.**

- If your tax return shows a PO Box or address other than the Oak Bluffs property's street address, please ALSO include a copy of both sides of your current driver's license showing owner's name with the Oak Bluffs address. If you do not have a valid driver's license please contact our office at (508) 693-3554 x104.
- If you weren't required to file a tax return in 2022, please provide a written explanation

5) List the location and type of any other residential real estate owned by you: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6) Have you received or applied for, or will you receive or apply for any other residential exemption and/or homestead exemption in any other state, city or town in this fiscal year (7/1/22 to 6/30/23) or the previous fiscal year? \_\_\_ NO \_\_\_ YES If yes, what city/state? \_\_\_\_\_

*Signing this form under the penalties of perjury has the legal effect of swearing under oath to the truthfulness of the information contained herein. All items on this form must be completed as indicated. In addition to other sanctions provided by law, intentional misrepresentation of facts in this application may result in cancellation of this exemption and the subsequent issuance of an omitted bill for the exempted value involved for the current fiscal year.*

9) Signature of Applicant: \_\_\_\_\_

10) Mailing Address (if different than property location): \_\_\_\_\_

Email Address: \_\_\_\_\_ Phone Number: \_\_\_\_\_

### ASSESSOR'S USE ONLY

GRANTED: \_\_\_\_\_ DENIED: \_\_\_\_\_ NO ACTION: \_\_\_\_\_ DATE: \_\_\_\_\_ AMOUNT ABATED: \_\_\_\_\_

# Sample tax bill

Based on assessments as of January 1, 2022, your Real Estate Tax for the fiscal year beginning July 1, 2022 and ending June 30, 2023 on the parcel of real estate described below is as follows:

PROPERTY DESCRIPTION				
152 NEW YORK AV				
State Class	1010			
Land Area	0.35 AC			
Parcel ID	0004-0101			
Book/Page				
RE TAX RATE PER \$1,000				
1-Res	2-OpSp	3-Comm	4-Indust	
\$5.28	\$0.00	\$5.21	\$5.21	
Land Value	\$482,800			
Building Value	\$741,000			
Residential Exemption	-\$90,838			
<b>Total Taxable Value</b>	<b>\$1,132,962</b>			

Assessed owner as of January 1, 2022:

THE COMMONWEALTH OF MASSACHUSETTS  
SEE REVERSE SIDE FOR IMPORTANT INFORMATION  
TOWN OF OAK BLUFFS

Fiscal Year 2023 Actual  
Real Estate Tax Bill

**Treasurer/Collector**

**Cheryl A. Sashin**

**Office Hours**

Monday - Friday 8:30 AM - 4:00 PM

**DO NOT MAIL CASH**

**Mail Payments To:**

Town of Oak Bluffs

Collector of Taxes

P.O. Box 55

Medford, MA 02155-0001

**Telephone Numbers:**

Collector: (508) 693-3554 x209

Assessor: (508) 693-3554 x201

THIS FORM APPROVED BY COMMISSIONER OF REVENUE

**TAXPAYER'S COPY**

Bill No.	4066
Real Estate Tax	\$5,982.04
CPA	\$163.62
Commercial Tax	\$0.00
Special Assessments	\$0.00
Exemptions/Abatements	\$0.00
Total Tax/Spec. Assess.	\$6,145.66
Preliminary Tax	\$3,043.23
Current Payments/Credits	\$3,043.23
Past Due	\$0.00
Interest	\$0.00
Fees	\$0.00
<b>3rd Qtr. Due 2/1/2023</b>	<b>\$1,551.22</b>
<b>4th Qtr. Due 5/1/2023</b>	<b>\$1,551.21</b>

**SPECIAL ASSESSMENTS**

DESC	AMOUNT	DESC	AMOUNT
------	--------	------	--------

# Processing an application

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Most applications can establish residence by a copy of IRS Form 1040.

The Assessors should establish uniform standards for what documentation (for example, driver's license) to use when an applicant has not filed Form 1040.

Trust documents need to be examined carefully to establish ownership for the purpose of the exemption.

The Assessors will need to follow up on incomplete applications.

Applications can be submitted up to the beginning of April (3 months after the mailing of the actual tax bill). **This means that the total amount of exemptions will not be known until after the tax rate for that year has been set.**

# Residential exemption example 3

Assumption: 85% of single-family homes and condos are owner-occupied

Rate set by Select Board: **4%** (following example of Oak Bluffs)

Amount of exemption (estimated from FY23 values): \$49,282

Old tax rate: \$12.96

New tax rate: \$13.39

% increase: 3.3%

## Effect on taxpayers

Full assessed value	Old tax	New tax (qualified)	Change	%	New tax (not qualified)	Change	%
700000	9072.00	8713.11	-358.89	-4.0%	9373.00	+301.00	+3.3%
1000000	12960.00	12730.11	-229.89	-1.8%	13390.00	+430.00	+3.3%
1169500	15156.72	14999.72	-157.00	-1.0%	15659.61	+502.89	+3.3%
1400000	18144.00	18086.11	-57.89	-0.3%	18746.00	+602.00	+3.3%
2500000	32400.00	32815.11	+415.11	+1.3%	33475.00	+1075.00	+3.3%

# Residential exemption risks

Exposure to errors in estimated % of qualifying properties, tax collected over/under levy:

	30% exemption	22% exemption	4% exemption
1% error (approx. 60 parcels)	\$370,261 error	\$241,424 error	\$37,389 error
Actual 10% above estimate	N/A	\$2,414,236 shortfall	\$373,891 shortfall
Actual 4% above estimate	\$1,481,044 shortfall	\$965,694 shortfall	\$149,556 shortfall
Actual 5% below estimate	\$1,851,305 excess	\$1,207,118 excess	\$186,946 excess
Actual 10% below estimate	\$3,702,610 excess	\$2,414,236 excess	\$373,891 excess
Actual 20% below estimate	\$7,405,221 excess	\$4,828,472 excess	\$747,782 excess

Initial overlay account balance FY2023: \$2,579,699

Excess levy capacity FY2023: \$5,381,932

# Possible effects of residential exemption

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Reference: The Lexington Select Board's Residential Exemption Policy Study Committee (Ad Hoc), *An Examination of Residential Property Tax Exemptions for the Town of Lexington, Massachusetts*, April 2019.

## Indirect effects:

Expect little impact on out-migration, demand for higher-priced homes, activity of developers.

Incentive to convert rental apartments to condos.

Incentive to convert rental houses to owner-occupied.

A shrinking rental market could increase rents.

Shift in property tax could be capitalized into home values as measured by sale prices:

- Lower-value homes would increase in price.
- Higher-value homes would decrease in price.

Capitalization would reduce the benefit to current residents and even further reduce the benefit to new buyers of lower-value homes (because of increased prices).

Estimated 28% of the residential exemption's effect would be canceled by changes in property values.

Expert panel recommended means-tested approach and greater promotion of tax deferral.

# Exemptions for seniors

	Concord Means-Tested	Clause 41C	Clause 41C½
Availability	Now	Now	FY2025 or later
Number eligible	38	3	<1540 (est.)
Benefit	Up to 50% of tax	\$1000	Determined by %
Who qualifies	Minimum age 65(*), 10-year(*) domicile in MA, owner-occupant for 5 years		
Income limit, single	\$64,000	\$27,147	\$64,000
... head of household	\$80,000	\$27,147	\$80,000
... filing jointly	\$96,000	\$40,718	\$96,000
Property value limit	\$1,169,500	None	None
Other assets limit, single	\$275,000	\$55,297	None
... married	\$275,000	\$74,656	None
When total of exemptions is known	Before setting tax rate	After setting tax rate	After setting tax rate

(\* ) Clause 41C½ minimum age is 70 but can be reduced to 65 by Town Meeting; domicile can be reduced to 5 years.

# Clause 41C½ exemption

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Clause 41C½ is a statutory exemption available to all cities and towns in Massachusetts.

It is similar to the Residential Exemption, but with these differences:

- Only resident homeowners 70 years or older are eligible (can be reduced to 65 years by local option)
- Applicant must have lived 5 years in the same property
- Applicant must have lived 10 years in Massachusetts (can be reduced to 5 years by local option)
- There are income limits for eligibility (can be adjusted by local option)
- Only 5% or less of the average residential property value can be exempted (can be increased to 20% by local option)

# Procedure to adopt Clause 41C½

---

Clause 41C½ must be accepted by a vote at the polls during a regular town election using language dictated by statute.

Town meeting may then decide

- To lower the minimum age to 65
- To reduce the in-state residence requirement to 5 years
- To raise the exemption to up to 20% of the average value
- To adjust income limits

The earliest year for which Concord could adopt Clause 41C½ is FY2025 (the tax year starting on July 1, 2024).

- Vote to accept in March 2024 town election
- Change limits as allowed by law at April 2024 Annual Town Meeting

Clause 41C½ would then replace Clause 41C, which could no longer be granted.

# One town has adopted Clause 41C½

---

Ashland is the only municipality that has adopted Clause 41C½.

The exemption percentage is set each fall by a Special Town Meeting.

This allows the tax rate to be estimated before setting the percentage.

## Figures for FY2023

Percentage	11.25%
Residential value exempted	\$62,031
Tax exempted	\$854

# Clause 41C½ exemption example

Assumption: 1000 qualifying properties (est. 32% of all senior households, 17% of all residential parcels)

Rate set by Town Meeting: 8% (minimum amount to decrease tax on the median single-family home by \$1000)

Amount of exemption (estimated from FY23 values): 98,564

Old tax rate: \$12.96

New tax rate: \$ 13.14

% increase: 1.4%

## Effect on taxpayers

Full assessed value	Old tax	New tax (qualified)	Change	%	New tax (not qualified)	Change	%
700000	9072.00	7902.87	-1169.13	-12.9%	9198.00	+126.00	+1.4%
1000000	12960.00	11844.87	-1115.13	-8.6%	13140.00	+180.00	+1.4%
1169500	15156.72	14072.10	-1084.62	-7.2%	15367.23	+210.51	+1.4%
1400000	18144.00	17100.87	-1043.13	-5.7%	18396.00	+252.00	+1.4%
2500000	32400.00	31554.87	-845.13	-2.6%	32850.00	+450.00	+1.4%

# Clause 41C½ exemption risks

Exposure to errors in estimated % of qualifying properties, tax collected over/under levy:

Exemption type and amount	8% exemption, Clause 41C½	4% Residential Exemption (for comparison)
1% error (approx. 60 parcels)	\$77,345 error	\$37,389 error
Actual 10% above estimate	\$773,452 shortfall	\$373,891 shortfall
Actual 4% above estimate	\$309,381 shortfall	\$149,556 shortfall
Actual 5% below estimate	\$386,726 excess	\$186,946 excess
Actual 10% below estimate	\$773,452 excess	\$373,891 excess
Actual 20% below estimate	N/A	\$747,782 excess

Initial overlay account balance FY2023: \$2,579,699

Excess levy capacity FY2023: \$5,381,932

# Possible effects of Clause 41C½

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## Direct effects:

Tax shift reducing lower-income owner-occupant senior households' tax by a large percentage while increasing other taxpayers' burden by a small percentage.

Clause 41C would no longer be available and would be entirely replaced by Clause 41C½.

The town would receive only a fixed reimbursement from the state based on the previous Clause 41C exemptions. This is estimated at \$1000 per year.

## Indirect effects:

Purchasers of properties currently receiving the exemption would not qualify for the exemption (due to the 5-year occupancy requirement).

Therefore:

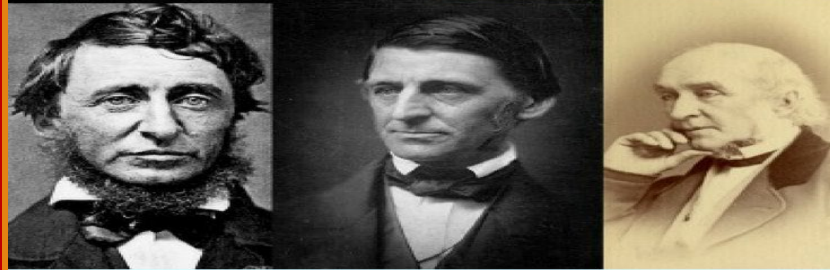
- Little or no incentive to convert rental apartments to condos or rental houses to owner-occupied.

- Little or no upward pressure on prices of lower-valued homes.

- Little downward pressure on prices of higher-valued homes since tax increase is small.

# Comparison of alternatives

Policy	Residential Exemption implemented rapidly	Residential Exemption implemented gradually	Clause 41C½
Estimated number eligible properties	Approx. 5000	Approx. 5000	Approx. 1000
Who pays less tax	Owner-occupants of homes in lower 60% of value		Low-income seniors
How much less (first year)	\$1000-3200 decrease (below median value)	\$160-360 decrease (below median value)	>\$1000 for homes in lowest 66% of values
Who pays more tax	Non-resident owners, landlords, owners of homes in upper 30% of value		Younger homeowners, higher-income seniors
How much more (first year)	20-40% increase (non-residents)	3-4% increase (non-residents)	1.4% increase
Likely effect on values	Low-valued properties increase in value, high-valued properties decrease, effects on tax burden partially erased		Little change
Likely effect on rental availability	Reduced supply due to conversion to owner-occupied units		Little change



# Town of Concord Massachusetts

## Statutory Senior and Residential Exemptions

### Board of Assessors

David Karr Chairman

Brendan O'Neill Kemeza

Yanni Konstantions Tsitsas

Mera K Tilley

Arry Charles

### Office Staff

Meredith Stone Town Assessor

Lee Phalen

Carolyn Dee

Michael Gibbons

4-3-2023



## Memorandum

Date: March 22, 2023  
To: Concord Select Board  
From: Walter Latta, Assistant Fire Chief  
Copy: Kerry Lafleur, Town Manager; Tom Judge, Fire Chief  
Subject: Adoption of 2022 (FEMA) Hazard Mitigation Plan

The Town of Concord, working with an environmental consultant provided by Metropolitan Area Planning Council (MAPC), updated the 2018 Hazard Mitigation Plan for 2023. Hazard mitigation planning is an essential municipal tool intended to reduce the loss of life and property by minimizing the impact of disasters, including identifying natural disaster risks and vulnerabilities that are common in the area and developing long-term strategies for protecting people and property from such events. The Federal Emergency Management Agency (FEMA) requires an update to the HMP every five years in order for local municipalities to remain grant-eligible.

As part of the process to update the plan, a working group was assembled to provide updates to the 2017 version of the HMP. The update process included a community forum on October 12, 2022 along with a series of internal working group sessions attended by staff from the Fire Department, Town Manager's Office, Public Works, Planning and Land Management, the Light Plant, Natural Resources, IT, Public Health division, Building Division, and community members. The final draft of the HMP was submitted in December 2022 and has received conditional approval by the Massachusetts Emergency Management Agency (MEMA) and FEMA Region 1 in March 2023. A copy of the final plan is attached to this memo.

The next step in the approval process is for the Concord Select Board to formally adopt the mitigation plan and send a resolution or adoption documentation to the state for submission to FEMA. Please note that this adoption process by the Select Board is not soliciting any additional changes to the plan – making any changes at this point would require re-starting the planning process from the beginning.

**The Town of Concord must adopt the plan and receive approval by April 18, 2023.** If the plan is not approved by this date, the Town will need to revise the plan to meet the requirements in the FEMA [Local Mitigation Planning Policy Guide](#), resulting in additional work and delays for funding eligibility.

FEMA re-certification of the Town's HMP will allow the Town to participate in the following critical emergency management programs:

- Hazard Mitigation Grant Program (HMGP)
- HMGP Post Fire
- Building Resilient Infrastructure and Communities
- Flood Mitigation Assistance

Thank you for the timely consideration of this request.

# TOWN OF CONCORD HAZARD MITIGATION PLAN 2022 UPDATE



**DRAFT PLAN FOR MEMA REVIEW**

**December 21, 2022**

## ACKNOWLEDGEMENTS & CREDITS

This plan was prepared for the Town of Concord by the Metropolitan Area Planning Council (MAPC) under the direction of the Massachusetts Emergency Management Agency (MEMA) and the Massachusetts Department of Conservation and Recreation (DCR).

### MAPC Officers

President, Adam Chapdelaine, Town of Arlington  
Vice President, Monica Tibbits-Nutt, Gubernatorial  
Secretary, Jennifer Constable, Town of Rockland  
Treasurer, Sam Seidel, Gubernatorial  
Executive Director, Marc Draisen, MAPC

### Credits

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Mapping/GIS Services: Rachel Bowers, Alyssa Kogan

### Massachusetts Emergency Management Agency

Director: Samantha Phillips

### Department of Conservation and Recreation

Commissioner: Jim Montgomery

### Town of Concord Local Hazard Mitigation Planning Team 2022

Kerry Lafleur	Town Manager
Thomas Judge	Chief, Fire Department
Walter Latta	Assistant Fire Chief
Christopher Carmody	Risk Manager
Alan Cathcart	Director, Public Works
Aaron Miklosko	Highway & Grounds Superintendent
Jeffrey Murawski	Water/Sewer Superintendent
Steve Dookran	Town Engineer
David Wood	Director, Municipal Light Plant
Joseph O'Connor	Chief, Police Department
Erin Stevens	Manager, Public Information & Communications
Delia Kaye	Director, Natural Resources
Marcia Rasmussen	Director, Planning and Land Management
Melanie Dineen	Director, Public Health
Paul Creedon	Commissioner, Building & Inspections
Jason Bulger	Chief Technology Officer, IT
John Bolduc	Climate Action Advisory Board

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## SECTION 1: EXECUTIVE SUMMARY

Hazard mitigation planning is a proactive effort to identify actions that can be taken to reduce the dangers to life and property from natural hazard events. In the communities of the Boston region of Massachusetts, hazard mitigation planning tends to focus most on flooding, the most likely natural hazard to impact these communities. This plan considers how our warming climate will affect natural hazards. Warming temperatures will fuel changing precipitation patterns, sea level rise, and an increasing frequency and intensity of severe storms. The Federal Disaster Mitigation Act of 2000 requires all municipalities that wish to receive FEMA funding for hazard mitigation grants, to adopt a local multi-hazard mitigation plan and update this plan in five-year intervals in order to maintain FEMA eligibility.

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### PLANNING PROCESS

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The Hazard Mitigation Plan 2022 Update was led by the Concord Local Hazard Mitigation Planning Team (“Local HMP Team” or “Local Team”), composed of staff from different town departments and boards including Fire, Police, Engineering, Water and Sewer, Public Health, Natural Resources, Planning, Inspections, Concord Municipal Light Plant, Highway and Grounds, Town Manager’s Office, and Climate Action Advisory Board. The Local HMP Team convened on July 13, August 25, and November 8, 2022, to discuss the impacts of natural hazards on various areas in town, the effects of climate change, goals for addressing these impacts, updates to the Town’s existing mitigation measures, and new or revised hazard mitigation measures that would enhance resiliency of the town and its residents.

Public participation in this planning process is important for improving awareness of the potential impacts of natural hazards and to build support for the actions the Town takes to mitigate them. The Local HMP Team also hosted two public meetings. The first meeting on October 12, 2022, was held via Zoom. The second meeting was held on November 30, 2022, also via Zoom. The draft plan was also posted on the Town’s website for a 10-day public review from December 1 through December 15, 2022. Key stakeholders and neighboring communities were notified and invited to review the draft plan and submit comments. See Public Comments for feedback.

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### RISK ASSESSMENT

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The Concord Hazard Mitigation Plan assesses the potential impacts to the town from flooding, high winds, winter storms, brush fire, geologic hazards, extreme temperatures, drought, and invasive species. For each risk, the assessment identifies the projected impacts of a warming climate. These are shown in the map series in Appendix B. The Concord Local HMP Team identified 142 critical facilities throughout the town. These are also shown on the map series in Appendix B and listed in Table 30, identifying which facilities are located within the mapped hazard zones.

Hazards U.S. – Multihazards (HAZUS-MH) is a standardized methodology developed by FEMA that utilizes Geographic Information Systems (GIS) to estimate physical, economic, and social

impacts of disasters. The HAZUS-MH analysis for Concord estimates property damages from Hurricanes of category 2 and 4 (\$19.1 million to \$246.1 million), earthquakes of magnitudes 5 and 7 (\$563.1 million to \$3.9 billion), and the 1% and .2% chance of flooding (\$92.3 million to \$135.1 million).

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## HAZARD MITIGATION GOALS

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The Local HMP Team endorsed the following seven hazard mitigation goals at the August 25, 2022, team meeting. The team added a ninth goal focused on incorporating future climate change projections.

1. Prevent and reduce the loss of life, injury, public infrastructure, public health impacts and property damage resulting from all major natural hazards.
2. Identify and seek funding for measures to mitigate or eliminate each known significant hazard area.
3. Incorporate hazard mitigation planning as an integral factor in all relevant municipal departments, committees, and boards.
4. Prevent and reduce the damage to public infrastructure and resources resulting from all hazards, especially the critical services for climate-vulnerable populations.
5. Work with the business community, major institutions, and non-profits to develop, review, and implement the hazard mitigation plan that ensures prompt recovery and continuity of operations during and post emergency events of disasters.
6. Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation, communications, and solutions for hazards affecting multiple communities.
7. Ensure that future development meets federal, state, and local standards for preventing and reducing the impacts of natural hazards.
8. Take maximum advantage of resources from FEMA and MEMA to communicate and educate Town staff and the public about hazard mitigation.
9. Consider the current and future impacts of climate change. Incorporate climate sustainability and resiliency in hazard mitigation planning.

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## HAZARD MITIGATION STRATEGY

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The Concord Local HMP Team identified mitigation measures that would serve to reduce the Town's vulnerability to natural hazard events. Overall, the hazard mitigation strategy recognizes that mitigating hazards for Concord will be an ongoing process as our understanding of natural hazards and the actionable steps to mitigate their damages changes over time. Global climate change and a variety of other factors impact the Town's vulnerability in the future, and local officials will need to work together across municipal lines and with state and federal agencies to understand and address these changes. The Hazard Mitigation Strategy will be incorporated into the Town's other related plans and policies.

## PLAN REVIEW & UPDATE PROCESS

A summary of the process for developing Concord’s Hazard Mitigation Plan 2022 Update is provided in Table 1 below.

**Table 1: Plan Review and Update Process**

	<b>Reviews and Updates</b>
<b>Section 3: Public Participation</b>	The Local HMP Team placed an emphasis on public participation for the update of the Hazard Mitigation Plan, discussing strategies to enhance participation opportunities at the first local committee meeting. During plan development, the plan was discussed at two public meetings hosted by the Hazard Mitigation Team. The plan was also available on the Town’s website for public comment. See Public Comments for feedback.
<b>Section 4: Risk Assessment</b>	MAPC gathered the most recently available climate, hazard and land use data and met with town staff to identify changes in local hazard areas and development trends. Town staff reviewed critical infrastructure with MAPC staff to create an up-to-date list. The Risk Assessment integrates projected climate impacts. MAPC also used the most recently available version of HAZUS and assessed the potential impacts of flooding using the latest data.
<b>Section 5: Goals</b>	The Concord Local HMP Team updated and endorsed the Hazard Mitigation Goals.
<b>Section 6: Existing Mitigation Measures</b>	The list of existing mitigation measures has been updated to reflect current mitigation activities in town.
<b>Sections 7 and 8: Hazard Mitigation Strategy</b>	Mitigation measures from the 2017 Plan were reviewed and assessed as to whether they were completed, in progress, or deferred. The Local HMP Team determined whether to carry forward measures into the 2022 Plan Update or modify or delete them. The Plan Update’s hazard mitigation strategy reflects both new measures and measures carried forward from the 2017 plan. The Local HMP prioritized these mitigation measures based on current conditions.
<b>Section 9: Plan Adoption &amp; Maintenance</b>	This section of the plan was updated with a new on-going plan implementation review and five-year update process that will assist the Town in incorporating hazard mitigation issues into other planning and regulatory review processes and better prepare the Town for the next comprehensive plan update.

The Town of Concord has made progress implementing mitigation measures identified in the 2010 as well as 2017 HMPs. Since 2017, medium and high priority projects that were completed include drainage upgrades in various locations; conducting town-wide shade tree inventory and management planning; improving communications and monitoring during winter storms; and integrating sustainability in planning efforts.

Many of the mitigation measures are also in progress or continue as ongoing operations and maintenance programs and community outreach efforts. Overall, many of the “in progress” or “ongoing” mitigation measures from the 2017 plan will be continued in this plan update. Most retain the same priority in this 2022 Update, a couple measures previously indicated as “Medium” will be elevated to “High” priority in this plan.

Moving forward into the next five-year plan implementation period there will be many more opportunities to incorporate hazard mitigation into the Town’s decision-making processes. The challenges the Town faces in implementing these measures are primarily due to limited funding and available staff time. This plan should help the Town prioritize the best use of its limited resources for enhanced mitigation of natural hazards.

## SECTION 2: INTRODUCTION

### PLANNING REQUIREMENTS UNDER THE FEDERAL DISASTER MITIGATION ACT

The Federal Disaster Mitigation Act, passed in 2000, requires that after November 1, 2004, all municipalities that wish to continue to be eligible to receive funding for hazard mitigation grants, must adopt a local multi-hazard mitigation plan and update this plan in five-year intervals. This planning requirement does not affect disaster assistance funding.

The Federal Emergency Management Agency (FEMA) administers federal hazard mitigation planning and grant programs in collaboration with the states. These programs are administered in Massachusetts by the Massachusetts Emergency Management Agency (MEMA) in partnership with the Department of Conservation and Recreation (DCR).

The Town of Concord contracted with the Metropolitan Area Planning Council (MAPC) to assist the Town in updating its local Hazard Mitigation Plan, which was first adopted in 2010 as a multijurisdictional plan. The local Hazard Mitigation Plan update produced under this contract is designed to individually meet the requirements of the Disaster Mitigation Act for each community while listing regional concerns and hazards that impact the Town or City creating the plan. Concord has since completed the first Plan Update in 2017. This 2022 Plan serves as the second update upon completion and adoption.

### WHAT IS A HAZARD MITIGATION PLAN?

Natural hazard mitigation planning is the process of determining how to systematically reduce or eliminate the loss of life and property damage resulting from natural hazards such as floods, earthquakes, and hurricanes. Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries, and property resulting from natural hazards through long-term strategies. These long-term strategies include planning, policy changes, programs, projects, and other activities. This plan incorporates consideration of future risks due to projections for the increased frequency and severity of extreme weather fueled by a warming planet.

### PREVIOUS FEDERAL/STATE DISASTERS

As noted in the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP), Middlesex County, in which Concord is located, has experienced 22 natural hazards that triggered federal or state disaster declarations since 1991 (see Table 2 for statewide list of disasters). The majority of these events involved flooding, while others were due to hurricanes or nor'easters, and severe winter weather.

**Table 2: Federal/State Disaster Declarations, 1991-2018**

<b>Disaster Name</b>	<b>Date of Event</b>	<b>Declared Areas</b>
Hurricane Bob	August 1991	Counties of Barnstable, Bristol, Dukes, Essex, Hampden, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
Severe Coastal Storm No Name Storm	October 1991	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
Blizzard	December 1992	Counties of Barnstable, Dukes, Essex, Plymouth, Suffolk
Blizzard	March 1993	Statewide
Blizzard	January 1996	Statewide
Windstorm	May 1996	Counties of Essex, Plymouth, Norfolk, Bristol
Severe Storms, Flood	October 1996	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
Heavy Rain, Flood	June 1998	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
Severe Storms, Flood	March 2001	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
Snowstorm	March 2001	Counties of Berkshire, Essex, Franklin, Hampshire, Middlesex, Norfolk, Worcester
Snowstorm	February 2003	Statewide
Snowstorm	December 2003	Counties of Barnstable, Berkshire, Bristol, Essex, Franklin, Hampden, Hampshire, Middlesex, Norfolk, Plymouth, Suffolk, Worcester
Flooding	April 2004	Counties of Essex, Middlesex, Norfolk, Suffolk, Worcester
Blizzard	January 2005	Statewide
Hurricane Katrina	August 2005	Statewide
Severe Storms, Flooding	October 2005	Statewide
Severe Storms, Flooding	May 2006	Statewide
Nor'easter	April 2007	Statewide
Severe Storms, Flooding	December 2008	Counties of Berkshire, Bristol, Essex, Franklin, Hampden, Hampshire, Middlesex, Suffolk, and Worcester
Severe Storms, Flooding	December 2008	Statewide

<b>Disaster Name</b>	<b>Date of Event</b>	<b>Declared Areas</b>
Severe Storms, Flooding	March/April 2010	Counties of Bristol, Essex, Middlesex, Suffolk, Norfolk, Plymouth, Worcester
Severe Winter Storm, Snowstorm	January 2011	Counties of Berkshire, Essex, Hampden, Hampshire, Middlesex, Norfolk, Suffolk
Severe Winter Storm, Snowstorm and Flooding	February, 2013	Statewide
Severe Winter Storm, Snowstorm, and Flooding	April 2013	Statewide
Severe Winter Storm, Snowstorm, and Flooding	April 2015	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, Worcester
Severe winter storm and flooding	March 2018	Counties of Barnstable, Bristol, Essex, Nantucket, Norfolk, Plymouth
Severe winter storm and Snowstorm	March 2018	Counties of Essex, Middlesex, Norfolk, Suffolk, Worcester

Source: SHMCAP, 2018

### **FEMA FUNDED MITIGATION PROJECTS**

To date, the Town of Concord has received funding from FEMA for three mitigation projects under the Hazard Mitigation Grant Program (HMGP). The projects are summarized in Table 3 below.

**Table 3: FEMA-Funded Mitigation Projects**

<b>Project Title</b>	<b>Scope of Work</b>	<b>Total Cost</b>	<b>Federal Funding</b>	<b>Local Funding</b>
Culvert Replacement at Fitchburg Turnpike (grant 1994-01)	Upgrade of undersized culvert	\$92,960	\$69,720	\$23,240
Spencer Brook Culvert Replacement at Westford Road (grant 1895-25)	Upgrade of 36 pipe culvert with upgraded box bottom culvert	\$73,700	\$55,277	\$18,423
Culvert Replacement and Drainage Improvements at Lowell Road (grant 4028-02)	Replacement of stone culvert with concrete box culvert. Replacement of closed drainage system with open system, including new piping and drainage structures.	\$675,000	\$506,250	\$168,750

(Source: database provided by MEMA)

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## COMMUNITY PROFILE <sup>1</sup>

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The Town of Concord is in Middlesex County, bordered by Maynard and Acton to the west, Carlisle to the north, Bedford, and Lincoln to the east and southeast, and Sudbury to the south. Concord is 15 miles south of Lowell, 18 miles west of Boston, and 34 miles northeast of Worcester. The Fitchburg line of the commuter rail runs through Concord, with two stations – Concord and West Concord. Major local roadways (maintained by Town) include Routes 62, 117, and 126. State roadways include Routes 2, 2A, 111/119, and 126.

The town is governed by a five-member Select Board and a Town Manager. The town operates under the open town meeting format. The Town Manager, appointed by the Select Board, carries out the day-to-day governing functions of the town.

Named in 1635, Concord is an historic town on the western axis of suburban Boston. Concord is home to a number of regional, state and national assets: Minute Man National Historic Park, Walden Pond State Reservation, and the Great Meadows National Wildlife Refuge. The Assabet and Sudbury Rivers converge in Concord to form the Concord River. The Northeastern Correctional Center and MCI-Concord are located in Concord. Concord is also home to several historic resources, including nine well-preserved colonial houses on or near Concord Green and witnesses to the famous Battle of Concord.

Skyrocketing land prices in the real estate boom of the 1980's resulted from Concord's proximity to Boston and the 128 technical/industrial corridor, coupled with a vigorous regional economy. Considerable concern is felt by Concord residents about the pressures on the town from its significant tourist industry and suburban development.

There are slightly fewer than 11,807 jobs in Concord. A part of Hanscom Airfield is located in eastern Concord. Emerson Hospital, a regional medical facility, is in Concord. According to the hospital's website, the facility provides medical services to more than 300,000 people in 25 communities.

**Table 4: Town of Concord's Demographics and Characteristics**

- Population: 18,950 residents
  - 24% are under age 18
  - 55% are between age 18-64
  - 21% are over age 65
  - 79% of the population is White
  - 7% of the population is Hispanic
  - 4% of the population is Black
  - 8% of the population is Asian
- About 2.7% of residents are living below poverty level. Median household income in Concord is \$160,392 (nearly double the amount of statewide median household income).
  - 2% of seniors are living below poverty level.
- Number of housing units: 7,066
  - 26% are renter-occupied

Source: 2020 U.S Census Bureau; 2020 American Community Survey (ACS).

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<sup>1</sup> Envision Concord Comprehensive Long-Range Plan (2018)

The Town of Concord has several unique characteristics to keep in mind while planning for natural hazards:

- A defining characteristic of the town is that three major rivers, the Assabet, Sudbury, and Concord, flow through town and are associated with a large amount of floodplain.
- Another defining characteristic of the town is the tree-lined streets. Although these trees are vulnerable to high winds and ice storms, they provide an important urban canopy and reduce heat-island effects.
- The town is home to over 50 registered farms with animals such as horses, goats, and chickens that need to be considered in evacuation plans.
- The town has very proactive municipal officials that frequently share information and coordinate on a regular basis.
- Concord is home to natural, cultural, and historic structures and sites that are irreplaceable and bring economic value to the town.
- Concord contains several major roadways that provide emergency routes for evacuation and for routes to medical facilities, such as Emerson Hospital.
- Concord has numerous bridge crossings and dams that could be at risk in the event of flooding.
- Concord would be a good candidate for flood-related grants due to the potential impact to property, transportation emergency routes, economic/historic resources, and the ability to solve the flooding problems through structural measures such as culvert upgrades, dam and bridge upgrades or flood proofing. The cost-benefit analysis would likely be in the town's favor.
- Much of the critical infrastructure in the town is located in clusters, often near areas of floodplain. These facilities are therefore at higher risk during natural hazards.

The Town of Concord's official website is <https://www.concordma.gov/>.

## SECTION 3: PLANNING PROCESS & PUBLIC PARTICIPATION

MAPC employs a six-step planning process based on FEMA’s hazard mitigation planning guidance focusing on local needs and priorities but maintaining a regional perspective matched to the scale and nature of natural hazard events and regional climate change. Public participation is a central component of this process, providing critical information about the local occurrence of hazards while also serving to build a base of support for hazard mitigation activities. MAPC supports participation by the public and other plan stakeholders through two public meetings, posting of meeting materials and draft plan to the Town’s website, and invitations sent to neighboring communities, town boards and commissions, and other local or regional entities to review the plan and provide comment.

### PLANNING PROCESS SUMMARY

The six-step planning process outlined below is based on the guidance provided by FEMA’s Local Multi-Hazard Mitigation Planning Guidance. Public participation is a central element of this process, which attempts to focus on local problem areas and identify needed mitigation measures based on where gaps occur in the existing mitigation efforts of the municipality. In plan updates, the process described below allows staff to bring the most recent hazard information into the plan, including new hazard occurrence data, changes to a municipality’s existing mitigation measures, and progress made on actions identified in previous plans.

Figure 1: Six-Step Planning Process



1. **Map the Hazards** – MAPC relies on data from a number of different federal, state, and local sources in order to map the areas with the potential to experience natural hazards. This mapping represents a multi-hazard assessment of the municipality and is used as a set of base maps for the remainder of the planning process. A particularly important source of information is the knowledge drawn from local municipal staff on where natural hazard impacts have occurred. These maps can be found in Appendix B.

2. **Assess the Risks & Potential Damages** – Working with local staff, critical facilities, infrastructure, vulnerable populations, and other features are mapped and contrasted with the hazard data from the first step to identify those that might represent vulnerabilities to these hazards. Land use data and development trends are also incorporated into this analysis. In addition, MAPC develops estimates of the potential impacts of certain hazard events on the community.

MAPC drew on the following resources to complete the plan:

- Town of Concord, General Bylaws
- Town of Concord, Zoning Bylaw
- Town of Concord, Comprehensive Long-Range Plan “Envision Concord – Bridge to 2030,” 2018
- Town of Concord Open Space Plan, 2015
- Town of Concord Water Quality Report, 2020
- Town of Concord Climate Action and Resilience Plan, 2020
- Town of Concord, Municipal Vulnerability Preparedness (MVP) Planning Report, 2019
- Blue Hill Observatory
- FEMA, Flood Insurance Rate Maps for Middlesex County, MA, 2013
- FEMA, Hazards U.S. Multi-Hazard
- FEMA, Local Mitigation Plan Review Guide, April 2022
- Fourth National Climate Assessment, 2018
- Massachusetts Flood Hazard Management Program
- Massachusetts Office of Coastal Zone Management Shoreline Change Data
- Massachusetts Office of Dam Safety, Inventory of Massachusetts Dams 2018
- Massachusetts State Hazard Mitigation and Climate Adaptation Plan, 2018 (and 2020 Draft Updates)
- Metropolitan Area Planning Council, GIS Lab, Regional Plans and Data
- National Weather Service
- Nevada Seismological Library
- New England Seismic Network, Boston College Weston Observatory, <http://aki.bc.edu/index.htm>
- NOAA National Climatic Data Center, <http://www.ncdc.noaa.gov/>
- Northeast Climate Adaptation Science Center
- Northeast States Emergency Consortium, <http://www.nesec.org/>
- Tornado History Project
- US Census, 2020 and American Community Survey 2020
- USGS, National Water Information System, <http://nwis.waterdata.usgs.gov/usa/nwis>
- USDA Forest Service, Wildfire Risk to Communities, [www.wildfirerisk.org](http://www.wildfirerisk.org)
- University of Massachusetts Boston, “Climate Change Impacts and Projections for the Greater Boston Area: Findings of the Greater Boston Research Advisory Group Report,” 2022

3. **Review Existing Mitigation** – Municipalities in the Boston Metropolitan Region have an active history in hazard mitigation as most have adopted flood plain zoning districts, wetlands protection programs, and other measures as well as enforcing the State building code, which

has strong provisions related to hazard resistant building requirements. Many communities have started adopting regulations designed to promote climate resilience. All current municipal mitigation measures must be documented.

4. **Develop Mitigation Strategies** – MAPC works with the local municipal staff to identify new mitigation measures, utilizing information gathered from the hazard identification, vulnerability assessments, and the community’s existing mitigation efforts to determine where additional work is necessary to reduce the potential damages from hazard events. Additional information on the development of hazard mitigation strategies can be found in Section 7.
5. **Plan Approval & Adoption** – Once a final draft of the plan is complete it is sent to MEMA for the state level review and, following that, to FEMA for approval. Typically, once FEMA has approved the plan the agency issues a conditional approval (Approval Pending Adoption), with the condition being adoption of the plan by the municipality. More information on plan adoption can be found in Section 9 and documentation of plan adoption can be found in Appendix D.
6. **Implement & Update the Plan** – Implementation is the final and most important part of any planning process. Hazard Mitigation Plans must also be updated on a five-year basis making preparation for the next plan update an important on-going activity. Section 9 includes more detailed information on plan implementation.

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## **2017 PLAN IMPLEMENTATION & MAINTENANCE**

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Town of Concord’s 2017 Hazard Mitigation Plan Update contained a risk assessment of identified hazards for the town and mitigation measures to address the risk and vulnerability from these hazards. Since approval of the plan by FEMA and local adoption, progress has been made on implementation of the measures. Examples of high priority projects that were completed to date included: drainage improvements to Cambridge Turnpike; conducting alternatives analysis for flood protection at Lowell Road wastewater pump station; culvert replacements (although this is an ongoing effort); and identifying alternate option for community sheltering (also an ongoing effort).

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## **THE LOCAL MULTIPLE HAZARD COMMUNITY PLANNING TEAM**

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MAPC worked with the local community representatives to organize a Local HMP Team for Concord. The Local HMP Team is central to the planning process, and it was tasked with working with MAPC to set plan goals, provide information on the hazards that impact the town, existing mitigation measures, and helping to develop new mitigation measures for this plan update. The team membership is listed below.

