Milton Climate Action Plan (DRAFT)

Dear Select Board Members

Climate change presents an urgent challenge that demands both immediate action and long-term planning. While Milton's dependence on fossil fuels clearly cannot be ended overnight, delaying measures to reduce greenhouse gas emissions and prepare for the climate impacts that are already inevitable jeopardizes our children's future. We risk leaving them a world that is increasingly inhospitable, where the natural environment is too unstable to provide the level of prosperity that we have enjoyed. Proactive steps must be taken now to ensure a safe and livable environment for future generations

I am pleased to share this draft of Milton's Climate Action Plan for your review and feedback.
It was prepared over the past year by a dedicated group of Milton citizens with backgrounds in climate and environmental science as well as clean energy technologies and practical steps to support their adoption. It provides a series of goals, strategies, and actions the town can pursue to reduce harmful greenhouse gas emissions and lessen climate change's damaging effects. It is based on plans and goals developed by the Commonwealth of Massachusetts and many cities and towns in Massachusetts, which build on established science and in-market technologies to chart a course to net-zero greenhouse gas emissions while maintaining energy abundance and reliability.

We are seeking your partnership to refine and ultimately approve the plan, then align resources, staffing, and priorities to set it in motion. We understand there are many urgent, competing, short-term priorities the town is facing, such as zoning changes, maintaining our school buildings while addressing overcrowding, and putting the budget on a more solid foundation. It is our perspective that all these urgent issues have sustainability and climate dimensions that should be incorporated in our town's problem solving. We hope this plan will be a valuable resource as you tackle the urgent priorities of Milton residents.

Please don't hesitate to contact us if you have any questions.

Best Regards,

Milton Climate Action Planning Committee

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1 Executive Summary

The overarching objective of this plan is to minimize the damaging impacts of climate change in Milton. It focuses on goals, strategies, and actions to 1) significantly reduce town-wide greenhouse gas emissions and 2) improve the town's resilience and preparedness for climate change's likely impacts.

The Commonwealth of Massachusetts has a set of legally binding climate change goals aimed at supporting the overarching goal of reaching "net-zero" greenhouse gas emissions by 2050. Massachusetts law[1] defines interim emission reduction targets from 1990 levels for each decade, which are:

- 50% by 2030,
- 75% by 2040,
- "Net-zero" by 2050.

"Net-zero" means that statewide greenhouse gas emissions do not exceed what is removed from the atmosphere annually by both natural and artificial sequestration processes. To reach net-zero, Massachusetts must reduce statewide emissions by at least 85% relative to 1990 levels while enhancing the Commonwealth's carbon sequestration capacity to balance residual emissions. State plans currently target a 90% reduction of emissions to enable a more achievable level of carbon sequestration.

This plan targets reductions of town-wide greenhouse gas emissions aligned with these goals. It focuses on practical recommendations for both individuals and organizations that, if followed, will reduce harmful emissions in four key areas:

1. **Transportation:** 53% of town-wide emissions.
2. **Buildings and Energy**: 45% of town-wide emissions
3. **Land Conservation**: Sequesters approximately 6% of town-wide emissions annually
4. **Waste:** 2% of town-wide emissions

The plan also makes recommendations to ensure Milton is prepared to adapt to the likely harmful effects of climate changes that are already unavoidable: including **heat waves, intense storms, coastal and inland flooding, drought, wildfire, and reduced energy security.**

1.1 How We Get There

The concentration of emissions in the Buildings and Transportation sectors requires a sharp focus on improving the energy efficiency of our homes and vehicles and transitioning them to clean energy sources. Massachusetts Clean Energy and Climate Plan (CECP) for 2050 gives a clear summary of the pathway to net-zero, described in Table 1 The Commonwealth's Net-Zero Roadmap. The CECP also

[1] M.G.L. Chapter 21N, Section 3(b)(vi) and Section 4(h)

enumerates key, quantitative outcomes by sector that are necessary to achieve state goals. These are summarized in Table 2.

Table 1 The Commonwealth's Net-Zero Roadmap

"The main components of the path to Net Zero are clear to Massachusetts, with four key priorities:

- The first priority is reducing emissions from energy "end-uses," such as vehicle transportation or building heating, via electrification or fossil-free alternatives.
- The second priority is maximizing the efficiency and flexibility of energy use to ensure electric grid reliability and cost-effective decarbonization.
- Third, the electricity supply must transition to low-emitting sources.
- Fourth and finally, in a 2050 future where some emissions are likely to remain, Massachusetts must balance residual GHG emissions with carbon sequestration approaches.

These tenets are the guiding pillars of the Commonwealth's 2050 planning process, illustrated [below]"

Massachusetts Clean Energy and Climate Plan (CECP) for 2050

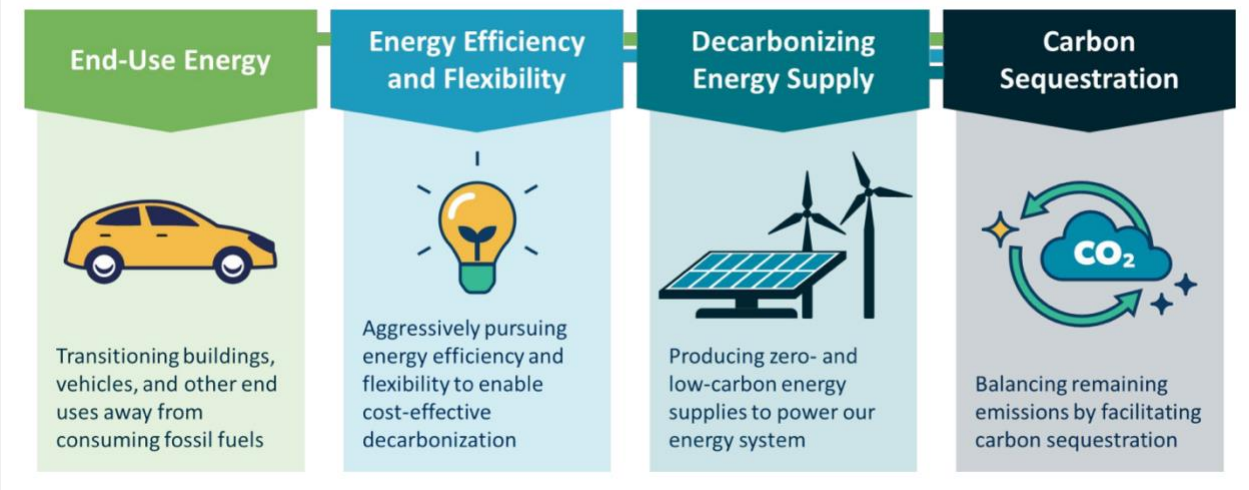

Table 2: Statewide Outcomes Necessary to Achieve Climate Goals

	2030	2050
Buildings	• 24% of homes complete energy efficiency renovations • 20% of homes electrify with air source heat pumps • 15% of homes install solar	• 63% homes complete energy efficiency renovations • 80% of homes and 87% of commercial spaces electrify with air source heat pumps • 75% of homes install solar
Transportation	• 15% of gas vehicles replaced with EVs • 75,000 public charging stations • Approaching 100% of new vehicles sales are Electric	• 95% of gas vehicles replaced with EVs • Reduced VMT per household through alternative transport
Conservation	• Permanent conservation of 30% of Massachusetts lands and waters • Proactive forest management to maintain tree health, control invasive species and pests.	• Permanent conservation of 40% of Massachusetts lands and waters • 64,400 acres of new urban and wetland tree cover
Waste	• 30% reduction in solid waste disposal by 2030 • 10% of food waste diverted to composting	• 90% reduction in solid waste disposal by 2050

Sources: [1]

1.2 The Role of the Town

As a primarily residential community, the majority of Milton's greenhouse gas emissions come from private sources. Municipal operations were responsible for only 2% of emissions in 2023. Additionally, the town's ability to meet these goals clearly depends on regional progress toward climate goals that is not under the town's control, such as the modernization of the electric grid and its transition to clean electricity. Nevertheless, the town can play an outsized role in reducing emissions through three major areas of action:

1. **Support Individual and Community Action**: Support residents in making climate-smart decisions related to our homes, vehicles, food, and waste. Remove obstacles, provide coaching, and help residents access incentives to adopt and benefit from clean-energy technologies.
2. **Lead by Example in Municipal Operations**: Lead by example reducing emissions from town-managed facilities, vehicles, and overall operations. The use of clean, energy-efficient technologies in public spaces will raise awareness of and comfort with these technologies, supporting private adoption.
3. **Resilience and Preparedness**: Enhance the town's capabilities to handle the impacts of climate change that are unavoidable.

1.3 Key Actions in the Next Two Years

A journey of a 1000 miles begins with a single step. While 2050 may seem far away, our choices for new vehicles, HVAC equipment, and renovations in the next few years will lock in increases or reductions in emissions for decades to come. Planning and preparation is urgently needed now to ensure that Milton can make climate-smart and financially prudent choices as projects and investments with significant climate and emissions impact become urgent priorities.

1.3.1 Organizing for implementation

1. Hire a Sustainability Director
2. Work toward Climate Leader Community certification
3. Secure grant funding and/or budget for planning, feasibility, and cost studies
4. Improve the town's ability to reach residents with important and urgent communications

1.3.2 Transportation

1. Collects RFPs and contract with school bus vendors to switch to Electric School Buses
2. Collect data and report on the modes of transportation to and from schools.
3. Adopt an electric-first vehicle policy for the Town's municipal fleet.
4. Identify the largest employers in town and develop buy-in to create programs that reduce VMT

1.3.3 Buildings and Energy

1. Launch an energy coaching program to support Milton residents with:
    a. Energy efficiency and electrification projects
    b. Accessing state and federal incentives for these projects
    c. Vetting contractors and project proposals
2. Complete electrification and energy-efficiency pathway studies for all municipal buildings and incorporate in capital planning, with an urgent focus on end-of-life HVAC equipment at our existing school buildings.
3. Increase the voluntary green energy component of the default "Milton Green" tier of the CEA program from 10% to 20% in the next power purchase contract renegotiations (2027).
4. Align voluntary clean energy purchases for municipal electricity with Milton CEA program levels.

1.3.4 Forest and Watershed conservation

1. Conduct an estimate of expected structural and cost damages to 100 abutting residents or loss of vegetation on buffering parcels
2. Adopt a dedicated budget line item to make sure at least 100 shade trees are planted each year
3. Collect baseline data on the tree stock in the Blue Hills

1.3.5 Waste Management

1. Create a waste management community outreach plan by 2026
2. Establish an internal bi-annual waste audit practice by 2026
3. Identify and install potential additional waste collection locations by 2027
4. Obtain joint hazardous waste engagement opportunities with similar neighboring communities by 2028

1.3.6 Adapting to Climate Risks

Heat Waves

1. Enhance public awareness and education about heat waves, including the development of an effective emergency response system
2. Increase access to cooling centers in Milton
3. Protect, maintain, and expand tree canopy and green spaces in Milton

Wildfire

1. Create a Community Wildfire Protection Plan (CWPP) for Milton that addresses wildfire response, community emergency measures, public awareness, and wildfire impact mitigation on buildings, landscapes, and life.
2. Establish data collection and dissemination processes regarding local wildfire risk for town leadership and the public.
3. Establish a liaison structure for coordination between the Department of Conservation and Recreation (DCR) and the Milton Fire Department.
4. Implement an emergency alert system for residents and town employees.

