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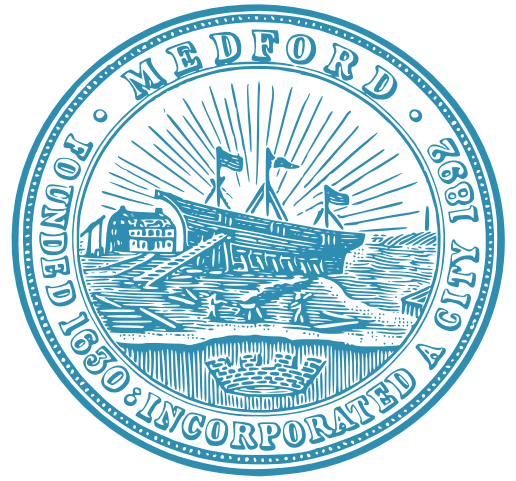
Medford

Climate

Action and

Adaptation

Plan



DRAFT PLAN
OCTOBER 2021



Letter from the Mayor

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Acknowledgments

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Many thanks to the significant number of Medford residents and city staff who have contributed time and insight in the development of this plan, including those of you who are reviewing the draft plan right now.

(acknowledgments continued)

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Executive Summary

The Climate Action and Adaptation Plan (CAAP) is Medford's plan to address climate change, and for investing in a healthy, livable future for all residents today and for future generations.

This plan addresses the **direct causes** of climate change, the **effects** of climate change, and many of the **root challenges** and underlying patterns that have fueled the climate crisis and that work against our ability to be a thriving, healthy, and inclusive city.

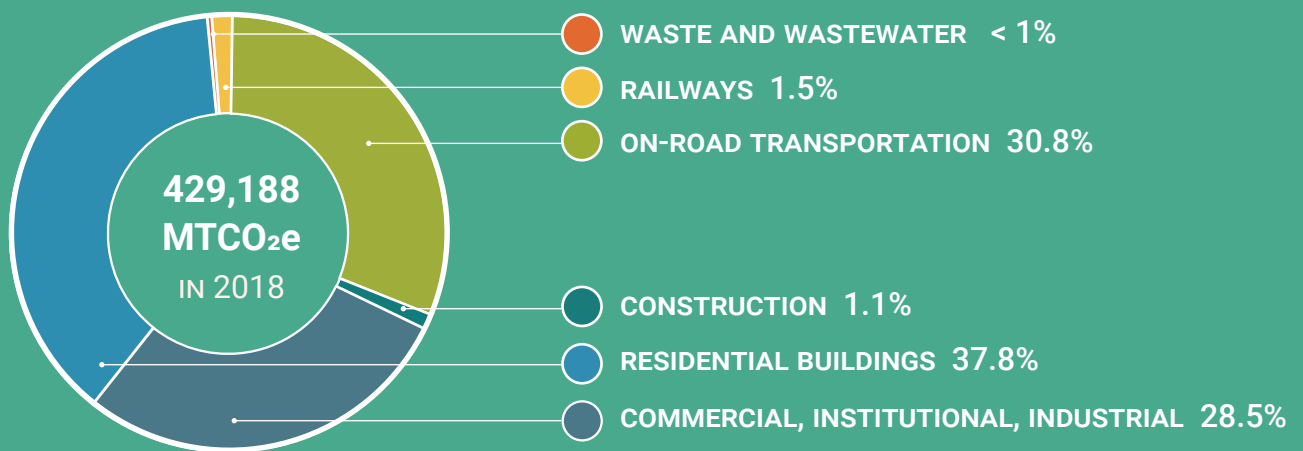
The CAAP identifies the actions Medford will take to...

..... **drastically and rapidly reduce
Medford's greenhouse gas emissions,
putting Medford on pace to achieve
net zero emissions by 2050.**

Greenhouse gases have increasingly built up in the atmosphere over the last century, due to human activities such as burning fossil fuels (like oil and gas) to heat our homes, drive vehicles, and power industries. Greenhouse gases trap heat and have been causing the average temperature on earth to rise faster than ever before.¹ Without a drastic reduction in emissions globally in the next couple decades, we are guaranteed to see temperatures rise to levels that can significantly harm communities, ecosystems, and local economies.

Community-wide, Medford emitted 429,188 metric tons of carbon dioxide

Medford's Emissions



equivalents (MTCO₂e) in 2018, 67% of which came from the buildings in our city and 32% from transportation. As part of the Metro Mayors Coalition, Medford has committed to achieving **net zero emissions** by 2050. “Net zero” means that Medford will nearly eliminate all greenhouse gas emissions from human activities, and any remaining emissions will be balanced by drawing carbon dioxide out of the atmosphere using natural systems (such as forests and wetlands).

Medford must draw down carbon emissions in ways that are equitable and just, whereby residents who will experience the first and worst effects

of climate change most greatly benefit from climate investments. Achieving net zero emissions will require an expansion of renewable energy, and a transition to more efficient and electric systems to power our homes, businesses, offices, and vehicles. It will require strengthening public transit systems and investing in communities that are more walkable, bikeable, and transit-oriented. And it will call on Medford and the region to shift to a more **circular economy**, and to protect and grow the capacity of soils, forests, and wetlands to store and draw down carbon.