Kerry Lafleur	Town Manager
Thomas Judge	Chief, Fire Department
Walter Latta	Assistant Fire Chief
Christopher Carmody	Risk Manager
Alan Cathcart	Director, Public Works
Aaron Miklosko	Highway & Grounds Superintendent

Jeffrey Murawski	Water/Sewer Superintendent
Steve Dookran	Town Engineer
David Wood	Director, Municipal Light Plant
Joseph O'Connor	Chief, Police Department
Erin Stevens	Manager, Public Information & Communications
Delia Kaye	Director, Natural Resources
Marcia Rasmussen	Director, Planning and Land Management
Melanie Dineen	Director, Public Health
Paul Creedon	Commissioner, Building & Inspections
Jason Bulger	Chief Technology Officer, IT
John Bolduc	Climate Action Advisory Board

The Assistant Fire Chief convened and solicited feedback with representatives of other town departments, commissions and boards, and all entities responsible for regulating and maintaining operations of the town. The Department of Planning and Land Management, the Town Manager's Office, and Concord Public Works (CPW) are responsible for managing and regulating development in town. The Town's Climate Action Advisory Board also participated on the HMP Local Team to provide feedback and ensure the town's mitigation and resilience initiatives are also aligned with this hazard mitigation planning effort. In addition, MAPC, the State-designated regional planning authority for Concord, works with all agencies that regulate development in the region, including state agencies such as the Department of Transportation and the Department of Conservation and Recreation.

The Local HMP Team met on the following dates: July 13, August 25, and November 8, 2022. The purpose of the meetings was to provide an overview of the Hazard Mitigation planning program, consider climate impacts, review, and update hazard mitigation goals, and to gather information on local hazard mitigation issues and sites or areas related to these. Later meetings focused on verifying information gathered by MAPC staff and discussion of existing mitigation practices, the status of mitigation measures identified in the 2017 HMP Update, and potential new or revised mitigation measures. The agendas for these meetings are included in Appendix A.

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## PUBLIC MEETINGS

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Public participation in the hazard mitigation planning process is important both for plan development and for later implementation of the plan. Residents, business owners, and other community members are an excellent source for information on the historic and potential impacts of natural hazard events and particular vulnerabilities the community may face from these hazards. Their participation in this planning process also builds understanding of the concept of hazard mitigation and climate impacts, potentially creating support for mitigation actions taken in the future to implement the plan. To gather this information and educate residents on hazard mitigation, the Town hosted two public meetings, one during the planning process and one after a complete draft plan was available for review.

The public had an opportunity to provide input to the Town of Concord's hazard mitigation planning process during the first virtual public meeting (Zoom) held on October 12, 2022. The

draft plan update was presented at the second virtual public meeting on November 30, 2022, also on Zoom. Both meetings were publicized in accordance with the Massachusetts Open Meeting Law. See public meeting notices in Appendix C.

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## LOCAL STAKEHOLDER INVOLVEMENT

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The local Hazard Mitigation Planning Team was encouraged to reach out to local stakeholders that might have an interest in the Hazard Mitigation Plan including neighboring communities, agencies, businesses, nonprofits, and other interested parties. The draft plan was posted on the Town's website for 10 days for public comment; and notice of public meetings and opportunity to comment were promoted on the Town's social media outlets. Members of the public could access the draft document and submit comments or questions to the Town. Public meeting presentations were also shared across these communications platforms.

Notice of the draft plan was also sent to the following town boards and commissions, community organizations and neighboring municipalities inviting them to review the Hazard Mitigation Plan and submit comments to the Town:

- Planning Board
- Natural Resources Commission
- Emergency Planning Committee
- Climate Action Advisory Board
- Housing Authority
- Board of Health
- Council on Aging
- Park Commission
- Great Meadows National Wildlife Refuge (U.S. Fish and Wildlife)
- U.S. Army Corps of Engineers Regional Headquarters
- Walden Pond State Reservation (MA DCR)
- Emerson Hospital
- Concord Chamber of Commerce
- Walden Street School
- Concord Academy
- Concord Museum
- DeCordova Museum
- NE Deaconess Newbury Court
- Concord Business Partnership
- Concord Park Assisted Living
- Town of Acton
- Town of Bedford
- Town of Lincoln

- Town of Sudbury
- Town of Carlisle
- Town of Maynard
- Town of Wayland

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## **PUBLIC COMMENT**

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At the first public meeting, the Local HMP Team encouraged the public to share their experiences and concerns related to the natural hazards identified. Questions to prompt discussion include:

- What have you experienced at home/in your neighborhood? (Regarding flooding, extreme heat/heatwaves, or extreme storm events, etc.)
- What are your concerns?
- What are your suggestions?

There were 20 participants at the first public meeting. The Local HMP Team did not receive comments specific to these questions during this public meeting. Additional concerns posed from the public included status of completion of mitigation measures included in the 2017 HMP, preparedness measures in response to future extreme flood events as well as extreme weather events (such as tornadoes, wildfires, etc.), and consideration of the town's energy vulnerability and adaptive capacity. The Team assured the public that these are also the questions the group will discuss during the development of new potential mitigation measures to be included in the 2022 HMP.

There were 13 participants at the second public meeting. While there was no additional feedback on local hazard areas or identified critical infrastructure, questions from participants focused on clarifying details about the proposed mitigation measures. Participants indicate they are supportive of the proposed mitigation measures. Generally, the presentation of the draft plan was well received at the meeting.

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## **CONTINUING PUBLIC PARTICIPATION**

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Following the adoption of the plan update, the planning team will continue to provide residents, businesses, and other stakeholders the opportunity to learn about the hazard mitigation planning process and to contribute information that will update the Town's understanding of local hazards. As updates and a review of the plan are conducted by the Hazard Mitigation Implementation Team, these will be placed on the Town's web site, and any meetings of the Hazard Mitigation Implementation Team will be publicly noticed in accordance with municipal and state open meeting laws.

## PLANNING TIMELINE

July 13, 2022	Meeting of the Concord Local Hazard Mitigation team
August 25, 2022	Meeting of the Concord Local Hazard Mitigation team
October 12, 2022	First Public Meeting held virtually
November 8, 2022	Meeting of the Concord Local Hazard Mitigation Team
November 30, 2022	Second Public Meeting held virtually
December 22, 2022	Draft Plan Update submitted to MEMA
TBD	Draft Plan Update submitted to FEMA
TBD	Notice of Approvable Pending Adoption sent by FEMA
TBD	Plan Adopted by the Town of Concord
TBD	FEMA final approval of the plan for 5 years

## POST-APPROVAL IMPLEMENTATION AND PLAN UPDATE TIMELINE

2024	Conduct Mid-Term Plan Survey on Progress
2025	Seek FEMA grant to prepare next plan update
2026	Begin process to update the plan
2027	Submit Draft 2027 Plan Update to MEMA and FEMA
2027	FEMA approval of 2027 Plan Update

## SECTION 4: RISK ASSESSMENT

The risk assessment analyzes the potential natural hazards that could occur within the Town of Concord as well as the relationship between those hazards and current land uses, potential future development, and critical infrastructure. This section also includes a vulnerability assessment that estimates the potential damage that could result from certain large-scale natural hazard events. To update Concord's risk assessment, MAPC gathered the most recently available hazard and land use data and discussed with Local HMP Team to identify changes in local hazard areas and development trends. MAPC also used FEMA's damage estimation software, HAZUS.

In this 2022 plan update, the projected impacts of our warming climate on natural hazards are integrated throughout the risk assessment. Key impacts include rising temperatures, which in turn affect precipitation patterns, sea level, and extreme weather. Analysis of these impacts included in this plan aligned closely with the data and assessment presented in Massachusetts's 2018 State Hazard Mitigation and Climate Adaptation Plan (2018 SHMCAP).

*“Global climate is changing rapidly compared to the pace of natural variations in climate that have occurred throughout Earth's history. Global average temperature has increased by about 1.8°F from 1901 to 2016, and observational evidence does not support any credible natural explanations for this amount of warming; instead, the evidence consistently points to human activities, especially emissions of greenhouse or heat-trapping gases, as the dominant cause.”*

Fourth National Climate Assessment, 2018 (Chapter 2-1)

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### CLIMATE CHANGE OBSERVATIONS AND PROJECTIONS

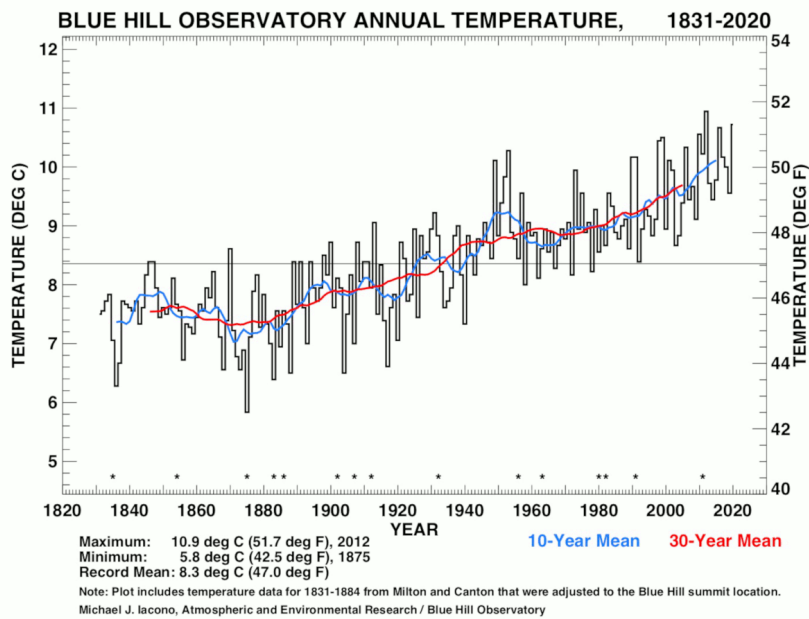
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Climate change observations come from a variety of data sources that have measured and recorded changes in recent decades and centuries. Climate change projections, however, predict future climate impacts and, by their nature, cannot be observed or measured. As a result of the inherent uncertainty in predicting future conditions, climate projections are generally expressed as a range of possible impacts.

#### Temperature

Our climate has always been regulated by gases, including carbon dioxide, methane, and nitrous oxide, that blanket the earth. These gases trap heat that would otherwise be reflected out to space; without them our planet would be too cold to support life. We refer to these gases as “greenhouse gases” (GHGs) for their heat trapping capacity. The combustion of fossil fuels, our primary energy source in the age of industrialization, releases GHGs into the atmosphere. In the past century, human activity associated with industrialization has contributed to a growing concentration of GHGs in our atmosphere. Records from the Blue Hill Observatory in Milton, MA show that average temperatures (30-year mean) have risen approximately 3 degrees F in the almost 200 years since record keeping began in 1831 (Figure 2).

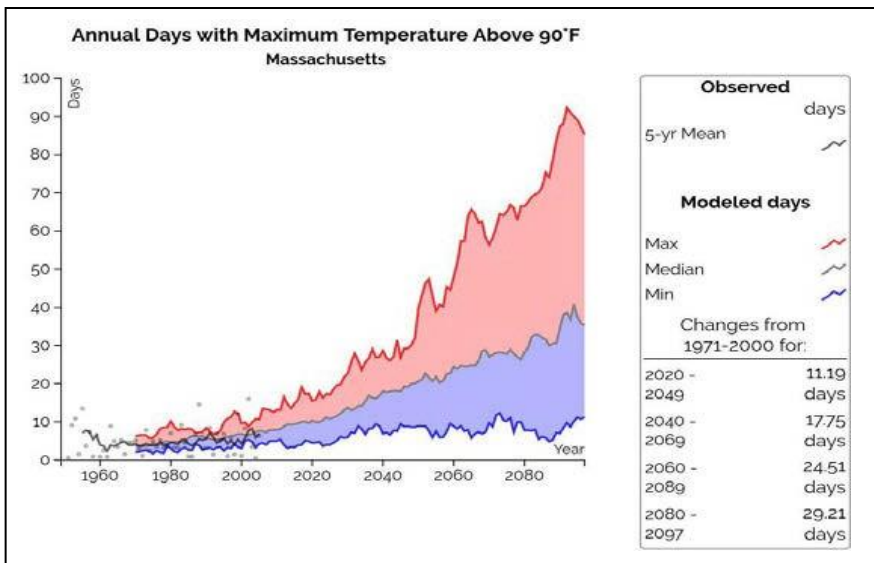
**Figure 2: Observed Increase in Temperature**



Source: Northeast Climate Adaptation Science Center

Climate projections include an increase in average temperature and in the number of extreme heat days. Extreme cold days are projected to decrease in number. The Northeast Climate Adaptation Science Center (NECASC) projects average temperatures in Massachusetts will increase by 5 degrees F by mid-century and nearly 7 degrees F by the end of the century. Figure 3 shows the range of projections for increases in the number of days over 90 degrees annually.

**Figure 3: Projected Increase in Annual Days Over 90 Degrees F**



Source: ResilientMA.org

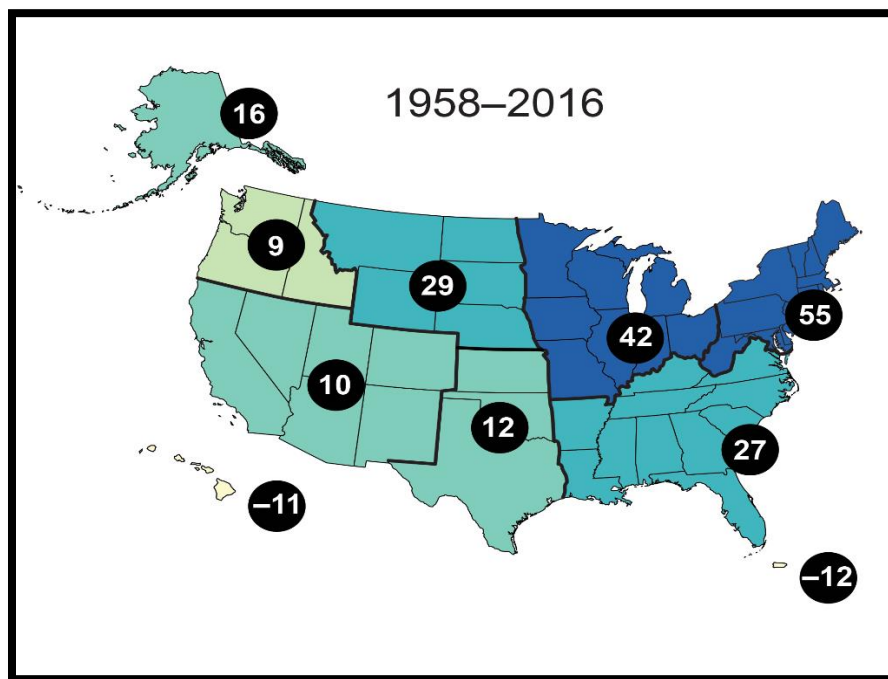
## Precipitation Patterns

Annual precipitation in Massachusetts has increased by approximately 10% in the fifty-year period from 1960 to 2010 (MA Climate Adaptation Report, 2011). Moreover, there has been a significant increase in the frequency and intensity of large rain events. For the Northeast US, according to the Fourth National Climate Assessment 2018, in the past sixty years there has been a 55% increase in the amount of annual precipitation that falls in the top 1% of storm events (Figure 4). Changes in precipitation are fueled by warming temperatures which increase evaporation and, therefore, the amount of water vapor in the air.

Total annual precipitation in Massachusetts is projected to increase by 1 to 6 inches by mid-century, and by 1.2 to 7.3 inches by the end of this century (SHMCAP p. 2-22). The Fourth National Climate Assessment predicts that the pattern of increasing frequency and intensity of extreme rain events will continue. By 2070 to 2099, (relative to 1986 to 2015) they project a 30-40% increase in total annual precipitation falling in the heaviest 1% of rain events (Figure 5).

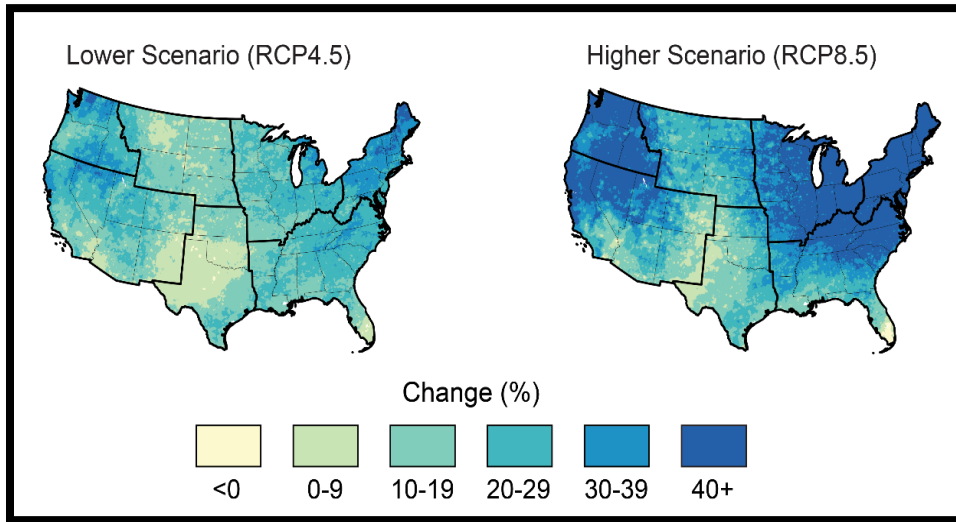
Despite overall increasing precipitation, more frequent and significant summer droughts are also a projected consequence of climate change. This is due to projections that precipitation will increase in winter and spring and decrease slightly in the summer, a result of earlier snow melt and higher temperatures that will reduce soil moisture.

**Figure 4: Observed Change in Total Annual Precipitation Falling in the Heaviest 1% of Events**



Numbers circled in black indicate % change.  
Source: Fourth National Climate Assessment, 2018

**Figure 5: Projected Change in Total Annual Precipitation Falling in the Heaviest of 1% of Events for 2070-2099**



Source: Fourth National Climate Assessment, 2018

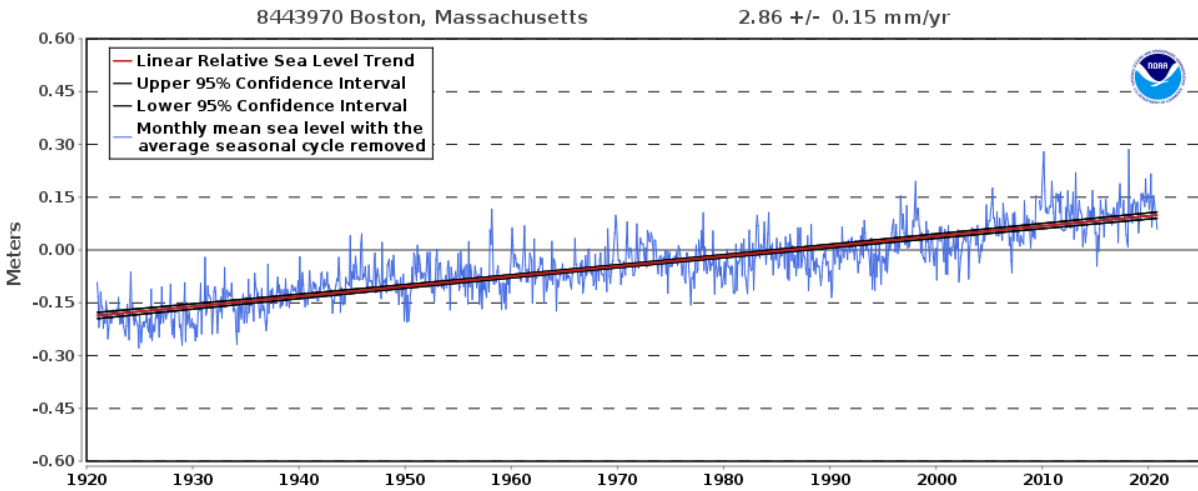
### Sea Level Rise

While Concord is not a coastal community, high-level information on sea level rise is discussed here as the regional economy of Boston Metro may be impacted by sea level rise in the future.

Records from the Boston Tide Station show nearly one foot of sea level rise in the past century (Figure 6). Warming temperatures contribute to sea level rise in two ways. First, warm water expands to take up more space. Second, rising temperatures are melting land-based ice which enters the oceans as melt water. A third, quite minor, contributor to sea level rise in New England is not related to climate change. New England is still experiencing a small amount of land subsidence (drop in elevation) in response to the last glacial period.

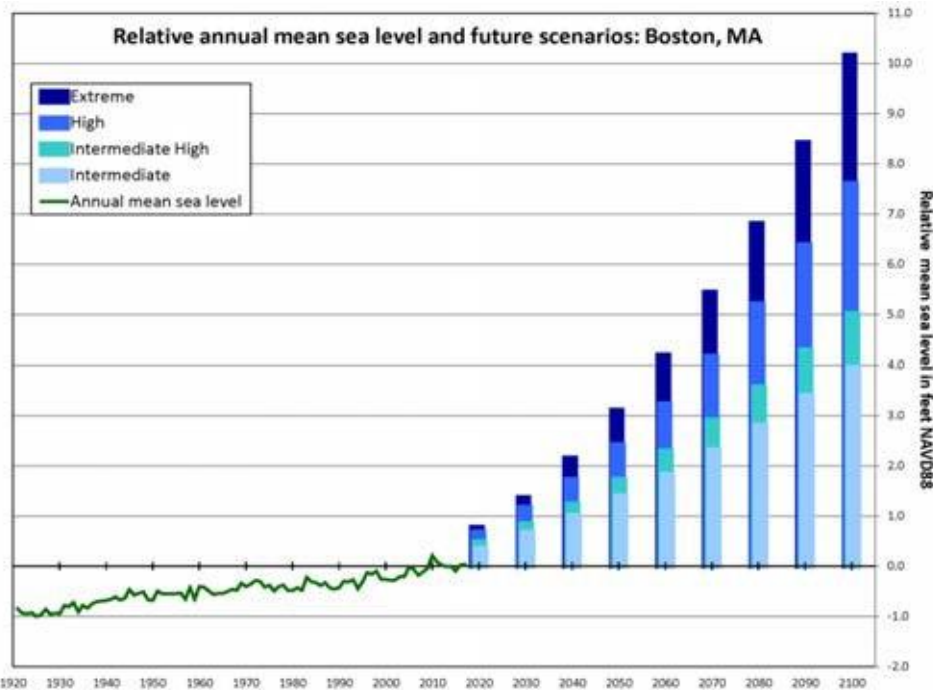
Projections of sea level rise through 2100 vary significantly depending on future greenhouse gas emissions and melting of land-based glaciers. Currently sea level is rising at an increasing rate. Figure 7 shows the recent rate of sea level rise, and a range of sea level rise scenarios. Projections for 2100 range from 4 feet to 10 feet. With 10 feet representing the most extreme scenario. For 2050, the projections range approximately 1.5 to 3 feet.

**Figure 6: Observed Increase in Sea Level Rise**



Source: NOAA





**Figure 7: Recent and Projected Increase in Sea Level Rise**



Source: SHMCAP, 2018

Following the outline of 2018 SHMCAP, this local hazard mitigation plan organizes consideration of natural hazards based on their relationship to projected climate changes. Table 5 below, from the SHMCAP, summarizes the natural hazards reviewed in this plan, climate interactions, and expected impacts.

**Table 5: Climate Change and Natural Hazards**

Primary Climate Change Interaction	Natural Hazard	Other Climate Change Interactions	Representative Climate Change Impacts
 <p><b>Changes in Precipitation</b></p>	Inland Flooding	Extreme Weather	Flash flooding, urban flooding, drainage system impacts (natural and human-made), lack of groundwater recharge, impacts to drinking water supply, public health impacts from mold and worsened indoor air quality, vector-borne diseases from stagnant water, episodic drought, changes in snow-rain ratios, changes in extent and duration of snow cover, degradation of stream channels and wetland
	Drought	Rising Temperatures, Extreme Weather	
	Landslide	Rising Temperatures, Extreme Weather	
 <p><b>Sea Level Rise</b></p>	Coastal Flooding	Extreme Weather	Increase in tidal and coastal floods, storm surge, coastal erosion, marsh migration, inundation of coastal and marine ecosystems, loss, and subsidence of wetlands
	Coastal Erosion	Changes in Precipitation, Extreme Precipitation	
	Tsunami	Rising Temperatures	
 <p><b>Rising Temperatures</b></p>	Average/Extreme Temperatures	N/A	Shifting in seasons (longer summer, early spring, including earlier timing of spring peak flow), increase in length of growing season, increase of invasive species, ecosystem stress, energy brownouts from higher energy demands, more intense heat waves, public health impacts from high heat exposure and poor outdoor air quality, drying of streams and wetlands, eutrophication of lakes and ponds
	Wildfires	Changes in Precipitation	
	Invasive Species	Changes in Precipitation, Extreme Weather	
 <p><b>Extreme Weather</b></p>	Hurricanes/Tropical Storms	Rising Temperatures, Changes in Precipitation	Increase in frequency and intensity of extreme weather events, resulting in greater damage to natural resources, property, and infrastructure, as well as increased potential for loss of life
	Severe Winter Storm / Nor'easter	Rising Temperatures, Changes in Precipitation	
	Tornadoes	Rising Temperatures, Changes in Precipitation	
	Other Severe Weather (Including Strong Wind and Extreme Precipitation)	Rising Temperatures, Changes in Precipitation	
<b>Non-Climate-Influenced Hazards</b>	Earthquake	N/A	There is no established correlation between climate change and this hazard

## OVERVIEW OF HAZARDS AND IMPACTS

Table 6 summarizes the frequency and severity of hazard risks for Massachusetts and the Town of Concord, based on available data from the SHMCAP (for statewide assessment), the National Climatic Data Center (NOAA) for Middlesex County (where Concord is located), and from the local Hazard Mitigation Team’s input. The statewide assessment was modified to reflect local conditions in Concord using the definitions for hazard frequency and severity listed below in the “notes” section of the table.

**Table 6: Hazards Risk Summary**

Hazard	Frequency		Severity	
	MA	Concord	MA	Concord
Inland Flooding	High	High	Serious	Serious
Drought	Medium	Medium	Minor	Minor
Landslides	Low	Very Low	Minor	Minor
Coastal Flooding	High	N/A	Serious	N/A
Coastal Erosion	Highly variable	N/A	Serious	N/A
Tsunami	Very Low	N/A	Extensive	N/A
Extreme Temperatures	High	High	Minor	Minor
Brush Fires	High	High	Minor	Serious
Invasives	N/A	N/A	Minor	Minor
Hurricane/Tropical Storm	Medium	Medium	Serious	Serious
Severe Winter Storms/Nor’easters	High	High	Extensive	Serious
Tornadoes	Medium	Low	Serious	Serious
Other Severe Weather (Thunderstorms/High Winds)	High	High	Minor	Minor
Earthquake	Very Low	Very Low	Extensive	Extensive

**Notes:**

*Frequency:*

- *Very low: events that occur less frequently, less than 1% per year*
- *Low: events that occur 1% to 2% per year*
- *Medium: events that occur 2% to 20% per year*
- *High: events that occur more frequently, greater than 20% per year*

*Severity:*

- *Minor: Limited and scattered property damage; limited damage to public infrastructure and essential services not interrupted; limited injuries or fatalities.*
- *Serious: Scattered major property damage; some minor infrastructure damage; essential services are briefly interrupted; some injuries and/or fatalities.*

- *Extensive: Widespread major property damage; major public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and/or fatalities.*

It should be noted that several of the hazards listed in the 2018 Massachusetts State Hazard Mitigation plan are not applicable to the Town of Concord, as follows:

- **Coastal Flooding, Coastal Erosion, and Tsunami** are not applicable to Concord since the town is not a coastal community.
- **Ice jams** are not a hazard in Concord. The US Army Corps Ice Jam Database shows no record of ice jams in Concord, and the Town did not identify this as an issue of concern.

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## FLOOD-RELATED HAZARDS

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The Assabet and Sudbury Rivers converge in Concord to form the Concord River, and as such the town is home to a significant amount of floodplain. In addition to these three major rivers, Concord’s waterways also consist of tributary streams, low-lying wetland areas, and both manmade and naturally occurring ponds. Flooding is the most prevalent serious natural hazard identified by local officials in Concord. The town is subject to the following kinds of flooding:

- **Inland/riverine flooding**, where the rate of precipitation and/or amount of stormwater runoff overwhelms the capacity of natural or structured drainage systems causing overflows; and
- **Urban flooding**, in which precipitation causes rivers and streams rise and leads to flooding of low-lying streets, structures, and underpasses.

Both kinds of flooding are generally caused by severe rainstorms, thunderstorms, Nor’easters, and hurricanes. Spring snowmelt may exacerbate flooding during storm events. Nor’easters are most common in the winter. Thunderstorms and hurricanes are most common in the summer and early fall. Climate change may intensify and worsen these issues over time, with the projected changing rainfall patterns leading to increasing extreme rainfall events. Increase in average annual rainfall may also lead to more incidents of basement flooding caused by high seasonal groundwater levels.

### Regionally Significant Storms

There have been a number of major floods that affect the Boston Metro region in the last fifty years. Significant historic flood events in the region (that also impacted Concord) included:

- |                                      |                |
|--------------------------------------|----------------|
| • The Blizzard of 1978               | • April 2004   |
| • January 1979                       | • May 2006     |
| • April 1987                         | • April 2007   |
| • October 1991 (“The Perfect Storm”) | • March 2010   |
| • October 1996                       | • March 2013   |
| • June 1998                          | • January 2018 |
| • March 2001                         | • March 2018   |

The best available local data on previous flooding events is for Middlesex County through the “Storm Events Database” of NOAA’s National Centers for Environmental Information (NCEI). Between 2010 and 2022, Middlesex County, which includes the Town of Concord, experienced 53 flood events (see Table 7). There were no deaths or injuries reported and the total property damage in the county was over \$42 million dollars. The March 2010 storms account for \$35.2 million of total damage during this time.

The impacts of flooding on the Town of Concord have not been as severe as many neighboring communities but remain locally significant. Potential damage from flooding in the town was estimated using FEMA’s HAZUS-MH program. The results, shown in Table 33, indicate potential damage from a 1% Annual Chance Flood at \$92.3 million and from a 0.2% Annual Chance Flood at \$135.07 million.

**Table 7: Middlesex County Flood Events, 2010-2022**

Date	Deaths	Injuries	Property Damage (\$)
3/14/2010	0	0	26,430,000
3/29/2010	0	0	8,810,000
4/1/2010	0	0	0
8/28/2011	0	0	5,000
10/14/2011	0	0	0
6/8/2012	0	0	0
6/23/2012	0	0	15,000
7/18/2012	0	0	5,000
10/29/2012	0	0	0
6/7/2013	0	0	0
7/1/2013	0	0	0
7/23/2013	0	0	0
9/1/2013	0	0	10,000
3/30/2014	0	0	35,000
7/27/2014	0	0	0
8/31/2014	0	0	0
10/22/2014	0	0	20,000
10/23/2014	0	0	0
12/9/2014	0	0	5,000
12/9/2014	0	0	30,000
5/31/2015	0	0	0
8/4/2015	0	0	0
8/15/2015	0	0	125,000
9/30/2015	0	0	0

Date	Deaths	Injuries	Property Damage (\$)
4/6/2017	0	0	0
6/27/2017	0	0	1,000
7/12/2017	0	0	1,000,000
7/18/17	0	0	0
8/2/2017	0	0	5,000
10/25/17	0	0	0
10/30/2017	0	0	0
1/12/2018	0	0	0
1/13/2018	0	0	0
4/16/2018	0	0	0
6/25/2018	0	0	15,000
8/8/2018	0	0	35,000
8/12/2018	0	0	30,000
8/17/2018	0	0	0
10/29/2018	0	0	0
11/3/2018	0	0	0
11/10/2018	0	0	0
7/6/2019	0	0	0
8/07/19	0	0	0
9/2/2019	0	0	300
6/21/20	0	0	0
6/28/20	0	0	5,000
7/23/20	0	0	0
9/10/20	0	0	3,000
7/9/21	0	0	0
9/2/21	0	0	0
11/12/21	0	0	10,000
8/5/22	0	0	0
8/7/22	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>\$42.06 M</b>

Source: NOAA, National Centers for Environmental Information

### CHANGING PRECIPITATION PATTERNS

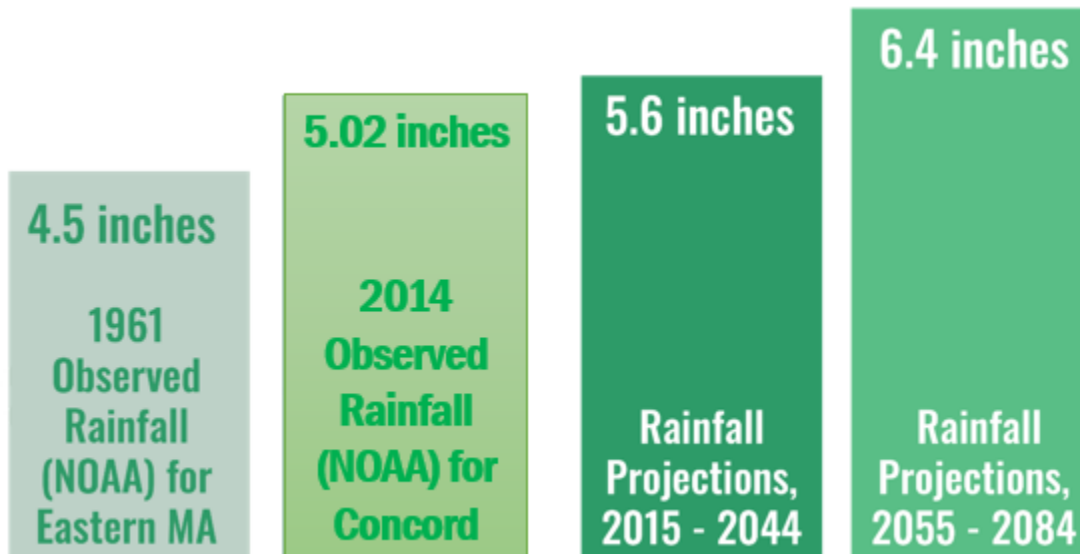
Precipitation frequency estimates, which are used to derive stormwater design standards, were published in 1961 by the U.S. Commerce Department in a document known as TP-40 (Technical Paper 40). The 10-year, 24-hour storm for eastern Massachusetts was calculated as a 4.5-inch

event. Recently the National Oceanic and Atmospheric Administration published updated estimates (NOAA Atlas 14), which increased this design storm by 0.6 inches to 5.14 inches for eastern Massachusetts.

In the future, based on projections developed for the City of Cambridge, the region will likely experience more frequent and intense precipitation events, including an increase in the standard “design storm” from historic levels of 4.5 inches to 6.4 inches by the late 21st century (Figure 8). According to data on ResilientMA.org, by mid- to late century, the region can anticipate 9-10 days with precipitation events with greater than one inch of rain, and an increase in total annual precipitation from 46 to 50 inches.

The March 2010 rainstorms fit the profile of a type of event expected to increase in frequency as the climate warms. That is, significant precipitation, falling in late winter as rain rather than snow, on frozen ground, and while vegetation is still dormant. The Blue Hill Observatory in Milton, MA recorded 17.7 inches of rain from three storms in the 19 days from March 13 to 31. The March 2010 storms were a federally declared disaster making federal assistance available to residents who did not carry flood insurance.

**Figure 8: Design Storm Trends and Projections for a 10-year, 24-hour Storm**



Source: NOAA; Cambridge Climate Vulnerability Assessment, 2017.

Figure 9 presents Concord’s March 2010 flood insurance claims in relation to the FEMA’s mapped 1% chance flood zone, highlighting the severity of stormwater flooding and the reality that much of the flooding in urban and suburban areas may also occur outside of the FEMA flood zones.



### DCR Dam Hazard Classification

- **High:** Dams located where failure or mis-operation will likely cause loss of life and serious damage to homes(s), industrial or commercial facilities, important public utilities, main highways(s) or railroad(s).
- **Significant:** Dams located where failure or mis-operation may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s)
- **Low:** Dams located where failure or mis-operation may cause minimal property damage to others. Loss of life is not expected.

There has not been any record of dam breaches or failures in Concord to date. Table 8 below lists all the dams located in Concord and their hazard classification provided by DCR Office of Dam Safety in 2018. With the exception of Warner’s Pond Dam and Dakin Brook Dam, which are municipally owned, the majority of dams in Concord are privately owned.

**Table 8: Inventory of Dams in Concord**

Dam	River	Owner	Hazard Classification
Warner’s Pond Dam	Nashoba Brook	Municipality	Significant
Kennedy’s Pond Dam	Second Division Brook	Private	N/A
Bateman’s Pond Dam	Dakin Brook	Private	N/A
Barretts Mill Road Dam	Spencer Brook	Private	Low
Upper Musquetaquid Pond Dam	Second Division Brook	Private	Low
Lower Musquetaquid Pond Dam	Second Division Brook	Private	N/A
Crosby Pond Dam	Mill Brook	Private	Significant
Dakin Brook Dam	Tributary of Assabet River	Municipality	N/A
Damondale Dam	Assabet River	Private	Significant
Estabrook Farm Pond Dam	Dakin Brook	Private	Low

Source: DCR Office of Dam Safety.

The Town frequently inspects all of its dams and dikes and submitted reports to the DCR Office of Dam Safety as required.

### **ICE JAM**

The U.S. Army Corps of Engineers’ Ice Jam Database does not list any ice jams in Concord from the earliest records since 1796. In addition, the Fire Chief confirmed that the town is not subject to this hazard, as such ice jams are not included in this local plan update.

## **DROUGHT**

Drought is a temporary irregularity in precipitation and differs from aridity since the latter is restricted to low rainfall regions and is a permanent feature of climate. Drought is a period characterized by long durations of below normal precipitation. Drought conditions occur in virtually all climatic zones, yet its characteristics vary significantly from one region to another since it is relative to the normal precipitation in that region. Drought can affect agriculture, water supply, aquatic ecology, wildlife, and plant life.

Average annual precipitation in Massachusetts is 44 inches per year, with approximately three to four-inch average amounts for each month of the year. In Massachusetts, droughts are caused by the prevalence of dry northern continental air and a decrease in coastal- and tropical-cyclone activity. In the driest year (1965), the statewide precipitation total of 30 inches was only 68% of the average total. Although Massachusetts is relatively small, it has several distinct regions that experience significantly different weather patterns and react differently to the amounts of precipitation they receive. The 2019 Massachusetts Drought Management Plan divides the state into seven regions: Western, Central, Connecticut River Valley, Northeast, Southeast, and Cape Cod and the Islands. Drought levels are declared on a regional basis for each of the seven regions in Massachusetts. County by county or watershed-specific determinations may also be made. Concord is in the Northeast region, and drought is considered a town-wide hazard.

As dry conditions can have a range of different impacts, indices are available to assess these various impacts. Massachusetts uses a multi-index system that takes advantage of several of these indices to determine the severity of a given drought or extended period of dry conditions. Drought level is determined monthly based on the number of indices which have reached a given drought level. A determination of drought level is based on seven indices:

1. Standardized Precipitation Index (SPI) reflects soil moisture and precipitation.
2. Crop Moisture Index: (CMI) reflects soil moisture conditions for agriculture.
3. Keetch Byram Drought Index (KBDI) is designed for fire potential assessment.
4. Precipitation Index is a comparison of measured precipitation amounts to historic normal precipitation.
5. The Groundwater Level Index is based on the number of consecutive month's groundwater levels are below normal (lowest 25% of period of record).
6. The Stream flow Index is based on the number of consecutive months that stream flow levels are below normal (lowest 25% of period of record).
7. The Reservoir Index is based on the water levels of small, medium and large index reservoirs across the state, relative to normal conditions for each month.