Drought

1. Implement a town-wide water conservation program that can be initiated during droughts. The program will include the following:
    a. a list of water conservation actions that are recommended that citizens take for each level of drought.
    b. a public outreach mechanism for reaching town of Milton residents with information about the local drought status and recommended actions to take to reduce water usage.
2. Collaborate with Miton DPW and Milton's Shade Tree Advisory Committee to ensure that new town tree plantings are drought tolerant.
3. Promote drought tolerant and climate friendly landscaping techniques to homeowners and landscaping companies through public education campaigns

1.4 Key Actions for Residents

Residents and business owners are encouraged to:

1. Purchase locally generated clean electricity by participating in Milton's CEA program at the highest "green energy" tier you can afford. (learn more)

2. Reduce their energy bills by completing a Mass Save home energy assessment and all recommended weatherization projects (learn more)
3. Prepare now to replace fossil-fuel heating equipment with clean heat pumps at end of life (learn more)
4. Install solar panels and/or battery storage when feasible and cost-effective (learn more)
5. Consider enrolling in a community solar program to get a discount on your electricity bill (learn more)

2 Introduction

2.1 Overarching Emissions Reduction Goals and Pathways

The state's 2050 Clean Energy and Climate Plan (CECP)[2] defines the emissions reductions required to achieve net-zero as follows:

> *To achieve Net Zero in 2050, Massachusetts must reduce statewide GHG emissions by at least 85% relative to the 1990 level and balance any residual emissions with carbon sequestration attributable to the Commonwealth.*

The state's pathways analysis targets 90% emissions reductions by 2050 to reduce the amount of carbon sequestration required.

In 2017, the baseline year for Milton's Greenhouse Gas inventory, Milton emitted 282,031 MTCO2e. By 2017, Massachusetts had already reduced its annual statewide GHG emissions to 22.4% below the 1990 level.[3] An emissions baseline for Milton from 1990 is not available. By assuming that Milton's emissions reductions followed the statewide trend over that period, we find that Milton will need to achieve the following emissions reductions:

- 36% reduction from 2017 levels by 2030, or 181,721 MTCO2e
- 68% reduction from 2017 levels by 2040, or 58,544 MTCO2e
- 87% reduction from 2017 levels by 2050, or 7,544 MTCO2e.

In 2022, Milton emitted 292,120 MTCO2e which is a 3.6% increase in emissions since 2017. We are headed in the wrong direction, and urgent action is needed to start bringing these numbers down.

Table 3: Massachusetts Emissions Limit and Sector-Specific Sublimits for 2050

Emissions Limit & Sublimits	Emissions Limit as a % Reduction from 1990	Emissions Limit Expressed in MMTCO2e*

[2] https://www.mass.gov/doc/2050-clean-energy-and-climate-plan/download
[3] See Final Signed Letter of Determination for 2050 Emissions Limits

Statewide Limit	85%	14.0
Sector-Specific Sublimits		
Transportation	86%	4.1
Residential Heating and Cooling**	95%	0.8
Commercial & Industrial Heating and Cooling**	92%	1.2
Electric Power	93%	2.0
Natural Gas Distribution & Service	72%	0.5
Industrial Processes	-27%	0.8

2.2 Our Planning Philosophy

Transitioning away from fossil fuels to power our daily lives is a planning challenge of unprecedented scope and ambition. There will undoubtedly be much uncertainty as to whether these goals can be achieved, and differing opinions on whether the costs necessary to achieve them are acceptable. There was much discussion within the CAPC regarding whether cost estimates and feasibility should be evaluated before action recommendations were included in the plan.

Ultimately, we chose to approach this plan as a roadmap describing the key strategies and outcomes that would be necessary to achieve the Commonwealth's emission reduction goals, regardless of cost, feasibility, or community buy-in. We chose to do this because it was clear to us that assessing feasibility, developing cost-effective solutions, and building buy-in from the community for specific actions will all require significant resources and time, and should be viewed as part of the implementation process rather than an up-front planning expectation.

This plan lays out the destination and key milestones for a long journey. Many of the roads we will need to travel have not been built yet. It is not intended to create a false sense of security based on tackling only those actions that are easy to complete. The plan's value will come as much from highlighting challenges requiring creative problem-solving as from defining specific next steps. Consequently, the plan includes a process for engaging residents and town staff to continuously update the plan as a living document.

2.3 Getting Buy-In and Raising Awareness

For Milton's Climate Action Plan to succeed, people need to understand why it matters, know and support the goals, feel motivated to be part of the solution, and know how to make changes in their own lives. That goes for residents, local businesses, community groups, and town departments.

The Climate Action Planning Committee is working on several ways to spread the word and get people engaged. We're maintaining a page on the town website where folks can learn about the plan, ask

questions, and download materials. We are sharing updates through the Milton Times and other local media, airing our meetings on Milton Access TV, and meeting directly with key groups to listen to their thoughts and keep them in the loop.

Each part of the plan (see Section 3) includes specific ideas to help people get informed, get involved, and take action.

2.4 Organizing and Resourcing for Implementation

Town Staff Leadership and Collaboration

Many of the goals and actions in this plan depend on ongoing input and partnership with town departments—like Public Works, Facilities, Engineering, and the Town Administrator's office. We spoke with most of these teams while developing the plan, and we'll need to keep working closely with them as we move ahead. Their continued support is essential to making real progress.

Realistically, the plan will also need a champion on town staff to drive and coordinate implementation. While the Climate Action Plan is not yet finalized, it is clear from the scope of this challenge and the breadth of activities called for in similar towns' Climate Action Plans that the town needs full-time staff with appropriate expertise focused on Sustainability. We recommend creating a Sustainability Director position on town staff responsible for:

- leading the implementation of the Climate Action Plan
- securing grant funding and appropriate town budget investments for sustainability goals
- coordinating an inter-departmental approach to sustainability
- ensuring effective outreach and collaboration with town residents and stakeholders

We are aware of more than 30 Massachusetts towns with a Sustainability leader on town staff, and many have experienced a positive return on investment based on their ability to access grant funding and drive energy cost savings. Kate Hanley, Sustainability Director of Concord, told us that "having staff dedicated to sustainability enables the town to take advantage of these (grant) opportunities that typically have short application periods and require significant preparation."

Funding

Putting this plan into action will require funding—but exactly how much is still unknown. The costs and savings relative to alternatives will need to be discovered through feasibility studies, design work, and procurement research that will take time, staff effort, and possibly support from outside consultants. So far, the Climate Action Planning Committee has operated entirely on a volunteer basis, but professional support will likely be necessary to bring funding requirements into focus. As a starting point, most towns hire consultants to drive the development of a Climate Action Plan at a cost ranging from $50,000 to $100,000.

We're committed to pursuing grant funding and private fundraising to support these early steps so that Milton taxpayers aren't left footing the entire bill up front. The committee has so far partnered with the Assistant Town Administrator, Nick Connors, to submit two grant applications under the MAPC Technical Assistance Program and Mass Save's Municipal Energy Manager grant. That said, Milton's current

compliance status with the MBTA Communities disadvantages us for some of the most common state grants used for climate planning, such as the EEA Planning Assistance Grants and MVP Action Grants. A timely investment in staff bandwidth or consulting support could allow us to more effectively access available grant funds.

Climate Leaders Program

The Green Communities Act of 2008 established the Green Communities Designation and Grant Program, creating the framework for communities to qualify for grant funds for energy efficiency projects. Since then, the vast majority of Massachusetts municipalities, including Milton, have become designated Green Communities, partnering with DOER on hundreds of projects resulting in energy and costs savings. Since becoming a Green Community in 2010, Milton has received over $1.16 million for energy efficiency renewable energy projects[4], including equipping Milton Public Schools with rooftop solar panels and converting the majority of municipal buildings' lighting to LED bulbs.

However, because the 2021 Climate Law expands the commonwealth's focus from energy efficiency to include greenhouse gas reduction, DOER has launched the Climate Leader Communities certification program. Building upon the Green Communities program, Climate Leader Communities creates a new voluntary framework for meeting emission reduction goals and provides tools and resources to help municipalities decarbonize through electrification and maximize the efficiency of buildings and transportation.

Climate Leader Community certification allows a municipality to access grant funding to support all or a portion of the cost of:

- studying, designing, constructing and implementing energy efficiency activities including, but not limited to, energy efficiency measures and projects;
- procuring energy management services;
- adopting energy efficiency policies; and,
- siting activities related to and construction of renewable energy generating facilities on municipally owned property

Additionally, the certification process itself provides municipalities with a step-by-step framework for identifying and planning for the implications of decarbonization goals on municipal operations.

We recommend that Milton pursue Climate Leader Community certification both as a framework for planning and as a source of funding for emission reduction projects. There are six requirements for certification, several of which Milton has already 9atisfied:

1. Must be a Green Community in "good standing" ✅ (completed 2010)
2. Establish/Maintain a local committee to advise, coordinate, and/or lead clean energy and climate activities ✅ (completed 2023)
3. Make a commitment to eliminating on-site fossil fuel use by the municipality by 2050.
4. Complete a Municipal Decarbonization Roadmap study

[4] Grant totals sourced from CELT Energy Transition explorer: https://bucas.maps.arcgis.com/apps/instant/portfolio/index.html?appid=ea07ae399445465e9dd2448f211affc0

5. Adopt a zero-emission-vehicle first policy[5]
6. Adopt the Specialized Stretch Energy Code ✅ (completed 2024)

3 Reducing Emissions

This section details our research and recommendations for goals, strategies, and actions for the four key sources of Greenhouse Gas Emissions in Milton.

3.1 Transportation

(A continuously updated working draft of this chapter is available here)

Globally, transportation is a significant contributor to greenhouse gas emissions. This is certainly true for Milton, where transportation is the largest contributor to Milton's greenhouse gas emissions, accounting for 52.8% of Milton's total emissions.[6] This includes transportation *through* Milton (e.g., on I-93) and trips *within* Milton.

The Commonwealth has the goal of reducing emissions from Transportation sources by 86% (from 1990 levels) by 2050. To reach this goal, there is a multi-pronged approach. Of particular relevance to Milton is the adoption of electric (EV or PHEV) or hybrid vehicles, as well as reducing reliance on light-duty vehicles[7] in general - reducing overall Vehicle Miles Traveled (VMTs). The former (EV adoption) directly reduces tailpipe emissions, as well as the "lifecycle" emissions of the fossil fuels they directly depend upon. Even with high EV/hybrid adoption, however, lifecycle emissions remain a concern because of charging reliance on a grid that (for now) uses a mixture of energy sources. Therefore, it remains essential to reduce dependence on light-duty vehicles and alternatively encourage the use of other no-emissions or energy-efficient uses, such as walking, biking, carpooling, and public transportation.[8]

Our recommendations below target both of these areas by increasing public knowledge of, and access to, modes of transportation that reduce overall emissions. A holistic approach is essential - addressing even seemingly minor infrastructure updates (such as improving sidewalks) to encourage alternative modes of transportation, and addressing equity and safety issues that make mode-transition difficult or impossible.

3.1.1 Goals and Metrics

Transportation

[5] "Zero-emissions-first" means that all departments in the municipality must purchase only zero-emission vehicles for municipal use whenever such vehicles are commercially available and practicable. In practice, this may create carve outs for heavy DPW vehicles and first-responder vehicles under current market conditions.
[6] As of 2022. Milton Greenhouse Gas Emissions Inventory, 2022
[7] Light-duty vehicles generally refer to personal passenger cars such as sedans, mini-vans, and SUVs.
[8] Even a public bus using fossil fuels has a potentially lower greenhouse gas emission than the number of light-duty vehicles that would otherwise be on the road - even if those vehicles are electric or hybrid.

Goal	Metrics
Electric Vehicle Adoption	
Increase the adoption of electric vehicles by Milton residents: • 15% by 2030 • 95% by 2050	Percentage of vehicles registered to Milton owners that are zero-emissions
Expand public and private opportunities for electric vehicle (EV) charging infrastructure	# of public charging stations available in or near Milton # of residents reporting charging access prevents Electric Vehicle ownership
Replace the municipal vehicle fleet and school busses with zero-emission vehicles • 15% by 2030 • 95% by 2050	Percentage of municipal VMT in zero-emission vehicles. Total fossil fuel consumption by municipal fel
Alternative Transportation Modes and Reducing Vehicle Miles Travelled (VMT)	
Reduce VMT per household to 19,400 miles/year by 2050	VMT for light-duty and medium-/heavy-duty vehicles within Milton

3.1.2 Strategies and Recommended Actions

Strategy 1: Ensure all community members can access safe and affordable transportation choices that will result in zero carbon emission, reduce Vehicle Miles Traveled (VMT), and lead to healthier and stronger communities.

Reducing greenhouse gas emissions from transportation must begin by ensuring the cleanest and most efficient forms of transportation are accessible, safe, and affordable. This involves improving access and quality of public transportation and exploring innovative transportation-sharing programs to expand affordable options.

Recommended Actions

- Develop public-private partnerships to support public transportation needs and co-fund innovative transportation initiatives (bikeshare programs, EV charger installations, electric car share programs, etc.) that make alternative modes of transportation more accessible.
- Participate in regional discussions on transportation and increase coordination with neighboring towns; support the linkage to commuter rail lines.

- Implement affordable in-town shuttle service to facilitate transportation to commuter rail lines or other significant locations (grocery stores, park & ride) not otherwise linked by existing public transportation.
- Promote electric vehicle adoption.

Strategy 2: Ensure Milton neighborhoods, commercial, and community centers are interconnected through infrastructure improvements and redesign that allow multiple safe and reliable modes of transportation

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Recommended Actions

1. Proactively implement Milton's existing bicycle and pedestrian plan
2. Continue implementing, supporting, and evaluating the town's Complete Streets Policy

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Strategy 3: Actively influence programs and policies that support zero-emission, affordable, accessible, and reliable regional transportation systems.

Recommended Actions

1. Advocate to the Massachusetts Bay Transportation Authority (MBTA) to improve "T" access in Milton to allow for more reliable and higher capacity over the Mattapan Trolley.

Strategy 4: Expand zero-emissions mobility options that reduce vehicle miles traveled with a focus on commuters and transportation of children.

Recommended Actions

- Reduce vehicle miles traveled when transporting children.
    - Require organizations that use town fields or buildings to have a transportation plan that promotes carpooling and walk/bike/roll alternatives.
    - Increase coordination with Safe Routes to School to support School and town efforts to promote pedestrian travel to school.
    - Collect data on school-related transportation: bus, pedestrian, gas vehicle, electric vehicle, carpool, etc. to calculate benchmarks.
    - Create incentives to reduce VMT such as having schools compete for the greatest decrease in emissions

- Reduce VMT by commuters

- Identify the largest employers in town and develop buy-in to create programs that reduce VMT

Strategy 5: Promote electric vehicle adoption

Recommended Actions

- Create an Electrified Vehicle knowledge center for the town
  - Provide centralized information about rebates, online resources, in-person site evaluations, and plans that would be able to review residential electrical requirements and site suitability for home charging or advice on how to get the most out of nearby public infrastructure.
- Expand public and private opportunities for electric vehicle (EV) charging infrastructure
  - Fill EV charger gaps near major thruways and at key locations that have frequent visitors, including trailheads, garages, parking lots, and other facilities.
  - Enforce EV-ready and/or installation requirements for new residential and commercial buildings or major rehab included in the Specialized Building Energy Code
  - Explore policies and incentives to enable multi-family housing residents to expand electric vehicle charging options.
  - MakeReady program to help install charging infrastructure
  - Work with vendors to locate an electric vehicle share in Milton

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Strategy 6: Lead by example to transition to all-electric school buses and town vehicles

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Recommended Actions

- Adopt an electric-first vehicle policy for the Town's municipal fleet
- Take advantage of the Mass CEC ACT School Bus program[9]

3.2 Buildings & Energy

(A continuously updated working draft of this chapter is available here)

In 2022, Milton's buildings generated 45% of its greenhouse gas emissions. As an overwhelmingly residential community, residential buildings emit three times more than commercial and municipal buildings:

[9] https://www.masscec.com/accelerating-clean-transportation-act-school-bus-overview

- Residential 91,077 mtCO2e (31%)
- Commercial: 26,149 mtCO2e (9%)
- Municipal: 4,709 mtCO2e (2%)

The key activities that generate these emissions are burning fossil fuels for heat, hot water, and cooking (76%) and for generating the electricity that powers our grid (24%). Leaks from natural gas and refrigerant lines account for an additional 3% of overall emissions. These are commonly known as "fugitive emissions" and are associated with buildings' operation.

To eliminate this climate-warming pollution, we must phase out fossil fuels for these activities while phasing in reliable and cost-effective sources of zero-emissions energy. While 2050 may seem far away, most of Milton's housing stock will still be in use then. Achieving net-zero emissions by 2050 requires starting now with technologies that are available today, particularly high-efficiency heat pumps, solar panels, and insulation enhancements. New buildings must be highly energy-efficient and predominantly electric, and owners of existing buildings must plan for energy-efficiency retrofits and to replace fossil fuel equipment with electric alternatives at end-of-life.

The town of Milton must lead by example by electrifying and retrofitting municipal buildings. However, as such a large share of Milton's building emissions come from privately-owned properties, the town must also work to inspire and facilitate widespread collective action by Milton residents to update their homes and businesses for a clean-energy future. Clean heating and cooling technologies are widely available and frequently cost-competitive, but still unfamiliar to many building owners. State and Federal financial incentives worth tens of thousands of dollars are available to all, but eligibility requirements and application process are still difficult to navigate. Milton residents need trustworthy, independent help to identify reputable contractors, evaluate project proposals, and access incentives.

Fugitive Emissions

Fugitive emissions refer to the direct leakage of greenhouse gases into the atmosphere not associated with combustion. The main source of Fugitive Emissions in Milton are leaks from gas pipelines within the town's boundaries. Fugitive emissions represent 3% of total GHG emissions in Milton and are included in the total for Buildings. According to the Milton GHG emissions inventory, fugitive gas and oil emissions in 2022 totaled 9,095 MTCO2E. According to HEET (Home Energy Efficiency Team, a Massachusetts Non-Profit with expertise in gas leaks), at the end of 2022, utilities reported 145 open leaks and 63 repaired leaks in Milton. These leaks were responsible for 63 metric tons of methane emissions, equivalent to 5,411 metric tons of carbon dioxide, or $89,220 of leaked gas (at residential rate). This inventory of leaks may not be complete, as only reported leaks are included.

Gas utilities are regulated by the state and are subject to requirements regarding gas leaks. In 2014, the Massachusetts State Legislature passed An Act Relative to Natural Gas Leaks ("Gas Leaks Act"). The Gas Leaks Act permits local distribution companies to submit to the Department of Public Utilities annual plans to repair or replace aged natural gas infrastructure in the interest of public safety. Gas distribution companies submit annual Gas System Enhancement Plans (GSEPs) setting forth their proposals for replacing aged pipe during the upcoming construction year. Gas leaks are categorized in four different grades that are subject to different requirements for repair. Grade 1 leaks are the most serious, and must be repaired. Grade 2 leaks are non-hazardous, but could become hazardous and must be repaired within a year. Grade 3 leaks are non-hazardous; leaks designated grade 3 on or after 2018 are required

to be repaired or eliminated within 8 years. Grade 3 SEI leaks are grade 3 leaks larger than 2000 square feet and must be repaired in 1 – 3 years. National Grid is the gas utility in Milton, and has been actively involved in replacing some old, leak-prone pipe (e.g., along Adams Street). Nevertheless, there are many ongoing leaks, and not all are reported to the utility.

3.2.1 Goals and Metrics

Buildings	
Goal	**Metrics**
Energy Efficiency	
100% of newly constructed buildings meet the highest energy-efficiency building code available in Massachusetts by 2030	Building code compliance rate
New construction and major renovations of municipal buildings meet zero net energy building performance standards starting in 2025.	Building standard compliance rate
Existing buildings have completed energy-efficiency audits and recommended weatherization projects • 50% by 2030 • 75% by 2040 • 100% by 2050	% of buildings completing energy audits
Electrification	
Replace 5000 fossil fuel heating systems with heat pumps by 2030	# of heat pump installations
Reduce and eventually eliminate on-site fossil fuel consumption of private buildings: • 50% of homes are all-electric by 2035 • 75% of homes are all-electric by 2042 • 90% of homes are all-electric by 2050.	% of buildings dependent on fossil fuel for space or water heating
Reduce and eventually eliminate on-site fossil fuel consumption of municipal buildings • 50% by 2030 • 75% by 2040 • 100% by 2050	% of municipal buildings dependent on fossil fuel for space or water heating
Fugitive Emissions	

Reduce pipeline gas leaks within the town of Milton • 50% by 2030 • 75% by 2040 • 100% by 2050	Number of high-impact leaks (e.g., Grade 1 and Grade 2) reported and repaired. Reduction in fugitive emissions from identified gas leaks in Milton.

Energy	
Goal	**Metrics**
Clean Energy Supply	
Transition residential electricity supply to 100% renewable sources by 2030	# of households participating in Milton CEA program tiers
Transition municipal electricity supply to 100% renewable sources by 2030	Voluntary REC purchases by Town
Energy Resilience	
100% of Milton residents have access to safety-critical energy resources during a power outage lasting up to three days	TBD
By 2030, TBD kW of solar PV capacity and TBD kWH of energy storage are installed within Milton	Total kW of solar and battery installations, including residential

3.2.2 Strategies and Recommended Actions

Strategy 1: Launch an energy coaching program to support Milton residents' energy transition and climate resilience projects

Electrification coaching programs help residents transition their homes away from fossil fuels by making clean energy upgrades—such as heat pumps, home solar, and EV charging—more accessible, less intimidating, and easier to navigate. These programs connect residents with trained volunteer coaches who offer independent, experience-based guidance, share lessons from similar projects, and help clarify contractor options and incentive programs.

Electrification projects can be overwhelming. As with any home renovation, both fossil-fuel and electric, they require financing, evaluating technology options and contractor proposals, and making critical design decisions with long-term comfort and cost implications. However, fossil fuel systems benefit from decades of

widespread use, a large pool of experienced contractors, and word-of-mouth recommendations from neighbors. In contrast, clean electric technologies like heat pumps are newer to the market, and residents often lack access to trusted peers or installers with deep experience. This knowledge gap discourages adoption and can lead to costly mistakes.

Given that home electrification is still in the early-adopter phase, it is essential to ensure that early projects in town are overwhelmingly successful. Each well-executed, cost-effective installation builds confidence, expands the network of local contractors and neighbors who can offer credible guidance, and smooths the path for others. Conversely, any poor experience will damage trust in the technology and slow momentum. Because these upgrades require significant investments—often tens of thousands of dollars—residents who are motivated to lead the way deserve to work with trustworthy, independent advisors, not just salespeople.