Five levels of drought have been developed to characterize drought severity: Normal, Advisory, Watch, Warning, and Emergency. These drought levels are based on the conditions of natural resources and are intended to provide information on the status of water resources. The levels provide a basic framework from which to take actions to assess, communicate, and respond to drought conditions. They begin with a normal situation where data are routinely collected and

distributed, move to heightened vigilance with increased data collection during an advisory, to increased assessment and proactive education during a watch. Water restrictions might be appropriate at the watch or warning stage, depending on the capacity of each individual water supply system. A warning level indicates a severe situation and the possibility that a drought emergency may be necessary. A drought emergency is one in which mandatory water restrictions or use of emergency supplies is necessary. Drought levels are used to coordinate both state agency and local response to drought situations.

Drought is considered a regional natural hazard, and therefore Concord does not collect local data on drought conditions. This plan references state data as the best available data for drought. The SHMCAP, using data collected since 1850, calculates that statewide there is a 1% chance of being in a drought emergency in any given month. For drought warning and watch levels, the chance is 2% and 8% respectively in any given month (Table 9).

**Table 9: Frequency of Massachusetts Drought Levels**

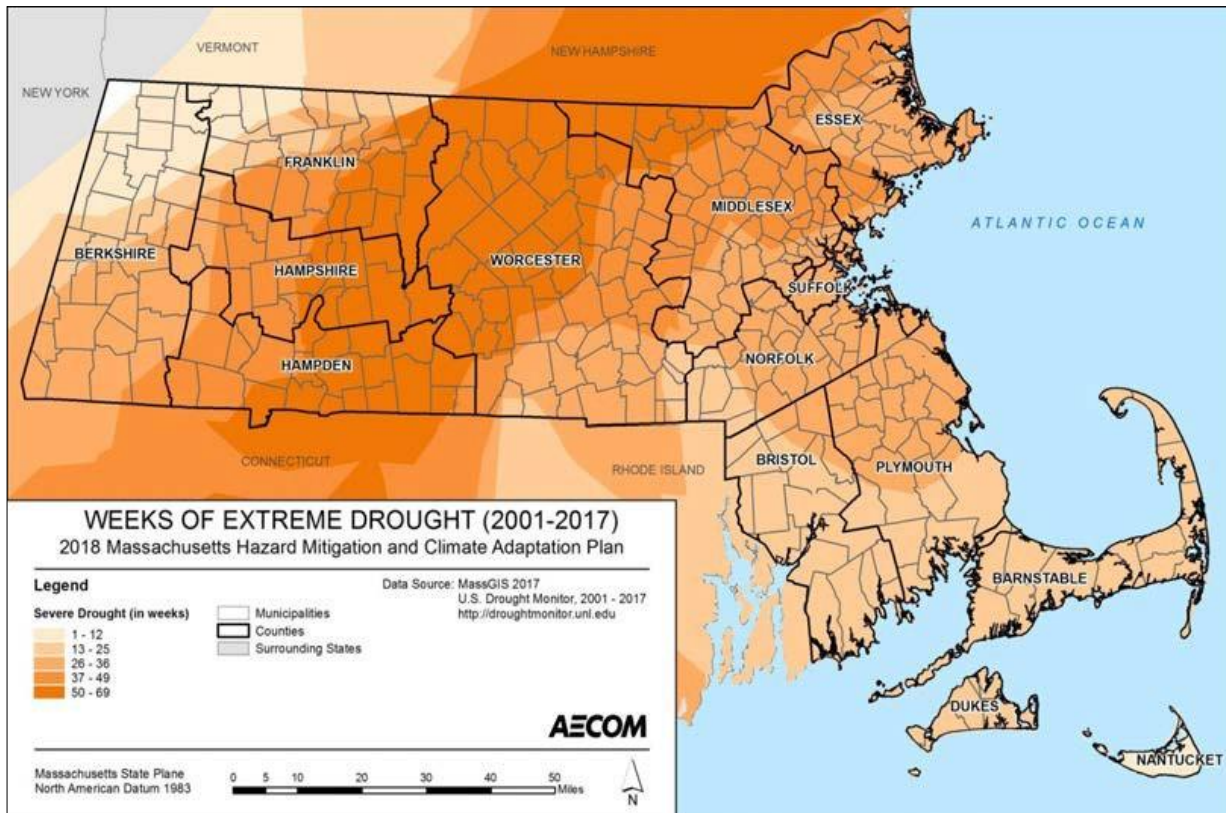
Drought Level	Frequency Since 1850	Probability of Occurrence in a Given Month
Drought Emergency	5 occurrences	1% chance
Drought Warning	5 occurrences	2% chance
Drought Watch	46 occurrences	8% chance

Source: SHMCAP

Drought emergencies have been reached infrequently, with five events occurring between 1850 and 2012: 1883, 1911, 1941, 1957, and 1965 to 1966. Due to its long duration, the drought from 1965 to 1966 is viewed as the most severe drought to have occurred in Massachusetts in modern times. The drought that extended from July 2016 to April 2017 reached the Drought Warning level. Determinations regarding the end of a drought or reduction of the drought level focus on two key drought indicators: precipitation and groundwater levels. These two factors have the greatest long-term impact on stream flow, water supply, reservoir levels, soil moisture, and the potential for forest fires.

The U.S. Drought Monitor characterizes droughts as moderate, severe, extreme, or exceptional. Severe drought is characterized by likely crop and pasture losses, water shortages, and water restrictions. As shown in Figure 10, the Town of Concord experienced between 26 and 36 weeks of severe drought between 2001 and 2017.

**Figure 10: Weeks of Severe Drought (2001-2017)**



Source: SHMCAP

Since the 2017 Concord Hazard Mitigation Plan, Massachusetts experienced a severe drought and another moderate one in 2020 and 2021 respectively. In both cases, Concord was mildly impacted.

Droughts are projected to increase in frequency and intensity in the summer and fall as weather patterns change. Drought impacts can include reduced groundwater and surface water levels, affecting water quality and quantity, streamflow, and wetlands levels, and negatively impacting aquatic organisms that rely on riverine and wetland habitats. Drought also increases stress on plant communities, weakening trees, and increasing the likelihood of forest and brush fires. Potential damages of a severe drought include increased risk of wildfires. Extended drought could also cause losses of landscaped areas if outdoor watering is restricted for a long period, impacts to local agriculture, and potential loss of business revenues if water supplies were severely restricted for a prolonged period. Economic sectors impacted could potentially include commercial water users, recreation facilities, agriculture, landscaping, and forestry.

### **LANDSLIDES**

According to the U.S. Geological Survey, “The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other

contributing factors.” Among the contributing factors are erosion by rivers or ocean waves over steepened slopes; rock and soil slopes weakened through saturation by snowmelt or heavy rains; earthquake created stresses that make weak slopes fail; excess weight from accumulation of rain or snow; and stockpiling of rock or ore from waste piles or man-made structures. In Massachusetts, according to the SHMCAP, the most common cause of landslides are geologic conditions combined with steep slopes and/or heavy rains. Landslides associated with heavy rains typically occur on steep slopes with permeable soil underlain by till or bedrock. There is no universally accepted measure of landslide extent, but it has been represented as a measure of destructiveness. Table 10 summarizes the estimated intensity for a range of landslides.

**Table 10: Landslide Volume and Velocity**

Estimated Volume (m <sup>3</sup> )	Expected Landslide Velocity		
	Fast moving (rock)	Rapid moving (debris)	Slow moving
<0.001	Slight intensity	--	--
<0.5	Medium intensity	--	--
>0.5	High intensity	---	--
<500	High intensity	Slight intensity	--
500-10,000	High intensity	Medium intensity	Slight intensity
10,000 – 50,000	Very high intensity	High intensity	Medium intensity
>500,000	--	Very high intensity	High intensity
>500,000	--	--	Very high intensity

Source: A Geomorphological Approach to the Estimation of Landslide Hazards and Risks in Umbria, Central Italy, M. Cardinali et al, 2002

Landslides can result from human activities that destabilize an area or can occur as a secondary impact from another natural hazard, such as flooding. In addition to structural damage to buildings and the blockage of transportation corridors, landslides can lead to sedimentation of water bodies. Typically, a landslide occurs when the condition of a slope changes from stable to unstable. Natural precipitation such as heavy snow accumulation, torrential rain, and run-off may saturate soil, creating instability enough to contribute to a landslide. More frequent extreme rain events may increase the chance of landslides as saturated soils are conducive to landslides. Drought may also increase the likelihood of landslides if loss of vegetation decreases soil stability. The SHMCAP, utilizing data from the MA Department of Transportation from 1986 to 2006, estimates that on average one to three known landslides have occurred each year. A slope stability map published by the MA Geological Survey and UMass-Amherst indicates that the most significant risk of landslide is in western Massachusetts. According to the SHMCAP, factors that influence landslide severity include soil properties, topographic position and slope, and historical incidence.

The western half of Concord is classified as low risk for landslides, while the eastern half is considered moderate risk. Should a landslide occur in the future, the type and degree of impacts would be highly localized, and the town’s vulnerabilities could include damage to structures,

damage to transportation and other infrastructure, and localized road closures. Potential damage would depend on the extent of impact, based on how many properties were affected. Given the relatively high assessed value of property in Concord, damages affecting a single residence could exceed \$500,000, and damages affecting several homes or business properties could theoretically total several million dollars. However, the town does not have records of any damage caused by landslides in Concord. As such injuries and casualties, while possible, would be unlikely given the low extent and impact of landslides in Concord.

Based on past occurrences and the Massachusetts Hazard Mitigation Plan, landslides are of Low frequency, events that have a 1% to 2% chance of occurring each year. The Town has not made significant changes regarding landslide hazard mitigation plan since the 2017 Plan was adopted, aside from the Town's work on general public engagement and education on the effects of climate change but continues to enforce the MA State Building Code to as its primary source of landslide hazard mitigation.

### ***TSUNAMI***

The Town of Concord is not a coastal community subject to coastal hazards such as tsunamis. A tsunami is a surge of water typically caused by an offshore earthquake. Other causes may include volcanoes and landslides. Tsunamis can cause wave heights of 100 feet or more. According to the SHMCAP, Massachusetts has never experienced a significant tsunami, although two tsunamis have occurred with no deaths or damages recorded. Damage from a tsunami could be very significant, but it is a low likelihood event, having occurred approximately once every 39 years along the entire east coast. No tsunami has impacted Massachusetts since 1950. According to the SHMCAP, collapse of glaciers resulting from our warming climate could cause landslides that could generate tsunamis more powerful than those caused by earthquakes. The severity of a tsunami is related to its wave height at the shore, and the extent of runoff. The extent of damage and impact from tsunami depends upon the source and severity of onset on the tide cycle.

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## **LOCALLY IDENTIFIED AREAS OF FLOODING**

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Information on potential flood hazard areas was taken from two sources. The first is the National Flood Insurance Rate Maps (FIRM). The FIRM flood zones are shown on Map 3 in Appendix B. The "Locally Identified Areas of Flooding" described below were identified by the Local HMP Team as areas where flooding is known to occur. These areas do not necessarily coincide with the flood zones on the FIRMs. Flood sources include inadequate drainage systems, high groundwater, coastal storms, or other local conditions that may not be within a Special Flood Hazard Area. The numbers listed below in Table 11 below correspond to the numbers on Map 8, "Local Hazard Areas" in Appendix B.

**Table 11: Locally Identified Areas of Flooding in Concord**

<b>Map ID</b>	<b>Name</b>	<b>Description</b>
1	Westvale Meadows Condominiums	Located downstream of several dams along the Assabet River and has experienced flooding of the property, but not of the buildings. If the dams were to breach, the buildings would likely be impacted.
2	Pine Street Bridge	The Pine Street Bridge over the Assabet River has been closed in the past due to flooding (approximately once every 5 years). If any upstream dams were to give way, the impacts to this bridge would be of concern. Tree stumps in the river wear on the bridge and the banks are eroded.
3	Commonwealth Avenue at Warner’s Pond Dam	This site at Commonwealth Avenue up to Maple Court has experienced flooding caused by Warner’s Pond.
4	Pedestrian Bridge over Nashoba Brook	This pedestrian bridge downstream of the Warner’s Pond Dam connecting Winthrop to Commonwealth Avenue is old and of concern due to scouring. This issue should improve upon completion of the Warner’s Pond Dam upgrades.
5	Lowell Road - Spencer Brook Bridge	The bridge over Spencer Brook has experienced flooding due to upstream beaver dams.
6	Sudbury Road- Heath’s Bridge	Heath’s Bridge over the Sudbury River has caused water backing up to houses, but so far it has not impacted the structures. The town has had to redirect traffic in the Sudbury and Oxbow Drive areas. This site does have potential for property damage, but this has not yet occurred. The flooding occurs during the wet season or during a major storm such as a hurricane.
7	Fitchburg Turnpike	The Fitchburg Turnpike area in southern concord has experienced road closures 3 to 4 times per year for the past several years. This area is located within floodplain. The state reconstructed a bridge over Cold Brook several years ago to raise it due to increased flooding concerns.
9	Concord Center	Concord Center is located within the floodplain of the Sudbury River and Mill Brook. Mill Brook runs under the buildings, many of which are historic. This area floods around once every 10 years. Basements have been impacted, access has been restricted, roads have closed, and floor drains have backed up. A collapse of the culverted sections of the brook could greatly impact buildings, which is of great concern to the town.
8	Route 2 Bridge over Sudbury River	The Route 2 bridge over the Sudbury River has not experienced impacts from flooding, however, the town has noted this as an area of concern due to its important status as a main arterial route.

<b>Map ID</b>	<b>Name</b>	<b>Description</b>
10	Cambridge Turnpike	The Cambridge Turnpike experiences flooding every year over approximately a 2-mile stretch. It had two road closures in 2006 due to rising water levels. The water damages the roadbed and the town has spent money to keep repairing the bed, which is constructed on peat moss. Beaver dams in the area also worsen the flooding. The Town recently completed a multi-year project to improve and raise a stretch of road along the Turnpike due to flooding concerns.
11	Hawthorne Lane	Hawthorne Lane is located in floodplain and seasonal floods, causing road closures and impacts to basements. One potential solution may be for residents to flood proof their homes.
12	Police/Fire Station	Mill Brook behind the Fire and Police Stations has caused some flooding on the property but not at the buildings.
13	Harrington Avenue	Harrington Avenue, near Kennedy's Pond Dam, has been identified by the town as a historical flooding site.
14	Laws Brook Road	This site has been identified by the town as a historical flooding area.
15	Lowell Road Sewer Pump Station	This wastewater pump station is located within floodplain and may be susceptible to infiltrating flows during large storm events, thus requiring a greater pump capacity to maintain wastewater services to important sections of the town.
16	Williams Road	This site has been identified by the town as a historical flooding area.
17	Barrett's Mill Road	This site has been identified by the town as a historical flooding area.
18	Barrett's Mill Road & east of Strawberry Hill Road	This site, near Barrett's Mill Road Dam, has been identified by the town as a historical flooding area.
19	Old Road to Nine Acre Corner	This site has been identified by the town as a historical flooding area.
20	Heath's Bridge Road	This site has been identified by the town as a historical flooding area.
21	Nashawtuc Road (bridge)	This town-owned bridge is an area of concern due to the failure of its sidewalls and the large debris dams that form during a flood.
22	Liberty Street	This site has been identified by the town as a historical flooding area.
23	Peter Spring Road	This site has been identified by the town as a historical flooding area.
24	Crosby's Pond	Crosby Pond and dam, located adjacent the Cambridge Turnpike, have flooded and exacerbated the flooding at Cambridge Turnpike.

Map ID	Name	Description
25	Virginia Road	This site has been identified by the town as a historical flooding area.
27	Main Street Bridge between Elm and Wood	This bridge is a concern due to its weight restrictions and inability to carry loads from Emergency Response Vehicles.
28	Damon Mill Properties (office buildings)	These office buildings are subject to flooding below Damondale dam.
29	Pail Factory Bridge	New locally flooded area identified since 2017 HMP
30	Route 2 Nashoba Brook Bridge	New locally flooded area identified since 2017 HMP
31	Main Street/MBTA Underpass	This is an area subject to heavy rain flash flooding, as water is trapped between the bridge walls.
32	Strawberry Hill Road (near Pope Road)	This area adjacent to wetlands, flooded in the March 2010 rainstorm.
90	Warner's Pond Dam	Area around Warner's Pond Dam
91	Kennedy's Pond Dam	Area around Kennedy's Pond Dam
92	Damonmill Dam	Area around Damonmill Dam
93	Harrington Pond Dam	Area around Harrington Pond Dam
94	Lower Musquetaquid Pond Dam	Area around Lower Musquetaquid Pond Dam
95	Upper Musquetaquid Pond Dam	Area around Upper Musquetaquid Pond Dam
96	Bateman's Pond Dam	Area around Bateman's Pond Dam
97	Barrett's Mill Road Dam	Area around Barretts Mill Road Dam
98	Dakin Brook Dam	Area around Dakin Brook Dam
99	Crosby Pond Dam	Area around Crosby Pond Dam. In addition, beaver activity has worsened the situation. The dam is in poor condition due to infiltration through the earthen dam, and trees growing in the embankment.
101	Harrington Ave @ Upland Road	New locally flooded area identified since 2017 HMP
102	Farmer's Cliff Road Culvert	New locally flooded area identified since 2017 HMP
104	Culvert at intersection of Monument Street and Buttrick's Hill Road	New locally flooded area identified since 2017 HMP
105	Valley Road @ #45 and #120	New locally flooded area identified since 2017 HMP

## REPETITIVE LOSS STRUCTURES <sup>2</sup>

As defined by FEMA, a repetitive loss property is any property which the National Flood Insurance Program (NFIP) has paid two or more flood claims of \$1,000 or more in any given 10-year period since 1978. There are 5 repetitive loss structures in Concord—2 residential and 3 non-residential and/or commercial properties—as of September 2022, the latest data available from MA DCR. These repetitive loss properties had a total of 18 losses, with estimated aggregated building property losses of \$140,289, contents losses of \$101,280, or a total of \$241,569 for total losses.

<sup>2</sup> FEMA Repetitive Loss Data

For more information on repetitive losses, visit:

[https://www.fema.gov/txt/rebuild/repetitive\\_loss\\_faqs.txt](https://www.fema.gov/txt/rebuild/repetitive_loss_faqs.txt) and

<https://www.fema.gov/repetitive-flood-claims-grant-program-fact-sheet>.

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## RISING TEMPERATURES

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### AVERAGE AND EXTREME TEMPERATURES

Extreme temperatures occur when either high temperature or low temperatures relative to average local temperatures occur. These can occur for brief periods of time and be acute, or they can occur over long periods of time where there is a long stretch of excessively hot or cold weather. Like the rest of New England, Concord has four well-defined seasons. The seasons have several defining factors, with temperature one of the most significant. Extreme temperatures can be defined as those that are far outside of the normal seasonal ranges for Massachusetts.

### Extreme Temperatures and Climate Change

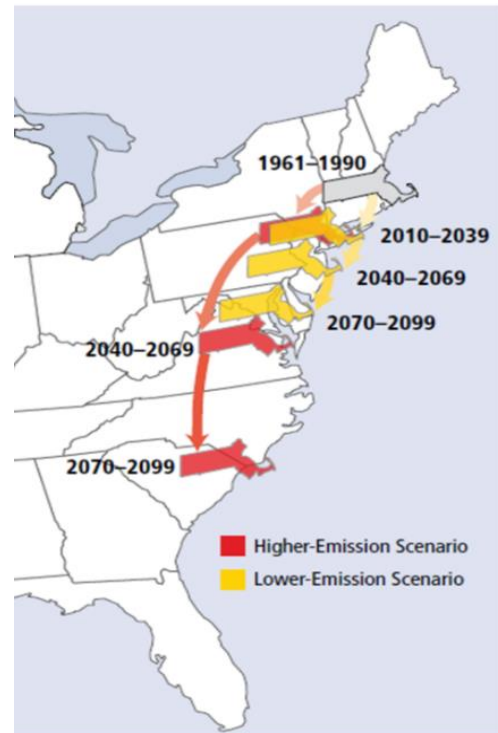
Average temperatures in Massachusetts are projected to increase by 3.8 to 10.8 degrees by the end of the century (SHMCAP). Over time our climate will become more similar to areas south of New England (see Figure 11).

Impacts on natural resources include a longer growing season and northern migration of plants and animals, including invasive species. The SHMCAP identifies ecosystems that are expected to be particularly vulnerable to warming temperatures. These include cold-water fisheries, vernal pools, spruce-fir forests, northern hardwood forests (Maple, Beach, Birch), Hemlock forests, and urban forests (due to heat island impacts).

### EXTREME COLD

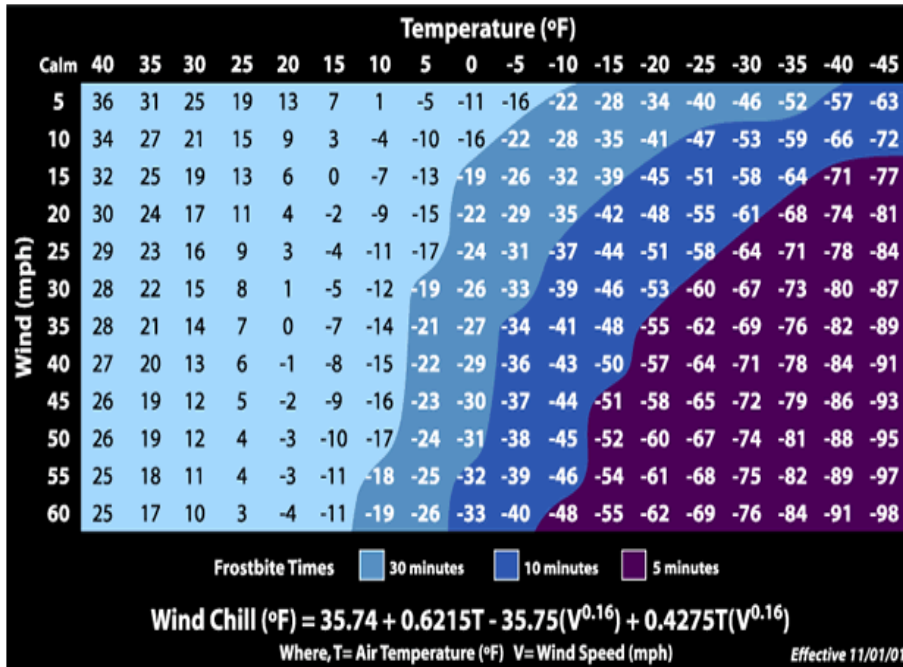
The severity of extreme cold temperature is typically measured using the Wind Chill Temperature Index, which is provided by the National Weather Service (NWS). The wind chill is the apparent temperature felt on exposed skin due to the combination of air temperature and wind speed. The index is provided in Figure 12. A Wind Chill warning is issued when the Wind Chill Index is forecast to fall below -25 degrees F for at least 3 hours. Extreme cold is a dangerous situation that can result in health emergencies for susceptible people, such as those without shelter, those who are stranded, or those who live in homes that are poorly insulated or without heat.

Figure 11: Temperature Change Scenarios



Source: Union of Concerned Scientists (2007)

**Figure 12: Wind Chill Temperature Index and Frostbite Risk**



Source: National Weather Service

The Town of Concord does not collect data for previous occurrences of extreme cold. The best available local data is for Middlesex County, through the National Centers for Environmental Information (NCEI). There have been three extreme cold events in the past ten years, which caused no deaths, no injuries, or property damage. When it occurs, extreme cold can result in health emergencies, particularly for those without shelter, who are stranded, or those who live in homes that are poorly insulated or without heat. In Concord, approximately 25% of town residents are over age 65, and approximately 2% of town residents are seniors who are living below poverty level.

**Table 12: Middlesex County Extreme Cold and Wind Chill Occurrences**

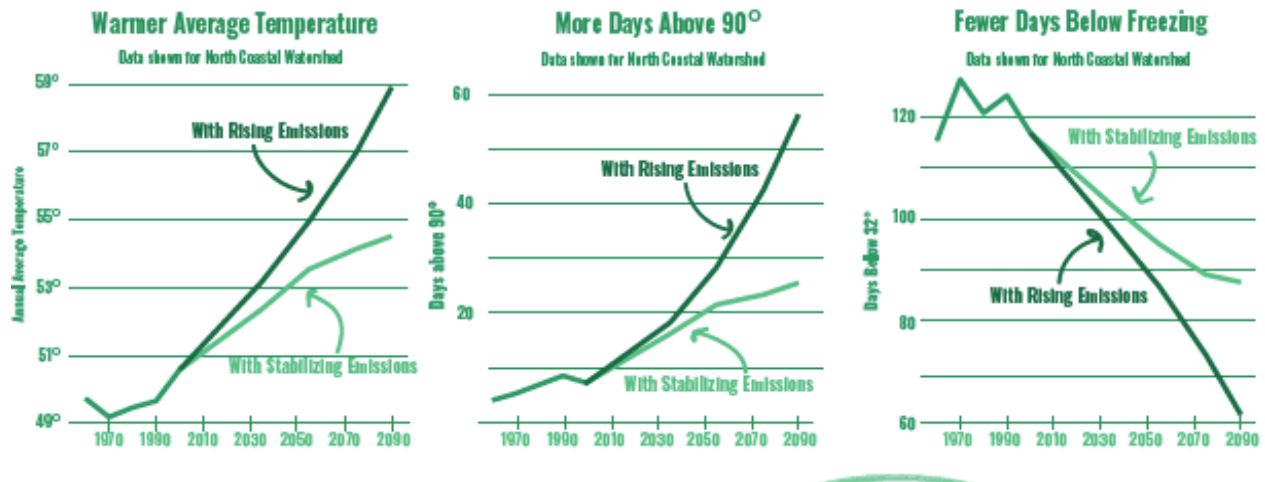
Date	Deaths	Injuries	Damages
2/15/2015	0	0	0
2/16/2015	0	0	0
2/14/2016	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>

Source: NOAA, National Centers for Environmental Information

Extreme cold events are predicted to decrease in the future, while extreme heat days as well as average temperatures are projected to increase (see Figure 13 below). Global temperatures have increased by nearly 2 degrees in the last century and even small changes in temperature have made widespread and significant changes to our climatic system. For example, the northeast has experienced a 10-day increase in the growing season since 1980. Extreme cold is still a community-wide hazard for Concord.

Figure 13: Projected Temperatures for Climate Scenarios to 2100

## Higher Temperatures



Source: ResilientMA.org

### EXTREME HEAT

A heat wave in Massachusetts is defined as three or more consecutive days above 90°F. Another measure used for identifying extreme heat events relies on the Heat Index. According to the National Weather Service (NWS), the Heat Index is a measure of how hot it really feels relative humidity is factored in with the actual air temperature. The NWS issues an advisory when the heat index (Figure 14) is forecast to exceed 100°F for two or more hours; an excessive heat advisory is issued if the forecast predicts the temperature will rise above 105°F.

**Figure 14: Heat Index Chart**

		Temperature (°F)															
		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
Relative Humidity (%)	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
	55	81	84	86	89	93	97	101	106	112	117	124	130	137			
	60	82	84	88	91	95	100	105	110	116	123	129	137				
	65	82	85	89	93	98	103	108	114	121	128	136					
	70	83	86	90	95	100	105	112	119	126	134						
	75	84	88	92	97	103	109	116	124	132							
	80	84	89	94	100	106	113	121	129								
	85	85	90	96	102	110	117	126	135								
	90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127											
100	87	95	103	112	121	132											
Category		Heat Index				Health Hazards											
Extreme Danger		130 °F – Higher				Heat Stroke or Sunstroke is likely with continued exposure.											
Danger		105 °F – 129 °F				Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.											
Extreme Caution		90 °F – 105 °F				Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.											
Caution		80 °F – 90 °F				Fatigue possible with prolonged exposure and/or physical activity.											

Source: National Weather Service

The best available local data on past occurrences of extreme heat in Concord is for Middlesex County, through the National Centers for Environmental Information (NCEI). In the last decade, there have been two excessive heat events recorded, with one reported death, no injuries, and no property damage (see Table 13).

**Table 13: Middlesex County Extreme Heat Occurrences 2010-2020**

Date	Deaths	Injuries	Damage
7/6/2010	0	0	0
7/5/2013	1	0	0
<b>TOTAL</b>	<b>1</b>	<b>0</b>	<b>0</b>

Source: NOAA, National Centers for Environmental Information

The projected increase in extreme heat and heat waves is the source of one of the key health concerns related to climate change. Prolonged exposure to high temperatures can cause heat-related illnesses, such as heat cramps, heat exhaustion, heat stroke, and death. Heat exhaustion is the most common heat-related illness and if untreated, it may progress to heat stroke. People who perform manual labor, particularly those who work outdoors, are at increased risk for heat-related illnesses. Prolonged heat exposure and the poor air quality and high humidity that often accompany heat waves can also exacerbate pre-existing conditions, including respiratory illnesses, cardiovascular disease, and mental illnesses.

Older adults are often at elevated risk due to a high prevalence of pre-existing and chronic conditions; in Concord, approximately 25% of the population is over age 65. People who live in older housing stock and in housing without air conditioning have increased vulnerability to heat-related illnesses. Areas with less shade and darker surfaces (pavement and roofs) will experience even hotter temperatures; these surfaces absorb heat during the day and release it in the evening, keeping nighttime temperatures warmer as well. Map 9 in Appendix B displays areas that are among the hottest 5% of land in the MAPC region based on land surface temperature derived from satellite imagery on July 13, 2016, when the high temperature at Logan Airport was 92°F. There are a few hot spots spread across West and South Concord areas.

Power failures are more likely to occur during heat waves, affecting the ability of residents to remain cool during extreme heat. Individuals with pre-existing conditions and those who require electric medical equipment may be at increased risk during a power outage.

## **WILDFIRE**

Wildfire is a non-structure fire occurring in a forested, shrub or grassland areas. In the Boston Metro region these fires rarely grow to the size of a wildfire, as seen more typically in the western U.S. A more likely occurrence is brush fires that typically burn no more than the underbrush of a forested area. There are three different classes of wildfires:

- Surface fires are the most common type and burn along the floor of a forest, moving slowly and killing or damaging trees
- Ground fires are usually started by lightning and burn on or below the forest floor
- Crown fires spread rapidly by wind, jumping along the tops of trees

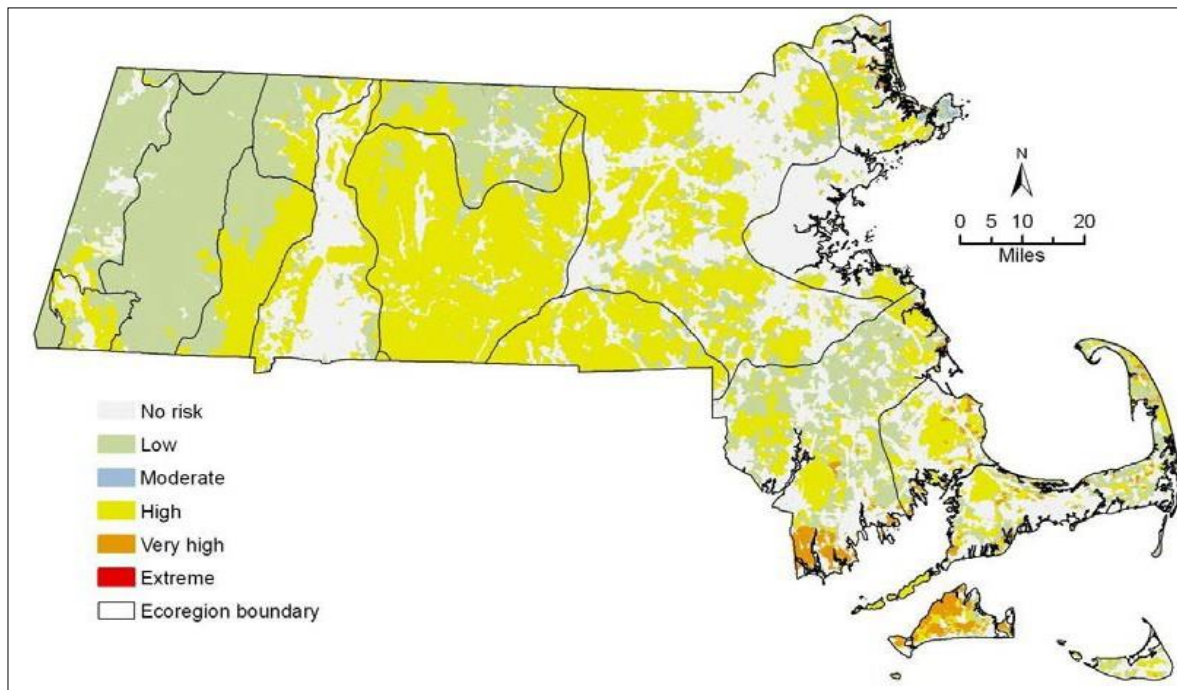
A wildfire differs greatly from other fires by its extensive size, the speed at which it can spread out from its original source, its potential to unexpectedly change direction, and its ability to jump gaps such as roads, rivers, and fire breaks. Wildfire season can begin in March and usually ends in late November. Wildfires typically occur in April and May, when most vegetation is void of any appreciable moisture, making them highly flammable. Once "green-up" takes place in late May to early June, the fire danger usually is reduced somewhat. As the climate warms, drought and warmer temperatures may increase the risk of wildfire as vegetation dries out and becomes more flammable. The National Wildfire Coordinating Group classifies the severity of wildfires based on their acreage.

These fires can present a hazard where there is the potential to spread into developed or inhabited areas, particularly residential areas where sufficient fuel materials might exist to allow the fire to spread into homes. Protecting structures from fire poses special problems and can stretch firefighting resources to the limit. If heavy rains follow a fire, other natural disasters can occur, including landslides, mudflows, and floods. If the wildfire destroys the ground cover, then erosion becomes one of several potential problems.

## POTENTIAL BRUSHFIRE HAZARD AREAS

The SCHMCAP depicts statewide fire risk incorporating three risk components: fuel, wildland-urban interface, and topography (Figure 15). The wildland-urban interface reflects communities where housing and vegetation intermingle, and fire can spread from structures to vegetated areas. The most susceptible fuels are pitch pine, scrub oak and oak forests. Topography can affect the behavior of fires, as fire spreads more easily uphill. Concord is shown in the “high” wildfire risk area. The most common cause of wildfires is the careless disposal of smoking materials and untended campfires.

**Figure 15: Wildfire Risk Areas**



Source: SHMCAP

Table 14 below summarizes areas of Concord that were identified as having the highest potential for brush fires. The ID numbers correspond to the numbers on Map 8, “Hazard Areas” in Appendix B.

**Table 14: Locally Identified Areas of Brushfire Risk**

Map ID	Name
106	Hapgood Wright Town Forest @ Walden Street
107	Wright Woods/Fairhaven Bay
108	Old Rifle Range/Old Marlboro Road
109	Annursnac Hill
110	Concord-Bedford Line
111	Lowell Road, near Monument Street

## **INVASIVE SPECIES**

The 2018 SHMCAP includes invasive species as a natural hazard for the first time. They are defined as “non-native species that cause or are likely to cause harm to ecosystems, economies, and/or public health”. In new habitats invasive species displace native species because they have competitive advantages including no biological controls from their native habitat. Some of the more recognizable invasive plant species noted in the SHMCAP include Norway maple, garlic mustard, Japanese barberry, black swallowwort, buckthorn, purple loosestrife, water milfoil, Japanese knotweed, and phragmites. Invasive pests include emerald ash borer, hemlock wooly adelgid, and the Asian long-horned beetle. The Massachusetts Invasive Plant Advisory Group categorizes invasive severity as either limited prevalence in Massachusetts, partial containment potential, or public health threat.

According to Concord’s Open Space and Recreation Plan (2015), Concord is home to a diversity of wetland communities and plant associations, several of which are classified by the Natural Heritage and Endangered Species Program (NHESP) as priority natural communities that are imperiled or vulnerable. It includes stretches of small river floodplain forest along its three rivers, alluvial red maple swamp (at Great Meadows), level and kettlehole level bogs (most notably Gowing’s Swamp, Bose’s Meadow, and Jenny Dugan Kames bog), and acidic fens (the Andromeda Ponds and Heyward Meadow, west and southwest of Walden Pond). Common invasive plants in Concord include buckthorn, burning bush, Asiatic bittersweet, Japanese knotweed, garlic mustard, porcelain berry, water chestnut, and swallowwort. Since 2005, Concord has been participating in regional invasive species control efforts including the establishment of the Cooperative Invasive Species Management Area (CISMA) in 2009 - a group of partnering organizations that work together to manage and control invasive species in the Sudbury-Assabet-Concord (SuAsCo) Watershed.

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## **EXTREME WEATHER**

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### **HURRICANES AND TROPICAL STORMS**

A hurricane is a violent wind and rainstorm with wind speeds of 74 to 200 miles per hour. A hurricane is strongest as it travels over the ocean and is particularly destructive to coastal property as the storm hits land. A tropical storm has similar characteristics, but wind speeds are between 34 and 73 miles per hour. Climate models suggest that hurricanes and tropical storms will become more intense as warmer ocean waters provide more fuel for the storms. In addition, rainfall amounts associated with hurricanes are predicted to increase because warmer air can hold more water vapor. Since 1900, 39 tropical storms have impacted New England (NESEC). Massachusetts has experienced approximately 32 tropical storms, nine Category 1 hurricanes, five Category 2 hurricanes and one Category 3 hurricane. Like its neighboring communities in the region, the Town of Concord is vulnerable to hurricanes, which occur between June and November. Table 15 presents hurricane records for Massachusetts since 1938.

**Table 15: Hurricane Records for Massachusetts, 1938 to 2018**

Hurricane Event	Date
Great New England Hurricane*	September 21, 1938
Great Atlantic Hurricane*	September 14-15, 1944
Hurricane Doug	September 11-12, 1950
Hurricane Carol*	August 31, 1954
Hurricane Edna*	September 11, 1954
Hurricane Diane	August 17-19, 1955
Hurricane Donna	September 12, 1960
Hurricane Gloria	September 27, 1985
Hurricane Bob	August 19, 1991
Hurricane Earl	September 4, 2010
Tropical Storm Irene	August 28, 2011
Hurricane Sandy	October 29-30, 2012

\* Category 3.

Source: National Oceanic and Atmospheric Administration

Hurricane intensity is measured according to the Saffir/Simpson scale, which categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential. These are combined to estimate potential damage. Table 16 provides an overview of the wind speeds, surges, and range of damage caused by different hurricane categories.

**Table 16: Saffir/Simpson Scale**

Scale No. (Category)	Winds (mph)	Surge (ft)	Potential Damage
1	74 – 95	4 - 5	Minimal
2	96 – 110	6 - 8	Moderate
3	111 – 130	9 - 12	Extensive
4	131 – 155	13 - 18	Extreme
5	> 155	>18	Catastrophic

Source: NOAA

Hurricanes typically have regional impacts beyond their immediate tracks. Falling trees and branches are a significant problem because they can result in power outages when they fall on power lines or block traffic and emergency routes. Total damages in Concord are estimated at \$19.1 million for a 100-year hurricane (equivalent to Category 2), and about \$246.1 million for a 500-year hurricane (Category 4).

### **SEVERE WINTER STORM/NOR'EASTER**

A northeast storm, known as a nor'easter, is typically a large counterclockwise wind circulation around a low-pressure center. Featuring strong northeasterly winds blowing in from the ocean over coastal areas, nor'easters are relatively common in the winter months in New England occurring one to two times a year. The storm radius of a nor'easter can be as much as 1,000 miles and these storms feature sustained winds of 10 to 40 mph with gusts of up to 70 mph. These

storms are accompanied by heavy rain or snow, depending on temperatures. Many of the historic flood events identified in the previous section were precipitated by nor'easters, including the "Perfect Storm" event in 1991. More recently, blizzards in February 2013, January 2015, and in March 2018 were large nor'easters that caused significant snowfall amounts.

Frequently, nor'easters are coastal events for Massachusetts. For inland communities, Concord can be impacted by high winds. High winds can cause damage to structures, fallen trees, and downed power lines leading to power outages. Intense rainfall can overwhelm drainage systems causing localized flooding of rivers and streams as well as urban stormwater ponding and localized flooding. Fallen tree limbs as well as heavy snow accumulation and intense rainfall can impede local transportation corridors, and block access for emergency vehicles. Nor'easters are also a cause of coastal flooding.