Electrification coaching addresses this challenge by connecting residents with trained experts—often volunteers or municipal partners—who can provide end-to-end support. Coaches help residents:

- **Understand their current home energy systems** and the implications of switching to electric technologies. For example, energy cost savings differ based on current fuel type, and installation costs depend on existing infrastructure, such as pre-existing ductwork that can be reused?
- **Identify experienced and reliable contractors**
- **Evaluate quotes from contractors and identify red flags**
- **Make critical system configuration decisions** that balance tradeoffs between cost, comfort, and efficiency.
- **Navigate financial incentives** which can be complex based on state and federal programs, equipment qualification, and available financing options

Coaching Programs have launched across Massachusetts

Across Massachusetts, a growing number of municipalities have launched electrification coaching programs, including Concord, Lexington, Wellesley, Wayland, and Arlington. As of 2020, no such programs existed. By the end of 2022, at least 14 were up and running, with demand continuing to rise. In Concord, for example, the number of households consulting a coach before installing a heat pump more than tripled from 24 in 2021 to 90 in 2022. These results reflect increasing homeowner interest and a growing recognition among towns that structured support is critical to progress on climate goals.

Several nonprofit and private-sector partners are helping municipalities launch and scale these programs:

- **HeatSmart Alliance** is a volunteer-led nonprofit engaged with 11 of the state's local coaching programs. It connects municipal efforts with a regional peer network, shares technical and programmatic expertise, and offers onboarding for new coaches. Many towns begin by training volunteers locally, then tap into the Alliance for ongoing support and shared learning.
- **Abode Energy Management**, a home efficiency and decarbonization consultancy, offers a complementary model. Since launching its training curriculum in 2022, Abode has prepared 76 heat pump coaches across 20 towns. Their 10-hour blended curriculum is used by both municipal volunteers and public employees—including city staff and municipal light plant representatives. Some towns have used utility-funded grants to cover the roughly $1,000-per-trainee cost. Abode also serves as a technical escalation resource: coaches act as initial guides, and more complex questions are referred to Abode for expert assistance.
- **MassEnergize**, through its *plugIN* initiative, provides cohort-based support to towns pursuing community-wide electrification goals. Participating municipalities receive outreach templates,

training materials, data dashboards, and monthly webinars. MassEnergize helps coordinate efforts across towns while offering flexible support that aligns with local capacity and needs.

Together, these partners offer a robust foundation for Milton to build a successful, scalable program. Whether the Town chooses to train its own volunteer coaches, work with external consultants, join a regional cohort, or a combination of all three, there are proven models to draw from and a growing community of practice eager to share what works. The Town's role can be limited but strategic: helping promote the program, hosting informational events, and recruiting volunteer coaches. With modest investment and strong partners, electrification coaching can become a high-leverage tool in Milton's broader climate strategy.

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Associated Actions

- Partner with groups like Abode Energy Management and HeatSmart Alliance to recruit and train volunteer electrification coaches.
- Develop and maintain a list of preferred vendors and contractors that Miltonites can trust
- Provide residents with independent review of project proposals
- Help residents access all incentives to which they are entitled
- Education and outreach efforts to drive participation and successful outcomes

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Strategy 2: Update zoning, building codes, and the development review process to encourage highly energy-efficient, resilient, and low-carbon new construction

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Associated Actions

- Adopt the opt-in specialized building code (Completed January 2025)
- Use the development review process to encourage large developments to consider microgrids and other district-scale energy solutions that reduce peak demand and greenhouse gas emissions.

Strategy 3: Lead by example in the management of municipal facilities

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While municipal facilities drive only 2% of Milton's emissions, it is critical for the town to show credibility and leadership on measures to maximize existing buildings' energy performance.

Associated Actions

- Establish municipal building policies that appropriately consider the long-term costs and risks of fossil fuels
- Complete electrification and energy-efficiency pathway studies for all municipal buildings and incorporate in capital planning.
- Conduct energy audits and retrofits (such as whole-building insulation or air sealing improvements) at all municipal facilities, starting with schools and other large buildings
- Evaluate all municipal facilities' suitability for on-site renewable energy generation and storage.
- Align voluntary clean energy purchases for municipal electricity with Milton CEA program levels.
- Require major municipal facilities to benchmark and report their fuel-consumption and energy performance once a year, and encourage large private buildings (multi-families, churches, businesses) to do the same.
- As retrofits and renewable energy projects are completed, promote these buildings as models for other buildings in the community.

Strategy 4: Deploy distributed energy systems such as microgrids and district geothermal to reduce peak demand and power essential services in a grid outage

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A microgrid system combines local energy generation and storage to provide power in the event of a grid outage. They can also use local power to reduce grid demand during peak times, reducing costs and grid stress and increasing energy efficiency.

Actions

- Pilot a solar + battery microgrid system to ensure resilient Town government operations and develop a plan to expand the system to more buildings
- Strategically deploy liquid-fuel backup generators for longer grid outages, with a focus on heating and cooling centers for vulnerable residents
- Pilot a district geothermal heating system (a neighborhood-scale underground system that uses a ground-source heat pump to supply heat to buildings)

Strategy 5: Proactively engage Eversource's grid modernization process to ensure adequate grid capacity and resilience in Milton

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Milton's transition to clean, renewable energy depends on regional energy infrastructure investments, and particularly Eversource's ability to meet increasing demand for zero-carbon electricity reliably and cost-effectively. Over the five-year period beginning in 2025, Eversource plans to invest $4.5 billion in electric operations and $1 billion in clean energy enablement.

Eversouce's Electric Sector Modernization Plan identifies Milton as a community with a current capacity deficiency that will constrain building electrification and distributed energy projects until the deficiency is resolved. The Hyde Park substation that serves Milton is at 104% capacity as of 2023, and is forecasted to reach 152% capacity by 2030. Eversource is planning upgrades to the substation with target completion in 2029, but has not, to our knowledge, proactively engaged Milton in its community outreach efforts.

Strategy 6: Increase public awareness of gas leaks in Milton to accelerate the repair of major gas leaks

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Recommended Action Items:

1. Increase public awareness of gas leaks in Milton by sharing information on how to identify a gas leak, what to do if you identify a gas leak, and why gas leaks matter.
2. Publicize maps from HEET and encourage residents to report all gas leaks, especially those not already identified on the map https://heet.org/gas-leaks/gas-leak-maps/
3. Track planned gas leak repairs in Milton through the National Grid GSEP, and advocate for accelerated repair of gas leaks in town.

3.3 Forest and Watershed Conservation

Although Massachusetts is the third most densely populated state in the country, it is also the 11th most forested state by percent forest land (Oswalt et al. 2019). The 3.2 million acres of forest in the Commonwealth make up 63% of the state's area. These forestlands comprise state forests and, town forests and conservation lands, small family forests, non-profit owned conservation land, commercially owned working forests, and even wooded backyards. Each contributes to the multitude of essential benefits that forests provide to the Commonwealth and its residents.

Massachusetts forests are projected to have the capacity to sequester about 5 MMTCO2e per year from now through 2050. This is equivalent to roughly 7% of the Commonwealth's current emissions and roughly half of allowable residual emissions in 2050, so maintaining and expanding the capacity of natural land to absorb carbon-dioxide from the atmosphere is a necessary element of the plan to meet the commonwealth's net-zero goal. Massachusetts Clean Energy and Climate Plans for 2030 and 2050 set goals to increase permanent conservation to at least 28% by 2025, at least 30% by 2030, and at least 40% by 2050. [2]

The Climate Action Planning Committee used state conservation land maps to determine that 33% of Milton's land, or about 2800 acres, is currently in conservation status. Additionally, a tree-canopy survey performed with the i-Tree Canopy tool estimated that Tree canopy covers approximately 57% of Milton's land area and sequesters about 6% of Milton's GHG emissions annually.

The Blue Hills and the Neponset River wetlands are 2 environmental markers in the Town of Milton. Both have demonstrated the impact of climate change in the form of fires, droughts, coastal flooding

and storm water surges. Both are ringed by private homes and property that are at-risk as a result of the changing climate.

3.3.1 Goals and Metrics

Conservation Land	
Goal	**Metrics**
Maintain or increase the current percentage of Milton land in permanent conservation status	Acres of conservation land within the town of Milton
Increase the number of shade trees in Milton by 1500 Improve the ability of the town's major conservation areas—the Blue Hills and the Neponset Rivervalley Watershed, to sequester carbon and reduce emissions	# of healthy shade trees managed by Town of Milton Improvement in the climate quality and quantity of the tree stock in the Blue Hills, and an increase in the mechanisms to prevent flooding in the Neponset River Valley.

3.3.2 Strategies and Recommended Actions

Strategy 1: Evaluate and reduce the impact of climate change on private property abutting the Blue Hills and Neponset River Watershed

The Blue Hills and the Neponset River are 2 environmental markers in the Town of Milton. Both have demonstrated the impact of climate change in the form of fires, droughts, coastal flooding and storm water surges. Both are ringed by private homes and property that are at-risk as a result of the changing climate.

The Conservation Lands Group of the MCAPC proposes working with Friends of the Blue Hills and the Neponset River Watershed Association to conduct assessments in both of these areas that will determine the degree that private property is at risk.

In order to better understand the threat to private property, buffer zones of increased risk near these natural resources (the Blue Hills Reservation and the Neponset River and its tributaries) need to be established, along with frequency of hazard occurrence and estimation of damage valuation within these buffers. The primary threats are development, wildfire, stormwater and riverine flooding, and coastal storm surge and sea level rise.

Coordination with planning consultants could be used to assess the relative level of threat. For stormwater and coastal storm surge flooding, NepRWA's freshwater flooding and soon-to-be-updated coastal flooding models could delineate properties at various risk categories, such as rate of occurrence (5 year vs 100 year) and average inundation depth (inches to feet). For wildfire damage, the risk from wildfire could be determined via historical fire frequency and expected intensity (total vs partial burn). For development damage, the risk from development could be determined via the FBH Buffer study results and analysis.

To then transfer this into an estimate of monetary damage, assessment of private property would need to be done, either in person or via accurate aerial imagery, compared to historic damages, and related to current valuations of property in the Milton area. Coordination with the Metropolitan Area Planning Council and likely an environmental planning consultant would be needed. With accurate models in place, consultants identified, and funding available, such assessment could likely be done within a year timeframe.

The result of this analysis would likely be expected structural and cost damages to abutting residents or loss of vegetation on buffering parcels that would be of interest for future planning, the need for increased insurance in the future, or potentially discussion around managed retreat, where private property is purchased by the town, state, or land trust organization to develop climate resilience. This may take the form of forest edge habitat and fire breaks, easements, buffering wetland for riverine and stormwater flooding, or salt marsh expansion to blunt storm surge potential.

Potential sources of funding include state climate focused grants, which would require coordination with Milton municipal staff.

Estimated Two-Year Outcomes: Expected structural and cost damagaes to 100 abutting residents or losss of vegetation on buffering parcels; estimates of the need for future insurance for abutting resients and organiations, and one or more plans for managed retreat to develop climate resilience.