A blizzard is a winter snowstorm with sustained or frequent wind gusts to 35 mph or more, accompanied by falling or blowing snow which reduces visibility to or below 1/4 mile. These conditions must be the predominant conditions over a three-hour period. Extremely cold temperatures are often associated with blizzard conditions but are not a formal part of the definition. The hazard related to the combination of snow, wind, and low visibility significantly increases when temperatures drop below 20 degrees.

The Regional Snowfall Index (RSI) characterizes and ranks the severity of northeast snowstorms. RSI has five categories: Extreme, Crippling, Major, Significant, and Notable. RSI scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The largest RSI values result from storms producing heavy snowfall over large areas that include major metropolitan centers. The RSI categories are summarized below:

**Table 17: Regional Snowfall Index**

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

Source: SHMCAP

Winter storms, including heavy snow, blizzards, and ice storms, are the most common and most familiar of the region's hazards that affect large geographic areas. The majority of blizzards and ice storms in the region cause more inconvenience than serious property damage, injuries, or deaths. However, periodically, a storm will occur which is a true disaster, and necessitates intense large-scale emergency response. The impacts of winter storms are often related to the weight of snow and ice, which can cause roof collapses and causes tree limbs to fall. This in turn can cause property damage and potential injuries. Power outages may also result from fallen trees and

utility lines. Winter storms are a community-wide hazard in Concord. Map 6 in Appendix B illustrates the average annual average snowfall in Concord, which is between 48 to 72 inches. A number of public safety issues can arise during snowstorms. Impassible streets are a challenge for emergency vehicles and affect residents and employers. Snow-covered sidewalks force people to walk in streets, which are already less safe due to snow, slush, puddles, and ice. Large piles of snow can also block sight lines for drivers, particularly at intersections. Refreezing of melting snow can cause dangerous roadway conditions. In addition, transit operations may be impacted, as they were in the 2015 blizzards which caused the closure of the MBTA system for one day and limited services on the commuter rail for several weeks. As with hurricanes, warmer ocean water and air will provide more fuel for winter storms. According to the SHMCAP it appears that Atlantic coast nor'easters are increasing in frequency and intensity. Further, the SHMCAP notes that research suggests that warmer weather in the Arctic is producing changes to atmospheric circulation patterns that favor the development of winter storms in the Eastern United States.

Data for Middlesex County is the best available data to help understand previous occurrences and impacts of heavy snow events. According to National Centers for Environmental Information (NCEI) records, from 2010 to 2022, Middlesex County experienced nearly 40 days with heavy snowfall events, resulting in no injuries, deaths, and property damage of \$142,000.

**Table 18: Heavy Snow Events and Impacts in Middlesex County, 2010 to 2022**

Date	Deaths	Injuries	Property Damage (\$)
1/18/2010	0	0	0
2/16/2010	0	0	15,000
2/23/2010	0	0	8,000
1/12/2011	0	0	0
1/26/2011	0	0	0
10/29/2011	0	0	30,000
12/29/2012	0	0	0
2/8/2013	0	0	0
2/8/2013	0	0	0
2/23/2013	0	0	0
3/7/2013	0	0	0
3/18/2013	0	0	0
12/14/2013	0	0	0
12/17/2013	0	0	0
1/2/2014	0	0	0
1/18/2014	0	0	0
2/5/2014	0	0	0
2/13/2014	0	0	0
2/18/2014	0	0	0
11/26/2014	0	0	10,000
1/24/2015	0	0	0
1/26/2015	0	0	0
2/2/2015	0	0	0
2/8/2015	0	0	0
2/14/2015	0	0	0

Date	Deaths	Injuries	Property Damage (\$)
2/5/2016	0	0	75,000
3/21/2016	0	0	0
4/4/2016	0	0	0
12/29/2016	0	0	0
3/14/2017	0	0	0
11/15/2018	0	0	0
12/1/2019	0	0	4,000
1/18/20	0	0	0
3/23/20	0	0	0
10/30/20	0	0	500
12/05/20	0	0	0
12/16/20	0	0	0
2/1/21	0	0	0
1/28/22	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>\$142,500</b>

Source: NOAA, National Climatic Data Center

In Eastern Massachusetts, blizzards and severe winter storms have occurred in the following years:

**Table 19: Severe Weather Major Disaster Declarations in Eastern MA**

Storm Event	Date
Severe Winter Storm and Snowstorm	March 2018
Severe Winter Storm, Snowstorm, and Flooding	January 2015
Severe Winter Storm, Snowstorm, and Flooding	February 2013
Hurricane Sandy	October/November 2012
Severe Storm and Snowstorm	October 2011
Tropical Storm Irene	August 2011
Severe Winter Storm and Snowstorm	January 2011
Severe Winter Storm and Flooding	December 2008
Severe Storms and Inland and Coastal Flooding	April 2007
Severe Storm and Flooding	October 2005
Severe Storms & Flooding	March 2001
Blizzard	January 1966
Winter Coastal Storm	December 1992
Severe Coastal Storm	October 1991
Hurricane Bob	August 1991
Hurricane Gloria	September 1985

Coastal Storm, Flood, Ice, Snow	February 1978
Hurricane, floods	August 1955
Hurricanes	September 1954

Source: FEMA

The most significant winter storm was the “Blizzard of 1978,” which resulted in over three feet of snowfall and multiple day closures of roadways, businesses, and schools.

### **ICE STORMS**

The ice storm category covers a range of different weather phenomena that collectively involve rain or snow being converted to ice in the lower atmosphere leading to potentially hazardous conditions on the ground. Ice storm conditions are defined by liquid rain falling and freezing on contact with cold objects, creating ice buildups of one-fourth of an inch or more. An ice storm warning, which is now included in the criteria for a winter storm warning, is issued when a half inch or more of accretion of freezing rain is expected.

The best available local data is for Middlesex County through NOAA’s Centers for Environmental Information. Middlesex County experienced two ice storm events since 2000. No deaths or injuries were reported and the total reported property damage in the county was estimated at \$6.5 million. There is some indication that if winters warm, temperatures may be more likely to produce icing conditions.

Sleet and hail are other forms of frozen precipitation. Sleet occurs when raindrops fall into subfreezing air thick enough that the raindrops refreeze into ice before hitting the ground. The difference between sleet and hail is that sleet is a wintertime phenomenon whereas hail falls from convective clouds (usually thunderstorms), often during the warm spring and summer months. Hail size typically refers to the diameter of the hailstones. Warnings and reports may report hail size through comparisons with real-world objects that correspond to certain diameters:

**Table 20: Hail Size Comparisons**

<b>Description</b>	<b>Diameter (inches)</b>
Pea	0.25
Marble or mothball	0.50
Penny or dime	0.75
Nickel	0.88
Quarter	1.00
Half dollar	1.25
Walnut or ping pong ball	1.50
Golf ball	1.75
Hen's egg	2.00
Tennis ball	2.50
Baseball	2.75

Teacup	3.00
Grapefruit	4.00
Softball	4.50

Source: NOAA

While ice pellets and sleet are examples of these, the greatest hazard is created by freezing rain conditions, which is rain that freezes on contact with hard surfaces leading to a layer of ice on roads, walkways, trees, and other surfaces. The conditions created by freezing rain can make driving particularly dangerous and emergency response more difficult. The weight of ice on tree branches can also lead to falling branches damaging electric lines.

Compared to ice storms, hail events are much more frequent in Middlesex County. Records show that Middlesex County experienced 26 hail events since 2010 with no recorded property damage, injuries, or deaths (Table 21).

**Table 21: Hail Events in Middlesex County, 2010-2022**

Date	Magnitude	Deaths	Injuries	Property Damage (\$)
5/4/2010	0.75	0	0	0
5/7/2011	0.75	0	0	0
6/1/2011	0.75	0	0	0
8/2/2011	0.75	0	0	0
8/19/2011	0.75	0	0	0
3/13/2012	1.25	0	0	0
3/14/2012	1	0	0	0
6/23/2012	0.75	0	0	0
7/18/2012	1	0	0	0
10/30/2012	1	0	0	0
6/17/2013	0.75	0	0	0
5/25/2014	0.75	0	0	0
7/3/2014	1	0	0	0
8/7/2014	0.75	0	0	0
9/6/2014	0.88	0	0	0
8/4/2015	1	0	0	0
8/15/2015	0.75	0	0	0
7/23/2016	.75	0	0	0
6/27/2017	1.00	0	0	0
8/2/2017	.75	0	0	0
6/29/19	.75	0	0	0
6/06/20	1.00	0	0	0
6/28/20	1.00	0	0	0
7/30/20	.75	0	0	0
8/23/20	1.00	0	0	0
<b>TOTAL</b>		<b>0</b>	<b>0</b>	<b>0</b>

Magnitude refers to diameter of hail stones in inches.

Source: NOAA, Centers for Environmental Information

## TORNADOS

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. These events are spawned by thunderstorms and occasionally by hurricanes and may occur singularly or in multiples. They develop when cool air overrides a layer of warm air, causing the warm air to rise

rapidly. Most vortices remain suspended in the atmosphere. Should they touch down, they become a force of destruction. Some ingredients for tornado formation include:







- Very strong winds in the mid and upper levels of the atmosphere
- Clockwise turning of the wind with height (from southeast at the surface to west aloft)
- Increasing wind speed with altitude in the lowest 10,000 feet of the atmosphere (i.e., 20 mph at the surface and 50 mph at 7,000 feet)
- Very warm, moist air near the ground with unusually cooler air aloft
- A forcing mechanism such as a cold front or leftover weather boundary from previous shower or thunderstorm activity

Tornado damage severity is measured by the Enhanced Fujita scale, which is based on the amount of damage created. As of February 1, 2007, the National Weather Service began rating tornados using the Enhanced Fujita-scale (EF-scale), which allows surveyors to create more precise assessments of tornado severity. The EF-scale is summarized below (Table 22).

The frequency of tornados in eastern Massachusetts is low; on average, there are six tornadoes that touchdown somewhere in the Northeast region every year. The strongest tornado in Massachusetts history was the Worcester Tornado in 1953 (NESEC). Recent tornado events in Massachusetts resulted in significant damage in Springfield in 2011 and in Revere in 2014. The Springfield tornado caused significant damage and resulted in four deaths in June of 2011. The Revere tornado touched down in Chelsea just south of Route 16, moved north into Revere's business district along Broadway, and ended near the intersection of Routes 1 and 60. The path was approximately two miles long and 3/8 mile wide, with wind speeds up to 120 miles per hour. Approximately 65 homes had substantial damage and 13 homes and businesses were rendered uninhabitable. And on August 22, 2016, an F1 tornado passed through part of Concord. It impacted an area 0.85 miles long by 400 yards wide. According to the report from the National Centers for Environmental Information:

*"This tornado touched down near the Cambridge Turnpike and headed northeast. Most of the damage was concentrated in an area beginning near the intersection of Lexington Road and Alcott Road and continuing up to the neighborhood of Alcott and Independence Roads. Numerous trees were uprooted or had the tops sheared off. These subsequently blocked roads, damaged homes, and downed power lines, cutting off power to the neighborhood. In addition, utility poles were downed either from the wind or from the downed power lines. Thirty-nine houses in this area were damaged to some degree. Only one house suffered significant structural damage. The tornado continued for a short distance beyond this neighborhood before lifting. The historical home of Louisa May Alcott and her family was right next to the tornado path but was not damaged."*

**Table 22: Enhanced Fujita Scale**

Scale	Wind speed		Relative frequency	Potential damage	
	mph	km/h			
EF0	65–85	105–137	53.5%	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.	
EF1	86–110	138–178	31.6%	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.	
EF2	111–135	179–218	10.7%	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.	
EF3	136–165	219–266	3.4%	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.	
EF4	166–200	267–322	0.7%	Extreme damage to near-total destruction. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.	
EF5	>200	>322	<0.1%	Massive Damage. Strong frame houses leveled off foundations and swept away; steel-reinforced concrete structures critically damaged; high-rise buildings have severe structural deformation. Incredible phenomena will occur.	

Source: SHMCAP 2018

Since 1955, there have been 18 tornadoes in Middlesex County recorded by the NCEI. Two tornadoes were F3, four were F2, ten were F1 and two were F0. These tornadoes resulted in one fatality, six injuries, and an estimated \$4.88 million in property damage, as summarized in Table 23 below.

**Table 23: Tornado Records for Middlesex County**

Date	Fujita Scale	Fatalities	Injuries	Property Damage \$	Length (mile)	Width (yard)
10/24/1955	1	0	0	2.50K	10	0.1
6/19/1957	1	0	0	25.00K	17	1
6/19/1957	1	0	0	0.25K	100	0.5
7/11/1958	2	0	0	250.00K	17	1.5
8/25/1958	2	0	0	2.50K	50	1
7/3/1961	0	0	0	25.00K	10	0.5
7/18/1963	1	0	0	25.00K	50	1
8/28/1965	2	0	0	250.00K	10	2
7/11/1970	1	0	0	25.00K	50	0.1

Date	Fujita Scale	Fatalities	Injuries	Property Damage \$	Length (mile)	Width (yard)
10/3/1970	3	1	0	250.00K	60	35.4
7/1/1971	1	0	1	25.00K	10	25.2
11/7/1971	1	0	0	0.25K	10	0.1
7/21/1972	2	0	4	2.500M	37	7.6
9/29/1974	3	0	1	250.00K	33	0.1
7/18/1983	0	0	0	0.25K	20	0.4
9/27/1985	1	0	0	0.25K	40	0.1
8/7/1986	1	0	0	250.00K	73	4
8/22/2016	1	0	0	1.000M	400	.85
<b>TOTAL</b>		<b>1</b>	<b>6</b>	<b>4.88M</b>		

Source: NOAA

Buildings constructed prior to current building codes may be more vulnerable to damages caused by tornadoes. Evacuation of impacted areas may be required on short notice. Sheltering and mass feeding efforts may be required along with debris clearance, search and rescue, and emergency fire and medical services. Key routes may be blocked by downed trees and other debris, and widespread power outages are also typically associated with tornadoes.

Tornados are community-wide hazards in Concord. Tornados are most common in the summer, June through August and most form in the afternoon or evening. Tornados are associated with strong thunderstorms. Based on the record of previous occurrences since 1950, tornado events in Concord are a “very low” frequency event. According to the SHMCAP, it is possible that severe thunderstorms which can include tornadoes may increase in frequency and intensity. However, scientists have less confidence in the models that seek to project future changes in tornado activity. At this time, the Massachusetts State Building Code’s provisions are the most cost-effective mitigation measure against tornados given the extremely low probability of occurrence.

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## OTHER SEVERE WEATHER

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### **SEVERE THUNDERSTORMS**

While less severe than the other types of storms discussed, thunderstorms can lead to localized damage and represent a hazard risk for communities. A thunderstorm typically features lightning, strong winds, rain, and/or hail. Thunderstorms sometime give rise to tornados. On average, these storms are only around 15 miles in diameter and last for about 30 minutes. A severe thunderstorm can include winds of close to 60 mph and rain sufficient to produce flooding. The severity of thunderstorms ranges from commonplace and of short duration to intense storms that cause damage due to high winds, flooding, or lightning strikes.

The best available data on previous occurrences of thunderstorms in Concord is for Middlesex County through NOAA’s National Centers for Environmental Information (NCEI). For the years 2010 to 2022, NCEI records show 84 thunderstorm wind events in Middlesex County (Table 24).

These storms resulted in an estimate of \$3.47 million in property damage. There were seven injuries and no death reported.

**Table 24: Middlesex County Thunderstorm Wind Events, 2010 to 2022**

DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE \$
5/4/2010	50	0	0	30000
6/1/2010	50	0	0	5000
6/3/2010	50	0	0	20000
6/5/2010	50	0	0	40000
6/6/2010	50	0	1	100000
6/24/2010	50	0	0	30000
7/12/2010	50	0	0	50000
7/19/2010	50	0	0	25000
6/1/2011	50	0	0	5000
6/9/2011	50	0	0	15000
8/2/2011	50	0	0	1000
8/19/2011	50	0	0	15000
6/8/2012	50	0	0	25000
6/23/2012	45	0	0	5000
7/4/2012	50	0	0	10000
7/18/2012	70	0	0	350000
9/7/2012	50	0	0	10000
9/8/2012	40	0	0	3000
6/17/2013	50	0	0	25000
6/18/2013	45	0	0	10000
6/24/2013	45	0	0	3000
7/23/2013	50	0	0	20000
7/29/2013	50	0	0	5000
7/3/2014	50	0	0	75000
7/7/2014	87	0	0	100000
7/15/2014	50	0	0	25000
7/28/2014	50	0	0	50000
9/6/2014	50	0	1	15000
5/28/2015	45	0	0	5000
8/4/2015	50	0	0	40000
8/15/2015	50	0	0	25000
2/25/2016	50	0	0	30000
3/17/2016	45	0	0	5000
7/22/2016	50	0	0	14,000
7/23/2016	50	0	0	0
8/22/2016	50	0	0	0

DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE \$
9/11/2016	50	0	0	10,000
5/18/2017	50	0	0	0
6/13/2017	52	0	0	0
6/23/2017	52	0	0	1000
6/27/2017	50	0	0	0
7/12/2017	50	0	0	0
8/2/2017	50	0	0	0
9/6/2017	50	0	0	0
5/15/2018	40	0	0	0
6/18/2018	50	0	0	0
6/25/2018	43	0	0	0
7/17/2018	50	0	0	3000
7/26/2018	50	0	0	5000
8/7/2018	50	0	0	3000
8/17/2018	50	0	0	4000
9/6/2018	50	0	0	2000
10/23/2018	46	0	0	10,000
6/30/2019	50	0	0	800
7/17/2019	50	0	0	7250
7/31/2019	50	0	0	2500
8/7/2019	50	0	0	800
9/4/2019	55	0	0	26700
5/15/20	50	0	0	285,000
6/06/20	50	0	0	7000
6/21/20	50	0	0	38,200
6/28/20	55	0	0	6000
7/02/20	50	0	0	15300
7/05/20	50	0	0	12300
7/23/20	60	0	0	40600
7/30/20	50	0	0	3100
8/22/20	50	0	0	6000
8/23/20	50	0	0	25600
8/27/20	50	0	0	1600
10/07/20	61	0	5	6500
11/15/20	56	0	0	4000
5/6/21	50	0	0	800
6/30/21	50	0	0	500
7/6/21	50	0	0	18,500
7/7/21	55	0	0	7,600
7/27/21	52	0	0	33,800

DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE \$
8/19/21	50	0	0	1,300
9/13/21	50	0	0	400
3/7/22	56	0	0	19,000
7/2/22	50	0	0	800
7/21/22	50	0	0	500
8/5/22	50	0	0	9,900
8/7/22	60	0	0	30,300
8/26/22	50	0	0	7,800
<b>TOTAL</b>		<b>0</b>	<b>7</b>	<b>\$3.47M</b>

\*Magnitude refers to maximum wind speed  
Source: NOAA, National Climatic Data Center

Severe thunderstorms are a community-wide hazard for Concord. The town’s vulnerability to severe thunderstorms is similar to that of nor’easters. High winds can cause falling trees and power outages, as well as obstruction of key routes and emergency access. Heavy precipitation may also cause localized flooding, both riverine and urban drainage related.

Based on the record of previous occurrences, thunderstorms in Concord are high frequency events; this hazard has occurred an average of three times per year in the past ten years. As noted previously, the intensity of rainfall events has increased significantly, and those trends are expected to continue. The SHMCAP does not specifically address whether climate will affect the intensity or frequency of thunderstorms.

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## NON-CLIMATE INFLUENCED HAZARDS

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### EARTHQUAKES

Earthquakes are the sole natural hazard for which there is no established correlation with climate impacts. Damages in an earthquake stem from ground motion, surface faulting, and ground failure in which weak or unstable soils, such as those composed primarily of saturated sand or silts, liquefy. The effects of an earthquake are mitigated by distance and ground materials between the epicenter and a given location. An earthquake in New England affects a much wider area than a similar earthquake in California due to New England’s solid bedrock geology (NESEC).

Seismologists use a magnitude scale known as the Richter scale to express the seismic energy released by each earthquake. The typical effects of earthquakes in various ranges are summarized below:

**Table 25: Richter Scale and Effects**

Richter Magnitudes	Earthquake Effects
Less than 3.5	Generally, not felt, but recorded

<b>Richter Magnitudes</b>	<b>Earthquake Effects</b>
3.5- 5.4	Often felt, but rarely causes damage
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas up to about 100 km. across where people live.
7.0- 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred meters across.

Source: Nevada Seismological Library (NSL), 2005

From 1668 to 2016, 408 earthquakes were recorded in Massachusetts (NESEC). Most have originated from the La Malbaie fault in Quebec or from the Cape Anne fault located off the coast of Rockport. The region has experienced larger earthquakes in the distant past, including a magnitude 5.0 earthquake in 1727 and a 6.0 earthquake that struck in 1755 off the coast of Cape Anne. More recently, a pair of damaging earthquakes occurred near Ossipee, NH in 1940. A 4.0 earthquake centered in Hollis, Maine in October 2012 was felt in the Boston area. Historic records of some of the more significant earthquakes in the region are shown in Table 26.

**Table 26: Historic Earthquakes in Massachusetts or Surrounding Area**

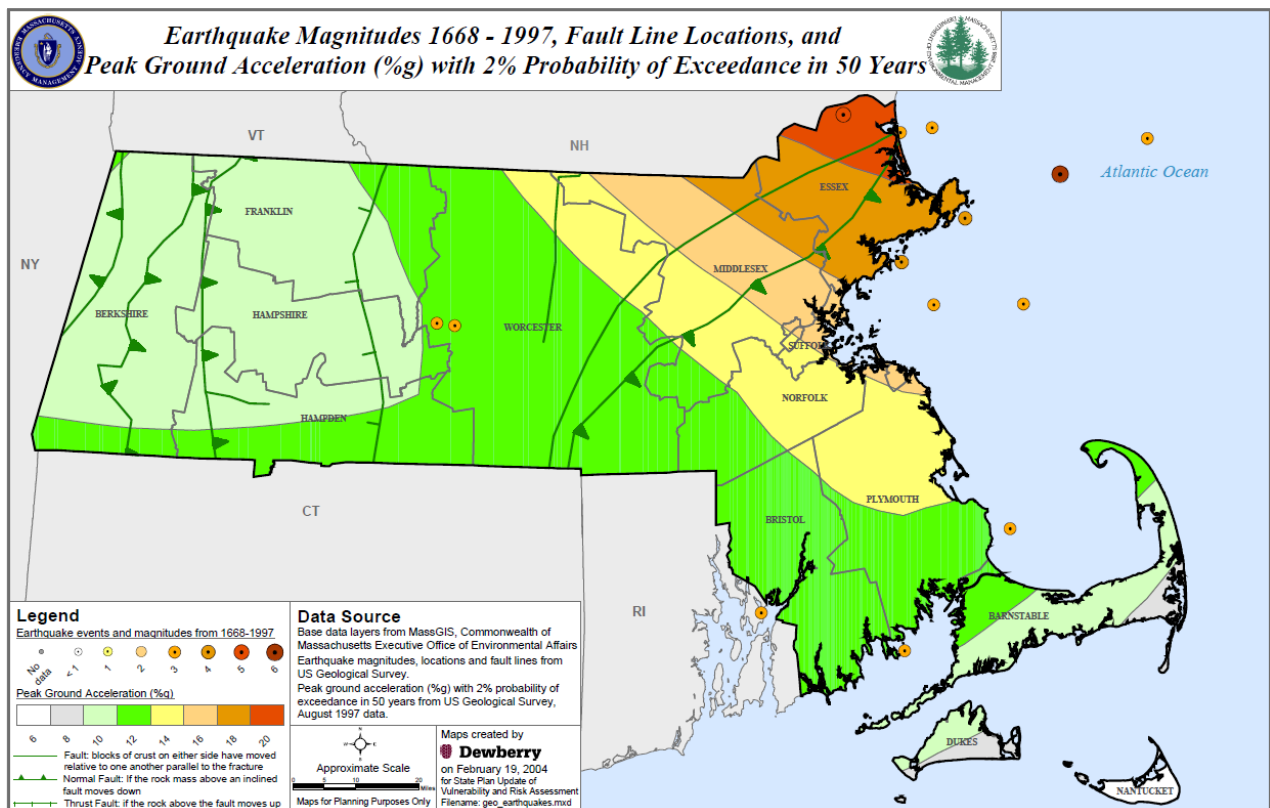
<b>Location</b>	<b>Date</b>	<b>Magnitude</b>
MA - Cape Ann	11/10/1727	5
MA - Cape Ann	12/29/1727	NA
MA - Cape Ann	2/10/1728	NA
MA - Cape Ann	3/30/1729	NA
MA - Cape Ann	12/9/1729	NA
MA - Cape Ann	2/20/1730	NA
MA - Cape Ann	3/9/1730	NA
MA - Boston	6/24/1741	NA
MA - Cape Ann	6/14/1744	4.7
MA - Salem	7/1/1744	NA
MA - Off Cape Ann	11/18/1755	6
MA - Off Cape Cod	11/23/1755	NA
MA - Boston	3/12/1761	4.6
MA - Off Cape Cod	2/2/1766	NA
MA - Offshore	1/2/1785	5.4
MA - Wareham/Taunton	12/25/1800	NA
MA - Woburn	10/5/1817	4.3
MA - Marblehead	8/25/1846	4.3
MA - Brewster	8/8/1847	4.2
MA - Boxford	5/12/1880	NA
MA - Newbury	11/7/1907	NA
MA - Wareham	4/25/1924	NA
MA - Cape Ann	1/7/1925	4

Location	Date	Magnitude
MA - Nantucket	10/25/1965	NA
MA - Boston	12/27/74	2.3
MA - Nantucket	4/12/12	4.5
ME - Hollis	10/17/12	4.0

Source: Boston HIRA

One measure of earthquake risk is ground motion, which is measured as maximum peak horizontal acceleration, expressed as a percentage of gravity (%g). The range of peak ground acceleration in Massachusetts is from 10 %g to 20 %g, with a 2% probability of exceedance in 50 years. Concord is in the middle to upper part of the range for Massachusetts, at 16-18 %g, making it a relatively moderate high area of earthquake risk within the state, although the state as a whole is considered to have a low risk of earthquakes compared to the rest of the country. There have been no recorded earthquake epicenters within Concord.

Figure 16: State of Massachusetts Earthquake Probability Map



Source: SHMCP

Although New England has not experienced a damaging earthquake since 1755, seismologists state that a serious earthquake occurrence is possible. There are five seismological faults in Massachusetts, but there is no discernible pattern of previous earthquakes along these fault lines. Earthquakes occur without warning and may be followed by aftershocks. The majority of older

buildings and infrastructure were constructed without specific earthquake resistant design features.

Earthquakes are a hazard with multiple impacts beyond the obvious building collapse. Buildings may suffer structural damage which may or may not be readily apparent. Earthquakes can cause major damage to roadways, making emergency response difficult. Water lines and gas lines can break, causing flooding and fires. Another potential vulnerability is equipment within structures. For example, a hospital may be structurally engineered to withstand an earthquake, but if the equipment inside the building is not properly secured, the operations at the hospital could be severely impacted during an earthquake. Earthquakes can also trigger landslides. According to the SHMCAP there is a 10-15% chance of a magnitude 5 earthquake in a given ten-year period. Earthquakes are considered a community-wide hazard in Concord. Although new construction under the most recent building codes generally will be built to seismic standards, much of the development in the town pre-dates the most recent building code. Potential earthquake damage to Concord have been estimated using HAZUS-MH. Total building damages are estimated at \$563.1 million for a 5.0 magnitude earthquake and \$3.9 billion for a 7.0 magnitude earthquake. Other potential impacts of earthquakes such as sheltering and debris generation, are detailed in Table 32.

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## LAND USE AND DEVELOPMENT TRENDS

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### Existing Land Use

The most recent land use statistics available from the state are from aerial imagery completed in 2016. Some change has certainly occurred in Concord since then, but this data still provides the most detailed town-wide descriptions of land use available. Table 28 shows the acreage and percentage of land in Concord. If the primary residential categories are aggregated, residential uses make up about 35% of the area of the town. Commercial use makes up about 2%, and industrial less than 1%. Open land makes up a total of 4.7% of the land. The tax-exempt category represents about 37% of Concord’s total land use area. Most of this land is additional impervious areas, open space, unconsolidated shore, wetlands, and water.

**Table 27: Town of Concord Land Use (2016)**

Land Use Type	Acres	Approx. Percentage
Residential - single family	5,047	30.53%
Residential - multi-family	771	4.66%
Residential – other	4	0.02%
Commercial	319	1.93%
Mixed use – primarily residential	3	0.02%
Mixed use – primarily commercial	0	0
Mixed use - other	4	0.03%
Water	337	2.04%
Industrial	102	0.62%
Open land	781	4.72%

Land Use Type	Acres	Approx. Percentage
Unknown	15	0.09%
Right-of-way	917	5.54%
Tax exempt	6,141	37.15%
Forest	485	2.94%
Agriculture	779	4.71%
Recreation	827	5%
<b>Total</b>	<b>16,533</b>	<b>100%</b>

For more information on how the land use statistics were developed and the definitions of the categories, please go to <https://docs.digital.mass.gov/dataset/massgis-data-land-use-2005>.

**Economic Elements**

As of 2015, Concord’s economy includes 960 businesses and accounts for approximately 11,800 jobs. Key business districts include Town Center (Mildham, Walden Street, and historic sites), West Concord Center, Concord Depot/Thoreau School/Sudbury Road, Baker Avenue, Old Road to Nine Acre Corner at Route 2, Virginia Road, and Forest Ridge. Retailers, professional services, finance, and real estate are the most common business types. Many of these businesses, especially in Concord Center, also depend on tourism and visitor spending to remain viable. Agriculture is another key component of Concord’s economy, however, like other places in the state, this sector faces issues including labor availability, lack of housing for employees and transportation for seasonal workers, farm/agriculture economic viability, and ownership succession.<sup>3</sup>

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**NATURAL, CULTURAL, AND HISTORICAL RESOURCE AREAS**

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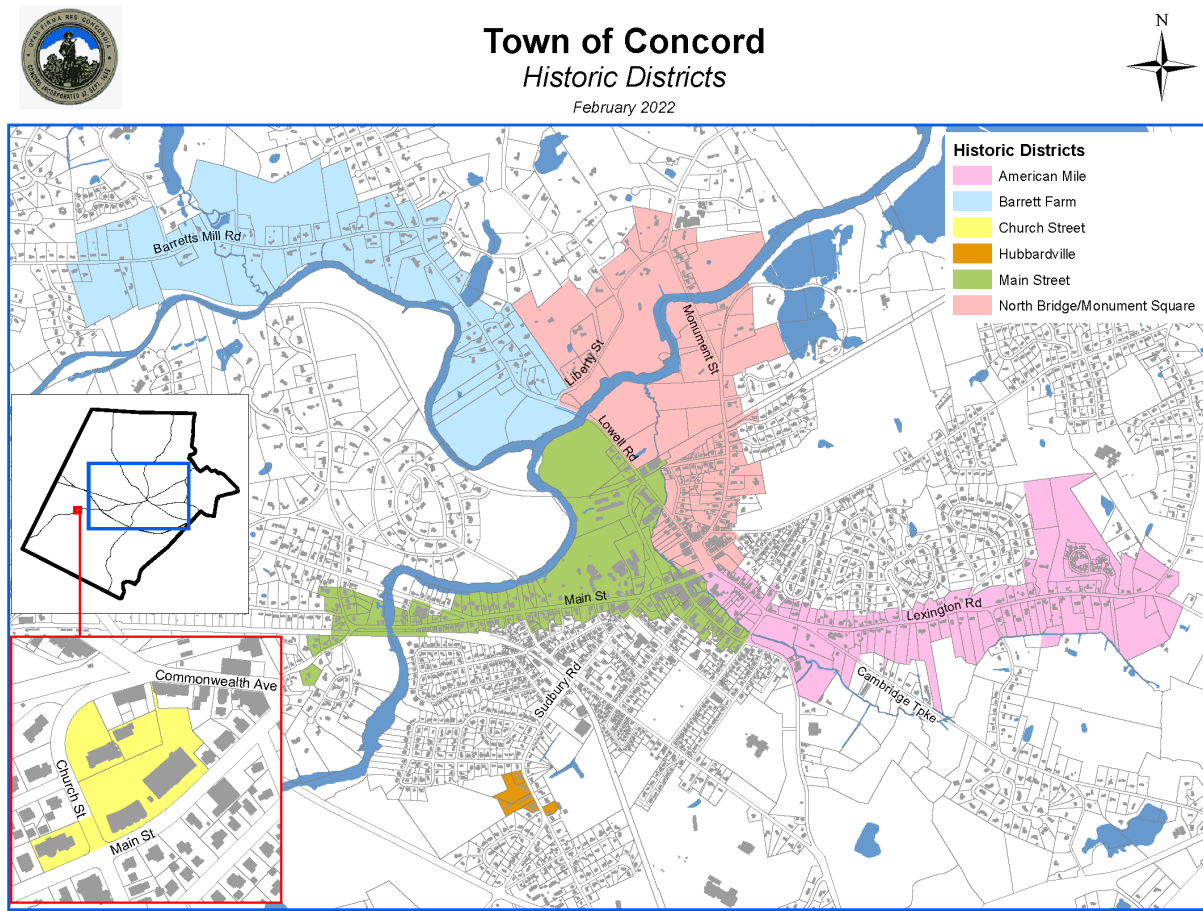
The Town of Concord has considerable natural, historic and cultural resources. Concord’s topography includes rolling forested and open landscapes, extensive low-lying wetlands and floodplain, rivers, streams, and vernal pools. Its glacial history is seen in the drumlins and kettle ponds that dot the landscape. In 1999, Congress designated the three rivers – Concord, Sudbury, and Assabet – as Wild and Scenic Rivers – for their “outstanding ecology, history, scenery, recreation values, and place in American literature.” The confluence of the Sudbury and Assabet Rivers to form the Concord River falls within the center of Concord. From this confluence, the Concord River flows to the Merrimac River. Much of the town is mapped by the Natural Heritage and Endangered Species Program as Estimated Habitat and Priority Habitat for rare flora and fauna. Significant protected open space includes the Great Meadows National Wildlife Refuge, the Minute Man National Historic Park, the Walden Pond State Reservation, and over 2,700 acres of locally conserved land.<sup>4</sup>

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3 Envision Concord Comprehensive Long Range Plan (2018), Section 4.2 “Economic Vitality Plan Element,” <https://www.concordma.gov/DocumentCenter/View/15432/Section-42-Economic-Vitality-Plan-Element>.

4 Envision Concord Comprehensive Long Range Plan (2018), Section 4.1 “Cultural Historic Plan Elements,” <https://www.concordma.gov/DocumentCenter/View/15431/Section-41-Cultural-Historic-Plan-Elements>.

Concord's 2015 Open Space Plan has identified nine "Large Natural Areas" that provide ecosystem services and serve as areas with the highest conservation values. Great Meadows, Estabrook Woods, and White Pond are among these areas.<sup>5</sup> Approximately 20% of the town's buildings are surveyed, listed, or protected in some way. The Town has 5 Local Historic Districts, 3 National Historic Districts and 18 structures on the National Register of Historic Houses and Districts. Concord is home to the Minute Man National Historic Park, including the town-owned North Bridge. Other important historic sites include the Old Hill and South Bury Grounds, the Thoreau birthplace, Walden Pond Reservation, and the Harrington, Town, Cuming, and Warden's Houses. Cultural resources include the Free Public Library and numerous theatres, music and arts organizations. Concord is home to 6 museums and houses open to the public, including the Concord Museum, the Concord Art Association, the Emerson and Orchard Houses, Old Manse and Wayside. Many of these sites have also been identified and included in this Plan's critical infrastructure and assets.



Source: <https://concordma.gov/1528/Map-of-Historic-Districts>

5 Open Space and Recreation Plan (2015), <https://www.concordma.gov/DocumentCenter/View/27974/2015-Open-Space-and-Recreation-Plan>.

## DEVELOPMENT TRENDS

Under current zoning, the Town of Concord is largely built out. Approximately 35% of the land is developed with residential, commercial and industrial buildings and more than 30% is permanently protected open space (federal, state, municipal and private). Much of the land area is occupied by existing residential neighborhoods, commercial districts and corridors, open space and recreational spaces, and conservation land and undevelopable wetlands. Most of the larger and more easily developed parcels in Concord have already been developed or protected as conservation land, so the development that is occurring in the Town largely infill development and redevelopment. Development trends throughout the metropolitan region are tracked by MassBuilds, MAPC’s Development Database, which provides an inventory of new development over the last decade. The database tracks both completed developments and those currently under planning and/or construction. The database includes 71 developments in the Town of Concord, of which 8 have been completed since 2017, and 3 are currently planned or under construction.

**Table 28: Summary of Concord’s Developments (2017-2022)**

Name	Status	Year	Project Type	Housing Units	Commercial SF
<b>Black Horse Place PRD</b>	Completed	2018	Residential	16 single-family 3 duplexes	0
<b>Concord Academy Bradford Hall</b>	Completed	2018	Institutional	0	8,000
<b>Millbrook Tarry</b>	Completed	2018	Commercial	0	15,000
<b>506 Old Bedford Road</b>	Completed	2018	Residential	8 single family units, 1 at 80% affordable	0
<b>Concord Museum Expansion</b>	Completed	2019	Institutional	0	13,000
<b>Black Birch Phase II</b>	Completed	2020	Residential	16 single-family	0
<b>Fenn School</b>	Completed	2020	Institutional	0	16,030
<b>1440 Main Street Planned Residential Development (PRD)</b>	PRD was not approved, and the proposed Subdivision Plan decision has been appealed. Future residential development is not defined yet.	N/A	Residential	TBD	0
<b>13B Commonwealth Avenue</b>	Planning	2020	Commercial	0	6,000
<b>McCaller Lane Subdivision</b>	Planning	2022	Residential	5 multi-family	0

## POTENTIAL FUTURE DEVELOPMENT

The Town of Concord’s Department of Planning and Land Management has identified the following potential future development projects in the next five years, as listed in Table 29 below. These potential future land uses are expected to take place on redevelopment sites. As new development and redevelopment occurs, it will be subject to the latest building code requirements and zoning regulations pertaining to the Town’s identified natural hazards, including wind, earthquakes, and flooding.

**Table 29: Summary of Concord’s Potential Future Developments for the Next Five Years**

Name	Status	Year	Project Type	Housing Units	Commercial SF
<b>Concord Academy Centennial Arts Center</b>	Planning	2023	Institutional	0	36,826
<b>Concord Art Association - addition</b>	Planning	2023	Institutional	0	2,593
<b>48Y Fitchburg Turnpike PRD</b>	Planning	2023	Residential	6	
<b>406 Old Marlboro Road/Assabet River Bluff</b>	Planning	2024/25	Residential	3	
<b>Junction Village</b>	Planning	2027	Residential	TBD	

To characterize potential change in the Town’s vulnerability associated with new developments, a GIS mapping analysis was conducted which overlaid the development sites with the FEMA Flood Insurance Rate Map. The analysis indicated two (2) sites partially located in AE zone (1% Annual Chance of Flooding): Junction Village and 48Y Fitchburg Turnpike PRD. Parcels that are partially in a flood zone typically include a portion of the site that is not built on. All these potential development sites have “Low Incidence” landslide risk. Other hazards such as wind speed and snowfall rates do not vary across Concord. Overall, Concord’s potential future development would not significantly increase the Town’s vulnerability if existing regulations were adhered to.

## CRITICAL FACILITIES & INFRASTRUCTURE IN HAZARD AREAS

Critical facilities and infrastructure include facilities that are important for disaster response and evacuation (such as emergency operations centers, fire stations, water pump stations, communications, and electricity) and facilities where additional assistance might be needed during an emergency (such as nursing homes, elderly housing, day care centers, etc.). There are **142 critical facilities** identified throughout the Town of Concord. These are listed in Table 30 and are shown in Figures 17, as well as on the maps in Appendix B.