Strategy 2: Increase the amount of shade tree cover in the Town of Milton

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Shade trees play an important role in reducing the amount of heat and other climate risk factors that neighborhoods are exposed to. Trees have a tough life on the streets, and the Town has to take down an average of 140 a year. According to a comparison of comprehensive street tree inventories conducted by the Davey Tree Company in 2007 and the Shade Tree Advisory Committee in 2017 and thereafter, the Town failed to keep up with this attrition in the past resulting in a roughly 30% deficit of street trees, or over 1500 vacant tree sites across the 300 residential streets in town

Milton's Shade Tree Advisory Committee recently conducted a Canopy Study of different types of Land cover in the Town of Milton. The i-Tree Canopy program determines the percentage of tree cover within a defined area using user input of tree cover at numerous random points in a Google Earth aerial view. This percentage, combined with the square miles of the area, allows the program to calculate generalized values for carbon sequestration, air pollution removal (carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter), and storm water mitigation. Two areas were analyzed, the portion of the Blue Hills Reservation within Milton town limits (85% tree cover, 3.12 square miles),

and the residential area of Milton (51% tree cover, 10.21 square miles). As an example of the data, the trees in the Blue Hills were calculated to store a total of 214 kT (kilotons) of carbon and sequester 8.5 kT of carbon per year, while the trees in the residential area store a total of 416 kT of carbon and sequester 17 kT of carbon per year. Because of the greater square miles of the residential area, the environmental value of the tree cover is two-fold greater than the Blue Hills area despite the lower percent tree coverage. The extended tables of benefits are available as attachments. These environmental values do not include local protection from UV radiation and heat, and benefits to wildlife. Most importantly only about half the total number of shade tree vacancies have been filled by the town, and this number shows no indication of decreasing, given the number of trees that die each year and need to be replaced. The current cost of planting and/or replacing a shade tree is $500.00.

The Conservation Lands Group, working with the Shade Tree Advisory Committee proposes that the Climate Action Plan include a number of steps to increase the amount of shade trees in the town along roads and parks. These steps include

Recommended Actions

- Adopt a dedicated budget line item for shade trees:
    - To ensure sure at least 140 trees are planted every year, halting the increase in vacant shade tree sites. Funds also are neded to ensure tree coverage in Town of Milton owned open spaces, and tree coverage in Milton Conservation owned lands.
    - Doubling annual target to 280 trees would result in restoration over a 10 year period.
- Explore opportunities to reduce the budget impact of each shade tree, such as resources that may be avialable fromthe Conservation Commission tree fund or creating a tree nursery to lower the cost of new tree purchases.
- The Town also needs to budget for watering trees. Watering is imperative if planted trees are to survive.
- Tree care should be improved by hiring a town arborist.
- A tree bylaw could also be powerful, but only if the Town has an expert and an enforcer. This role also could be filled by the Milton Tree Warden.
- The Town should identify heat islands/tree deserts, areas in town where trees are few or struggling, and the temperatures are hotter. We should consider improving the free equity score of these places so all people benefit from shade and filtering. Tree Equity Score.
- Shade trees should be planted that sequester carbon at high rates (Red Oak, Silver Maple, Tulip). See article: Trees That Capture the Most Carbon.

Estimated Two-Year Outcomes: an increase of 1500 shade trees in the Town of Milton (along with an increase in carbon sequestration); an increase in the town budget and services to support the planting and care of shade trees.

Strategy 2: Improve Climate-Friendly Tree Stock in the Blue Hills

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For forests to be resilient to a changing climate, they must contain a diversity of species and size classes. This allows the ecosystem as a whole to recover and adapt more quickly from the increased

disturbances forests face due to climate change (e.g. novel pests, increased extreme weather, etc). Forests store carbon in vegetation (both live and dead) and soil. As trees grow, they sequester additional carbon, adding to the carbon stock. Although forest sequestration rates are small relative to fossil fuel consumption rates, forests contain large carbon stocks, which, when lost, contribute significantly to global climate change.

The Blue Hills spans some thirteen miles of forest across Milton and adjacent communities. Yet we know relatively little about the nature of the tree stock in the Blue Hills. A recent estimate using an interpolated model of forest carbon stocks from the USFS suggests that the forests in Blue Hills store about 45 tons of carbon per acre, or over 260,000 tons of total carbon across the whole park.

However, this and similar studies tell us relatively little about the carbon storage and sequestration capacity of the Blue Hills or about the diversity and ages of its tree stock. To do this we need to collect baseline information on the current carbon stock and the composition and demographics of Blue Hills tree species.

To collect such information in an expeditious manner Milton's Climate Action Planning Committee proposes working with the DCR to implement a small case study. This would establish a small network of plots (20-30, or more depending on the resources available) that are purposefully selected to represent just a few of the dominant conditions within the park. These "sentinel" plots could be monitored closely: for example, data on understory vegetation, invasive species, tree condition (e.g. is the tree still alive, is there evidence of storm or pest damage, etc), down woody debris, etc. could be collected in addition to tree species, DBH, and soil. These plots could also be revisited, allowing for a precise calculation of tree growth, and therefore sequestration rate, and tree mortality.

This approach would require ~2 weeks of 2 well-trained people's time to set up the plots (assuming that each plot will take 2-3 hours for 2 people to set up, plus transit time between plots), which would need to happen during the growing season (May-September). Future annual monitoring of these plots could likely be carried out by trained volunteers, and would require less time: monitoring of an already set up plot would likely take 1 well-trained person ~1 hour.

Estimated Two-Year Outcomes

Collecting such baseline data would enable us to quantify for the DCR and others the current status of Bill Hills as a climate mitigation and adaptation resource for Milton, and plan and implement forest improvement strategies. Below is a table of data that could be collected and what outcomes that data is necessary for quantifying:

Data	**Outcome of interest**
Tree species	Biodiversity, Carbon storage, climate resilience
Tree size	Structural diversity, carbon storage
Tree status (live/dead, pests, etc)	Carbon storage, forest health
Tree growth and mortality	Carbon sequestration, forest health
Soil carbon	Carbon storage
Down woody debris	Carbon storage, structural diversity, wildfire risk
Understory plants	Invasive species presence

This data would provide useful insight to the structure of the forest, and could help to guide management decisions. First, it would provide some baseline knowledge of the tree species composition, and therefore how well adapted for future climate the forest is. Future management activities can then be planned to promote the species that are likely to thrive. Additionally, the presence of invasive understory plants is a common threat to urban forests, and therefore knowing which invasives are present and where would allow managers to decide whether to attempt invasive removal strategies. Data on tree health and the presence of pests would similarly allow managers to decide whether and when to remove sick trees (e.g. salvage log) to help promote healthy regeneration. As with all forest management activities, the benefits from these interventions would likely not be felt for several years. However, management to maintain a relatively healthy forest is far easier and less costly than trying to restore a degraded one.

3.4 Waste Management

(A continuously updated working draft of this chapter is available here)

Solid waste management, and organic waste management in particular, can be an integral part of the climate change solution. Waste, and notably organic waste, is a significant part of GHG emissions. In 2021 waste sector emissions represented approximately 3% of greenhouse gas emissions, with landfills contributing the largest portions of carbon dioxide, methane, and nitrous oxide. When incorporating all emissions related to solid waste, it is closer to **12%** of the total GHG.

The State has set waste reduction goals in line with GHG reduction targets. 30% reduction by 2030, and 90% reduction by 2050. This is due to not just the climate crisis. By 2030 there will only be 1 remaining landfill in Massachusetts, with no plans for additional ones to be built.

Solid waste disposal/management is typically the 2nd or 3rd highest budget expense. The cost will only increase as our waste will need to be shipped elsewhere, as far as Georgia.

Research findings across the climate action plans of nineteen U.S. cities or counties, along with the plans of Toronto Canada, indicate that there is no one waste solution, but that a combination of material source reduction, materials reuse, recycling, organic management, waste to energy recovery, and landfill management can serve as a solution. Embedding waste management strategies into decarbonization plans is an integral part of long-term climate resiliency

A waste management plan is a strategic document that outlines how a community will handle its waste materials to ensure environmental sustainability and regulatory compliance.

The plan guides the systematic management of waste from inception to disposal and includes procedures for separation, collection, transportation, treatment, and recycling.

A well-crafted waste management plan identifies the types of waste generated; solids, liquids, hazardous, clothing and shoes, composting, and recyclable materials, etc. for determining the appropriate handling and disposal methods for each type.

The plan sets out clear responsibilities and roles for all stakeholders involved, ensuring that everyone understands their part in the process.

Additionally, the plan includes measures for monitoring and evaluating the effectiveness of waste management practices, allowing for continuous improvement and adjustment of strategies.

The efficient and economical operation of waste management services requires planning that communicates with citizens and entities on waste management programming through its goals, strategies, and actions.

Approach to the Plan

The working group identified a number of resources for input into its discussions leading to the development of this draft plan.

Boston, Cambridge, and Brookline have robust Zero Waste plans containing various strategies and programs aimed at improving recycling and waste management. Their Zero Waste goals are defined as conserving resources through responsible production, consumption, reuse, and recovery without harmful environmental impacts. The most important subjects are community participation, education, infrastructure development, and targeted programs to reduce waste, increase recycling, and move toward a more sustainable, zero-waste future.

Key findings from these successfully implanted plans, some of which were initiated in 2019, are:

Community Involvement: The success of waste management initiatives depends on residents, businesses, and community leaders adopting new recycling and sustainability practices.
Education & Tools: Programs such as mobile apps, columns in local newspapers, and school-based initiatives help educate people about recycling and proper waste sorting.
Waste Audits: Conducting audits to identify contamination in recycling streams is essential. Actions such as door-to-door outreach and "lid-flipping" help reduce contamination and increase participation.
Establishing a Recycling Rate Formula: The recycling rate is calculated by dividing the total diversion from landfills by total waste generation.
Targeted Programs: These include promoting textile recycling, providing bulk item collection services, creating recycling centers, and encouraging correct sorting at schools with student leadership involvement.
Recycling Challenges: Issues such as contamination and lack of markets for certain recyclable materials (e.g., plastic bags). The focus is on improving curbside recycling quality and expanding the infrastructure for hard-to-recycle items.
Support for Zero Waste: Additional initiatives include support for reuse events, recycling education, and enforcing local waste reduction policies. Public events could be required to follow zero-waste strategies.
Innovation in Waste Management: Expand recycling programs to make it easier to recycle hard-to-recycle materials, such as mattresses and carpets, electronics, etc. The town could provide recycling bins for these materials in locations besides the DPW, like the library or schools

Other resources included information on best practices for waste management available from planners and practitioners, including industry leaders, any number of which provide waste management advisories to both public and private sector entities.

3.4.1 Goals and Metrics

Waste	
Goal	**Metrics**
Solid Waste Reduction	
Achieve significant reductions in total solid waste disposal in Milton • 30% by 2030 • 90% by 2050	Tons of solid waste removed
Reduce Milton's recycling contamination rate from 13% to 10% by 2026	
Organic Waste Composting	
Increase the composting participation rate from 300 to 600 households by 2026	# of households participating in curbside composting pickup programs
10% of food waste is diverted from landfills into composting by 2030	Tons of organic waste hauled for composting

3.4.2 Strategies and Recommended Actions

Strategy 1: Create a waste management community outreach plan

Target Date: 2026
Setting goals for waste management is insufficient without an actionable public awareness program.

Associated Actions

- Identify how to inform the community of all waste management-related information
- Implement food waste education programs with the public schools, the library, the Chamber of Commerce, and with housing facilities such as Winter Valley, Unquity House, HOME, Inc., and Fuller Village.
- Ascertain the most effective methods of notifying the community about the risks each waste stream may present to human health, the environment, and the economic consequences of not doing so.
- Determine which people and groups can partner in communicating waste management information

Strategy 2: Establish an internal bi-annual waste audit practice

Target Date: 2026

Regular waste audits are necessary to track the types and quantities of waste generated by the community over time and determine if progress is being made toward waste management goals. It creates a baseline from the audit data that allows for setting percentage-based reduction targets, which can be monitored and adjusted as needed over time. Additionally, conducting regular inspections of the waste stream will enable DPW to identify efficiencies, areas for improvement, and recommendations for staffing and equipment requirements.