### **Explanation of Columns in Table 30**

- **Column 1: ID #:** The first column in Table 30 is an ID number which appears on the maps that are part of this plan. See Appendix B.
- **Column 2: Name:** The second column is the name of the site.
- **Column 3: Type:** The third column indicates what type of site it is.
- **Column 4: FEMA Flood Zone:** The fourth column addresses the risk of flooding. A “No” entry in this column means that the site is not within any of the mapped risk zones on the Flood Insurance Rate Maps (FIRM maps). If there is an entry in this column, it indicates the type of flood zone. as follows:
  - **Zone A** Areas subject to inundation by the 1-percent-annual-chance flood event. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
  - **Zone AE** (1% annual chance) Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. Zones AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. Mandatory flood insurance purchase requirements apply
  - **Zone AH** Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are 1–3 feet. BFEs derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.
  - **Zone X** (0.2% annual chance) Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. (formerly Zone B)
  - **Zone VE** (1% annual chance) - Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
- **Column 5: Locally Identified Area of Flooding:** The fifth column indicates the risk of flooding in local hazard areas. If there is an entry in this column, it indicates the local hazard area.
- **Column 6:** Hot spots indicates areas that are within the 5% of hottest areas in the MAPC region based on satellite data from 2016.
- **Column 7:** The seventh column indicates the risk of brushfire. If there is an entry in this column, it indicates the local hazard area.
- **Column 8:** This column indicates locations subject to inundation at Mean Higher High Water with 3 feet of sea level rise.

**Table 30: Critical Facilities and Relationship to Hazard Areas**

ID	NAME	TYPE	FEMA Flood Zone	Locally Identified Flood Area	Hot Spot	Brushfire Risk
1.	Pine Hill Reservoir	Reservoir				
2.	Concord Carlisle Regional High School	School			x	
3.	Emerson Hospital	Hospital				
4.	Alcott School	School				
5.	Thoreau School	School				
6.	Willard School	School				
7.	Peabody Middle School	School				
8.	Sanborn Middle School	School				
9.	Concord Academy	School		x		
10.	Fenn School	School				
11.	Nashoba Brooks School	School				
12.	Middlesex School	School				
13.	Rivercrest Deaconess/Newbury Court	Nursing Home				
14.	Walden Rehabilitation and Nursing Center	Nursing Home				
15.	CVS	Pharmacy				
16.	Rite Aid	Pharmacy	X: 0.2% Annual Chance of Flooding	x		
17.	West Concord Pharmacy	Pharmacy			x	
18.	Congregation Kerem Shalom	Place of Assembly				
19.	Redeemer Presbyterian Church	Place of Assembly			x	
20.	First Church of Christ	Place of Assembly		x		
21.	First Parish in Concord	Place of Assembly		x		
22.	New Life Community Church	Place of Assembly				
23.	Holy Family Parish	Place of Assembly		x		
24.	Trinitarian Congregational Church	Place of Assembly		x		
25.	Trinity Episcopal Church	Place of Assembly				
26.	West Concord Union Church	Place of Assembly				
27.	Concord Municipal Light Plant	Municipal				
28.	Concord Public Works	Municipal	AE: 1% Annual Chance of Flooding; with BFE	x		
29.	Concord Town House	Municipal	x	x		
30.	Concord Planning & Land Management	Municipal	AE: 1% Annual Chance of Flooding; with BFE	x		
31.	Concord Police Department	Police Station		x		
32.	State Police Concord	Police Station				

ID	NAME	TYPE	FEMA Flood Zone	Locally Identified Flood Area	Hot Spot	Brushfire Risk
33.	Concord Fire Department #1	Fire Station				
34.	Concord Fire Department #2	Fire Station		x		
35.	Hunt Recreation Center	Daycare				
36.	Concord Carousel Day Care	Daycare				
37.	Concord Children's Center	Daycare				
38.	Concord Children's Center	Daycare				
39.	Concord Recreation	Daycare				
40.	Milldam Nursery School	Daycare		x		
41.	Minuteman ARC	Daycare			x	
42.	The Barn Coop Nursery School	Daycare		x		
43.	The Children's Meetinghouse Day Care	Daycare				
44.	MCI - Concord	Correctional Facility			x	
45.	Northeastern Correctional Center	Correctional Facility			x	
46.	Walden Street School	Residential Board				
47.	Annursnac Hill Tower	Communication Tower				
48.	Annursnac Hill Repeater Tower	Communication Tower				
49.	Annursnac Hill Reservoir	Water Storage Tank / Reservoir				
50.	Concord District Court	Court House				
51.	Hugh Cargill Water Pump Station	Water Pump Station				
52.	Robinson Water Pump Station	Water Pump Station				
53.	Robinson Public Well	Well	AE: 1% Annual Chance of Flooding; with BFE			
54.	Second Division Water Pump Station	Water Pump Station	No			
55.	White Pond Water Pump Station	Water Pump Station	No			
56.	Jennie Duggan Water Treatment Plant	Water Pump Station	AE: 1% Annual Chance of Flooding; with BFE			
57.	Deaconess Water Pump Station	Water Pump Station	X: 0.2% Annual Chance of Flooding			
58.	Concord Wastewater Treatment	Wastewater Treatment	No			
59.	Bedford Street Sewer Pump Station	Sewer Pump Station	No			
60.	Lowell Road Sewer Pump Station	Sewer Pump Station	AE: 1% Annual Chance of Flooding; with BFE	x		

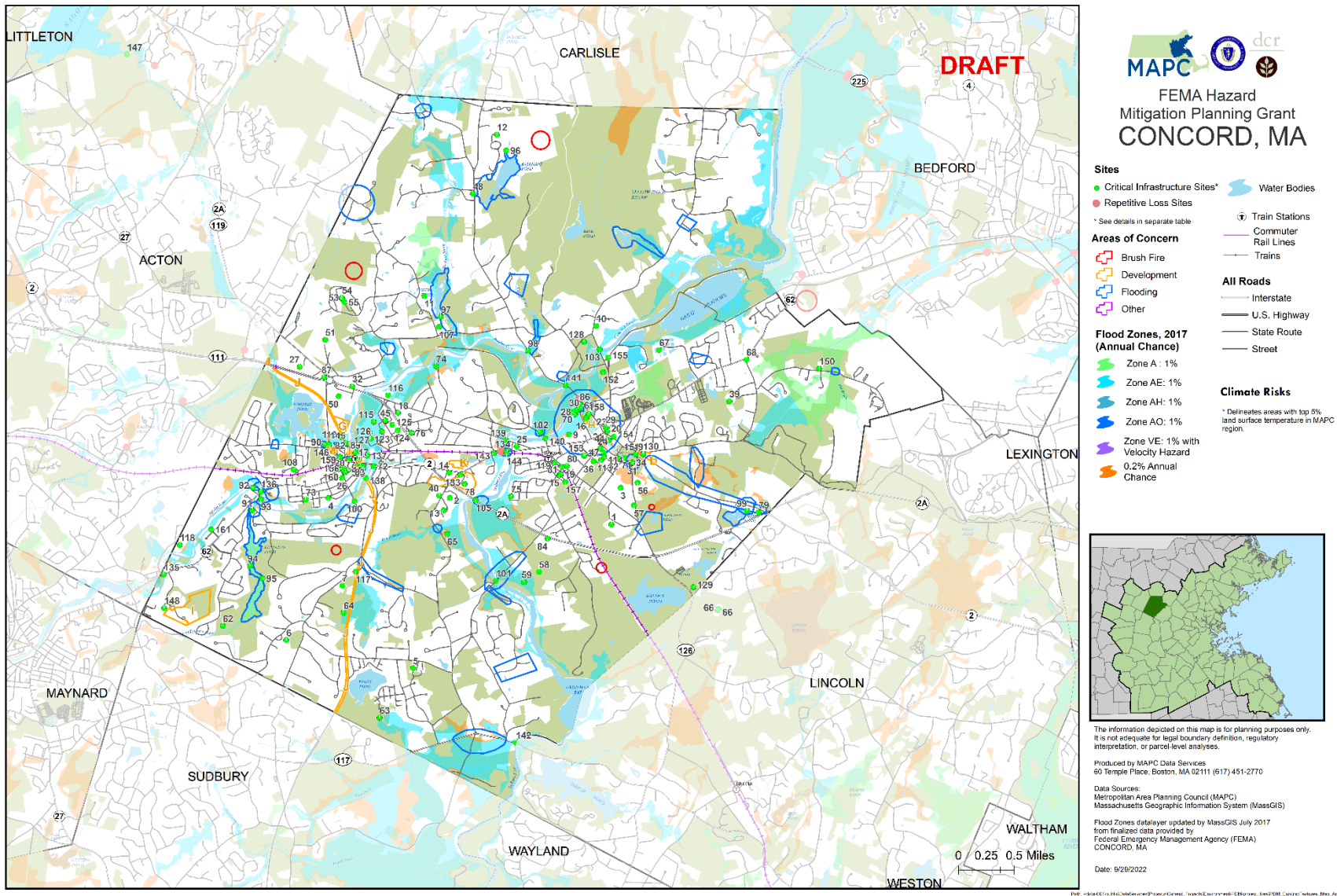
ID	NAME	TYPE	FEMA Flood Zone	Locally Identified Flood Area	Hot Spot	Brushfire Risk
61.	Concord Water/Sewer/Hiway Department	Municipal	AE: 1% Annual Chance of Flooding; with BFE	x		
62.	Laurel Street Sewer Pump Station	Sewer Pump Station	X: 0.2% Annual Chance of Flooding			
63.	Assabett Sewer Pump Station	Sewer Pump Station	AE: 1% Annual Chance of Flooding; with BFE			
64.	Cousins Park Sewer Pump Station	Sewer Pump Station	No			
65.	Park Lane Sewer Pump Station	Sewer Pump Station	AE: 1% Annual Chance of Flooding; with BFE			
66.	Pilgrim Road Sewer Pump Station	Sewer Pump Station				
67.	Gifford Land Sewer Pump Station	Sewer Pump Station				
68.	Harvey Wheeler Community Center	Place of Assembly				
69.	Concord Health Care	Nursing Home			x	
70.	Mobil Gas Station	Hazardous Material Site		x		
71.	Sudbury Road Mobil Gas Station	Hazardous Material Site				
72.	Cumberland Farm Gas Station	Hazardous Material Site			x	
73.	Commonwealth Avenue Gulf Gas Station	Hazardous Material Site				
74.	Colonial Motors Gas Station	Hazardous Material Site				
75.	Route 2 Gas Station	Hazardous Material Site				
76.	Concord Oil Company	Hazardous Material Site	AE: 1% Annual Chance of Flooding; with BFE	x		
77.	Exxon Gas Station (Rotary)	Hazardous Material Site				
78.	Concord Park Assisted Living	Assisted Living				
79.	Warner's Pond Dam	Dam	AE: Regulatory Floodway	x		
80.	Kennedy's Pond Dam	Dam	A: 1% Annual Chance of Flooding; no BFE	x		
81.	Damondale Dam	Dam	AE: Regulatory Floodway	x		
82.	Harrington Ave Dam	Dam	AE: 1% Annual Chance of Flooding; with BFE	x		

ID	NAME	TYPE	FEMA Flood Zone	Locally Identified Flood Area	Hot Spot	Brushfire Risk
83.	Lower Musquetaquid Pond Dam	Dam	A: 1% Annual Chance of Flooding; no BFE	x		
84.	Upper Musquetaquid Pond Dam	Dam	A: 1% Annual Chance of Flooding; no BFE	x		
85.	Bateman's Farm Pond Dam	Dam				
86.	Barretts Mill Road Dam	Dam		x		
87.	Dakin Brook Dam / Macone Pond Dam	Dam	AE: 1% Annual Chance of Flooding; with BFE			
88.	Crosby Pond Dam	Dam	AE: Regulatory Floodway	x		
89.	Pine Street Bridge	Bridge	AE: Regulatory Floodway	x		
90.	Heath's Bridge	Bridge	AE: Regulatory Floodway	x		
91.	Nashawtuc Road – Nashawtuc Bridge	Bridge	AE: 1% Annual Chance of Flooding; with BFE	x		
92.	Flint Bridge	Bridge	AE: Regulatory Floodway			
93.	Route 2 Bridge over Sudbury River / Concord Turnpike Bridge	Bridge	AE: Regulatory Floodway	x		
94.	Pine Hill Reservoir	Water Storage Tank / Reservoir				
95.	Little Sprouts Day Care Center	Daycare				
96.	Concord Montessori	School				
97.	Dialysis Clinic Inc.	Medical Facility	X: 0.2% Annual Chance of Flooding			
98.	Concord Housing Authority/Peter Bulkeley	Housing Authority				
99.	Concord Housing Authority/Everett Gardens	Housing Authority				
100.	Marriott Extended Stay	Hotel	AE: 1% Annual Chance of Flooding; with BFE		x	
101.	Best Western	Hotel				
102.	Fiber Node Point (Substation 479)	Utility				
103.	Public School Bus Depot	Transportation Facility				
104.	West Concord MBTA Station	Transportation Facility			x	
105.	Concord MBTA Station	Transportation Facility			x	

ID	NAME	TYPE	FEMA Flood Zone	Locally Identified Flood Area	Hot Spot	Brushfire Risk
106.	Harvard Vanguard	Medical Facility	AE: 1% Annual Chance of Flooding; with BFE		x	
107.	Emerson Specialty Care	Medical Facility			x	
108.	Emerson Specialty Care	Medical Facility			x	
109.	300 Baker Ave Offices	Office	AE: 1% Annual Chance of Flooding; with BFE		x	
110.	Emerson Hospital PT/Labs	Medical Facility	AE: 1% Annual Chance of Flooding; with BFE		x	
111.	Minuteman National Park Headquarters	Park Headquarters				
112.	Walden Pond Reservation Hdq./State Police Mounted Unit	Park Headquarters				
113.	Concord Museum	Museum				
114.	Fiber Node Point (Substation 223)	Utility				
115.	Main Street at South Bridge Boathouse (Sudbury River)	Bridge	AE: Regulatory Floodway	x		
116.	Rt 62 near Knox Trail at Acton Town Line (Assabet River) (bridge)	Bridge	AE: Regulatory Floodway			
117.	Rt 62 at Damon Mill (Assabet River)	Bridge	AE: Regulatory Floodway			
118.	MBTA Commuter Rail Bridge (Assabet River)	Bridge	AE: Regulatory Floodway			
119.	Bruce Freeman Rail Trail (Assabet River)	Bridge	AE: Regulatory Floodway			
120.	Elm Street Bridge (Sudbury River)	Bridge	AE: Regulatory Floodway			
121.	Nashawtuc Rd (Sudbury River)	Bridge	AE: 1% Annual Chance of Flooding; with BFE			
122.	Lowell Rd (Concord River)	Bridge	AE: Regulatory Floodway			
123.	Rt 117 at Lincoln Town Line (Sudbury River)	Bridge	AE: Regulatory Floodway			
124.	MBTA Commuter Rail Bridge over Rt 62	Bridge		x		
125.	MBTA Commuter Rail Bridge (Sudbury River)	Bridge	AE: Regulatory Floodway	x		
126.	Bruce Freeman Trail (Nashoba Brook)	Bridge	AE: Regulatory Floodway			
127.	Pail Factory Bridge / Commonwealth Ave (Nashoba Brook)	Bridge	AE: 1% Annual Chance of Flooding; with BFE			

ID	NAME	TYPE	FEMA Flood Zone	Locally Identified Flood Area	Hot Spot	Brushfire Risk
128.	Nagog Pond Treatment Plant	Water Treatment Plant				
129.	Substation 219	CMLP				
130.	Concord Museum	Cultural Resources				
131.	Thoreau Farm	Cultural Resources				
132.	Ralph Waldo Emerson House	Cultural Resources				
133.	The Old Manse	Cultural Resources				
134.	The Umbrella Arts Center	Cultural Resources				
135.	Concord Art Association	Cultural Resources		x		
136.	The Robbins House	Cultural Resources				
137.	Concord Youth Theatre	Cultural Resources				
138.	Crosby's Marketplace	Grocery Store				
139.	The Concord Market	Grocery Store	X: 0.2% Annual Chance of Flooding	x		
140.	Debra's Natural Gourmet	Grocery Store			x	
141.	Social Services	Municipal				
142.	Knox Trail	Municipal				

Figure 17: Identified Critical Infrastructure and Facilities in Concord



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## VULNERABILITY ASSESSMENT

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The purpose of the vulnerability assessment is to estimate the extent of potential damage from natural hazards of varying types and intensities. A vulnerability assessment and estimation of damages was performed for hurricanes, earthquakes, and flooding through the HAZUS-MH software.

### INTRODUCTION TO HAZUS-MH

HAZUS- MH (multiple-hazards) is a computer program developed by FEMA to estimate losses due to a variety of natural hazards. The following overview of HAZUS-MH is taken from the FEMA website. For more information on the HAZUS-MH software, go to <https://www.fema.gov/hazus/>

*“HAZUS-MH is a nationally applicable standardized methodology and software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. HAZUS-MH was developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS). Loss estimates produced by HAZUS-MH are based on current scientific and engineering knowledge of the effects of hurricane winds, floods, and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing and evaluating mitigation plans and policies as well as emergency preparedness, response and recovery planning.*

*HAZUS-MH uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods and earthquakes on populations.”*

There are three modules included with the HAZUS-MH software: hurricane wind, flooding, and earthquakes. There are also three levels at which HAZUS-MH can be run. Level 1 uses national baseline data and is the quickest way to begin the risk assessment process. The analysis that follows was completed using Level 1 data. Level 1 relies upon default data on building types, utilities, transportation, etc. from national databases as well as census data. While the databases include a wealth of information on the Town of Concord, it does not capture all relevant information. In fact, the HAZUS training manual notes that the default data is “subject to a great deal of uncertainty.”

However, for the purposes of this plan, the analysis is useful. This plan is attempting to generally indicate the possible extent of damage due to certain types of natural disasters and to allow for a comparison between different types of disasters. Therefore, this analysis should be considered a starting point for understanding potential damage from the hazards.

## ESTIMATED DAMAGES FROM HURRICANES

The HAZUS software was used to model potential damages to the community from a 100-year and 500-year hurricane event; storms that are 1% and 0.2% likely to happen in a given year, and roughly equivalent to a Category 2 and Category 4 hurricane. The damage caused by these hypothetical storms were modeled as if the storm track passed directly through the town, bringing the strongest winds and greatest damage potential.

Though there are no recorded instances of a hurricane equivalent to a 500-year storm passing through Massachusetts, this model was included in order to present a reasonable “worst case scenario” that would help planners and emergency personnel evaluate the impacts of storms that might be more likely in the future, as we enter into a period of more intense and frequent storms.

**Table 31: HAZUS Estimated Damages from Hurricanes**

	<b>Category 2 (100-yr)</b>	<b>Category 4 (500-yr)</b>
<b>Building Characteristics</b>		
Estimated total number of buildings	6,555	
Estimated total building replacement value (2014 \$)	\$3,750,174,000	
<b>Building Damages</b>		
# of buildings sustaining minor damage	128	837
# of buildings sustaining moderate damage	8	115
# of buildings sustaining severe damage	0	5
# of buildings destroyed	0	2
<b>Population Needs</b>		
# of households displaced	0	3
# of people seeking public shelter	0	0
<b>Debris</b>		
Building debris generated (tons)	2,506	7,891
Tree debris generated (tons)	5,594	13,753
# of truckloads to clear building debris (25 tons/truck)	22	118
<b>Value of Damages</b>		
Total property damage (buildings and content)	\$19,118,230	\$246,111,000
Total losses due to business interruption	\$442,880	\$26,551,660

## ESTIMATED DAMAGES FROM EARTHQUAKES

The HAZUS earthquake module allows users to define an earthquake magnitude and model the potential damages caused by that earthquake as if its epicenter had been at the geographic center of the study area. For the purposes of this plan, two earthquakes were selected: magnitude

5.0 and magnitude 7.0. Historically, major earthquakes are rare in New England, though a magnitude 5.0 event occurred in 1963.

**Table 32: HAZUS Estimated Damages from Earthquakes**

	Magnitude 5.0	Magnitude 7.0
<b>Building Characteristics</b>		
Estimated total number of buildings	6,555	
Estimated total building replacement value (2014 \$)	\$9,206,000,000	
<b>Building Damages</b>		
# of buildings sustaining slight damage	1,904	200
# of buildings sustaining moderate damage	1,045	1,338
# of buildings sustaining extensive damage	298	1,857
# of buildings completely damaged	78	3,146
<b>Population Needs</b>		
# of households displaced	239	3,539
# of people seeking public shelter	121	1,798
<b>Debris</b>		
Building debris generated (tons)	79,000	608,000
# of truckloads to clear debris (@ 25 tons/truck)	3,160	24,320
<b>Value of Damages</b>		
Total property damage	\$563,160,000	\$3,955,620,000
Total losses due to business interruption	\$101,368,800	\$514,230,600

### ESTIMATED DAMAGES FROM FLOODING

The HAZUS flooding module allows users to model the potential damage caused by a 100-year flood event and a 500-year flood event.

**Table 33: HAZUS Estimated Damages from Flooding**

	100-Year Flood	500-Year Flood
<b>Building Characteristics</b>		
Estimated total number of buildings	6,555	
Estimated total building replacement value (2014 \$)	\$3,750,000,000	
<b>Building Damages</b>		
# of buildings sustaining limited damage	228	286
# of buildings sustaining moderate damage	133	209
# of buildings sustaining extensive damage	5	20
# of buildings substantially damaged	0	0

	100-Year Flood	500-Year Flood
<b>Population Needs</b>		
# of households displaced	534	730
# of people seeking public shelter	50	91
<b>Value of Damages</b>		
Total property damage	\$92,310,000	\$135,070,000
Total losses due to business interruption	\$160,760,000	\$207,240,000

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## IMPACTS ON PEOPLE

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As some areas of Concord will be more vulnerable than others, it is also true that climate change and natural hazards will not affect all residents equally. As noted in Concord's 2019 Municipal Vulnerability Preparedness (MVP) Planning Report, confined populations (in schools and hospitals), seniors, people with disabilities and/or with pre-existing health conditions, and lower-income households were consistently identified as populations in community who are most vulnerable to extreme heat, poor air quality, and isolation.

Individuals with physical mobility constraints may need additional assistance with emergency responses. Older adults are often at elevated risk due to a high prevalence of pre-existing and chronic conditions. People who live in substandard housing and in housing without air conditioning have increased vulnerability to heat-related illnesses. Low-income households are often more susceptible to financial shocks, which can occur after extreme weather, and which can impact financial security and the ability to secure safe shelter and meet medical needs. Approximately 2.7% of Concord residents live below poverty level; and 2% of the senior population are below poverty level.<sup>6</sup>


Social isolation can also influence vulnerability, as it limits access to critical information, municipal resources, and social support systems. In the absence of strong social support networks and translation services, people living alone and those with limited English language proficiency may experience social isolation. Certain occupations, particularly those who work outdoors, or in unregulated temperatures, are at increased risk for heat-related illnesses.


In developing mitigation measures the Town of Concord will consider the different needs of all residents.


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<sup>6</sup> American Community Survey, 2019

## RISK ASSESSMENT SUMMARY

CLIMATE CHANGE	NATURAL HAZARD	PRIORITY (H/M/L)	KEY CONCERNS SOCIETY	KEY CONCERNS BUILT ENVIRONMENT	KEY CONCERNS NATURAL RESOURCES
<p style="text-align: center;"><b>Changes in Precipitation</b></p> 	<p style="text-align: center;">Inland Flooding</p>	H	<ul style="list-style-type: none"> <li>• Damage to buildings/homes in historic districts</li> <li>• Inland flooding could lead to the potential loss of historic artifacts or historic items that can't be replaced</li> <li>• List public health and economic damages to the town when an extreme event occurs</li> </ul>	<ul style="list-style-type: none"> <li>• Flooding of major arteries, emergency routes, key facilities, bridges (ex: South Bridge; police/fire departments in floodplain)</li> <li>• Residential basements</li> <li>• Concord has about 150 culverts all over town. Had a recent failure of a culvert that was significant - impacted travel and were close to more serious impacts to gas mains, water mains, and other infrastructure. Generally, it would also impact significant historic buildings in Concord Center if the Mill Dam Culvert fails.</li> <li>• Dam failures could result in downstream loss of life and property damage</li> <li>• Flooding also introduces the risk of infiltration of wastewater into the water system</li> <li>• Uprooted trees may cause culvert and bridge blockages</li> </ul>	<ul style="list-style-type: none"> <li>• Sedimentation and erosion, leading to degraded habitats, clogged rivers and streams, and adverse effects to aquatic organisms</li> <li>• Contaminated floodwaters can pollute rivers and streams</li> <li>• Uprooted trees along rivers may destroy or degrade riparian wildlife corridors</li> </ul>

CLIMATE CHANGE	NATURAL HAZARD	PRIORITY (H/M/L)	KEY CONCERNS SOCIETY	KEY CONCERNS BUILT ENVIRONMENT	KEY CONCERNS NATURAL RESOURCES
	Drought	H	<ul style="list-style-type: none"> <li>Increased risk of water supply shortage</li> <li>Impact to farm operations, plant nursery, etc. (water use restriction)</li> </ul>	<ul style="list-style-type: none"> <li>Infrastructure – turbines can't operate if they're exposed because of low water levels</li> </ul>	<ul style="list-style-type: none"> <li>Stress on surface and groundwater supplies</li> <li>Stress on terrestrial and aquatic ecosystems due to reduced stream baseflows and drying wetlands, which all fisheries and wildlife rely on</li> <li>Stress on agricultural crop production from reduced soil moisture, and water supplies → Concord enacted water use restrictions annually</li> <li>Loss of plant life, reduced habitat quality and biodiversity</li> <li>Less natural resistance to brushfires</li> </ul>
	Landslide	M/L		<ul style="list-style-type: none"> <li>Potentially buildings built on expansive soil could be impacted.</li> <li>There are 2 underground transmission lines that service the entire town.</li> </ul>	<ul style="list-style-type: none"> <li>Potential filling of wetlands and rivers; loss of wildlife habitat</li> </ul>
<p><b>Rising Temperatures</b></p> 	Average and Extreme Temperatures		<ul style="list-style-type: none"> <li>Heat related illness and deaths – particularly high risk for seniors and those who are medically vulnerable.</li> <li>Increase energy costs</li> </ul>	<ul style="list-style-type: none"> <li>Increase energy demand – stress on infrastructure → aging conduits for service and without redundancy</li> </ul>	<ul style="list-style-type: none"> <li>Loss of livestock and crops</li> </ul>

CLIMATE CHANGE	NATURAL HAZARD	PRIORITY (H/M/L)	KEY CONCERNS SOCIETY	KEY CONCERNS BUILT ENVIRONMENT	KEY CONCERNS NATURAL RESOURCES
	Wildfires	M/L	<ul style="list-style-type: none"> <li>Smoke from fires could result in poor air quality → health risk for those with pre-existing conditions and/or respiratory illnesses.</li> </ul>		<ul style="list-style-type: none"> <li>Brushfire hazard areas have historically been the same places – Hapgood Wright Town Forest, Spencer Brook Valley, places on Old Marlborough Rd near Sudbury line. The absence of brushfires over time can lead to larger wildfires in future.</li> </ul>
	Invasive species	M/H	<ul style="list-style-type: none"> <li>Rising temperatures will mean an increase in invasive species.</li> <li>Shift in climate also creates more favorable habitat for ticks and mosquitos and disease vectors (EEE). Concord is especially concerned about ticks, because it's happening already.</li> </ul>		<ul style="list-style-type: none"> <li>Introduction of exotic pests (e.g., Asian long-horned beetle, emerald ash-borer, and hemlock wooly adelgid) can severely impact the composition of Concord's forests and woodlands</li> <li>Increased presence of invasive species alters habitats, reduce native plant populations, and reduce biodiversity</li> <li>Invasives that outcompete native species can result in species extinction, particularly to vulnerable, rare species</li> </ul>
<b>Extreme Weather</b> 	Hurricanes / Tropical Storms  Severe Winter Storms	H	<ul style="list-style-type: none"> <li>Disruption to the movement of goods, which hinders local economy</li> <li>Dependence on energy to power life-sustaining machines, access critical</li> </ul>	<ul style="list-style-type: none"> <li>Downed trees and snow-packed or icy roads disrupt emergency management systems, delay commutes, etc.</li> <li>Concord Municipal Light Plant's systems vulnerable to intense storms</li> </ul>	

CLIMATE CHANGE	NATURAL HAZARD	PRIORITY (H/M/L)	KEY CONCERNS SOCIETY	KEY CONCERNS BUILT ENVIRONMENT	KEY CONCERNS NATURAL RESOURCES
			<p>information databases (prescription), keep the heat on during winter, communicate with emergency management and family (losing cell phone charge), etc.</p> <ul style="list-style-type: none"> <li>• Damage to buildings/homes in historic districts</li> </ul>	<ul style="list-style-type: none"> <li>• Increased frequency of power outages</li> <li>• Damage infrastructure like roads, bridges, and private property</li> </ul>	
	Tornadoes	M/H	<ul style="list-style-type: none"> <li>• Significant property damage and household displacement</li> <li>• Destruction of historical and cultural resources in Concord.</li> </ul>	<ul style="list-style-type: none"> <li>• In 2016, EF-1 tornado 1 mile from downtown – it was short lived but did a lot of damage. If it went down Main Street, it would have wiped out the historic downtown.</li> </ul>	
	Other (Wind/Thunderstorms)	H	<ul style="list-style-type: none"> <li>• Damage to buildings and homes in historic districts</li> </ul>		<ul style="list-style-type: none"> <li>• Risk to 23,000 public shade trees in town. They're aging. This town prides itself on the urban forest and wants to maintain the tree canopy.</li> </ul>
<b>Non-Climate Hazard</b>	Earthquake	L	<ul style="list-style-type: none"> <li>• Significant property damage and household displacement</li> </ul>	<ul style="list-style-type: none"> <li>• Damage to utility infrastructure (especially underground)</li> </ul>	

## SECTION 5: HAZARD MITIGATION GOALS

The Local Hazard Mitigation Planning Team reviewed and discussed the goals from the 2017 Hazard Mitigation Plan for the Town of Concord. All the goals are considered critical for the town, and they are not listed in order of importance. Prior to the Hazard Mitigation Plan update process, the Town of Concord has also developed a climate action and adaptation planning process as part of the state Municipal Vulnerability Preparedness (MVP) program. The Local HMP Team decided to incorporate climate considerations as noted in Goals 4, 5, and 9.

**Goal 1:** Prevent and reduce the loss of life, injury, public infrastructure, public health impacts and property damage resulting from all major natural hazards.

**Goal 2:** Identify and seek funding for measures to mitigate or eliminate each known significant hazard area.

**Goal 3:** Integrate hazard mitigation planning as an integral factor in all relevant municipal departments, committees, and boards.

**Goal 4:** Prevent and reduce the damage to public infrastructure and resources resulting from all hazards, especially the critical services for climate vulnerable populations.

**Goal 5:** Work with business community, major institutions, and non-profits to develop, review and implement the hazard mitigation plan that ensures prompt recovery and continuity of operations during and post emergency events or disasters.

**Goal 6:** Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation, communications, and solutions for hazards affecting multiple communities.

**Goal 7:** Ensure that future development meets federal, state, and local standards for preventing and reducing the impacts of natural hazards.

**Goal 8:** Take maximum advantage of resources from FEMA and MEMA to communicate and educate Town staff and the public about hazard mitigation.

**Goal 9:** Consider the current and future impacts of climate change. Incorporate climate sustainability and resiliency in hazard mitigation planning.

## SECTION 6: EXISTING MITIGATION MEASURES

The existing protections in the Town of Concord are a combination of zoning, land use, and environmental regulations, infrastructure maintenance, and drainage infrastructure improvement projects. Infrastructure maintenance generally addresses localized drainage clogging problems, while large scale capacity problems may require pipe replacement or invert elevation modifications. These more expensive projects are subject to the capital budget process and lack of funding is one of the biggest obstacles to execute and complete some of these.

The Town's existing mitigation measures, which were included in the 2017 Plan, are listed by hazard type here and are summarized in Table 34 below. Many upgrades to existing measures have occurred and are noted in the following sections.

### EXISTING TOWN-WIDE MITIGATION FOR FLOOD-RELATED HAZARDS

It is an ongoing effort for Concord to address and minimize potential flooding and impacts from flooding, and to maintain existing drainage infrastructure. Existing town-wide mitigation measures include the following:

#### ***National Flood Insurance Program (NFIP)***

Concord participates in the National Flood Insurance Program (NFIP) with 106 policies in force. The Town complies with the NFIP by enforcing floodplain regulations, maintaining up-to-date floodplain maps, and providing information to property owners and builders regarding floodplains and building requirements. FEMA maintains a database on flood insurance policies and claims. The following information is provided for the Town of Concord, provided by MEMA on September 6, 2022:

Flood insurance policies in force	106
Coverage amount of flood insurance policies	\$35,239,700
Closed losses (Losses that have been paid)	61
Total payments (Total amount paid on losses)	\$372,956

The Town complies with the NFIP by enforcing floodplain regulations, maintaining up-to-date floodplain maps, and providing information to property owners and builders regarding floodplains and building requirements.

#### **Massachusetts State Building Code**

The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing, and snow loads. The town has adopted the state building code.

#### ***GIS inventory***

Engineering staff developed a Drainage System Inventory and integrated the data into the Town's Geographical Information System (GIS).

### ***Catch Basins and Street Sweeping***

Catch basins on public roads and property are cleaned annually. Street sweeping also occurs on an annual basis, and more often in the village center areas.

### ***Infrastructure Maintenance***

The Public Works Department provides maintenance to culverts, drainage pipes, and other drainage infrastructure on an as-needed basis. Drainage maintenance activities are coordinated with the Division of Natural Resources and are performed under the general maintenance permit issued by the Natural Resources Commission.

### ***Stormwater/Drainage Upgrade Plan***

Concord has established a multi-year program to fund and improve drainage and has a 20-Year Stormwater/Drainage Management Plan to address a backlog of deferred repairs and the need for replacement of approximately 17 large culverts. Since 2017, six projects including 10 culvert replacements have been completed.

### ***Beaver Management***

The Town manages for beavers on a case-by-case basis, when there is a threat to public health or safety. Options include trapping, beaver dam breaching or removal, or installation of a water flow device. A permit for trapping is required by state law through the local Board of Health, and dam breach/removals, as well as installation of water flow devices, require a permit from the Natural Resources Commission. Water flow devices (beaver deceivers or pond levelers) have been installed at several locations in Town (Hutchins Pond, Fairyland Pond, and Westford Road). The Town uses an interdepartmental approach to manage beavers.

### ***Wetlands Protection Act and Concord Wetlands Bylaw***

The state and local wetland law and bylaw require approval and compensation for activities within the floodplain.

### ***Flood Plain Conservancy District***

Concord's Zoning has a Flood Plain Conservancy District (Section 7.2) that restricts certain activities and requires a special permit for activities located within a flood zone.

### ***Wetlands Conservancy District***

Concord's Zoning has a Wetlands Conservancy District, intended to protect wetland resource areas and minimize flooding (Section 7.3).

### ***Stormwater Policy***

The Massachusetts Stormwater Policy is applied to developments within the jurisdiction of the Natural Resources Commission.

### ***Subdivision Regulations***

The Town's subdivision regulations have general language about avoiding impacts to flood plains and minimizing drainage issues. Peak flows and runoff from the property cannot be greater than

pre-development rates. Drainage requirements for Site Plans are also general and require post-development rates to meet pre-development runoff rates.

### ***Cluster Development***

Residential Developments that provide open space protections are allowed under Concord's Zoning.

### ***Groundwater Conservancy District***

The Town's Zoning also has a Groundwater Conservancy District to protect its drinking water supplies.

### ***Open Space Protection***

Concord has substantial protected open space and proactive land acquisition and preservation programs, including:

- The town's Open Space and Recreation Plan, Long-Range Plan, and Community Preservation Plan are comprehensive and identify key parcels for purchase or protection.
- The Natural Resources Commission, Concord Land Conservation Trust, and other conservation organizations acquire and manage conservation lands in town. Since the 2017 HMP, an additional 140 acres in town has been protected.
- The town adopted the Community Preservation Act with a 1.5% surcharge in 2004. The Community Preservation Committee helps administer the Community Preservation Act, and developed a Community Preservation Plan in 2008.
- Low-lying wetlands and floodplains provide significant flood storage from the town's rivers.
- Flood plain has been preserved and is effective at minimizing flooding.

### ***NPDES stormwater***

The town continues to implement its NPDES Phase II stormwater program which includes public education programs.

## **ONGOING FLOOD MITIGATION FOR SPECIFIC SITES**

### ***Cambridge Turnpike***

Cambridge Turnpike experiences flooding every year over approximately a 2-mile stretch. It had two road closures in 2006 due to rising water levels. The water damages the roadbed, and the town has spent money to keep repairing the bed, which is constructed on peat moss. Beaver dams in the area also worsen the flooding. The town has used beaver deceivers to mitigate beaver activity in the area. Improvements to the Crosby Dam will also help alleviate some of the flooding (see Crosby Pond discussion below), however, a complete solution would require significant culvert upgrades and raising of the roadbed. Work commenced in 2017, has been completed and under the supervision of the MA Office of Dam Safety.

### *Crosby's Pond*

Crosby's Pond and dam located adjacent the Cambridge Turnpike previously flooded and exacerbated the flooding at Cambridge Turnpike. In addition, beaver activity has worsened the situation. The dam is in poor condition due to infiltration through the earthen dam, and trees growing in the embankment. Flood management efforts at Crosby's Pond have been ongoing and under the supervision of the MA Office of Dam Safety.

Previous flood mitigation efforts mentioned in the 2017 Plan and have since been completed included: Pine Street Bridge, Sudbury Road/Heath's Bridge, Concord Center, Nashawtuc Road/Bridge, Monument Street/Flint's Bridge.

## **EXISTING DAM FAILURE MITIGATION MEASURES**

### ***DCR dam safety regulations***

In 2002 the Massachusetts legislature enacted revisions of the Dam Safety Statute, MGL Chapter 253 §§ 44-50, which significantly changes the responsibilities of dam owners to register, inspect and maintain dams in good operating condition. Amendments to Dam Safety Regulations 302 CMR 10.00-10.16 became effective November 4, 2005 and are reflective of the statutory changes. MGL Chapter 253 and 302 CMR 10.00 requires Emergency Action Plans be prepared, maintained, and updated by dam owners, for High Hazard Potential dams and certain Significant Hazard Potential dams.

Specific sites:

- Warner's Pond Dam, located in West Concord tributary to the Assabet River, has been reconstructed to mitigate flooding of downstream properties.
- Crosby's Pond and dam, located adjacent to the Cambridge Turnpike have flooded and exacerbated the flooding at Cambridge Turnpike. As of the 2022 update to this plan, the property owner has lowered pond levels, and the length of the dam that is privately-owned is in the process of upgrading. This mitigation effort is ongoing and under supervision of the MA Office of Dam Safety.

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## **EXISTING TOWN-WIDE MITIGATION FOR WIND-RELATED HAZARDS**

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### ***Massachusetts State Building Code***

The town enforces the Massachusetts State Building Code whose provisions are generally adequate to mitigate against most wind damage. The code's provisions are the most cost-effective mitigation measure against tornados given the extremely low probability of occurrence. If a tornado were to occur, the potential for severe damage would be extremely high.

### ***Tree-trimming Program***

The Public Works Department has an effective tree trimming program in public areas and along Rights-of-Ways. They have a multi-year plan trimming program (approximately a 3-year cycle) to go over their whole system. The Concord Municipal Light Department also effectively maintains

trees around the wires and substations and will occasionally take down trees on private property. They have a multi-year plan trimming program (approximately a 3-year cycle) to go over their whole system.

### ***Underground Utilities***

New developments are required to install buried utilities. The town currently has 40% of its wires installed underground and is retroactively burying wires where street work is underway for other purposes.

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## **EXISTING TOWN-WIDE MITIGATION FOR WINTER-RELATED HAZARDS**

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### ***Snow Disposal***

Regular plowing and snow/ice removal. Calcium chloride is used primarily for road treatments. Sand is very rarely used as it creates siltation and cleans up problems. The CPW works to clear roads as requested or in an emergency for the Fire and Police Departments.

### ***Parking***

Overnight parking bans are in effect from November 1 – April 1.

### ***Snow and Ice Disposal Bylaw***

The Town of Concord prohibits disposal of snow or ice in any public place or upon any part of a public street or sidewalk. Snow is stored in the Keyes Road lot.

### ***Public Education***

Winter maintenance information is available on the town website. The Town provides public education to residents regarding roof collapses due to snow when conditions are dangerous. The town works with the Chamber of Commerce to get the word out, such as via social media, listservs, and email. In addition, new codes are more stringent to better guard against roof collapses

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## **EXISTING TOWN-WIDE MITIGATION FOR FIRE-RELATED HAZARDS**

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### ***Burn Permits***

Town bylaws allow controlled open burning in accordance with state regulations, but a permit is required from the Fire Chief for each day of intended burning.

### ***Review of Development Plans***

The Fire department reviews all subdivision and site plans for compliance with site access, water supply needs, and all other applicable regulations.

### ***Public Education***

The Fire Department maintains a website with substantial public education on fire prevention at: <http://www.concordnet.org/166/Fire-Rescue>. The town provides public education and notices during “drought watches.”

### ***Site Specific Training***

The Fire Department is trained for protecting the Federal Wildlife Preserve and the National Park.

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## **EXISTING TOWN-WIDE MITIGATION FOR GEOLOGIC HAZARDS**

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### ***EARTHQUAKES***

#### ***Massachusetts State Building Code***

The State Building Code contains a section on designing for earthquake loads (780 CMR 1612.0). Section 1612.1 states that the purpose of these provisions is “to minimize the hazard to life to occupants of all buildings and non-building structures, to increase the expected performance of higher occupancy structures as compared to ordinary structures, and to improve the capability of essential facilities to function during and after an earthquake”. This section goes on to state that due to the complexity of seismic design, the criteria presented are the minimum considered to be “prudent and economically justified” for the protection of life safety. The code also states that absolute safety and prevention of damage, even in an earthquake event with a reasonable probability of occurrence, cannot be achieved economically for most buildings.

Section 1612.2.5 sets up seismic hazard exposure groups and assigns all buildings to one of these groups according to a Table 1612.2.5. Group II includes buildings which have a substantial public hazard due to occupancy or use and Group III are those buildings having essential facilities which are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

#### ***Shelters***

The town does have shelters and backup facilities (see multi-hazard mitigation below).

#### ***Water System Protection***

The Concord Water and Sewer Division is proactive in isolating portions of the water system and identifying alternative firefighting water supply sources.

#### ***Evacuation Plan***

The Town has an evacuation plan as specified in its Comprehensive Emergency Management Plan (CEMP).

### ***LANDSLIDES***

#### ***Maximum slope requirements***

The subdivision regulations has maximum slope requirements for new roads.

#### ***Earth Removal Bylaw***

The Town has an Earth Removal Bylaw.

## **BRIDGE WEIGHT RESTRICTIONS**

Concord has many bridges that cross the numerous waterways throughout town. Many of these bridges are older structures that are not rated for the weights of the emergency vehicles such as fire trucks. As a result, the Fire Department has to plan for alternate routes around these bridges to reach an emergency that can be a detour of up to 3 miles. This greatly hinders the emergency response efficiency for a natural hazard or any other emergency.

As of this 2022 Plan update, two of the three bridges of greatest concern have been upgraded, and detours are no longer required. They are Pine Street Bridge and Flint's Bridge on Monument Street. There is yet to be a plan for upgrading the Main Street Bridge between Elm and Wood Streets; this bridge has a 7-ton rating and adds a 2-mile detour, which happens several times per week.

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## **EXISTING TOWN-WIDE MITIGATION FOR MULTIPLE HAZARDS**

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### ***Multi-department Review of Developments***

Multiple departments, including Planning, Zoning, Health, Public Works, Fire, Police, and Natural Resources review all subdivision and site plans prior to approval.

### ***Comprehensive Emergency Management Plan (CEMP)***

Every community in Massachusetts is required to have a Comprehensive Emergency Management Plan. These plans address mitigation, preparedness, response and recovery from a variety of natural and man-made emergencies. These plans contain important information regarding flooding, hurricanes, tornadoes, dam failures, earthquakes, and winter storms. Therefore, the CEMP is a mitigation measure that is relevant to all of the hazards discussed in this plan. The CEMP is available online through secure access for town personnel.

### ***Enforcement of the State's Building Code***

The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing, and snow loads.

### ***Local Emergency Management Planning Committee (LEPC)***

The LEPC consists of representatives from Public Works, Fire, Police, Health, School Transportation, Select Board, Emergency Management, Emerson Hospital, MCI-Concord, and local businesses. Concord is also part of a CrossRoads Regional Emergency Management Planning Committee (REPC) that consists of the towns of Acton, Concord, Lincoln, Sudbury, Wayland, and Weston.

### ***Emergency Preparedness***

Public education is available on the town's website. Concord establishes a reverse 911 system and names can be added to the database via the town's website. The Concord/Carlisle High School and Harvey Wheeler Community Center are the designated community shelter sites. The Police and Fire Stations have a backup generator, but it runs on natural gas and would be inoperable if the gas system was to go down. They do have backup diesel generators, but these

are not as powerful. The town has a Citizen Emergency Response Team (CERT) that provides training, supplies, and public education to neighborhoods. The town also has a Medical Reserve Corps. The town has a critical responder shelter center.

### **Gas Leaks**

El Paso Tenneco Energy Company flies helicopters routinely and monitors flow and looks for leaks and damage in its natural gas line.

### **Heat emergencies**

The town works with the Council on Aging to help provide shelter for the elderly during extreme heat.

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## **PREPARING FOR CLIMATE CHANGE IMPACTS**

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Concord established the Climate Action Advisory Board (CAAB) to advise and provide strategic direction to the Town on how to meet its climate goals. The purpose, charge, and membership are intentionally broad. Addressing climate change in Concord will require both reducing GHG emissions and ensuring community members are resilient to impacts due to climate change.

In 2019, Concord participated in the state’s Municipal Vulnerability Preparedness (MVP) Planning program, conducting community workshops to assess the community’s climate vulnerabilities and priority actions to adapt and enhance resilience of the town’s social, environmental, and infrastructural assets. In becoming an MVP community, Concord is eligible to pursue Action grants to implement the identified priority actions.

In June 2020, Concord published *Sustainable Concord: Climate Action and Resilience Plan*<sup>7</sup>, which lays out a roadmap for how Concord will take action in the next 5 years to make progress toward our climate goals.

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## **COMPILATION OF EXISTING MITIGATION**

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Table 34 summarizes the many existing natural hazard mitigation measures already in place in Concord when the last Hazard Mitigation Plan was developed in 2017. Because of the number of entities, public and private, involved in natural hazard mitigation, it is likely that this list is a starting point for a more comprehensive inventory of all measures.

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<sup>7</sup> Sustainable Concord: Climate Action and Resilience Plan, June 2020.  
<https://concordma.gov/DocumentCenter/View/25318/Sustainable-Concord-Climate-Action-and-Resilience-Plan-2020>

**Table 34: Existing Natural Hazard Mitigation Measures in Concord**

<b>HAZARD</b>	<b>AREA</b>	<b>MITIGATION MEASURE</b>	<b>EFFECTIVE Y/N</b>	<b>UPDATES SINCE 2017</b>
<b>Flood-Related</b>	Town-Wide	The town participates in the National Flood Insurance Program and has adopted FIRM maps.	Y	None. The town actively enforces the floodplain regulations.
		The Town enforces the Massachusetts Building Code	Y	None.
		Stormwater system is mapped in GIS	Y	None.
		Annual catch basin cleaning and street sweeping	Y	None.
		Drainage system maintenance	Y	None.
		Long-term stormwater plan and funding, and ongoing system improvements	Y	Completed replacing 10 culverts.
		Beaver mitigation	Y	None.
		State Wetlands Protection Act and local Wetlands Bylaw	Y	None
		Flood Plain Conservancy District	Y	None.
		Wetlands Conservancy District	Y	None.
		Massachusetts Stormwater Policy	Y	None
		Stormwater Requirements in Subdivision Regulations and Site Plan Review	Y	None.
		Open Space Residential Developments	Y	None.
		Groundwater Conservancy District	Y	None.
		Protected open space and proactive land preservation programs	Y	An additional 140 acres of protected land.
	Public Education on stormwater through the NPDES Phase II program	Y	None	
Pine Street Bridge	Reconstruction by the state for structural upgrades, not necessarily to improve water flow	Y	Complete.	

HAZARD	AREA	MITIGATION MEASURE	EFFECTIVE Y/N	UPDATES SINCE 2017
	Commonwealth Ave at Warner's Pond	Reconstruct Warner's Pond Dam to alleviate flooding at this location.	Y	Complete.
	Pedestrian Bridge at Nashoba Brook	Reconstruct Warner's Pond Dam to alleviate flooding at this location.	Y	Complete.
	Sudbury Road – Heath's Bridge	Reconstruction by the state	Y	Complete.
	Concord Center	Rehabilitate the Mill Dam culvert under Main Street is currently being rehabilitated.	Y	Complete.
	Cambridge Turnpike	Cambridge Turnpike reconstruction	Y	Complete.
	Cambridge Turnpike	Improvements to Crosby Dam (private owner) to alleviate some flooding at the Cambridge Turnpike.	N/A	On-going, under the supervision of the Office of Dam Safety
	Nashawtuc Road- Nashawtuc Bridge	Jersey barriers were installed to maintain the side walls.	Y	Complete.
	Crosby Pond	Lowered pond levels in anticipation of flooding. The owner is currently in the process of upgrading the dam.	N/A	On-going, under the supervision of the Office of Dam Safety
	Monument Street – Flint's Bridge (26)	Upgraded by the state.	Y	Complete.
<b>Dams</b>	Town-Wide	DCR Dam Safety Regulations	Y	None.
	Warner's Pond Dam	Reconstruction needed.	Y	Complete.
	Crosby's Pond Dam	Lowered pond levels in anticipation of flooding. Upgrading the dam (by owner).	N/A	On-going, under the supervision of the Office of Dam Safety
<b>Wind-Related</b>	Town-Wide	Enforcement of the Massachusetts Building Code.	Y	None.
		Tree Maintenance Program by Public Works and by Concord Municipal Light.	Y	None.

HAZARD	AREA	MITIGATION MEASURE	EFFECTIVE Y/N	UPDATES SINCE 2017
		Requirement for new developments to install underground utilities. Town continually removing existing overhead wires and installing them underground	Y	None.
<b>Winter-Related</b>	Town-Wide	A) Standard snow operations, restricted salt B) Overnight parking ban November – April C) Public Education on snow operations and winter maintenance is on the town website D) Snow and Ice Disposal Bylaw E) Public Education on how to prevent roof collapses from snow loads F) Sufficient space for municipal snow storage	Y	None.
<b>Fire-Related</b>	Town-Wide	A) Open burning permits required B) Fire Department reviews all development plans C) Fire Department provides public education on its website D) Fire Department is trained for protecting the Federal Wildlife Preserve and National Park E) Fire department obtained new brush fire vehicle in 2006 F) Town provides public education on drought watches	Y	None.
<b>Geologic - Earthquake</b>	Town-Wide	Shelters and backup facilities available (see multi-hazard mitigation below)	Y	Addition shelter has been designated.
		Water Department able to isolate portion of the water system and identify alternate firefighting supply sources	Y	None.
		Evacuation plan in CEMP	Y	None.

HAZARD	AREA	MITIGATION MEASURE	EFFECTIVE Y/N	UPDATES SINCE 2017
<b>Geologic - Landslides</b>	Town-Wide	Maximum slopes for subdivision roads	Y	None.
		Earth Removal Bylaw	Y	None.
<b>Other – Bridge Weight Restrictions</b>	Pine Street Bridge (2)	Upgraded by the state	Y	Complete.
	Flint’s Bridge on Monument Street (26)	Scheduled for upgrades by the state	Y	Complete.
	Main Street Bridge b/t Elm and Wood	No planned upgrades underway	N	Not done.
<b>Multi-Hazard</b>	Town-Wide	<ul style="list-style-type: none"> <li>A) Multi-department review of developments</li> <li>B) Comprehensive Emergency Management Plan (CEMP)</li> <li>C) Enforcement of State Building Code</li> <li>D) Local Emergency Management Planning Committee (LEPC) and CrossRoads Regional Emergency Management Committee (REPC)</li> <li>E) Emergency Preparedness public education on the town website</li> <li>F) Reverse 911</li> <li>G) Concord/Carlisle High School is designated as a community shelter (although it has no generator)</li> <li>H) Police and Fire Stations have backup generators (although they are on natural gas or are limited diesel)</li> <li>I) Citizen Emergency Response Team (CERT)</li> <li>J) Medical Reserve Corps</li> <li>K) El Paso Tenneco Energy company monitors its gas line</li> <li>L) Sheltering available for elderly during extreme heat</li> </ul>	Y	G) Harvey Wheeler Community Center is new shelter

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## **EXISTING MITIGATION CAPABILITIES AND LOCAL CAPACITY FOR IMPLEMENTATION**

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### **Town Plans and Policies**

Under the Massachusetts system of “Home Rule,” the Town of Concord is authorized to adopt and from time to time amend local bylaws and regulations that support the town’s capabilities to mitigate natural hazards. These include Zoning Bylaws, Subdivision and Site Plan Review Regulations, Wetlands Bylaws, Health Regulations, Public Works regulations, and local enforcement of the State Building Code. Local Bylaws may be amended each year at the annual Town Meeting to improve the town’s capabilities, and changes to most regulations simply require a public hearing and a vote of the authorized board or commission. The Town of Concord has recognized several existing mitigation measures that require implementation or improvements, and has the capacity based on these Home Rule powers within its local boards and departments to address these.

### **Town Staff and Commissions**

The Concord Department of Public Works will address the needs for catch basin cleaning, repairs and upgrades to drainage infrastructure. The town’s Planning Board will address relevant updates to the Comprehensive Plan and implementation of the Zoning Bylaw, Floodplain District, and Subdivision Rules and Regulations. The Natural Resources Commission will oversee implementation of the Wetlands Bylaw and the Open Space Plan. Public Works together with the Planning Board and Natural Resources Commission will coordinate drafting and adoption of the Stormwater Bylaw.

The Town can improve its hazard mitigation capabilities with the following measures:

- Adopt Low Impact Development (LID) best practices and/or incorporating LID requirements more formally into a bylaw to ensure it becomes widely adopted in new developments and redevelopments
- Adopt a Stormwater Utility or stormwater user fee to provide a dedicated, predictable revenue stream to finance upgrades to the stormwater infrastructure.
- Incorporate climate resilience in the local wetlands bylaws and regulations.
- Continue analyzing future threats to critical infrastructure, facilities, and residences based on projections of sea level rise and increasing storms.

### **Financial Capabilities**

In addition to pursuing state and federal funding sources, Concord will continue identifying potential local funding sources to implement hazard mitigation activities, such as data analysis or outreach efforts, which may require little to no costs other than staff time and existing operating budgets. Additional financial assistance in the form of grant funding will likely be required to implement the larger proposed mitigation actions.

## SECTION 7: MITIGATION MEASURES FROM PREVIOUS PLAN

### IMPLEMENTATION PROGRESS ON THE PREVIOUS PLAN

The Local HMP Team reviewed the mitigation measures identified in the 2017 Concord Hazard Mitigation Plan and determined whether each measure had been implemented or deferred. Of those measures that had been deferred, the team evaluated whether the measure should be deleted or carried forward into this 2022 Plan Update. The decision on whether to delete or retain a particular measure was based on the HMP Local Team’s assessment of the continued relevance or effectiveness of the measure and whether the deferral of action on the measure was due to the inability of the Town to act on the measure. Table 35 summarizes the status of mitigation measures from the 2017 Plan.

**Table 35: Mitigation Measures from the 2017 Plan**

<b>Mitigation Action (from 2017 HMP)</b> <i>Note: Measures retained from 2010 Plan are marked with (*)</i>	<b>Priority</b>	<b>Current Status</b>	<b>Include in 2022 HMP</b>
*Drainage improvement to the Cambridge Turnpike	High	COMPLETED: Construction complete.	No
Conduct alternatives analysis for flood protection at Lowell Road wastewater pump station	High	COMPLETED: The facility has been refurbished. Rehabilitated completed in 2022.	No
*Continuation of Open Space Protection and Land Acquisition	High	This is now ongoing mitigation program. Some locations have been identified but not approved.	No
Provide improved elevation resolution in GIS	High/Medium	NOT COMPLETED: MassGIS has provided a more detailed view of groundwater without structures. Have better base data but still need to analyze – need additional staff capacity to lead this effort and expand analysis to include community-wide flooding capacity and vulnerability.	Yes
Continue culvert replacement projects	High	NOT COMPLETED: Sawmill Brook culvert repaired. A consultant is conducting a full inventory of bridges and culverts and preparing a capital spending plan on priority needs.	Yes

		Beaver dams caused severe flooding that the town will need to keep monitoring.	
Continue to monitor status of private dams for flood risk.	Medium/High	This is now an ongoing program.	No
Town wide shade tree inventory and management plan	High	NOT COMPLETED: This action needs to be done every 5 years or so. Completed a shade tree inventory in 2017 – there are more than 2,300 trees in the inventory. Currently looking for funding to conduct an inventory update.  The Town has a Public Shade Tree Planting Policy to ensure standard operating procedures for public tree planting and replacement.	Yes
Maintain debris stockpile location at the Composting Facility, identify back-up location	High	This is now an ongoing maintenance program.	No
Tree management at Annursnac Reservoir	High	COMPLETED.	No
Clear/create fire roads to brush fire risk areas	High	This is now an ongoing program.	No
Maintain snow storage at the Composting Facility; secure replacement for West Concord location	High	This is now an ongoing program. Have a MOU with DOC to get approved every year for snow storage.	No
Investigate technology for better monitoring of roadway conditions during storms	Medium	NOT COMPLETED: Made improvements, continue to look for new technology as it's always improving. Always opportunities to expand this.	Yes
Optimize use of space for salt storage	High	NOT COMPLETED: Was a "Medium" priority in 2017 Plan	Yes
Research options for additional back-up fuel storage capacity	High	NOT COMPLETED.	Yes
Provide public information on the risks of extreme temperatures	High	NOT COMPLETED: Was a "Medium" priority in 2017 Plan	Yes
Add treatment for Nagog Pond's water supply	High	This is an ongoing mitigation program.	No

Institute drought management plan	High	NOT COMPLETED. But also recognizing that the State has advanced its drought management plan, so the Town will dovetail on that. Need to evaluate long range supply needs, potential for regionalization.	Yes
*Review status of historic buildings relative to earthquake resistance	Medium/Low	NOT COMPLETED: review in progress	Yes
*Upgrades to Main St. and Pail Factory bridges (bridge weight restrictions)	High	NOT COMPLETED: No actions have been taken because the State is responsible for these, and the town has no say in it. The Town will continue coordinating with state agency to address the issue.	Yes
*Identify alternate option for community sheltering	High	NOT COMPLETED: In progress. Looking at sheltering at high school and Harvey community center. Middle school is an option. Have ID alternative places. Nursing homes alternative sheltering is ongoing. How to shelter and evacuate nursing homes.	Yes
Outfit back-up emergency operations center	High	NOT COMPLETED: In progress.	Yes
Include sustainability in planning efforts	High	NOT COMPLETED: In progress – Need to develop an adaptation plan. Make recommendations more actionable.	Yes
Include climate change impacts in Comprehensive Long-Range Plan and Open Space and Recreation Plan	High	NOT COMPLETED: In progress.	Yes

As indicated in Table 35 above, the Town has made progress implementing mitigation measures identified in the 2010 as well as 2017 HMPs. Since 2017, medium and high priority projects that were completed include drainage upgrades in various locations in town; conducting town-wide shade tree inventory and management planning; improving communications and monitoring during winter storms; and integrating sustainability in planning efforts.

Many of the mitigation measures are also in progress or continue as ongoing operations and maintenance programs and community outreach efforts. Overall, many of the “in progress” or “ongoing” mitigation measures from the 2017 plan will be continued in this plan update. Most retain the same priority in this 2022 Update; a couple measures previously indicated as “Medium” will be elevated to “High” priority in this plan.

Moving forward into the next five-year plan implementation period there will be many more opportunities to incorporate hazard mitigation into the Town's decision-making processes. The challenges the Town faces in implementing these measures are primarily due to limited funding and available staff time. This plan should help the Town prioritize the best use of its limited resources for enhanced mitigation of natural hazards.

## SECTION 8: HAZARD MITIGATION STRATEGY

### WHAT IS HAZARD MITIGATION?

Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries and property resulting from natural hazards through long-term strategies. These long-term strategies include planning, policy changes, education programs, infrastructure projects and other activities. FEMA currently has three mitigation grant programs: the Hazards Mitigation Grant Program (HGMP), the Pre-Disaster Mitigation program (PDM), and the Flood Mitigation Assistance (FMA) program. The three links below provide additional information on these programs.

<https://www.fema.gov/hazard-mitigation-grant-program>

<https://www.fema.gov/pre-disaster-mitigation-grant-program>

<https://www.fema.gov/flood-mitigation-assistance-grant-program>

According to FEMA Local Multi-Hazard Mitigation Planning Guidance, identified measures can generally be sorted into the following groups:

- **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection:** Actions that involve the modification of existing buildings or infrastructure to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter resistant glass.
- **Public Education & Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the potential risks from hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, wetland and stream corridor restoration, watershed management, forest and vegetation management, and wildlife habitat restoration and preservation.
- **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (e.g., culverts), floodwalls, seawalls, retaining walls, and safe rooms.
- **Emergency Services Protection:** Actions that will protect emergency services before, during, and immediately after an occurrence. Examples of these actions include protection of warning system capability, protection of critical facilities, and protection of emergency response infrastructure.

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## REGIONAL AND INTER-COMMUNITY CONSIDERATIONS

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Some hazard mitigation issues are strictly local. The problem originates primarily within the municipality and can be solved at the municipal level. Other issues are inter-community and require cooperation between two or more municipalities. There is a third level of mitigation which is regional and may involve a state, regional or federal agency or three or more municipalities.

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## REGIONAL PARTNERS

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In developed urban and suburban communities such as the metropolitan Boston area, mitigating natural hazards, particularly flooding, is more than a local issue. The drainage systems that serve these communities are complex systems of storm drains, roadway drainage structures, pump stations and other facilities owned and operated by a wide array of agencies including the Town, the Department of Conservation and Recreation (DCR), the Massachusetts Department of Transportation (MassDOT) and the Massachusetts Bay Transportation Authority (MBTA). The planning, construction, operation, and maintenance of these structures are integral to the flood hazard mitigation efforts of communities. These agencies must be considered the communities' regional partners in hazard mitigation. These agencies also operate under the same constraints as communities do including budgetary and staffing constraints and they must make decisions about numerous competing priorities.

The following section is a brief overview of regional facilities found in Concord and a discussion of inter-municipal mitigation efforts.

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## OVERVIEW OF REGIONAL FACILITIES WITHIN CONCORD

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Major facilities owned, operated, and maintained by federal, state, regional or private entities include:

- Great Meadows National Wildlife Refuge (US Fish and Wildlife)
- Minute Man National Historical Park (U.S. National Park Service)
- Walden Pond State Reservation (MA DCR)
- Hanscom Air Force Base (U.S. Air force)
- Hanscom Field Regional Airport (Massport)
- Commuter Rail Fitchburg Line with stations in Concord and West Concord (MBTA)
- State Police Barracks on Elm Street (MA State Police)
- Massachusetts Highway Facility
- Northeastern Correctional Facility - former "Farm Dormitory" (Mass Department of Correction)
- Massachusetts Correctional Institute at Concord (Mass Department of Correction)
- Emerson Hospital (177 beds with service to 25 communities)
- Walden Street School
- Tenneco Gas Line (El Paso Energy Company)

- Army Corps of Engineers (ACOE) Regional Headquarters
- Routes 2, 2A, and 119 (MassDOT).

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## INTER-COMMUNITY CONSIDERATIONS

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The Town of Concord will continue engaging with neighboring communities on the following efforts:

**Coordinate and Review Developments on a Regional Basis:** As Concord and the surrounding communities are undergoing development, it is vital that these communities communicate and provide input during the review processes. When addressing housing, transportation, and economic development projects, the impacts to neighbors must be addressed. The Concord Mews rental development in Concord is a prime example of how one comprehensive permit development has the potential to create impacts in neighboring communities of Sudbury, Maynard, and Acton.

**Long-Term Regional Management Plan to Control Beaver Activity:** One regional issue of significance is the widespread effects of beaver dams in the area. Most streams, wetland areas, and ponds in the region have had some degree of beaver activity in the past several years. Much of the localized flooding that occurs is due to beaver activity. Beaver management will always occur on a case-by-case basis. In many instances beavers can live harmoniously with humans, in others, active management is necessary.

**Coordinate Community Sheltering with Emerson Hospital:** In addition to seeking alternate sheltering for the Concord community as noted under proposed mitigation, the town should coordinate with other communities to address sheltering issues at Emerson hospital and other regional facilities such as the correctional facilities.

**Dam Conditions and Emergency Plans Upstream of the Town of Concord:** Dams in upstream communities are frequently of concern to downstream communities. In the case of Concord, the dams along the Assabet River upstream in Acton and Maynard have been the greatest concern, particularly in the past when the dams have been in poor condition. The Old High Street dam in Acton is currently undergoing significant upgrades that will help mitigate future dam breaches. The Mill Pond Dam in Maynard has also undergone recent upgrades. The Town has identified the Powdermill Dam in Maynard as critical infrastructure of concern to the community. The communities should continue to coordinate with each other to address concerns of dam conditions and emergency response plans in the event of a hazardous storm event.

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## NEW DEVELOPMENT AND INFRASTRUCTURE

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As part of the process of developing recommendations for new mitigation measures for this plan update, the Town considered the issues related to new development, redevelopment, and infrastructure needs in order limit future risks. Taking into consideration the town's update to stormwater requirements, the Wetlands Bylaw enforced by the Natural Resources Commission, the Comprehensive Long-Range Plan, and the Open Space Plan, the town determined that existing

regulatory measures are taking good advantage of local “Home Rule” land use regulatory authority to minimize natural hazard impacts of development. Including sustainability and climate change measures in town plans and operations are envisioned as part of this plan. Open Space purchases and drainage upgrades are also priorities in this plan. Concord’s Town Meeting has voted to approve a fossil-fuel ban on new construction and substantial renovations. After the Commonwealth approved legislation allowing certain Towns to participate in a pilot program, Concord is waiting to hear from the Department of Energy Resources whether it will be selected as one of the ten pilot communities for this effort.

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## **PROCESS FOR SETTING PRIORITIES FOR MITIGATION MEASURES**

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The last step in developing the Town’s mitigation strategy is to assign a level of priority to each mitigation measure to guide the focus of the Town’s limited resources towards those actions with the greatest potential benefit. At this stage in the process, the Local Hazard Mitigation Planning Team had limited access to detailed analyses of the cost and benefits of any given mitigation measure, so prioritization is based on the local team members’ understanding of existing and potential hazard impacts and an approximate sense of the costs associated with pursuing any given mitigation measure.

Priority setting was based on local knowledge of the hazard areas, including impacts of hazard events, the extent of the area impacted, and the relation of a given mitigation measure to the Town’s goals. In addition, the local Hazard Mitigation Planning Team also took into consideration factors such as the number of homes and businesses affected, whether road closures occurred and what impact closures had on delivery of emergency services and the local economy, anticipated project costs, whether any environmental constraints existed, and whether the Town would be able to justify the costs relative to the anticipated benefits. Table 36 below demonstrates the prioritization of the Town’s potential hazard mitigation measures. For each mitigation measure, the geographic extent of the potential benefiting area is identified as an estimate of the overall benefit and cost of the measures. The benefits, costs, and overall priority were evaluated in terms of:

<b>ESTIMATED BENEFITS</b>	
High	Action will result in a significant reduction of hazard risk to people and/or property from a hazard event
Medium	Action will likely result in a moderate reduction of hazard risk to people and/or property from a hazard event
Low	Action will result in a low reduction of hazard risk to people and/or property from a hazard event
<b>ESTIMATED COSTS</b>	
High	Estimated costs greater than \$100,000
Medium	Estimated costs between \$25,000 to \$100,000
Low	Estimated costs less than \$25,000 and/or staff time

PRIORITY	
High	Action very likely to have political and public support and necessary maintenance can occur following the project, and the costs seem reasonable considering likely benefits from the measure
Medium	Action may have political and public support and necessary maintenance has potential to occur following the project
Low	Not clear if action has political and public support and not certain that necessary maintenance can occur following the project

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## INTRODUCTION TO MITIGATION MEASURES TABLE

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**Description of the Mitigation Measure** – Each mitigation measure is provided with a brief description, and cost information is given if available from the community. The cost data represents a point in time and would need to be adjusted for inflation and for any changes or refinements in the design of a particular mitigation measure.

**Priority** – As described above and summarized in Table 36, the designation of high, medium, or low priority was done considering potential benefits and estimated project costs, as well as other factors in the STAPLEE (Social, Technical, Administrative, Legal, Economic, and Environmental) analysis.

**Implementation Responsibility** – based on a general knowledge of what each municipal department is responsible for; coordination with state agencies should also be considered. Most mitigation measures may require coordination of multiple departments, and assigning staff is the sole responsibility of the governing body of each community.


**Time Frame** – The timeframe was based on a combination of the priority for that measure, the complexity of the measure and whether the measure is conceptual, in design, or already designed and awaiting funding. The timing for all mitigation measures has also been kept within the typical five-year HMP framework. The identification of a likely timeframe is not meant to constrain a community from taking advantage of funding opportunities as they arise.


**Potential Funding Sources** – The information on potential funding sources in this table is preliminary and varies depending on a number of factors. These factors include whether a mitigation measure has been studied, evaluated, or designed, or if it is still in the conceptual stages. MEMA and DCR assisted MAPC in reviewing the potential eligibility for hazard mitigation funding. Individual grant programs and agencies also have specific eligibility requirements to be considered. In most instances, the measure may require different funding sources. Identification of a potential funding source does not guarantee that a project will be eligible for or selected for funding. Upon adoption of this plan, the local team responsible for its implementation should begin to explore the funding sources in more detail.

Additional information on funding sources – The best way to determine eligibility for a particular funding source is to review the project with a staff person at the funding agency. The following websites provide an overview of programs and funding sources:


- *Army Corps of Engineers (ACOE)* provides assistance for different project types including shoreline/streambank protection, flood damage reduction, flood plain management services and planning services. Website: <http://www.nae.usace.army.mil/>.
- *Massachusetts Emergency Management Agency (MEMA)* provides information and guidance for the various Hazard Mitigation Assistance Program. Website: <https://www.mass.gov/hazard-mitigation-assistance-grant-programs>.

Table 36: Mitigation Measures Prioritization

CLIMATE CHANGE	ACTION	GEOGRAPHIC COVERAGE	LEAD	IMP.TIME FRAME	EST. BENEFIT	EST. COST	FUNDING SOURCE	PRIORIT Y	
Changes in Precipitation 	<b>INLAND FLOODING</b>								
	1. Promote and increase implementation of green infrastructure, Low Impact Development (LID), and climate change resilience solutions.	Town-wide	Planning Natural Resources CPW Sustainability	1-2 years	High	Medium/ High	State (MVP) Federal (BRIC)	High	
	2. Rehabilitate or replace bridges to account for latest flood projections.	Town-wide	CPW	4+ years	High	High	State (MassDOT) Federal (BRIC)	High	
	3. Evaluate opportunities for dam removal.	Town-wide	CPW Natural Resources	2-4 years	High	High	Federal (FEMA NDSP)	High	
	4. Continue efforts to protect land in floodplain.	Town-wide	Planning Natural Resources	2-4 years	High	High	Local State (EEA LWCF)	High	
	5. Expand GIS elevation analysis to better understand flooding capacity and vulnerability.	Town-wide	Planning Sustainability Data/GIS	1-2 years	High	Medium	State (MVP)	High	
	6. Develop and calibrate hydrologic model with the latest climate change scenarios and considerations.	Town-wide	Sustainability CPW Data/GIS	1-2 years	High	Medium	State (MVP)	High	
	7. Coordinate with the MA Office of Dam Safety on outreach to owners of private dams for potential dam failure and flood risk.	Site-specific	CPW	1-2 years	Medium	Low	State (EOPSS) Federal (FEMA NDSP)	Medium	
8. Conduct a vulnerability assessment and identify resilience measures for the potential relocation of the Police/Fire/DPW facilities.	Site-specific	Sustainability Fire Police CPW	1-2 years	High	Low/ Medium	Local (Sustainability & Fire budgets)	High		

CLIMATE CHANGE	ACTION	GEOGRAPHIC COVERAGE	LEAD	IMP.TIME FRAME	EST. BENEFIT	EST. COST	FUNDING SOURCE	PRIORIT Y	
	9. Evaluate all Town-owned culverts and develop plan for replacement, repair, and routine maintenance.	Town-wide	CPW	1-2 years	High	Medium/High	Local (CPW) State (DER CRM)	High	
	<b>DROUGHT</b>								
	10. Establish policies and programs to increase water efficiency and minimize the use of fresh water for irrigation.	Town-wide	Sustainability CPW	1-2 years	Medium	Low/Medium	Local (Sustainability & CPW budgets)	High	
	11. Develop a drought management plan to protect town water supply, evaluate long-range supply needs, and coordinate with neighboring municipalities for potential regionalization.	Town-wide	CPW Sustainability	1-2 years	Medium	Medium	State (MVP)	High	
	12. Plant trees that are resistant to drought and heat.	Town-wide	CPW Natural Resources Sustainability	2-4 years	Medium	Medium	State (DFW MWCCRGO) Federal (USDA-FS, LSR)	High	
	13. Require drought resilient landscaping in development permits.	Town-wide	Planning	1-2 years	Medium	Low	Local (Planning)	High	
	14. Promote residents to adopt use of rain barrels by revamping existing program.	Town-wide	CPW Sustainability	1-2 years	Medium	Low	Local (Sustainability)	Medium	
	<b>LANDSLIDE</b>								
	15. Assess steep slopes that are potentially vulnerable to failure.	Site-specific	CPW	2-4 years	Low	Low	State (EOPSS; EEA HMGP)	Low	
Rising Temperatures 	<b>EXTREME HEAT AND HEAT WAVES</b>								
	16. Conduct extreme heat and heatwave risk awareness activities.	Town-wide	Health	1-2 years	High	Low	State (MVP)	High	
	17. Update town-wide shade tree inventory and management plan with latest climate change data and considerations incorporated.	Town-wide	CPW	1-2 years	High	Medium	State (MVP)	High	
	18. Increase shade (trees and/or structures) in public & commercial areas (including parking lots, urbanized sites).	Site-specific	CPW	2-4 years	High	Medium	State (EEA)	High	

CLIMATE CHANGE	ACTION	GEOGRAPHIC COVERAGE	LEAD	IMP.TIME FRAME	EST. BENEFIT	EST. COST	FUNDING SOURCE	PRIORIT Y	
	19. Evaluate removal of impervious surface areas to reduce heat island effect.	Town-wide	CPW	2-4 years	High	Low	State (MVP)	Medium	
	20. Evaluate and update local heat map regularly.	Town-wide	Sustainability	1-2 years	High	Low	Local (Sustainability) State (MVP)	Medium	
	<b>WILDFIRES</b>								
	21. Develop public education program about preventing and eliminating combustible areas around the home to reduce risk.	Town-wide	Fire/EMS	1-2 years	Medium	Low	State (DCR) Federal (FEMA, USDA-FS)	Medium	
	<b>INVASIVE SPECIES</b>								
	22. Include invasives management plan in permit requirements	Town-wide	Natural Resources	1-2 years	High	Low	Federal (USDA-FS, USDA-NRCS) State (DFW MWHMGP)	High	
	23. Develop a management plan for wildlife hazards and invasive species, with latest climate change data and considerations incorporated	Town-wide	Natural Resources	2-4 years	High	Medium	State (DCR)	Medium	
	24. Enhance surveillance for mosquito and ticks, vector-borne species	Town-wide	Health	1-2 years	Medium	Medium	State (DCR)	High	
	<b>SEVERE WEATHER (STRONG WINDS, THUNDERSTORMS, WINTER STORM/NOR'EASTER)</b>								
	25. Research options for additional back-up fuel storage, battery storage, salt storage spaces, and electric vehicle charging stations.	Site-specific	Fire Municipal Light Plant	2-4 years	Medium	Medium	State (DOER)	Medium	
	26. Evaluate critical facilities for ability to withstand snow loads, retrofit if needed.	Site-specific	Facilities Building	2-4 years	Medium	Medium	State (EOPSS)	High	
	27. Assess pavement materials, characteristics with consideration of future climate change conditions. Investigate technology for monitoring of roadway conditions during storms.	Town-wide	CPW	4+ years	Medium	Medium	State (MassDOT)	Low	
	28. Develop a plan for urban forestry management. Assess urban forest vulnerability.	Town-wide	CPW	2-4 years	High	Medium	State (MVP)	High	

CLIMATE CHANGE	ACTION	GEOGRAPHIC COVERAGE	LEAD	IMP.TIME FRAME	EST. BENEFIT	EST. COST	FUNDING SOURCE	PRIORIT Y
Multi-hazards 	<b>MULTI-HAZARDS</b>							
	29. Develop an integrated natural resource management plan.	Town-wide	Natural Resources	2-4 years	Medium	Medium/High	State (DCR)	Medium
	30. Expand database and educational outreach to seniors and medically vulnerable to collect information on critical needs, including prescriptions	Town-wide	Health Council on Aging Fire/EMS	1-2 years	High	Low	State (EOPSS, DHCD)	High
	31. Inventory and develop a needs assessment for vulnerable populations to expand plans for emergency preparedness (including community sheltering.	Town-wide	Health Council on Aging	1-2 years	High	Low	State (EOPSS, DHCD)	High
	32. Review existing communication and preparedness plans (from businesses, schools, town departments, etc.) to ensure response protocols are aligned.	Town-wide	Health Council on Aging	1-2 years	High	Low	State (EOPSS, DHCD)	High
	33. Coordinate with state agency (MassDOT) to make upgrades to bridges (e.g., Main Street, Pail Factory bridge) to meet weight restrictions	Site-specific	CPW	4+ years	High	Low	State (MassDOT) Federal (FEMA)	High
	34. Develop a community-wide climate adaptation plan. And also include climate change considerations in Comprehensive Long-Range Plan and Open Space and Recreation Plan.	Town-wide	Sustainability	2-4 years	High	Medium	State (MVP)	High
Non-Climate Hazard	<b>EARTHQUAKE</b>							
	35. Develop educational and outreach program on earthquake risks.	Town-wide	Fire/EMS	4+ years	Low	Low	State (EOPSS)	Low
	36. Assess vulnerability of infrastructure and buildings, particularly historic buildings.	Town-wide	CPW	4+ years	Low	Medium/High	State (MassDOT) Federal (FEMA BRIC)	Medium

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## DESCRIPTION OF MITIGATION MEASURES

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### CHANGES IN PRECIPITATION

#### Inland Flooding

Promote and increase **implementation of green infrastructure, Low Impact Development (LID), and climate change resilience** solutions. For example, the Town will review and adopt resilience-focused policies to ensure future developments incorporate green infrastructure, LID, and other relevant climate resilience measures (floodproofing, strategic placement of utilities and systems in floodplain area, etc.). The Town will also prepare and develop education materials to promote best practices.

**Rehabilitate or replace bridges** to account for latest flood projections, starting with South Bridge.

**Evaluate opportunities for dam removal** to enhance public safety and prevent flood damage to roads, bridges, and other downstream built environment/infrastructure in the event of dam failure. In addition, dam removal can have positive environmental and ecological impacts such as improving water quality, restoring natural river flows, and potentially allowing reconnection of river habitats that benefit fish and wildlife.