Strategy 3: Conduct a consumer engagement initiative

Target Date: 2025

Associated Actions

- Consult the public in the decision-making and implementation processes using various communications methods and tools, such as surveys, polls, focus groups, workshops, and forums to solicit feedback, opinions, ideas, and suggestions from the public on waste management issues and initiatives.
- Involve the public in co-designing and co-delivering waste management solutions, such as community composting, repair cafes, swap shops, and waste audits.
- Relevance is essential to a sound waste management public awareness program by addressing what effective waste management means for me, my family, my neighborhood, and my community

Strategy 4: Identify and install potential additional waste collection locations

Target Date: 2027

Determine resident access and frequency requirements as well as individual waste retrieval opportunities such as a citizen recommendation for dropping off batteries in appropriate bins at the fire stations as well as the DPW yard.

Strategy 5: Obtain joint hazardous waste engagement opportunities with similar neighboring communities

Target Date: 2028

Further reduce the level of hazardous waste materials being included in other waste or disposed of in alternate ways such as dumping into stormwater drains.

4 Adapting to Climate Risks

4.1 Heat Waves

A heat wave is generally defined as a period of three or more consecutive days with temperatures above 90°F or three days of such temperatures within a seven-day span.

In Massachusetts, from 1971 to 2000, the state experienced an average of four days per year with temperatures exceeding 90°F. However, by 2050, this number is expected to rise significantly, with areas facing 10-28 days of temperatures over 90°F.

Extreme heat and humidity can strain the body's ability to regulate temperature, leading to dehydration, muscle cramps, fatigue, heat exhaustion, and heatstroke. Symptoms range from discomfort and fatigue to dizziness and fainting, with potentially life-threatening outcomes.

Certain individuals are at higher risk during extreme heat events due to various factors including their living conditions, access to official information, preparedness, and existing health problems. These vulnerable groups include:

- Children under 5 and adults over 65
- Pregnant individuals
- Outdoor workers, people exercising outdoors, or people living outdoors
- People of color, often affected by systemic inequities
- Non-English speakers who may not receive emergency alerts in their native language
- People living alone
- People living without air conditioning
- Individuals with chronic health conditions like diabetes, cardiovascular disease, kidney disease, and mental illness
- Individuals taking certain medications that reduce the body's ability to sense and respond to heat
- People with disabilities

To minimize the risks associated with extreme heat, it's essential for residents to take proactive steps:

- **Stay Indoors During Peak Heat:** Avoid direct sunlight during the hottest parts of the day. Opt for outdoor activities in the early morning or late evening when temperatures are cooler, as even a small temperature drop can significantly improve comfort and safety.
- **Hydrate Regularly:** Drink more fluids than usual, even if you're not thirsty, and avoid alcohol, caffeine, and sugary beverages, as they can contribute to dehydration.
- **Dress Appropriately:** Wear lightweight, loose-fitting, and light-colored clothing when outdoors to stay cool.
- **Keep Indoor Spaces Cool:** Use shades or curtains to cover windows that receive direct sunlight, helping to reduce indoor temperatures.
- **Utilize Air Conditioning:** Stay in air-conditioned environments as much as possible. If your home doesn't have air conditioning, seek out public places like libraries, community centers, or malls. You can locate nearby cooling centers by calling 2-1-1.
- **Sign Up for Weather Alerts:** Stay informed about extreme heat events and create a heat emergency plan in advance.
- **Avoid Overexertion:** Don't push yourself or others beyond their comfort levels in extreme heat. This applies to workers, athletes (especially on turf fields), and anyone doing outdoor activities. Schedule regular breaks and ensure access to plenty of water.
- **Consult with Healthcare Providers:** Ask your doctor how to manage medications during extreme heat, as some may affect your body's ability to handle heat.
- **Gradual Acclimation:** It can take one to two weeks for the body to adjust to extreme heat. Gradually increase outdoor time by about 20% each day leading up to a heat wave.
- **Regular Wellness Check-ins:** Arrange for friends, neighbors, or family members to check in on you regularly, especially during extreme heat.
- **Prepare for Power Outages:** If you rely on electricity for medical equipment or medication storage, plan for potential power outages during heat waves.

4.1.1 Key Risks

- Adverse health impacts, including excess mortality, driven by more frequent and prolonged heat waves.
- Learning loss in schools due to more frequent heat waves during the school year.

4.1.2 Strategies and Recommended Actions

Strategy 1: Enhance public awareness and education about heat waves

Enhancing public awareness and education about heat waves is crucial because extreme heat poses serious health risks as described above. With climate change increasing the frequency, intensity, and duration of heat waves, proactive education is essential to help communities prepare and respond effectively.

Many heat-related illnesses and fatalities are preventable with proper awareness. Public education encourages community preparedness, ensuring that people check on neighbors, create emergency plans, and recognize early signs of heat-related illness.

By increasing awareness and education, individuals and communities can take heat waves seriously, adopt protective behaviors, and ultimately reduce preventable deaths and the strain on healthcare systems. It's imperative to increase community knowledge about the risks of heat waves and effective mitigation strategies through targeted outreach and educational programs.

Recommended Actions

- Share essential knowledge with individuals during heat waves
    - Recognize the signs of heat exhaustion and heatstroke
        - *Heat exhaustion:* Symptoms include heavy sweating, nausea, and red, hot skin, similar to a fever.
        - *Heatstroke:* A more serious condition requiring medical attention. Signs include the cessation of sweating and a rapid rise in core body temperature. Immediate care is critical.
    - Tips for what to do if you experience a heat-related illness
        - Hydrate by drinking water.
        - Apply ice packs to cooling points such as the armpits or groin and sit near a fan if available.
        - Have an emergency plan in place, including knowing the appropriate numbers to call for medical assistance.
    - Take proactive steps to prevent a potential power outage by encouraging residents to reduce electric demand through actions such as:
        - Raising thermostats a few degrees and keeping blinds or shades closed.
        - Minimizing the use of large appliances during peak heat hours, and turn off unnecessary lights and electronics.
        - Since water heating consumes a significant amount of energy, take shorter or cooler showers to conserve electricity.

- Create an information dissemination strategy within the community for heat wave education and response

    - Utilize multiple communication channels and public facilities

        - Leverage town-wide mailings, community TV, and signage to ensure residents are aware of the heat wave response program.
        - Since air conditioning is the most effective intervention to reduce heat-related mortality, Milton must ensure access by opening air-conditioned public buildings to the community during heat emergencies.
    - Target high-risk populations
        - Outreach efforts should prioritize seniors, socially isolated individuals, and those with chronic or mental health conditions, who are particularly vulnerable to heat waves.

        - Consider collecting voluntarily submitted names of at-risk individuals to contact during heat emergencies.
        - Publicly encourage people to check on elderly neighbors or relatives.
        - Distribution programs for air conditioners and fans can help mitigate the impact on those without adequate cooling.
        - Ensure that residential water service is not shut off during extreme heat and prevent the illegal use of fire hydrants for unauthorized cooling.
    - Collaborate with local organizations
        - Partner with the organizations like the Visiting Nurses Association to distribute flyers with heat safety information.
        - Utilize the Council on Aging's newsletter to reach older adults.
        - Work with local churches and clergy to disseminate information to congregants.

Strategy 2: Improve access to cooling resources

During heat waves, power grids can become strained, leading to potential outages. In such cases, the key question becomes who has access to backup power sources, such as facility or home generators, which are crucial for maintaining cool environments and powering essential medical equipment. Planning for both scenarios—with and without electricity—is essential in minimizing health risks during prolonged heat waves.

Recommended Actions

- Ensure widespread availability of air conditioning and cooling centers, especially for vulnerable populations, to reduce exposure to extreme heat.
- Prioritize the availability of clean drinking water and stable electricity to the Milton community during heat waves to help mitigate the health impacts.

Strategy 3: Protect and maintain tree canopy and green spaces

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Known for its hiking trails and nature, Milton faces potential challenges with canopy loss as heat-weakened trees become more vulnerable to disease and fire, particularly among species adapted to cooler climates. The loss of tree canopy threatens not only the ecological health of Milton's forests but also the well-being of the broader community. A shrinking canopy can contribute to higher temperatures in both urban and natural areas, reducing shade for outdoor enthusiasts and increasing overall heat exposure. Expanding and preserving green spaces, such as parks and community gardens, is essential for mitigating these effects. These spaces not only enhance air quality and biodiversity but also provide cooler, healthier environments where residents can find relief from extreme heat.

Recommended Actions

These policies can prevent unnecessary tree removal, encourage the planting of climate-resilient species, and require developers to incorporate green infrastructure into urban planning. They align with the recommendations in Section 3.3 to conserve tree canopy for it's ecosystem health and carbon sequestration benefits.

- Preserve and expand tree canopy and green spaces to enhance cooling in the community.
- Advocate for and implement policies that support heat wave resilience, such as improved tree protection bylaws.

Strategy 4: Strengthen emergency response systems

Developing and implementing robust heat wave emergency plans with clear activation and deactivation criteria is essential for effectively managing and responding to extreme heat events. Clear activation criteria ensure that authorities and communities are alerted in a timely manner, allowing for the swift implementation of measures such as opening cooling centers, issuing public health advisories, and mobilizing emergency response teams. Defined deactivation criteria help prevent unnecessary resource use while ensuring that support remains available until conditions are safe.

These plans also facilitate coordination among government agencies, healthcare providers, and community organizations, ensuring a comprehensive response that prioritizes vulnerable populations. Additionally, an effective emergency plan supports public awareness efforts, equipping individuals with the knowledge and resources needed to protect themselves and others during extreme heat events.

Recommended Actions

Develop and implement robust heat wave emergency plans, including clear activation and deactivation criteria, to effectively manage and respond to extreme heat events.

- Identify a lead agency and collaborating organizations
    - Effective heat wave response requires coordination among various local government departments and nongovernmental organizations.
    - The lead agency should ideally be the public safety department (fire, ambulance, police), emergency management office, or health department, in collaboration with Milton Hospital.
- Establish a standardized warning system
    - A consistent and standardized heat alert system should be activated and deactivated based on weather conditions.
    - Response measures must be triggered by local data showing weather thresholds linked to increased mortality.
    - Key criteria include threshold temperatures, the heat index (which accounts for both heat and humidity), and predicted air mass movements.
    - It is crucial that plans are implemented proactively, as soon as heat waves are forecast, rather than after they begin.
    - Clear deactivation criteria must also be in place for when the heat threat subsides.

4.2 Flooding and Stormwater

Massachusetts Environmental Affairs Secretary Rebecca Tepper states, “Data tells us that inland and coastal flooding are two of the biggest threats to Massachusetts.” As underscored by the Neponset River Watershed Association, whose watershed includes Milton, it is faced with two distinct types of climate change related stormwater impacts; inland flooding resulting from increasingly intensive rainfalls, and coastal flooding resulting from both sea level rise and more frequent coastal storm surges pushing salt water up into river basins. In instances where these trends occur simultaneously the conditions may constitute a new “Perfect Storm.”

More Milton homes, business, and other entities will find themselves adversely impacted by the effects of climate change related stormwater escalation, particularly those along brooks, streams, rivers, estuaries, and wetlands, but also those in other areas where soil conditions do not support the absorption of increasing rainfalls.

Some existing municipal infrastructures will become overburdened or even disrupted by stormwater increases, requiring investments in enhanced or alternative infrastructures.

Stormwater resilience challenges and needs will require rehabilitation programs addressing aging dams, improved stream flow management, protecting water sources from contaminants released into them by increased stormwater, additional public safety measures, and protecting the ability of wetlands and woodlands to sequester carbon emissions.
Wetlands are essential to climate action, capturing carbon out of the atmosphere up to 10 times faster than mature forests. They also provide diverse habitats and protect against storm damage. But our salt marshes, freshwater wetlands, and rivers need help to reverse damage from past land uses and provide resilience to the impacts of sea level rise, more intense storm events, and more frequent droughts.
The Massachusetts Department of Environmental Protection is issuing updated regulations to strengthen wetlands and stormwater resilience by providing flood control and preventing storm damage to shorelines and infrastructure from the impacts of climate change. The amendments will include data from the National Oceanic and Atmospheric Administration reflective of current climate and stormwater conditions.

Salt marshes are subsiding and eroding at increasingly alarming rates and interventions are needed to prevent marsh grasses and their peat platforms from further loss. Regulatory reforms are being implemented to accelerate curtailment of the loss of wetlands and to accelerate their restoration for multiple purposes including sea level rise, flooding mitigation, and GHG sequestration.

4.2.1 Key Risks

- By 2070, ___ additional structures in Milton will be exposed to flooding in a __-year flood event, mostly in the __, ___ neighborhoods.
- Municipal infrastructures will become overburdened or even disrupted by stormwater increases
- Wetland degradation results in reduced water storage and flood mitigation

4.2.2 Strategies and Recommended Actions

Apply hydrological, environmental, geological, topographical, and engineering data and expertise that can affect the successful mitigation of and adaptation to changing storm water conditions and the related need for planning stormwater projects into the future.

Action: Engage in flood risk and vulnerability assessment incorporating computer-based flood model use including hydrologic analysis (examining rainfall and estimating surface runoff) and hydraulic analysis (studying the movement of surface and underground water) to understand the impacts of and solutions to current and future increases in flooding.

Adhere to the recently revised Massachusetts Stormwater Handbook and the Stormwater Management Standards of the Massachusetts Department of Environmental Protection. There are 10 Stormwater Management Standards which are also expressly incorporated into the Wetlands Protection Regulations at 310 CMR 10.05(6)(k).

Action: Collaborate with the Milton Conservation Commission in facilitating the communication of current and developing stormwater management standards across related town committees and commission, town decision makers, and residents.

Collaborate with the Town and organizations and agencies involved in climate resilience interventions such as the Neponset River Watershed Association and the Massachusetts Office of Coastal Zone Management (CZM).

Action: Pursue as a town, or in conjunction with other communities directly or through an umbrella organization such as NepRWA, FY ’26 Office of Coastal Zone Management funding to support efforts to reduce risk from coastal storms and sea level rise.

Action: Contribute to an updating of the Town of Milton Stormwater Management Program with a heightened focus on mitigating climate change related increases in storm/flood water and sea level rise.

Address current and future coastal and inland environmental, protection, and preservation concerns for the town’s tidal salt marshes and inland wetlands in accordance with the guidelines of the Massachusetts Wetlands Protection Act regarding salt marsh restoration techniques.

Action: Participate with the Conservation Commission in seeking external and/or Community Preservation Act funds to implement the concept plan being developed by APEX Engineering in support the preservation and appropriate public use of the 33 acres of salt marsh and adjacent upland of the Neponset River Estuary in Milton.

Action: Support *An Act Accelerating Wetlands Restoration* (HD1619) and *An Act Pertaining to Regional Resilience and Flood Protection Entities* (SD1066) to address low risk restoration initiatives.

4.3 Intense Storms

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4.4 Wildfire

Wildfire risk in Milton, while historically moderate, is increasing due to the effects of climate change, including rising temperatures, stronger winds, and prolonged dry spells. Since 2001, the town has experienced an average of 22 wildfires annually, with peak activity in spring and late summer. These fires pose significant threats to homes, landscapes, and public safety, particularly given the densely forested areas like the Blue Hills. Proactive mitigation is crucial not only to protect lives, property, and the ecological and recreational integrity of these natural spaces – but also because healthy forests contribute to carbon sequestration and stormwater management which are important levers for achieving the Commonwealth's Climate Action goals. By adopting strategies such as enhanced fire response training, community education, and forest management practices, Milton can reduce wildfire risk and build resilience. Coordinated efforts with Milton Fire, the Department of Conservation and Recreation (DCR), and other stakeholders will be vital in safeguarding the community against this growing threat.

The overarching goal of our wildfire plan is to understand and reduce the risk of wildfire to life and property in Milton. Key risk factors include:

- Proximity of homes and property to densely forested areas like the Blue Hills.
- Lack of clear evacuation plans and risk assessments for every neighborhood
- Inadequate defensible spaces around homes and lack of fire-resistant building practices

4.4.1 Key Risks

- Loss of life and property damage from wildfires

4.4.2 Strategies and Recommended Actions

Strategy 1: Engage residents in the development of a Community Wildfire Protection Plan (CWPP)

The workgroup wants to ensure every neighborhood has access to clear evacuation plans, wildfire risk assessments, access to emergency information, and educational resources for creating defensible spaces and adopting fire-resistant building practices. Moreover, a quarter of the town is in the Blue Hills Reservation which has demonstrated the impact of climate change in the form of wildfires and drought.

The Blue Hills are also ringed by private homes and property that are at risk as a result of the changing climate.
In order to reduce the risks to life and property, we propose developing a comprehensive **Community Wildfire Protection Plan (CWPP)** tailored for Milton, addressing prevention, emergency measures, public awareness, and recovery strategies. This plan will serve as a foundation for all wildfire preparedness efforts.

Recommended Actions:

To develop a Community Wildfire Protection Plan (CWPP), the following steps and resources are recommended:

1. Community Involvement: Engage local community members, stakeholders, and organizations to participate in the planning process through public meetings and outreach.
2. Form a Core Team: Assemble a group of stakeholders including local government officials (Town Administrator), fire departments (Milton Fire), land management agencies (DCR), community organizations (Friends of the Blue Hills, Sustainable Milton), and residents.
3. Funding Opportunities: Explore funding opportunities for wildfire risk reduction projects from sources such as federal and state agencies, local government budgets, and community fundraising efforts.
4. Assessment of Wildfire Risks: Conduct a thorough assessment of the community's wildfire risks by analyzing factors such as vegetation, topography, weather patterns, and historical fire data.
5. Set Priorities and Goals: Identify and prioritize areas at highest risk and set specific goals for reducing wildfire hazards.
6. Fuel Reduction Projects: Identify and prioritize fuel reduction projects, such as creating defensible space around homes, thinning dense vegetation, and conducting prescribed burns.
7. Develop an Action Plan: Create a detailed plan that outlines specific actions to reduce wildfire risk, including fuel reduction projects, public education campaigns, and infrastructure improvements.

Resources & Collaboration

- Local Fire Departments: Engage Milton Fire for their expertise in fire behavior, suppression tactics, and community outreach.
- DCR and MassWildlife: Utilize the resources and expertise of the Massachusetts Department of Conservation and Recreation (DCR) and the Massachusetts Division of Fisheries and Wildlife (MassWildlife) for ecological management and fire management planning.
- GIS and Mapping Tools: Use Geographic Information System (GIS) tools to map the WUI, identify high-risk areas, and plan fuel reduction projects.
- Public Education Materials: Access educational materials from programs like Firewise to inform the community about wildfire risks and prevention strategies.
- Funding Opportunities: Seek funding from federal, state, and local grants to support CWPP development and implementation. This may include grants from the U.S. Forest Service, FEMA, and other agencies.
- Technical Assistance: Utilize technical assistance from organizations such as the National Fire Protection Association (NFPA) and the National Wildfire Coordinating Group (NWCG) for guidance on best practices and standards.

- Community Volunteers: Engage community volunteers to assist with public outreach, education programs, and implementation of fuel reduction projects.

Strategy 2: Increase Wildfire Response Capacity

The workgroup has learned that there is a high degree of collaboration between local fire departments and the DCR Fire Unit, but several gaps still exist that could exacerbate the already elevated risk of wildfires – and slow response time that could put property and lives at risk.

There are several gaps highlighted in the DCR Blue Hills Fire Management Plan, but the workgroup assumes (to be validated) that these gaps could also apply to fire-risked areas outside of the Blue Hills.

It's also known that there will be some overlap between our recommendations here and the proposed CWPP, but for completeness we have listed all of the gaps highlighted in the Plan below.

- Data Gaps:
    - Lack of Comprehensive Fire History Data: There is limited historical data on wildfires, particularly for specific areas within the Planning Unit. This makes it challenging to analyze trends and plan effectively for future fire management.
    - Inadequate Mapping of Sensitive Areas: Detailed and updated maps of sensitive ecological and cultural areas are lacking, which hinders the ability to implement Minimum Impact Suppression Tactics (MIST) effectively.
    - Incomplete fuel mapping: While initial fuels mapping has been conducted, there is a need for more detailed and updated mapping of fuel types and loadings to better predict fire behavior and plan fuel reduction projects (some tools exist)
- Equipment Gaps:
    - Limited Wildland Firefighting Equipment: Local fire departments, including Milton, have limited specialized wildland firefighting equipment. Most departments rely on older vehicles and equipment that may not be adequate for large or complex wildfires.
    - Insufficient Water Resources: There is a need for more accessible water sources for firefighting, such as additional hydrants and drafting sites. The current water resources are not always sufficient or easily accessible during fire incidents.
- Training Gaps:
    - Lack of Wildfire Training: Many local fire departments have limited training in wildland firefighting. While some training was conducted in 2003, there is a need for ongoing and updated training programs to ensure firefighters are prepared for wildland fire incidents.
    - Prescribed Fire Training: There is a lack of training for prescribed fire operations, which are essential for proactive fuel management and ecological restoration. Training for burn bosses and other key roles in prescribed fire operations is needed.
    - Instant Command / IMT: Specific for wildland (resources)
- Coordinated Response Gaps:
    - Absence of a Formal Response Plan: There is no formal, written protocol among the nine local fire departments and the Bureau of Forest Fire Control (BFFC) to coordinate

wildland fire response on the Planning Unit. This can lead to confusion and inefficiencies during fire incidents.
    - Limited Interagency Communication: Communication among local fire departments, DCR, and other agencies is not always seamless. There is a need for better interoperability of radio systems and more frequent joint training exercises to improve coordination.
    - Lack of Community Wildfire Protection Plans (CWPPs): Surrounding communities, including Milton, do not have CWPPs in place. These plans are crucial for coordinated wildfire prevention, preparedness, and response efforts.
    - Incident Command / IMT: Specific for wildland (resources)

Recommended Actions:

1. Develop a Comprehensive Fire Monitoring Program: Establish a program to collect and analyze fire data, including fire history, weather trends, and fuel conditions. Conduct regular updates and maintenance of data.
2. Enhance Mapping of Sensitive Areas: Conduct detailed surveys and mapping of sensitive ecological and cultural areas. Update maps regularly to reflect changes.
3. Complete Fuels Mapping: Conduct detailed and updated mapping of fuel types and loadings. Integrate fuel mapping data into fire behavior prediction models.
4. Upgrade Wildland Firefighting Equipment: Invest in modern wildland firefighting equipment, including vehicles, tools, and protective gear. Regularly maintain and update equipment.
5. Improve Water Resources: Install additional hydrants and identify new drafting sites. Develop a comprehensive water access plan for firefighting.
6. Expand Wildland Fire Training Programs: Provide ongoing wildland fire training for local firefighters. Encourage participation in NWCG courses and other relevant training programs.
7. Create a Formal Response Plan: Develop and annually review a formal interagency response plan for wildfires. Establish protocols for mutual aid, communication, and resource sharing.
8. Enhance Interagency Communication: Improve radio interoperability and conduct regular joint training exercises. Establish a communication protocol for wildfire incidents.
9. Develop a Community Wildfire Protection Plan

Resources & Collaboration:

- Fire monitoring, Mapping of Sensitive Areas, and Fuel Mapping: GIS tools and software; funding for data collection and analysis. Collaboration with fire ecologists and cultural heritage organizations
- Equipment: Funding for equipment purchase and maintenance. Grants from federal and state agencies
- Water Resources: Collaboration with local water authorities and municipalities.Funding for infrastructure improvements. Technical assistance from water resource engineers.
- Training: Funding for training programs and travel expenses.
- Coordinated Response: Collaboration with local fire departments, BFFC, and other agencies. Funding for plan development and review meetings. Technical assistance from emergency management experts.
- Interagency Communications: Funding for communication equipment and upgrades. Technical assistance from communication specialists. Collaboration with local, state, and federal agencies.