**Continue efforts to protect land in floodplain.** In addition to continue monitoring and better understanding the intensity of precipitation projections (including consideration of 0.2% storm scenario that are anticipated to occur more frequently in the future), the Town can also consider requiring 2x compensatory flood storage capacity.

Expand GIS elevation analysis to **better understand flooding capacity and vulnerability.**

**Develop and calibrate hydrologic model** to exam overland riverine flooding as well as water supply based on predicted groundwater and surface water levels for selected climate change scenarios and considerations.

Coordinate with the MA Office of Dam Safety on **outreach to owners of private dams** to plan for potential dam failure and flood risk.

**Conduct a vulnerability assessment and identify resilience measures for the potential relocation of the Police/Fire/CPW facilities,** which are currently in a floodplain.

**Evaluate all Town-owned culverts** and develop a plan for replacement, repair, and routine maintenance.

#### Drought

**Establish policies and programs to increase water efficiency and minimize the use of fresh water.** The Town should include educational materials to help residents rethink water usage for landscaping, farm irrigation, etc. For example, consider gray water usage.

**Develop a drought management plan** to protect town water supply, evaluate long-range supply needs, and coordinate with neighboring municipalities for potential regionalization.

**Require drought resilient landscaping in development permits** – Examples include incorporating drought tolerant native species into development landscape regulations; and using permeable driveways and surfaces to promote groundwater infiltration and reduce stormwater runoff.

**Plant trees that are resistant to drought and heat**, particularly in identified “hot spots” in Concord.

**Encourage residents to adopt the use of rain barrels** to harvest rainwater for later use such as on lawns, gardens, or indoor plants. This will also contribute to the Town’s water conservation efforts.

#### Landslide

**Assess steep slopes that are potentially vulnerable to failure** – The Town will review and identify potential landslide risk locations.

### **RISING TEMPERATURES**

#### Extreme Heat and Heatwaves

**Conduct extreme heat and heatwave risk awareness activities.** Similar to how New Englanders are well-prepared for snowstorms, the Town can help familiarize residents with preparation and procedures in dealing with more frequent heat days and heatwaves.

Continue exploring funding opportunities to **increase shade in public and commercial areas**, including parking lots and urbanized sites across town.

**Evaluate removal of impervious surface areas to reduce heat island impacts.**

**Evaluate and update local heat map** to inform priority emergency responses, strategic planning to reduce heat island impacts, etc.

#### Wildfires

**Continue promoting brush fire and fire prevention education.** The Fire Department participates in community events providing targeted outreach and informational brochures. The Fire Department maintains a web page with fire prevention materials. Additional focus should include prevention and elimination of combustible areas around homes.

#### Invasive Species

**Include invasives management in permit requirements.**

**Develop a management plan for wildlife hazards and invasive species.** Consider including the latest climate change data and impacts.

**Enhance surveillance for vector-borne species** and associated diseases, especially from mosquitoes and ticks.

## **EXTREME WEATHER**

**Research options for additional back-up fuel storage, battery storage, and electric vehicle charging stations.** Consider renewable energy sources for back-up fuel storage.

**Evaluate critical facilities and their ability to withstand snow loads** and develop a plan to retrofit facilities that do not pass the criteria.

**Assess pavement materials and characteristics** with consideration of future climate change conditions.

**Update town-wide shade tree inventory and management plan** with latest climate change data and considerations incorporated.

**Develop an urban forestry management plan** – this plan will serve as a roadmap to manage and protect the Town’s urban forest. It will include goals and priorities to enhance and expand the Town’s tree canopy in the future.

## **MULTI-HAZARDS**

**Develop an integrated natural resource management plan.** Develop a comprehensive plan for natural resource conservation and management (e.g., fish and wildlife, forestry, land management, outdoor recreation) in Concord.

**Expand database and education outreach to seniors and medically vulnerable** to collect information on critical needs, including provision of equipment, gathering points or shelters, prescriptions, healthcare services, etc. during extreme weather-related events

Review existing communications and plans from businesses, schools, town departments, etc. to **ensure alignment in preparedness and response protocols.**

**Develop a community-wide climate adaptation plan** to ensure the town and its residents are prepared for future climate change impacts. The plan can be built on the findings from the Municipal Vulnerability Preparedness planning efforts in 2019.

## **NON-CLIMATE HAZARD**

### Earthquake

**Conduct a seismic study to assess vulnerability of infrastructure and buildings.**

**Develop educational materials and outreach activities to raise awareness on earthquake risks** and prepare residents for potential incidents in the future.

## SECTION 9: PLAN ADOPTION & MAINTENANCE

### PLAN ADOPTION

The Concord Hazard Mitigation Plan 2022 Update was adopted by the Concord Select Board on [DATE TBD]. See Appendix D for documentation. The plan was approved by FEMA on [DATE TBD] for a five-year period that will expire on [DATE TBD].

### PLAN MAINTENANCE

MAPC worked with the Concord Local Hazard Mitigation Planning Team to prepare this plan. This group will continue to meet on an as-needed basis to coordinate the implementation and maintenance of this plan. The Town of Concord's Sustainability Director and Fire Chief will co-lead the implementation and maintenance efforts for the plan. Additional members could also be added to the local team from businesses, non-profits, and institutions. The Town will encourage public participation during the next 5-year planning cycle. As updates and a review of the plan are conducted by the Hazard Mitigation Team, these will be placed on the Town's web site, and any meetings of the Hazard Mitigation Team will be publicly noticed in accordance with the town and state open meeting laws.

### IMPLEMENTATION AND EVALUATION SCHEDULE

Mid-Term Survey on Progress – The coordinator of the Hazard Mitigation Team will prepare and distribute a survey in year three of the plan. The survey will be distributed to all the local team members and other interested local stakeholders. The survey will poll the members on progress and accomplishments for implementation, any new hazards or problem areas that have been identified, and any changes or revisions to the plan that may be needed.

This information will be used to prepare a report or addendum to the local hazard mitigation plan in order to evaluate its effectiveness in meeting the plan's goals and identify areas that need to be updated in the next plan. The Hazard Mitigation Implementation Team will have primary responsibility for tracking progress, evaluating, and updating the plan.

Begin to Prepare for the next Plan Update – FEMA's approval of this plan is valid for five years, by which time an updated plan must be approved by FEMA in order to maintain the Town's approved plan status and its eligibility for FEMA mitigation grants. Given the lead time needed to secure funding and conduct the planning process, the Hazard Mitigation Implementation Team will begin to prepare for an update of the plan in year three. This will help the Town avoid a lapse in its approved plan status and grant eligibility when the current plan expires.

The Hazard Mitigation Implementation Team will use the information from the Mid-Term progress review to identify the needs and priorities for the plan update and seek funding for the plan update process. Potential sources of funding may include FEMA Pre-Disaster Mitigation grants and the Hazard Mitigation Grant Program. Both grant programs can pay for 75% of a planning project, with a 25% local cost share required

Prepare and Adopt an Updated Local Hazard Mitigation Plan – Once the resources have been secured to update the plan, the Hazard Mitigation Team may decide to undertake the update themselves, contract with MAPC to update the plan or to hire another consultant. When the

Hazard Mitigation Implementation Team decides to update the plan, the Town will need to review the current FEMA hazard mitigation plan guidelines for any changes in requirements for hazard mitigation plans since the previous plan. Once the next plan update is prepared, the Town will submit it to MEMA and FEMA for review and approval and adopt the plan update in order to obtain formal FEMA approval of the plan.

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## **INTEGRATION OF THE PLANS WITH OTHER PLANNING INITIATIVES**

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Upon approval of the Concord Hazard Mitigation Plan 2022 Update by FEMA, the Local Hazard Mitigation Team will provide all interested parties and implementing departments with a copy of the plan and will initiate a discussion regarding how the plan can be integrated into that department's ongoing work. At a minimum, the plan will be reviewed and discussed with the following departments:

- Fire
- Police
- Engineering
- Water and Sewer
- Planning
- Natural Resources
- Recreation
- Health
- Building

Other groups that will be coordinated with include large institutions, Chambers of Commerce, land conservation organizations and watershed groups. The plan will also be posted on the Town's website with the caveat that a local team coordinator will review the plan for sensitive information that would be inappropriate for public posting. The posting of the plan on the website will include a mechanism for citizen feedback such as an e-mail address to send comments.

The Town of Concord has taken steps to implement findings from the 2017 Hazard Mitigation Plan into policy, programmatic areas, and plans, including two planning efforts currently in progress: the Master Plan Update and the Open Space and Recreation Plan. In addition, hazard vulnerabilities and mitigation measures were also considered and aligned during the action prioritization of the MVP Community Resilience Building Workshop in 2019. The Hazard Mitigation Plan will also be integrated into other town plans and policies as they are updated and renewed, including the Community Comprehensive Plan, Emergency Management Plan, and Capital Investment Plan.

## SECTION 10: LIST OF REFERENCES

- Town of Concord, General Bylaws
- Town of Concord, Zoning Bylaw
- Town of Concord, Comprehensive Long-Range Plan “Envision Concord – Bridge to 2030,” 2018
- Town of Concord Open Space Plan, 2015
- Town of Concord Water Quality Report, 2020
- Town of Concord Climate Action and Resilience Plan, 2020
- Town of Concord, Municipal Vulnerability Preparedness (MVP) Planning Report, 2019
- Blue Hill Observatory
- Boston HIRA
- FEMA, Flood Insurance Rate Maps for Middlesex County, MA, 2013
- FEMA, Hazards U.S. Multi-Hazard
- FEMA, Local Mitigation Plan Review Guide, October 2011
- Fourth National Climate Assessment, 2018
- Massachusetts Flood Hazard Management Program
- Massachusetts Office of Coastal Zone Management Shoreline Change Data
- Massachusetts Office of Dam Safety, Inventory of Massachusetts Dams 2018
- Massachusetts State Hazard Mitigation and Climate Adaptation Plan, 2018
- Metropolitan Area Planning Council, GIS Lab, Regional Plans and Data
- National Weather Service
- Nevada Seismological Library
- New England Seismic Network, Boston College Weston Observatory, <http://aki.bc.edu/index.htm>
- NOAA National Climatic Data Center, <http://www.ncdc.noaa.gov/>
- Northeast Climate Adaptation Science Center
- Northeast States Emergency Consortium, <http://www.nesec.org/>
- Tornado History Project
- US Census, 2020 and American Community Survey 2020
- USGS, National Water Information System, <http://nwis.waterdata.usgs.gov/usa/nwis>
- USDA Forest Service, Wildfire Risk to Communities, [www.wildfirerisk.org](http://www.wildfirerisk.org)
- University of Massachusetts Boston, “Climate Change Impacts and Projections for the Greater Boston Area: Findings of the Greater Boston Research Advisory Group Report,” 2022

# APPENDIX A: MEETING AGENDAS

## Concord Hazard Mitigation Plan - 2022 Update Local Hazard Mitigation Planning Team

July 13, 2022

3:00 PM - 4:15 PM

Via Zoom Conference Call

<https://us06web.zoom.us/j/82033399241?pwd=Mm44b2d6TFIwWTdMQXBQQTJxRTZrdz09>

### MEETING #1 - AGENDA

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1. **Introductions** (5 minutes)
2. **Overview of Planning Process and Schedule** (10 minutes)
  - a) Engagement process
  - b) Stakeholder ID
3. **Overview of Climate Integration/MVP Review** (20 minutes)
  - c) Review hazards & Identify key concerns
4. **Update local hazard areas** (20 minutes)
  - d) Flooding
  - e) Fires (brushfires/wildfires)
  - f) Winter Storms
  - g) Extreme Heat
  - h) Others (geologic, wind related, etc.)
5. **Review Critical Infrastructure** (15 minutes)
6. **Conclusion & Next Steps** (5 minutes)
  - a) Schedule Local Team Meeting #2

# Concord Hazard Mitigation Plan - 2022 Update

## Local Hazard Mitigation Planning Team

**August 25, 2022**

**10:00 PM - 11:30 PM**

**Hybrid: In-person at Concord Fire House (3<sup>rd</sup> Floor Conference Room)  
and via Zoom Conference Call**

<https://us06web.zoom.us/j/89564147851?pwd=R3AxZE9nS01oWWFMWms2cGV5eXA1QT09>

### **MEETING #2 - AGENDA**

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#### **1. Review and Confirm Critical Infrastructure (30 minutes)**

- i) Consider additional community and cultural assets to include on this list

#### **2. Review and Update Hazard Mitigation Goals (5 minutes)**

#### **3. Review and Update Status of 2017 Mitigation Measures (45 minutes)**

- a) Existing/Ongoing Mitigation Measures
- b) Proposed Mitigation Actions in 2017 HMP

#### **4. Prepare for Public Meeting (8 minutes)**

- a) Identify date, time, and location for Public Meeting #1
- b) Identify stakeholders for meeting outreach
- c) Consider: community-wide survey for feedback

#### **5. Conclusion & Next Steps (2 minutes)**

- b) Schedule Local Team Meeting #3

# Concord Hazard Mitigation Plan - 2022 Update

## Local Hazard Mitigation Planning Team

**November 8, 2022**

**3:00 PM - 4:00 PM**

**via Zoom Conference Call**

<https://us06web.zoom.us/j/87205108447?pwd=NWJ4aUgxeHhRVFhQmNEMG9aRzUyQT09>

### **MEETING #3 - AGENDA**

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#### **1. Develop New Mitigation Measures for 2022 Plan Update (50 mins)**

- d) Overview of mitigation table categories and evaluation criteria for prioritization (estimated benefits, costs, and overall priority)
- e) Review MVP Planning Report and determine priority actions to carry into the 2022 HMP Update

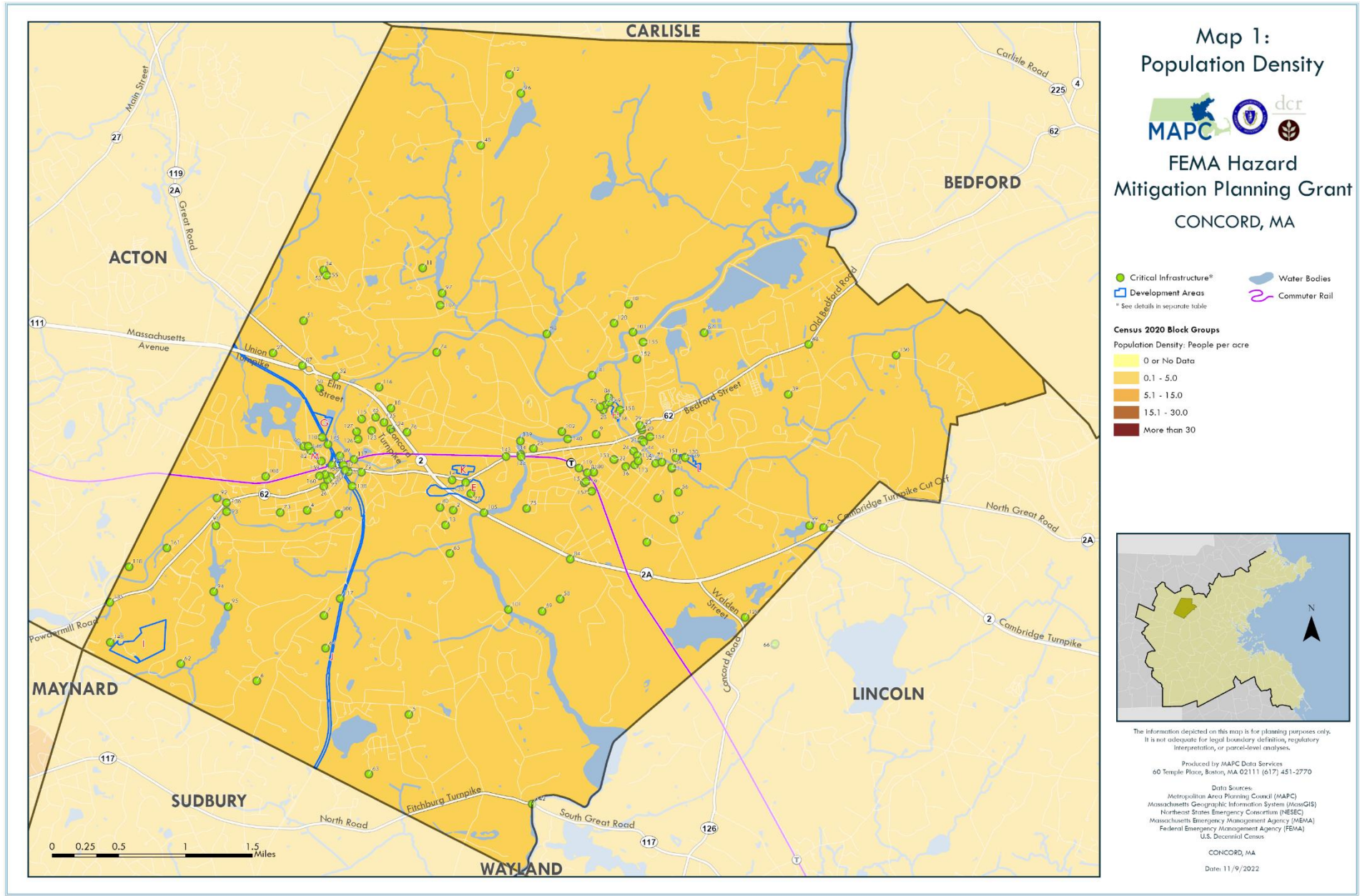
#### **2. Conclusion & Next Steps (10 mins)**

- c) Draft plan due to Local Team for review – by December 21
- d) Prepare for Public Meeting #2 – Week of December 5
  - Public Review – Dec 5 – Dec 16
  - Set up community-wide survey for final public input
- e) Deadline for submission to MEMA

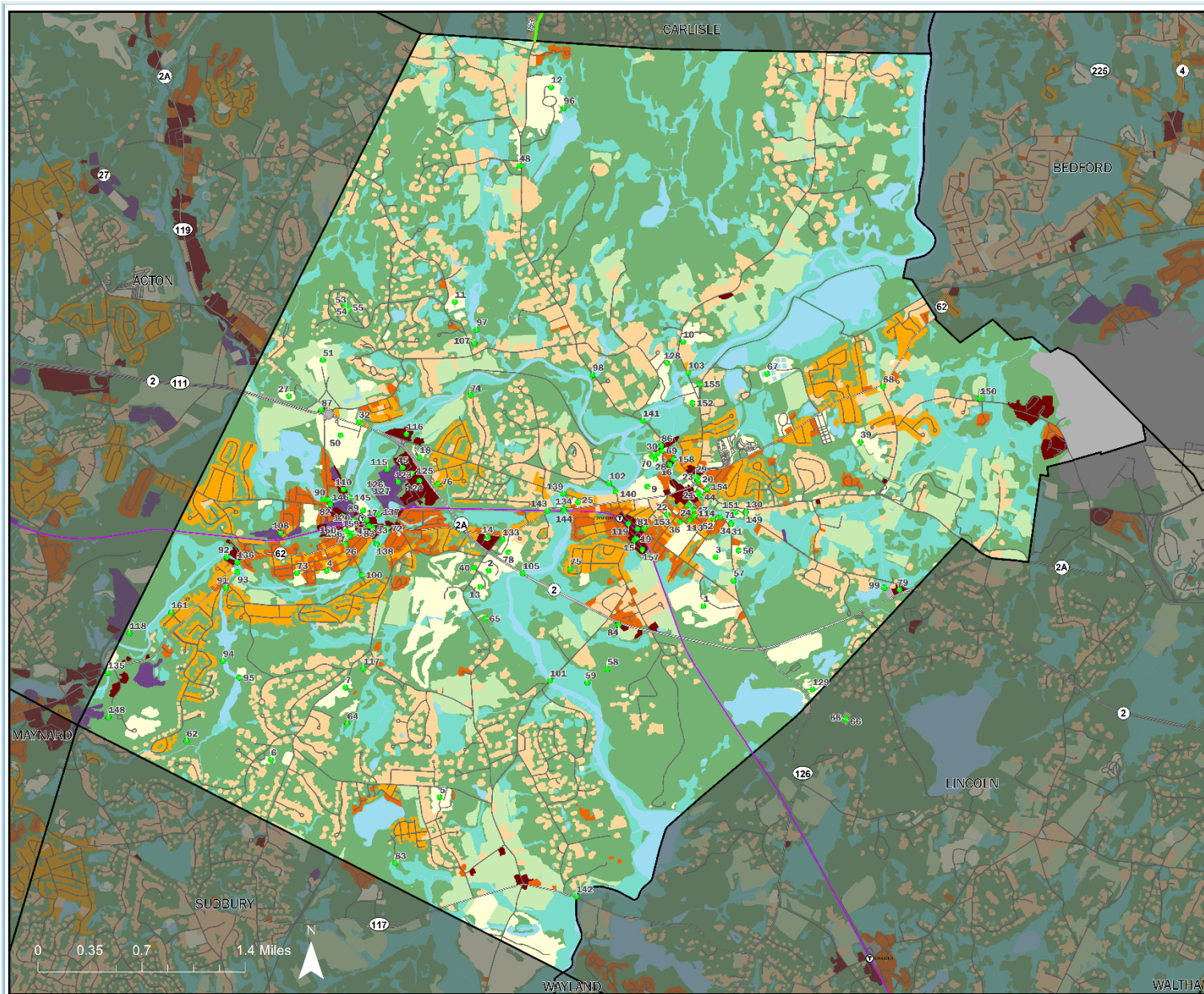
## APPENDIX B: HAZARD MAPPING

### Maps:

1. Population density
2. Land use
3. Flood zones
4. Earthquake/landslides
5. Hurricane/tornadoes
6. Average snowfall
7. Composite Natural Hazards
8. Local Hazard Areas
9. High Land Surface Temp



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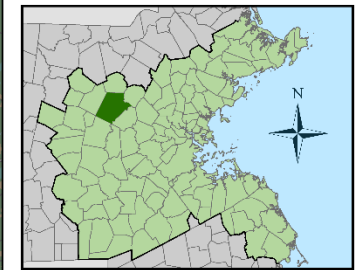


## Map 2: Land Use



### FEMA Hazard Mitigation Planning Grant CONCORD, MA

- All Roads**
  - Interstate
  - U.S. Highway
  - State Route
  - Streets
- Rail**
  - Stations
  - Commuter Rail
- Sites**
  - Critical Infrastructure
  - \* See details in separate table
- Water Bodies**
- Land Use**
  - High Density Residential
  - Medium Density Residential
  - Low Density Residential
  - Non-Residential Developed
  - Commercial
  - Industrial
  - Transportation
  - Agriculture
  - Undeveloped
  - Undeveloped Wetlands



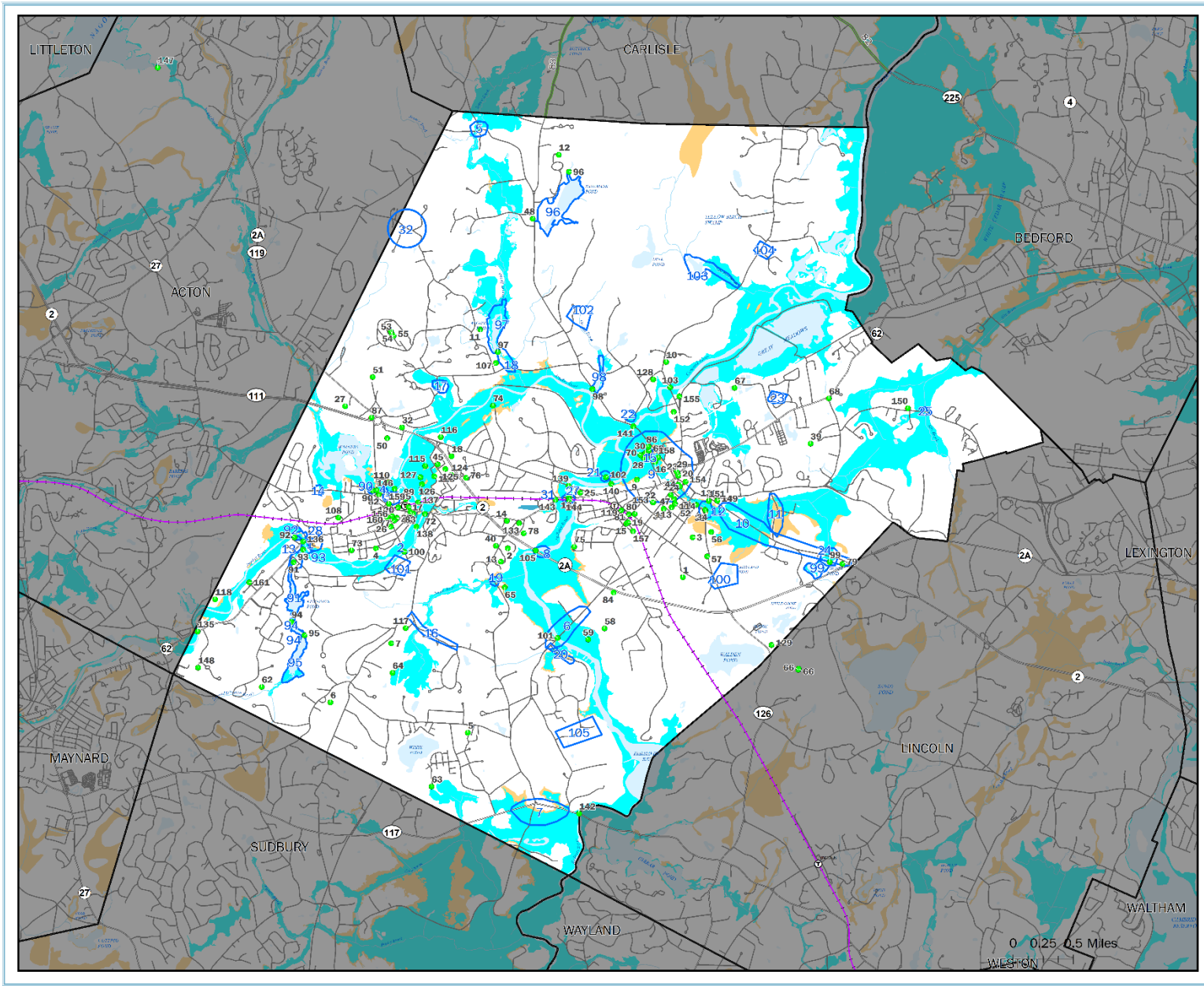
The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analyses.

Produced by MAPC Data Services  
60 Temple Place, Boston, MA 02111 (617) 451-2770

Data Sources:  
Metropolitan Area Planning Council (MAPC)  
Massachusetts Geographic Information System (MassGIS)  
Northeast States Emergency Consortium (NESEC)  
Massachusetts Emergency Management Agency (MEMA)  
Federal Emergency Management Agency (FEMA)

CONCORD, MA  
Date: 10/9/2022

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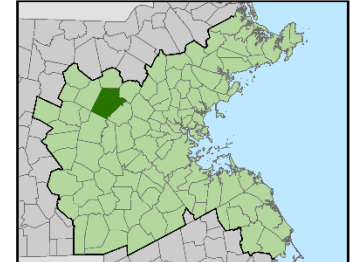


## FEMA Hazard Mitigation Planning Grant CONCORD, MA

Map 3: Flood Zones

- Water Bodies
- Sites**
  - Critical Infrastructure\*
  - Locally Identified Flooding
- Flood Zones, 2017 (Annual Chance)**
  - Zone A: 1%
  - Zone AE: 1%
  - Zone AH: 1%
  - Zone AO: 1%
  - Zone VE: 1% with Velocity Hazard
  - 0.2% Annual Chance
- All Roads**
  - Interstate
  - U.S. Highway
  - State Route
  - Streets
- Rail**
  - Stations
  - Commuter Rail
  - Trains

\* See details in separate table



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analyses.

Produced by MAPC Data Services  
60 Temple Place, Boston, MA 02111 (617) 451-2770

Data Sources:  
Metropolitan Area Planning Council (MAPC);  
Massachusetts Geographic Information System (MassGIS)

Flood Zones data layer updated by MassGIS October 2013  
from finalized data provided by  
Federal Emergency Management Agency (FEMA)

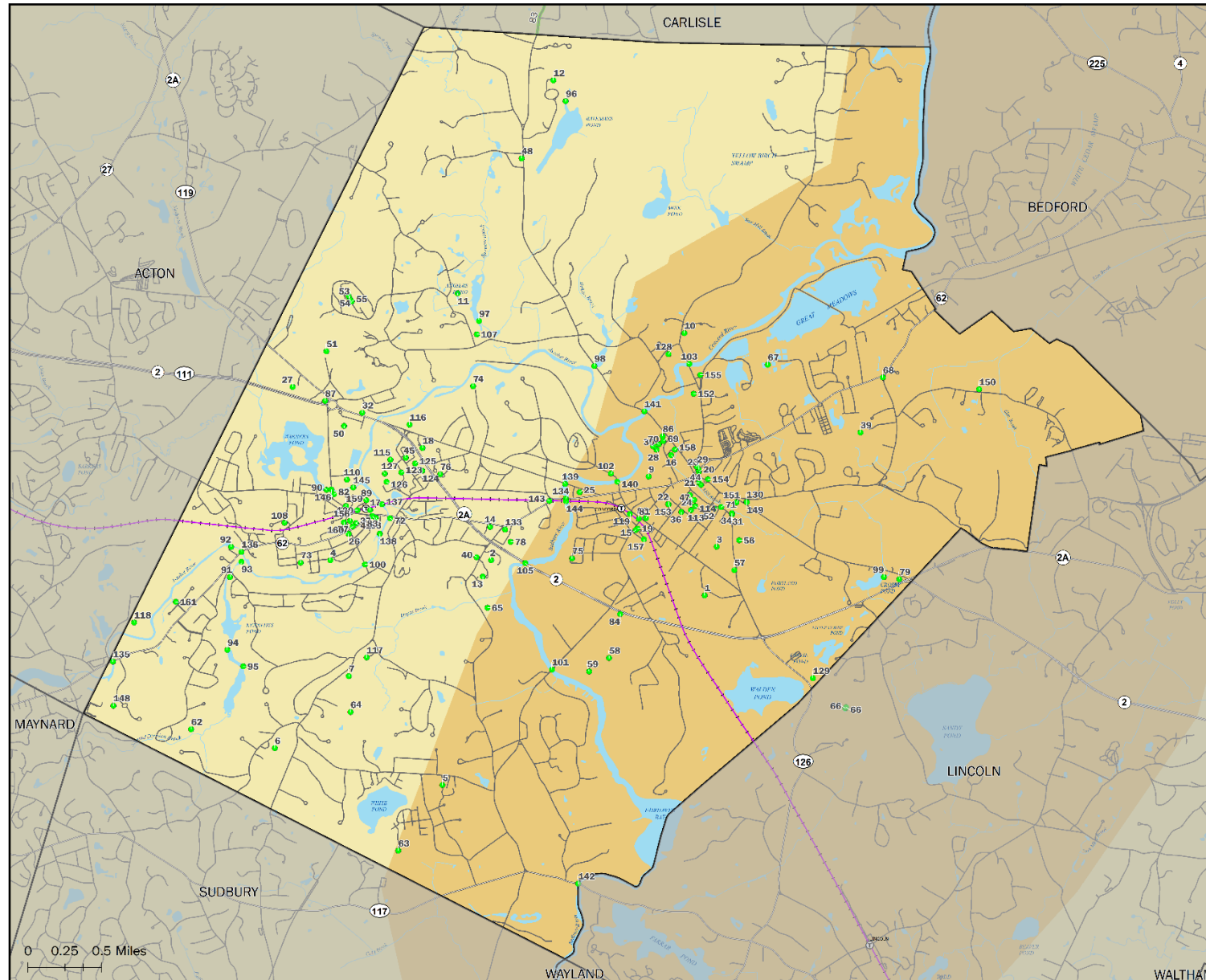
CONCORD, MA  
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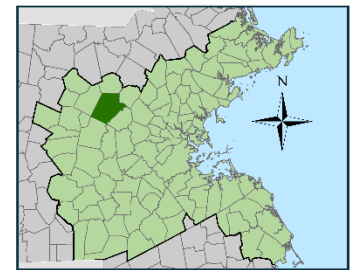
# Map 4: Earthquakes / Landslides



## FEMA Hazard Mitigation Planning Grant CONCORD, MA



- Sites**
- Critical Infrastructure Sites\*
- \* See details in separate table
- All Roads**
- Ⓜ Train Stations
  - Commuter Rail Lines
  - Ⓜ Trains
  - Interstate
  - U.S. Highway
  - State Route
  - Street
- Earthquakes**
- Epicenters
- Landslides**
- High landslide incidence (greater than 15% of the area is involved in landsliding)
  - High susceptibility to landsliding and moderate incidence
  - High susceptibility to landsliding and low incidence
  - Moderate susceptibility to landsliding and low incidence
  - Low landslide incidence (less than 1.5% of the area is involved in landsliding)



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Produced by MAPC Data Services  
60 Temple Place, Boston, MA 02111 (617) 451-2770

**Data Sources:**  
Metropolitan Area Planning Council (MAPC);  
Massachusetts Geographic Information System (MassGIS);  
Northeast States Emergency Consortium (NESEC);  
Massachusetts Emergency Management Agency (MEMA);  
Federal Emergency Management Agency (FEMA);  
U.S. Geological Survey (USGS)

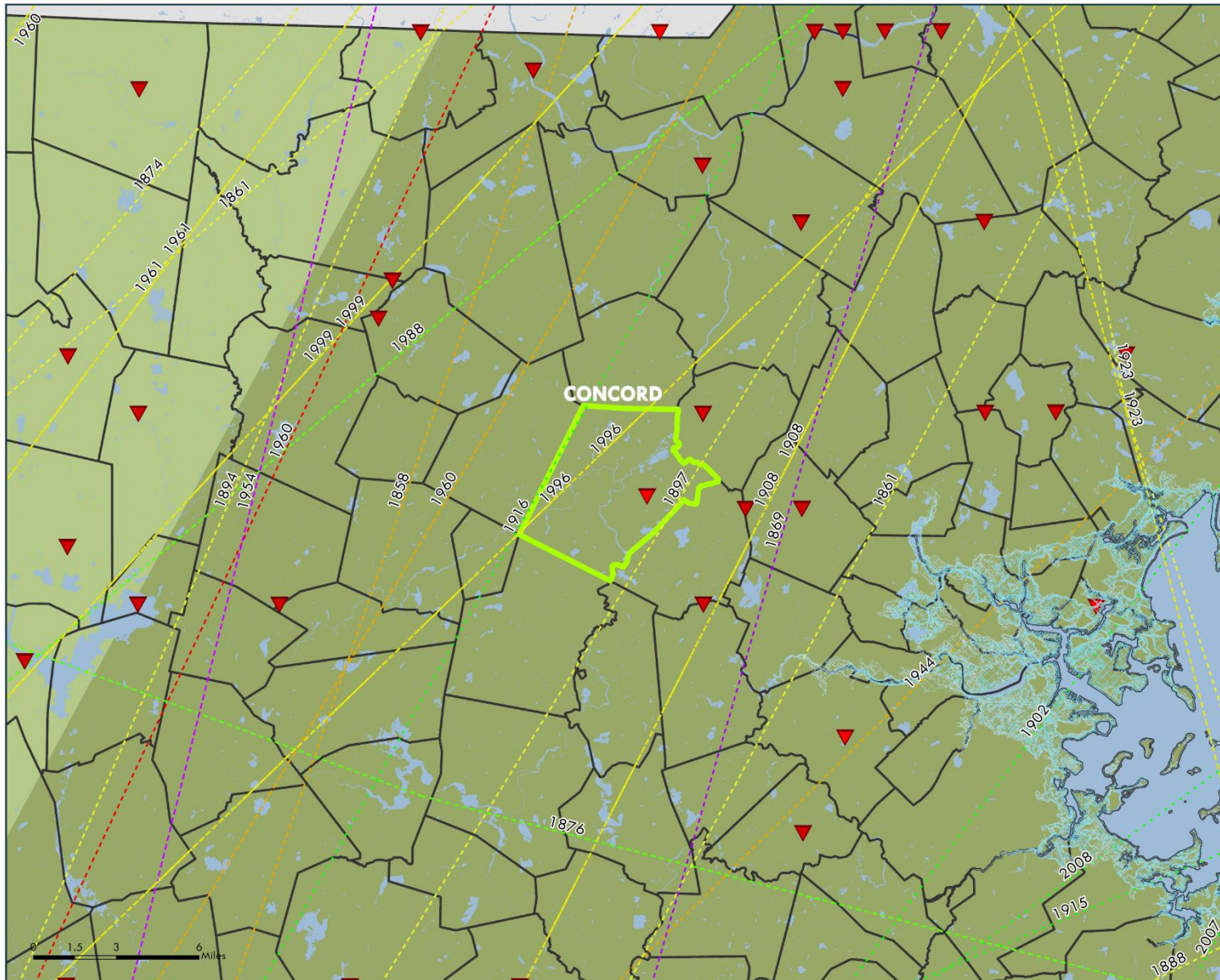
Date: 10/9/2022  
CONCORD, MA

Path: \\share001\public\Development\Project\Sharewell\_Proposed\Endowment\EDM\origins\_060504\_Map4

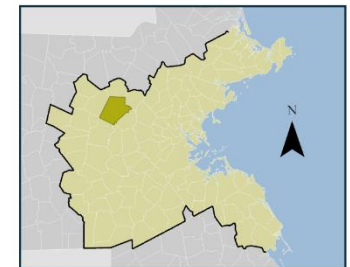
# Map 5: Hurricanes / Tornadoes



## FEMA Hazard Mitigation Planning Grant CONCORD, MA



- Hurricane Surge Inundation Area
- Tornado
- Storm Tracks**
  - Tropical Depression
  - Tropical Storm
  - Category 1 Hurricane
  - Category 2 Hurricane
  - Category 3 Hurricane
- 100 Year Wind Speeds**  
Miles Per Hour
  - 90 MPH
  - 100 MPH
  - 110 MPH
  - 120 MPH
  - 130 MPH



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Produced by MAPC Data Services  
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Data Sources:  
Metropolitan Area Planning Council (MAPC)  
Massachusetts Geographic Information System (MassGIS)  
Northeast States Emergency Consortium (NESCEC)  
Massachusetts Emergency Management Agency (MEMA)  
Federal Emergency Management Agency (FEMA)  
U.S. Decennial Census

CONCORD, MA  
Date: 11/9/2022

Path: K:\DataServices\Projects\Current\_Projects\Environment\FDM\project\_files\FDM\_ArcPro\proj