4.5 Drought

Drought is an emerging challenge for Milton, driven by climate change and its impact on precipitation patterns and temperatures. While historically not a major threat, the town now faces increasing risks of prolonged dry periods, particularly in late summer and fall. These changes reduce soil moisture, strain water supplies, and increase vulnerabilities, including heightened wildfire risk and declining tree health. Addressing these challenges is essential to ensure water availability, maintain ecological health, and mitigate cascading effects on public safety and infrastructure. By adopting proactive water management strategies, Milton can enhance its resilience and safeguard community well-being in the face of a changing climate.

4.5.1 Key Risks

- **Adequate Water Supply:** Milton's water supply comes from the Quabbin Reservoir, which has a relatively low risk of supply issues under current climate conditions. However, future risk is uncertain due to increasing statewide population and shifting precipitation patterns.
- **Wildfire:** Prolonged drought increases the risk of wildfire
- **Ecosystem and landscape health:** Increasing drought frequency may damage the health of local ecosystems

4.5.2 Strategies and Recommended Actions

Strategy 1: Reduce non-essential water consumption, particularly during drought.

As the risk of drought increases, it is essential to reduce non-essential water consumption to maintain essential supply and reduce strain on infrastructure during dry periods. Although Milton does not control its water supply, local water conservation helps maintain regional emergency preparedness.

The Massachusetts Drought Management Plan, as well as Milton's Hazard Mitigation Plan, each recommends municipalities establish a comprehensive water conservation program to maintain robust regional water reserves for emergencies, addressing both public and private water usage. We propose Milton develop such a program.

For Milton, this would involve monitoring and analyzing water usage data, implementing clear water use guidelines, identifying and addressing water loss through infrastructure improvements, and incentivizing efficient practices such as adopting low-flow fixtures and leak detection systems provided by the MWRA. The plan would also promote climate-resilient landscapes and ecosystems by prioritizing drought-tolerant and native plant species, reducing impervious surfaces, and optimizing irrigation practices in both public and private spaces. Public education campaigns would raise awareness about water conservation techniques and the importance of sustainable landscaping.

Recommended Actions:

1. Community Involvement: Engage local community members, stakeholders, and organizations to participate in the planning process through public meetings and outreach.
2. Form a Core Team: Assemble a group of stakeholders including local government officials (Town Administrator), Department of Public Works, community organizations (Sustainable Milton), and residents.
3. Funding Opportunities: Explore funding opportunities for water conservation projects from federal and state agencies, local government budgets, and community fundraising efforts.
4. Assessment of Current Water Usage: Conduct a thorough assessment of the community's current water usage, distinguishing between essential and non-essential use.
5. Set Priorities and Goals: Identify key areas where water usage can be improved and develop strategies to do so - with attention to:
    1. Infrastructure improvements
    2. Personal habit changes
    3. Climate-resilient landscaping on public properties
    4. Educating the public on climate-resilient landscaping practices for personal properties
6. Develop a Water Conservation Program that promotes education and policy changes to achieve non-essential water use reduction according to the identified key areas and strategies.

Strategy 2: Define and ensure essential water supply needs in drought conditions

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Both the Massachusetts Drought Management Plan and The Milton Hazard Mitigation Plan outline the need for a drought response plan that ensures there is sufficient supply to meet essential use and respond to specific new needs that may arise in a drought. Specifically, Milton's geography and ecology require specific preparation to preserve vegetative life and respond to wildfire risk.

We propose Milton establish a Drought Management Plan to manage water supply in a drought situation. While Milton does essential water supply needs in a drought condition not directly impact water supply, it can identify supply needs and educate, promote, communicate, and enforce measures for consumption management to meet needs in an emergency.

Such a program would integrate regional monitoring and early warning systems to track drought conditions and facilitate timely responses. It would outline clear protocols for managing essential water supplies, prioritizing critical needs such as public health, safety, and firefighting during drought emergencies. Public education is a cornerstone, focusing on water conservation, the impacts of drought, and steps the community can take to reduce vulnerability.

Recommended Actions:

1. Community Involvement: Engage local community members, stakeholders, and organizations to participate in the planning process through public meetings and outreach.
2. Form a Core Team: Assemble a group of stakeholders including local government officials (Town Administrator), Department of Public Works, community organizations (Sustainable Milton), and residents.

3. Funding Opportunities: Explore funding opportunities for drought management from federal and state agencies, local government budgets, and community fundraising efforts.
4. Identification of Water Needs: Using current water usage data and estimates that take into account potential drought scenarios and emergency needs (e.g., fire risk during drought conditions), identify essential water needs in drought conditions.
5. Establish goals: Determine mitigation strategies - through education and/or policy - to remain below target water usage during drought conditions.
6. Develop a Drought Management Plan that facilitates policy changes and communication plans to achieve mitigation goals

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Strategy 3: Promote climate-resilient landscapes and ecosystems

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Milton is fortunate to contain relatively high tree cover (33%), as well as numerous landscaped and natural parks, natural areas, and conservation lands. With increasing drought and extreme precipitation in our region, Milton's landscapes and natural ecosystems are at risk. In addition, landscaping practices that do not account for climate change can represent an unnecessary draw on increasingly important water resources. We therefore propose that Milton pursue climate- (and in particular drought-) friendly landscaping techniques and climate smart land management plans.

Recommended Actions:

1. Require that all new town-owned landscaped areas follow best practices for drought tolerance
    a. Town land should follow sustainable landscaping practices, including reducing impervious surfaces, planting drought tolerant native species, and following best watering practices
2. Ensure than all new street and park trees planted in Milton are climate-adapted species and are planted in locations that will have the greatest impact on local heat island effects (which can exacerbate drought conditions)
3. Promote drought tolerant and climate friendly landscaping techniques to homeowners and landscaping companies through public education campaigns (see the EPA's "WaterSense" program for specific strategies for doing this)
4. Support climate-smart management of natural areas in Milton (e.g. Blue Hills, Neponset River, etc)
5. Funding opportunities: There is a forthcoming grant program for drought resiliency and water efficiency due 1/31/25 that supports efforts to increase drought planning and resilience from the EEA: https://www.mass.gov/eea-funding-opportunity-for-a-new-grant-program

4.6 Energy Security

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5 Bibliography

Work in progress

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Massachusetts 2020 Forest Action Plan Goals

Massachusetts 2020 Forest Action Plan includes 10 overarching climate goals related to the forests and trees of Massachusetts, as well as assemblages of specific strategies that may be undertaken to work toward achieving those goals. This plan is a tool to help guide the activities of all stakeholders with an interest related to trees and forests over the decade leading up to 2030.

The 2020 Forest Action Plan goals for Massachusetts forests are:

- Goal 1: Increase resistance and resilience of trees and forests to mitigate and adapt to the effects of climate change
- Goal 2: Manage forest ecosystem health and biodiversity
- Goal 3: Support and enhance forest economy
- Goal 4: Maintain and increase urban tree canopy
- Goal 5: Enhance the connection between forests and people
- Goal 6: Increase land base of conserved forests (keep forests as forests)
- Goal 7: Advocate for a legal and institutional framework pertinent to the conservation and management of trees and forests
- Goal 8: Maintain and enhance soil, water, and air resources
- Goal 9: Support the role and use of prescribed fire in the landscape
- Goal 10: Cultivate and support partnerships with forestry and conservation Stakeholders

Appendix A: Definitions Needed

- Net-zero building
- Clean, renewable electricity
- "All-electric" building:
    - Uses electricity for heating, cooling, cooking, hot water
    - Backup fossil fuel generator OK, with preference for biofuels or other sustainable fuel.

Appendix B: Glossary

Base year
A historic datum (a specific year or an average over multiple years) against which the emissions of a company or organization are tracked over time.
Base year emissions
Greenhouse Gas (GHG) emissions in the base year.
Base year emissions recalculation/adjustment
Base year emissions recalculation reflects a change in the structure of the company or to reflect a change in the accounting methodology used. This ensures data consistency over time, i.e., comparisons of like with like over time.
Boundaries
GHG accounting and reporting boundaries can have several dimensions, i.e., organizational, operational, geographic, business unit, and target boundaries. For the Town of Milton, a geographic boundary is used and identifies the spatial dimension or physical perimeter of the inventory's boundary.
CO2 equivalent (CO2e)
The universal unit of measurement indicating the global warming potential (GWP) of each of the seven GHGs, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different GHGs on a common basis.

De minimis emissions
A level below which emissions are not included. For example, a de minimis source might include any emission sources that, in total, represent less than 5% of an organization's total GHG emissions.
Direct GHG emissions
Emissions from sources that are owned or controlled by the reporting city.
Emission factor
A factor allowing GHG emissions to be estimated from a unit of available activity data (e.g., tons of fuel consumed, tons of product produced) and absolute GHG emissions.
Fugitive emissions
Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing transmission storage, and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc.
Greenhouse gases (GHG)
For the purposes of this standard, GHGs are the seven gases listed in the Kyoto Protocol: carbon dioxide (CO2); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulfur hexafluoride (SF6); and nitrogen trifluoride (NF3).

Global warming potential (GWP)
A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO2.
Inventory boundary
An imaginary line that encompasses the direct and indirect emissions that are included in the inventory. It results from the chosen organizational and operational boundaries.
Adaptation
Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise. Examples of adaptation measures include large-scale infrastructure changes, such as building defences to protect against sea-level rise, as well as behavioural shifts, such as individuals reducing their exposure to high temperatures and checking on vulnerable family members and neighbours during heatwaves. In essence, adaptation can be understood as the process of adjusting to the current and future effects of climate change.
Mitigation
Mitigation means preventing or reducing the emission of greenhouse gases (GHG) into the atmosphere to make the impacts of climate change less severe. Mitigation is achieved either by reducing the sources of these gases — e.g. by increasing the share of renewable energies, or establishing a cleaner mobility system — or by enhancing the storage of these gases — e.g. by increasing the size of forests. In short, mitigation is a human intervention that reduces the sources of GHG emissions and/or enhances the sinks.
Mobile combustion
Burning of fuels by transportation technologies such as cars, trucks, airplanes, ships, trains, etc.
Net Zero
A level of statewide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is 85 percent below the 1990 level (as defined under the Commonwealth of Massachusetts Clean Energy and Climate Plan for 2050)
Opportunity for improvement
A requirement has been effectively implemented but additional effectiveness of robustness may still be attainable.
Scope
Defines the operational boundaries in relation to indirect and direct GHG emissions.
Scope 1 inventory
GHG emissions from sources located within the city boundary
Scope 2 inventory
GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the city boundary
Scope 3 inventory
All other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary
Stationary combustion
Burning of fuels to generate electricity, steam, heat, or power in stationary equipment such as boilers, furnaces, etc.
Verification
An independent assessment of the reliability (considering completeness and accuracy) of a GHG inventory