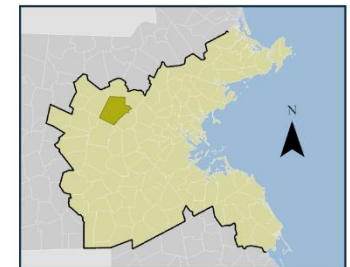
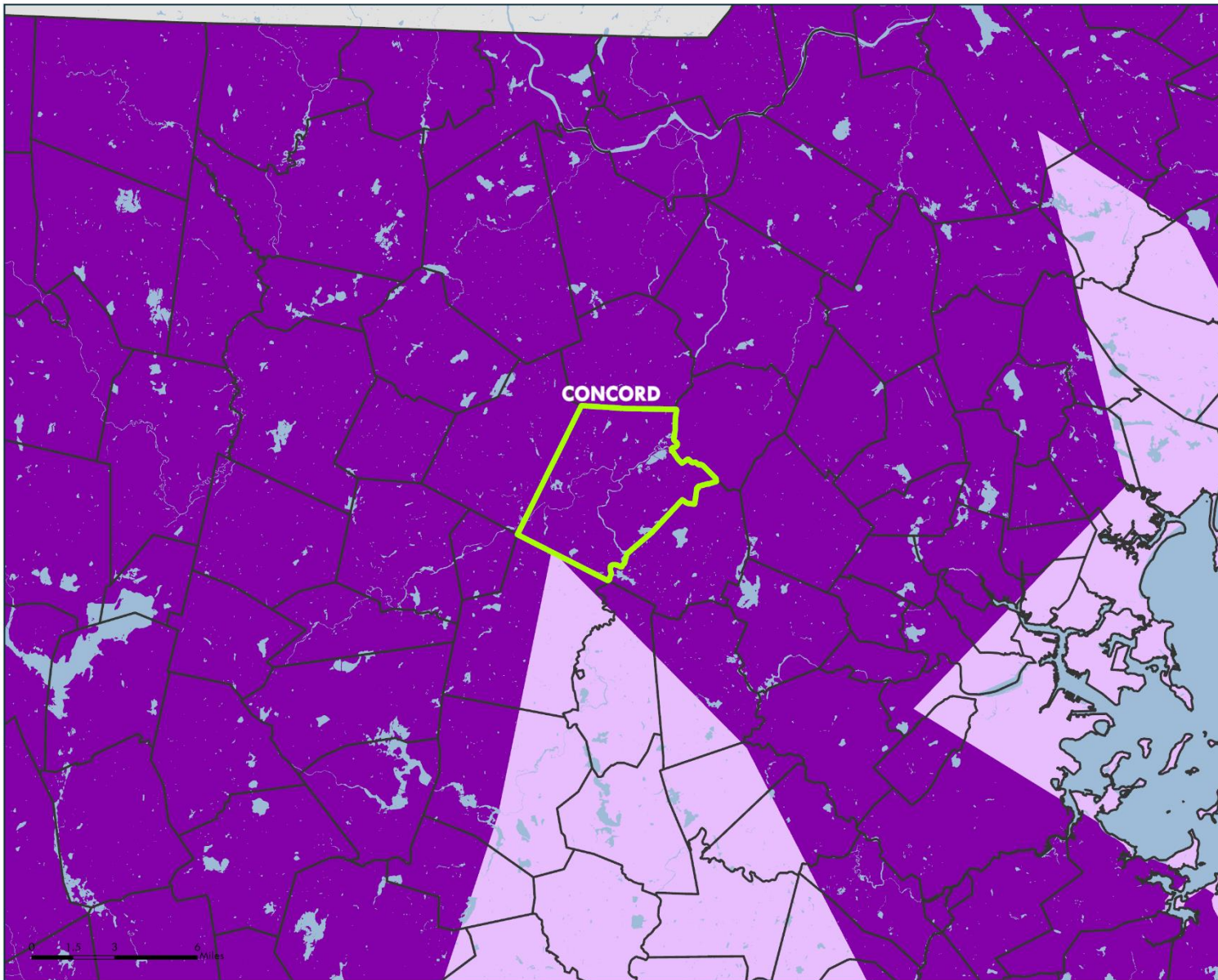
# Map 6: Average Snowfall



## FEMA Hazard Mitigation Planning Grant CONCORD, MA

**Average Annual Snowfall**  
Inches

G	36.1 - 48.0
H	48.1 - 72.0



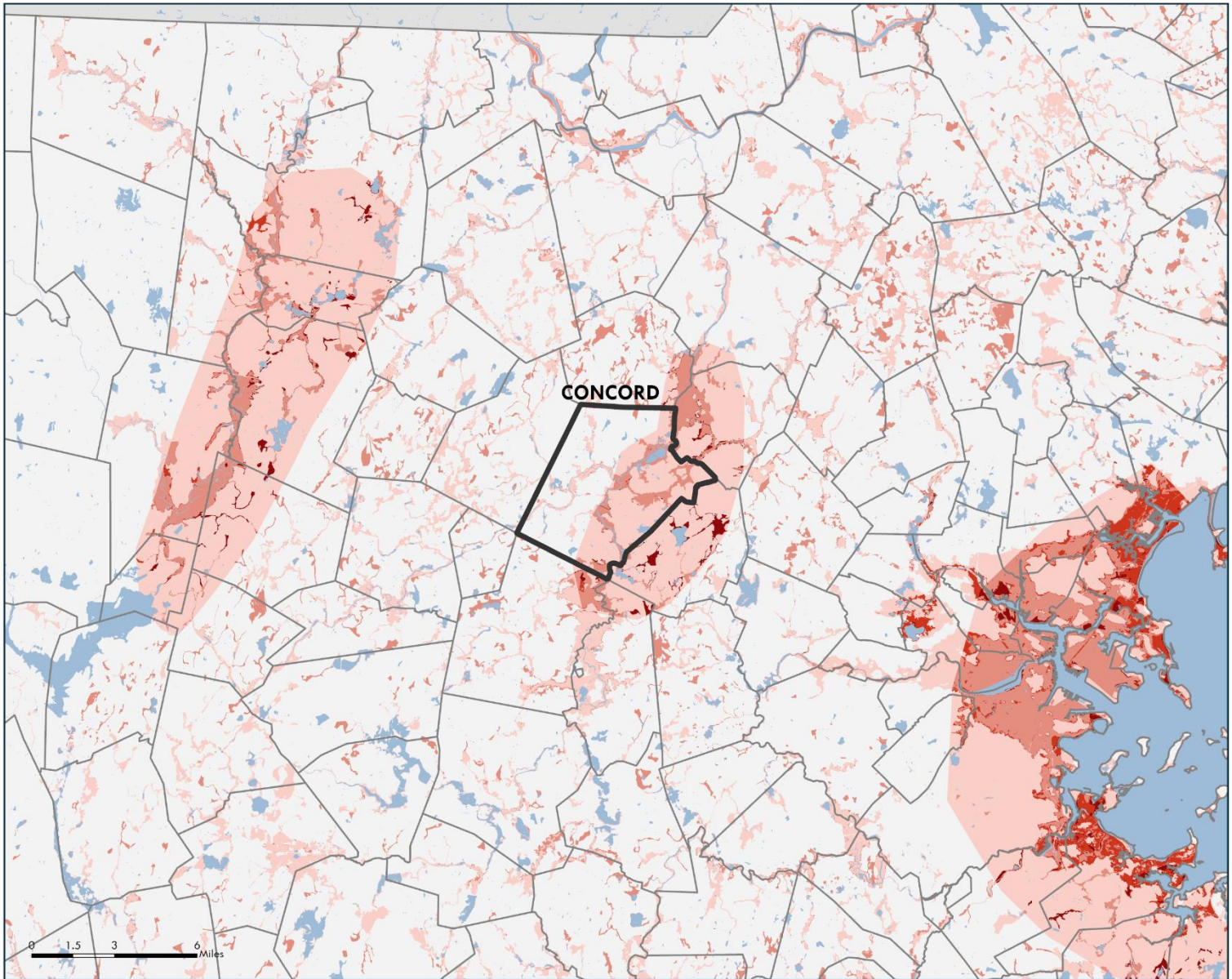
The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

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Data Sources:  
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Northeast States Emergency Consortium (NESCE)  
Massachusetts Emergency Management Agency (MEMA)  
Federal Emergency Management Agency (FEMA)  
U.S. Decennial Census

CONCORD, MA  
Date: 11/9/2022

Path: K:\DataServices\Projects\Current\_Projects\Environment\FDM\project\_files\FDM\_ArcPro.spprx



# Map 7: Composite Natural Hazards



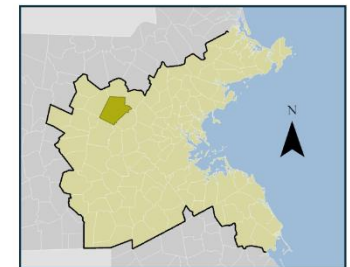
## FEMA Hazard Mitigation Planning Grant CONCORD, MA

### Composite Natural Hazards

- Low (2 Hazards)
- Moderate (3 Hazards)
- High (4 Hazards)
- Very High (5 Hazards)

Composite natural hazards shown for areas of existing development.  
Hazards include:

- 100 year wind speed of 110 MPH or higher
- Moderate landslide risk
- FEMA Flood zones (100 year and 500 year)
- Average snowfall of 36.1" or more
- Hurricane surge inundation areas



The information depicted on this map is for planning purposes only.  
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Produced by MAPC Data Services  
60 Temple Place, Boston, MA 02111 (617) 451-2770

Data Sources:  
Metropolitan Area Planning Council (MAPC)  
Massachusetts Geographic Information System (MassGIS)  
Northeast States Emergency Consortium (NESCE)  
Massachusetts Emergency Management Agency (MEMA)  
Federal Emergency Management Agency (FEMA)  
U.S. Decennial Census

CONCORD, MA  
Date: 11/9/2022

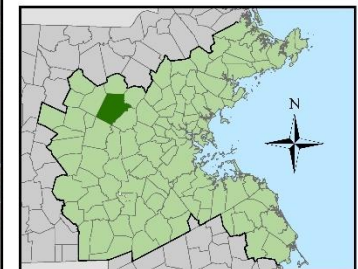
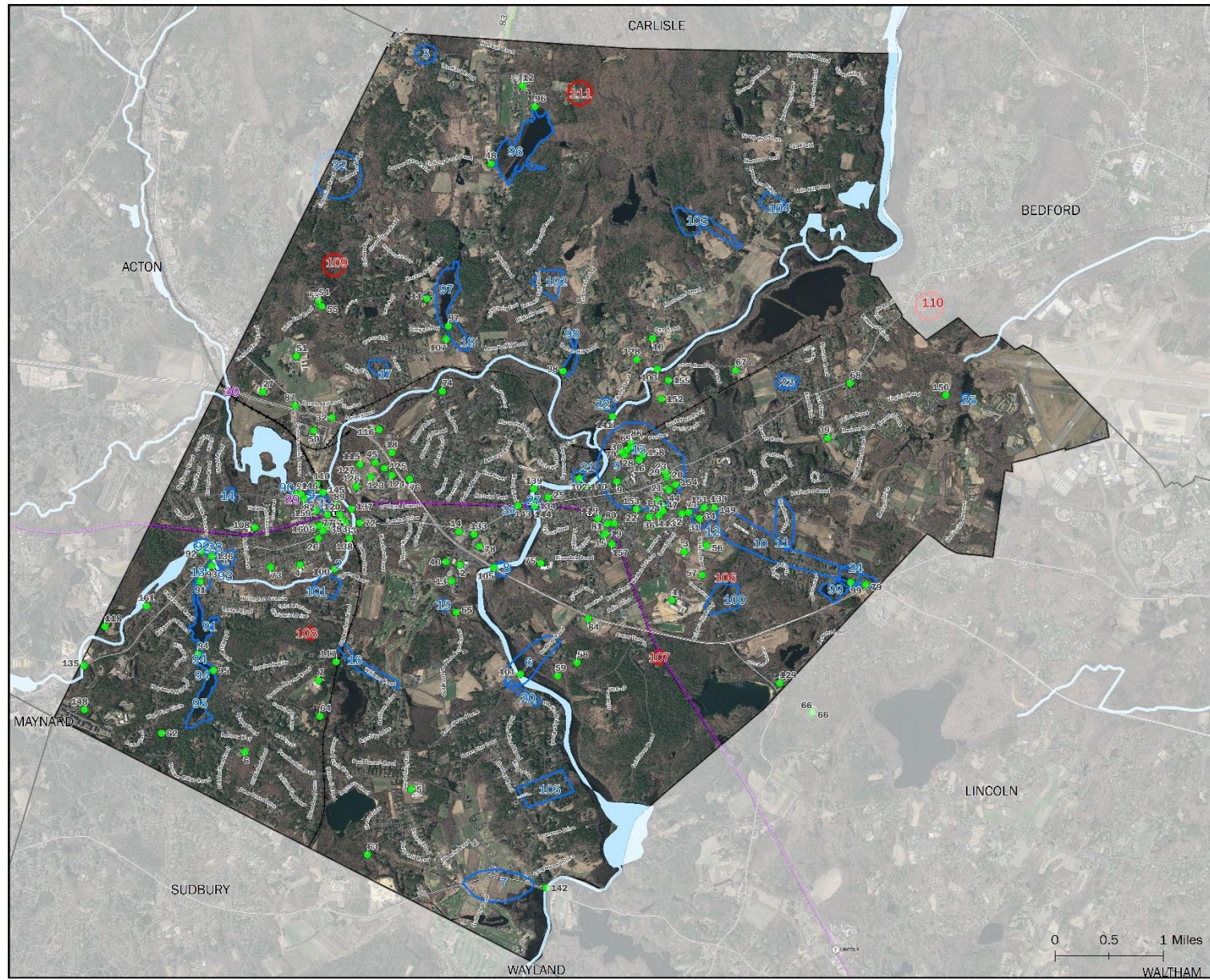
Path: K:\DataServices\Projects\Current\_Projects\Environment\PDM\project\_files\PDM\_ArcProc\pdx

# Map 8: Local Hazard Areas



## FEMA Hazard Mitigation Planning Grant CONCORD, MA

- Sites**
- Critical Infrastructure Sites\*
  - Repetitive Loss Sites
  - \* See details in separate table
- Locally Identified Hazard Areas**
- Brush Fires
  - Flooding
  - Other
  - Development Sites
  - \* See details in separate table
- Train Stations**
- Train Stations
  - Commuter Rail Lines
  - Trains
- All Roads**
- Interstate
  - U.S. Highway
  - State Route
  - Street

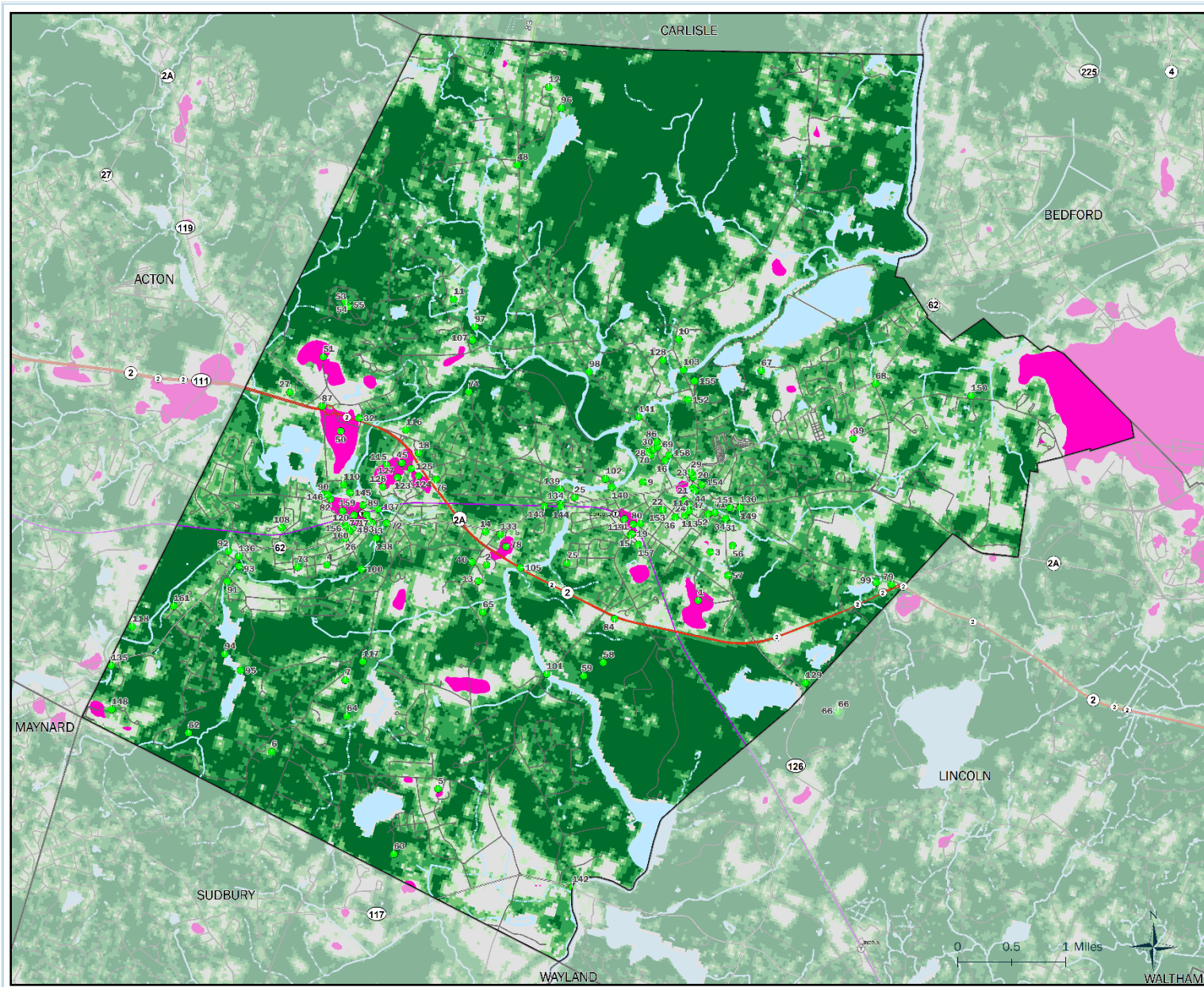


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60 Temple Place, Boston, MA 02111 (617) 451-2770

Data Sources:  
Metropolitan Area Planning Council (MAPC)  
Massachusetts Geographic Information System (MassGIS)  
Northeast States Emergency Consortium (NESCE)  
Massachusetts Emergency Management Agency (MEMMA)  
Federal Emergency Management Agency (FEMA)  
Imagery © DigitalGlobe, 2015

CONCORD, MA  
Date: 10/11/2022



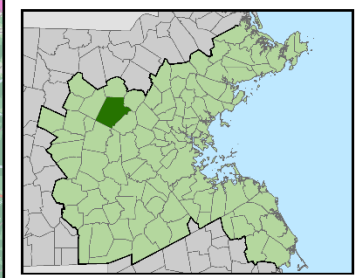
Map 9: High Land Surface Temperature



FEMA Hazard Mitigation Planning Grant

CONCORD, MA

- Tree Canopy Coverage**
  - 0%
  - 1-25%
  - 26-50%
  - 51-75%
  - 76 - 100%
- Climate Hazards**
  - Hottest 5% of region's land area
- Sites**
  - Critical Infrastructure\*
- Transportation**
  - Rail Stations
  - Commuter Rail
- Roads**
  - Interstate
  - U.S. Highway
  - State Route
  - Streets
- Hydrography**
  - Perennial Stream
  - Intermittent Stream
  - Ditch/Canal
  - Aqueduct
  - Water Bodies



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analyses.

Produced by MAPC Data Services  
60 Temple Place, Boston, MA 02111 (617) 451-9770

Data Sources:  
Metropolitan Area Planning Council (MAPC)  
Massachusetts Geographic Information System (MassGIS)  
Northeast States Emergency Consortium (NESEC)  
Massachusetts Emergency Management Agency (MEMA)  
Federal Emergency Management Agency (FEMA)  
Imagery © Google  
CONCORD, MA

Date: 10/11/2022

# Hazard Mitigation Plan Public Meeting

*Natural hazards can have serious impacts on the  
Town of Concord and its residents and businesses*



The Town of Concord is updating its Hazard Mitigation Plan to help assess its vulnerability to natural hazards such as flooding, hurricanes, and winter storms, and identifies strategies to mitigate impacts on community infrastructure and residents.

Please join us to learn more about Concord's climate and hazard preparations to date and provide your input for the plan!

**Date:** Wednesday, October 12, 2022

**Time:** 7:00 pm – 8:00 pm

**Location:** Zoom Meeting | Register in advance here:  
<https://mapc.ma/3QV9Dxe>

For more information, please contact  
Van Du at [vdu@mapc.org](mailto:vdu@mapc.org).



# Hazard Mitigation Plan Public Meeting



The Town of Concord is updating its Hazard Mitigation Plan to assess and reduce its vulnerability to natural hazards such as flooding, hurricanes, and winter storms. Please join us for a presentation on the final draft of the Plan and discussion of recommended measures to mitigate impacts on community infrastructure and residents.

**Date:** Wednesday, November 30, 2022  
**Time:** 7:00 pm – 8:00 pm  
**Location:** Zoom Meeting | Register in advance here:  
<https://mapc.ma/3hMkSMU>

*\*The Plan will also be available for public comment from December 5 through December 15, 2022; it will be posted on the town website.  
We look forward to your input on the Plan!*

For more information, please contact  
Van Du at [vdu@mapc.org](mailto:vdu@mapc.org).



**APPENDIX D: PLAN ADOPTION**



**CERTIFICATE OF ADOPTION  
SELECT BOARD  
TOWN OF CONCORD, MASSACHUSETTS**

**A RESOLUTION ADOPTING THE  
TOWN OF CONCORD HAZARD MITIGATION PLAN 2022 UPDATE**

WHEREAS, the Town of Concord established a Committee to prepare the *Town of Concord Hazard Mitigation Plan 2022 Update*; and

WHEREAS, the *Town of Concord Hazard Mitigation Plan 2022 Update* contains several potential future projects to mitigate potential impacts from natural hazards in the Town of Concord, and

WHEREAS, duly noticed public meetings were held by the LOCAL HAZARD MITIGATION PLANNING TEAM on October 12, 2022 and November 30, 2022, and

WHEREAS, the Town of Concord authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and

NOW, THEREFORE BE IT RESOLVED that the Town of Concord Select Board adopts the *Town of Concord Hazard Mitigation Plan 2022 Update*, in accordance with M.G.L. 40s §4 or the charter and bylaws of the Town of Concord.

ADOPTED AND SIGNED this Date. \_\_\_\_\_

Name/Title

Signature

\_\_\_\_\_

\_\_\_\_\_

## APPENDIX E: MVP WORKSHOP RESULTS

Top recommendations from the 2019 Municipal Vulnerability Preparedness workshop that focused on preparing for climate impacts in Concord.

### Infrastructure

- Promote and highlight low impact development and green infrastructure.
- Prioritize action plan for police, fire, DPW facilities located in the floodplain.
- Find ways to improve cell service throughout the town to ensure ongoing communication.
- Rehabilitate or build new bridges and dams to account for climate projections and the 100-year flood, starting with South Bridge.

### Environmental

- Develop an integrated resource management plan for the town.
- Educate people and encourage ecosystem health by utilizing updated emerging threats and best practices.
- Create an economic action plan/partnership between public and private agricultural sites.
- Take action through policies and programs to increase water efficiency and minimize the use of fresh water for irrigation.

### Societal/Economic

- Expand database and educational outreach to seniors and medically vulnerable to collect information on critical needs, including prescriptions.
- Inventory and develop a needs assessment for vulnerable populations to expand plans for emergency preparedness.
- Review existing communication and preparedness and response protocols and plans (from businesses, schools, town departments, etc.) to ensure they are aligned.

**Annual Town Meeting Warrant Articles  
April 30, 2023**

<b>Article Number</b>	<b>Article Name</b>	<b>Sponsor</b>	<b>Recommendation</b>
1	Choose Town Officers	Select Board	
2	Hear Reports	Select Board	4-0-0
3	Meeting Procedure	Finance Committee	4-0-0
4	Ratify Personnel Board Classification Actions	Personnel Board	3-0-1
5	New Classification & Compensation Plan for Regular-Status Positions	Personnel Board	4-0-0
6	Amended Classification & Compensation Plan for Regular-Status Positions	Personnel Board	
7	Use of Free Cash	Finance Committee	4-0-0
8	FY23 Budget Line Item Adjustments	Finance Director	
9	FY24 Town Budget	Town Manager	4-0-0
10	Citizen Petition: DEI Director	Tanya B. Gailus	
11	Capital Improvement & Debt Plan	Town Manager	4-0-0
12	OPEB Trust Fund Appropriation	Finance Director	4-0-0
13	OPEB Trust Fund Expense	Finance Director	4-0-0
14	Appropriation of Opioid Settlement Funds Received from the State Settlement Fund	Finance Director	
15	Minuteman Regional Technical High School District Budget	Minuteman Regional School Committee	4-0-0
16	Concord-Carlisle Regional High School Budget	CCRHS School Committee	4-0-0
17	Concord Public Schools Budget	CPS School Committee	3-1-0
18	Concord Public Schools Capital Budget	CPS School Committee	
19	Concord Public Schools Capital Projects – Fields & Landscaping	CPS School Committee	
20	Appropriation to Middle School Stabilization Fund	Finance Committee	4-0-0
21	Light Plan Solar Expansion – Middle School	Town Manager or Light Board	4-0-0
22	Citizen Petition: Municipal In-Town Solar Generation Task Force	Dean Banfield	
23	Adopt Specialized Stretch Energy Code	Climate Action Advisory Board	

24	Light Plant Expenditures & Payment in Lieu of Taxes	Town Manager	4-0-0
25	Appropriation for 250 <sup>th</sup> Anniversary Celebration	Select Board	
26	Community Preservation Committee Appropriation Recommendations	Community Preservation Committee	4-0-0
27	Community Preservation Act – Rescind and Reappropriate Funds	Community Preservation Committee	4-0-0
28	Community Preservation Committee Appropriation Recommendations – Concord Municipal Affordable Housing Trust	Community Preservation Committee	4-0-0
29	Transfer of Housing Funds	Select Board	4-0-0
30	162 Plainfield Road Easement	Town Manager	
31	Beede Swim & Fitness Center Enterprise Fund Expenditures	Town Manager	
32	Demolition Review General Bylaw	Historical Commission	4-0-0
33	Zoning Bylaw Amendment – Restaurant – Prohibited Uses – Parking	Planning Board	
34	Zoning Bylaw Amendment – Mobile Food Establishments	Planning Board	
35	Zoning Bylaw Amendment – Combined Business/Residence	Planning Board	
36	Citizen Petition: Update Concord Noise Bylaw	Sven Weber	
37	Citizen Petition: Prohibition of Gas-Powered Leaf Blowers	Sven Weber	
38	Solid Waste Disposal Fund Expenditures	Town Manager	4-0-0
39	Sewer System Expenditures	Town Manager	4-0-0
40	Sewer Improvement Fund Expenditures	Town Manager	4-0-0
41	Water System Expenditures	Town Manager	4-0-0
42	Authorize Expenditure from PEG Access & Cable-Related Fund	Town Manager	4-0-0
43	Annual Appropriation of Parking Meter Receipts	Town Manager	
44	Authorize Expenditure of Revolving Funds Under Mass. Gen. Laws c. 44 § 53E½	Town Manager	4-0-0
45	Unpaid Bills	Finance Director	
46	Debt Rescission	Finance Director	



# CONCORD BOARD OF HEALTH

141 Keyes Road  
Concord, MA 01742  
Phone: (978) 318-3275  
Fax: (978) 318-3281



**Public Health**  
Prevent. Promote. Protect.

TO: Kerry A. Lafleur, Town Manager

CC: Concord Select Board  
Marcia Rasmussen, Director Planning and Land Management  
Kellie Herbert, Interim Assistant Town Manager  
Christopher Carmody, Risk and Compliance Manager  
Jill Block, Chair, Concord Board of Health

FROM: Melanie T. Dineen, Public Health Director

RE: Use of Opioid Settlement Funds for Mental Health and Substance Use Prevention

DATE: April 1, 2023

\*\*\*\*\*

The Concord Behavioral Health Collaborative (the "Collaborative") had its inaugural meeting this winter as a group. The Collaborative is comprised of staff from the Town Manager's Office, Concord Police and Fire Departments, Council on Aging, Human Services, Recreation, Public Works, Sustainability, the Concord Library and the School Department. These Town stakeholders discussed currently known available programs and shared experiences and work associated with those facing Substance Use Disorders and other forms of mental health disorders and trauma. The Collaborative has examined data resources from the published Youth Risk Behavior Survey (YRBS)(Spring 2022) [Concord-Carlisle 2022 YRBS Report](#) and the Emerson Hospital Public Health Needs Assessment (2021) [Community Needs Assessment | Emerson Hospital](#).

The Collaborative has affirmed by overwhelming agreement that the umbrella of mental health issues are a significant problem throughout our entire community and that the Town of Concord does not currently have sufficient resources or training to support those in need. Additionally, the nature of mental health and Substance Abuse Disorders are varied and continue to have tremendous negative stigma attached to them.

Anecdotally we hear of a shortage of care providers and social workers for populations seeking treatment. Prevention and support for our youth is essential for our continuum-of-care paradigm -- but there are elements within our entire community (elders, parents, colleagues) also in need of mental health support services. All involved seek to assist those in crisis and develop appropriate preventive measures to reduce our crisis situations. The Collaborative has identified four areas of need that address the current mental health crisis:

- Better coordination of mental health resources and programming in the community.
- Increased resources needed to respond to emergency situations.
- Improved distribution of information to stakeholders with common interests and services to provide increased engagement in the entire community.
- Dedicated resources for capacity building within town government.

The Collaborative believes that these complex needs can be addressed by three distinct steps that include immediate action, long term planning, and funding of resources. Prior to FY23 fiscal year-end, the Health Division seeks to work with Grant Funds and the Opioid Settlement Funds to hire a Substance Use Prevention Coordinator and/or a Clinician to work in collaboration with the Concord Police, Council on Aging, and Social Services (LISWC).

To date, concerted efforts have already begun to address the group's long-term goal of improved health outcomes in specific areas. The Collaborative's sub-group, "Concord at Risk Group," has met with individuals who have struggled with hoarding and substance abuse (to name two) to seek improved and effective community mental health outcomes.

The Great Meadows Public Health Collaborative is offering Mental Health First Aid Training in our communities and will seek to provide outreach and public information on mental health in efforts to reduce stigma. The Collaborative is looking to collectively fund a substance use coordinator for the region. I would like to ask the Town to host this position and will work to coordinate intermunicipal agreements to collect funds from our partners in the Great Meadows Collaborative. A single point person is positioned to guide individual town collaboratives' and look at additional grant funding and opportunities to best use our resources.

Additionally, the aim is to use the opioid settlement funds to fund a public health needs assessment specific to Concord. A comprehensive needs assessment will inform specific goals that will lead to the development of a concise action plan. This process seeks to utilize a public health approach for mental health initiatives and prevention. This assessment will be geared to engage the entire community to better understand the extent and wide-reaching affects these issues have in our community.

Targeted Prevention Ideas:

- a. Informed Programming
- b. Public education, training, potential interventions

- c. Build capacity in government to meet the needs of residents
- d. Share data broadly

The goal of the assessment is to assist with making informed long-term decisions for the Town (e.g. a permanent Substance Use Coordinator, developing public health education and public health outreach in our immediate community and the region).

We look forward to having a productive dialogue with the Select Board to determine the best use of the Opioid Settlement Funds and discuss general strategies for addressing this mental health crisis in our community.

**Correspondence Index**

**Date**

1. 3/13/2023
2. 3/28/2023
3. 3/29/2023
4. 3/30/2023

**Author**

West Concord Advisory Committee  
Mari Weinberg  
Mark Garvey  
Tanya Gailus

**Subject**

Support of Affordable Housing  
Public Comment at Board Meetings  
Commuter Rail Quiet Zone  
ATM Warrant Article 10 – DEI Director



# TOWN OF CONCORD

WEST CONCORD ADVISORY COMMITTEE

141 Keyes Road ~ Concord, MA ~ 01742

March 13, 2023  
Lee Smith, Chair  
Concord Housing Development Corporation

Dear Lee,

Thank you so much for the information at our March 6, 2023 meeting regarding possibilities for affordable housing on the land off of Winthrop Street owned by the CHDC. The West Concord Advisory Committee is pleased to offer our support for new housing on this site, including the following elements.

- 40-50 units of family housing
- 100% affordable, as required by the deed restriction
- A mix of 1, 2 and 3-bedroom units
- The inclusion of some accessible units
- Infrastructure improvements that benefit the site and the surrounding community
- Open space that benefits the community and provides access to the natural resources on the site, as required by the deed restriction

We are in agreement that housing on this site meets the current needs of Concord, and is in line with both the 2022 Housing Production Plan and Concord's Long-Range Plan, Envision Concord – Bridge to 2030. We look forward to working with the CHDC as you move forward.

Sincerely,

Barbara Morse, on behalf of the West Concord Advisory Committee  
John Cooley  
Susan Mlodozeniec  
Ann Sussman  
Laura Payne  
Nicole Hammond

Cc: The Concord Select Board

March 28, 2023

To:  
The Concord Select Board:  
Matthew Johnson  
Terri Ackerman  
Linda Escobedo  
Henry Dane  
Mary Hartman  
Town Manager:  
Keezy LaFleur

From:  
Mari Weinberg  
26 Hillside Avenue  
West Concord  
[REDACTED]

Thank you all for adopting the Select Board  
Citizen Correspondence Policy on Oct 3, 2022.  
As is stated on the Town's Gov't website:  
"Letters from Concord citizens to the Select  
Board enhance participation in town gov't  
+ sharpen the debate on current issues.  
Citizen Correspondence complements other  
input, such as verbal public comment  
during board + committee meetings."

\* I see recent BOS meetings have scheduled  
"public comment" at the very end of  
the meeting. Please note: The recent  
March 27, 2023 BOS meeting:  
Public Comment: 9:40 P.M.

I don't know if I'm alone... I do not have  
access to Zoom, I am 78, and waiting  
till the very end of a BOS meeting is  
a hardship for me - to make my public  
comment. Thank you for your consideration  
in this matter. Respectfully yours,

Mari Weinberg \*ATTACHMENT ARTICLE

To Bps: Matthew Johnson, Terri Ackerman, LINDA ESCOBEDO, Henry Dore, Mary Hartman, Two Mgr: KERRY, La Fleur

# Opinions

## Find what's preventing people from attending Town Meeting

The answers of the two candidates for select persons to the question of how to improve citizen participation in Town Meeting exposes an important problem in improving the function of town government: proposing solutions without understanding the root cause of the problem.

A Japanese business model for improving the quality of products, the "5 Whys," addresses this. Once a defect in a product is exposed, the question asked is why did this

occur? When the answer is revealed, once again the question is why THIS occurred. The process is continued until the root cause is understood. An example of this was the breakdown of fans being produced. Why? The bolts of one component were being overly tightened. Why? The workers on the production line had no guidance of how tight to make the bolt. The answer was to suspend the wrench from the ceiling so that it could not be tightened beyond the proper point.

Improving the town website and the use of bookmarks may be the best solution to improving citizen participation but many people do not use computers or know how bookmarks function. This may be true for elderly citizens. Voting by mail may be an excellent approach to improving participation in Town Meeting, but not if this does not address the root cause of the problem.

In addition, two minutes allowed at Town Meeting for each citizen to present his or

her argument may be inadequate, especially for complex issues. Do citizens know the tax consequences of approving the additional \$7 million for the middle school?

It is certainly time-consuming and expensive to seek the root causes of problems but proposing solutions without knowing these can be ineffective and a waste of time.

Norman Weinberg MD FACP  
Hillside Ave

## Leaf blowers heard round the neighborhood

Has this happened to you? You're sitting on your porch in the spring or summer enjoying a quiet lunch when landscapers pull up at your neighbor's house — oh no — your peaceful lunch is over! As the leaf blowers start up, sometimes three at a time, the sound is deafening. And it's not just the noise; the

machines are guzzling gasoline and emitting greenhouse gasses into the air.

Article 37 allows a phased-in approach to a ban on gas-powered leaf blowers, giving two years for landscapers and three years for residents to retire fossil fuel-dependent blowers. We can join the town of Lexington

and encourage an evolution in landscaping as it becomes more environment-friendly (Google "town of Lexington MA gas leaf blower ban").

I'm proud that Concord stood up to serious pushback from big beverage companies when we banned plastic water bottles. We care about the planet and we can reduce greenhouse

gasses and noise pollution at the same time if this bill passes. Please come to Town Meeting on April 30 and vote in support of Article 37 so we can all enjoy a peaceful lunch on the porch.

Lisa Resnick  
Laurel Street

## Allowing Concord for Ukraine in parade is precedent set by town

A reminder ...

**"PROCLAMATION  
RECOGNIZING THE SUFFERING  
AND HEROISM OF THE  
UKRAINIAN PEOPLE  
IN THE STRUGGLE FOR LIBERTY AND**

all to defend their own liberty..."

The Proclamation concludes with a directive:

"[The] Concord Select Board does hereby declare that the struggle and sacrifice of the Ukrainian people shall be recognized on our observance of Patriot's Day in the year 2022."

has raised money for delivery of hospital beds to Ukraine; it recently partnered with the venerable Concord Bookstore to showcase Ukrainian books and culture in an upcoming display; etc.

The Select Board was not merely posturing when it wrote that there is a "special duty imposed

for democracy in Ukraine.

And the Select Board's clear directive to "[r]ecognize [Ukraine] in our observance of Patriots Day" means exactly what it says.

Pamela Talbot

## Shannon McAndrew

---

**From:** mark garvey <mark.garvey007@gmail.com>  
**Sent:** Wednesday, March 29, 2023 6:57 PM  
**To:** Shannon McAndrew  
**Subject:** Commuter Rail Quiet Zone(ZRI)

You don't often get email from mark.garvey007@gmail.com. [Learn why this is important](#)

To the Select Board:

I was the lead petitioner in the multi year effort to get a train horn quiet zone in Concord. At the time, West Concord was the first grade crossing where every train sounded its horn on its way from Boston. Working with town manager Chris Whelan, State Representative Cory Atkins, Selectwoman Dinny McIntyre, concerned citizens and the town's engineer and police chief, we secured our quiet zone after adding median dividers on both Baker Ave. and Belknap St. These steps brought our Federal Railroad Administration (FRA) quiet zone risk index (QZRI) down to a level where the FRA approved our quiet zone. Since then, train horns sound only in emergencies or when rail workers are in the right of way.

A report in today's Boston Globe stated that a lawsuit will be filed to overturn all rail quiet zones in Massachusetts. This misguided effort will be devastating to all along the rail corridor, including here in Concord. 110+ decibel horns between the hours of 5:30 AM and 12:30 AM will lead to disrupted sleep and health issues. I urge you to support maintaining our quiet zone and fight any effort to overturn it. Thank you.

Sincerely,

Mark Garvey  
25 Damon St.  
Concord, MA 01742  
[REDACTED]

## Shannon McAndrew

---

**From:** tbarveyan <tbarveyan@yahoo.com>  
**Sent:** Thursday, March 30, 2023 4:58 PM  
**To:** Matthew Johnson; Terri Ackerman; Linda Escobedo; Henry Dane; Mary Hartman; Shannon McAndrew  
**Cc:** Kerry Lafleur; Donna McIntosh; Eileen Blanchette; Carmin Reiss, Town Moderator  
**Subject:** Article 10 considerations - for meeting packet

Dear Members of the Concord Select Board,

I watched your March 27th meeting discussion of Article 10 online.

It is clear that you would like to be supportive of DEI efforts, just like, I would think, most residents would.

Thank you.

I know that our Town Manager is also deeply sensitive about DEI concerns.

As the official citizen sponsor of the Article, I wish to offer the following perspective:

The Article is deliberately worded resiliently. It does not require you or the Town Manager to hire a DEI director by any specific time. The word "expedite" can be interpreted within realistic guidelines- including budgeting, as well as strategic "readiness" for a DEI Director.

You considered - are considering- proposing an amendment which provides "increased spending" on DEI. You are doing this partly because you don't want to be unsupportive of DEI concerns.

However, this approach interprets the ask of the Article as a purely monetary issue. It is not. It is also a matter of providing attentive professional supervision to an important social phenomenon that is subtle and pervasive in many levels.

If you support the Article as is, it is not going to demand any immediate action on your part. It also will prevent our DEI work from being summarized as just a matter of money.

People who suffer from discrimination and marginalization are not always free to speak up. Sometimes they feel physically afraid. When they do speak up, they are not always heard accurately by others. Often their experiences are subjected to questioning and cross examination.

It is NOT only about money.

Giving the Commission and the Town the gift of a DEI Director is the right thing to do.

Suggesting a regional director complicates the issue, and it can result in "kicking the can down the road." Besides, Concord has its own unique demographics and social dynamics. There is much good will in Concord. There is also lack of awareness about inclusion, the concept of equity, and about embracing diverse expressions of cultural backgrounds.

You are of course free to present an Amendment to the Article at Town Meeting (that the Moderator approves.)

That is what Town Meeting is.

I nevertheless urge you to reconsider and support Article 10 as printed in the Warrant, for the above reasons.

Thank you,

Tanya B. Gailus  
62 Prescott Road

-- Please post this letter in your meeting packet.