..... **build the capacity of our communities, economy, infrastructure, and ecosystems to respond, adapt, and thrive in the face of new stresses and climate hazards.**

Medford is already feeling the effects of climate change—including hotter summers, more intense storms, rising sea levels, more frequent flooding, and worsening air and water quality. Medford could see up to 16 days over 100°F each year by 2070, in addition to more heat waves and unseasonably hot days. Heavier storms continue to increase the risk of flooding both inland and along the rivers, and rising sea levels combined with large storms could cause significant flooding in Medford as early as 2050.

These changes bring new sources of vulnerability, including threats to



BIGGER STORMS

MORE ANNUAL RAINFALL,
MORE INTENSE STORMS



RISING TEMPERATURES

30 DAYS OVER 90 °F BY 2030
(COMPARED TO 11 DAYS IN 1990)



STORM SURGE + SEA LEVEL RISE

9 INCHES OF SEA LEVEL RISE BY 2030
(COMPARED TO 2013 LEVELS)

our health and safety, strain on our economy, stress on our food systems and ecosystems, and higher risk of infrastructure failure. One's job, financial savings, social connections, neighborhood, transportation options, and housing situation are all factors that can help to buffer climate impacts by making it easier to cope or adapt, or they can magnify the impact, particularly for communities that have been subjected to **structural racism** and other inequities.² As a result, the effects of climate change will be felt unequally, creating greater risks particularly for Medford's low-income residents, residents with disabilities, residents of color, and immigrant communities.

Being a resilient city will therefore require Medford to reduce the city's direct exposure to climate hazards through adapting infrastructure, neighborhoods, and natural systems to reduce flooding, withstand storms, and help keep temperatures cooler—starting with meeting the needs of residents that will feel the effects first and worst. It also will require that we equitably invest in housing, neighborhood resources, public transportation, and access to nutritious food, such that all Medford residents have the resources to respond, adapt, and thrive day-to-day and in the context of new and changing hazards.

..... widely adopt ways of living that invest in the health of communities and the planet. This includes changing the bigger patterns that contributed to the climate crisis in the first place.

Climate change is rooted in a system of economic growth that extracts value without accounting for the real environmental and social costs. These costs—air pollution, water contamination, resource depletion, ecosystem decline, and economic inequality, to name a few—continue to be borne disproportionately by communities with the least political and financial resources at their disposal.

Addressing the underlying patterns that have fueled the climate crisis points to an enormous opportunity to not only shift to an economy run on clean and renewable energy, but to transition towards a more **regenerative**



economy—and to make that transition in a just and equitable way. A regenerative economy is one where our work and livelihoods continuously restore and invest in (as opposed to exploit and diminish) the long-term health and wellbeing of our natural systems, people, and communities.

Shifting to a just regenerative economy requires that we transform the way that we make decisions: we must shift and share power, as well as build trust and respect, for everyone to have a political voice in decisions that shape our collective future. It requires that we create inclusive pathways for everyone to participate in, and equitably benefit

from, the growth of a clean energy economy. And it requires that we begin measuring success not by short-term financial gains, but by the generation of lasting shared wealth and health, the livability of our city for all residents, and the vitality of the planet for current and future generations.

Collectively, these actions work to achieve Medford's **climate vision**:

Medford is a place where everyone can thrive, now and for generations to come, ensuring that our future is just and equitable, resilient, healthy, and carbon neutral.

Just

Just means to be fair, ethical, and unbiased. A just city is one that not only works to uphold these values today, but also actively acknowledges and works to correct past injustices (instances that have been unfair, unethical, or biased) that have negatively affected people, families, and communities.

Equitable

Equitable is different than equal. While being equal emphasizes the same treatment for everyone, being equitable recognizes that individuals and communities face unequal challenges that deserve different levels of support. An equitable city meets people's unique needs so that everyone has an equal opportunity to succeed.

Resilient

Resilient refers to the ability to recover quickly from a difficult situation. A resilient city is one that has the capacity to respond, recover, and bounce forward in response to stresses and new challenges, such as climate change.

Healthy

Healthy means to be well—physically, mentally, and socially. A healthy city is one that supports thriving, vibrant, and active people, neighborhoods, and ecosystems, while minimizing toxins and circumstances that hurt our well-being, such as air and water pollution and climate change.

Carbon neutral

When we burn fossil fuels and process waste, we release carbon emissions into the atmosphere, driving climate change and putting our health in jeopardy. A carbon neutral city is one that produces almost no carbon emissions, while also counterbalancing those emissions by drawing carbon out of the atmosphere through healthy wetlands, forests, soil, and other natural systems. With other communities in the Metro Mayors Coalition, Medford has committed to achieving carbon neutrality by 2050.

VETERAN'S MEMORIAL PARK, THE MYSTIC RIVER
PHOTO BY CALEB DRESSER



Summary of the Strategies

Medford's Climate Action and Adaptation Plan includes 32 strategies across four focus areas: **Buildings & Energy**, **Ecosystems & Natural Environment**, **Public Health**, and **Transportation**. Each strategy has 3 - 10 actions Medford plans to take within the next ten years—the majority within the next five years—to work towards our climate vision.

The plan also has three “overarching” actions related to the plan's next steps for implementation.

[See the following pages for more details.](#)

Overarching

OVERARCHING STRATEGY 1

Plan Implementation: Next Steps

Continue to advance the ongoing implementation of the plan in ways that are collaborative, equitable, and data-driven.

See page 74

- A** Create a Climate Equity Council.
- B** Use the Climate Equity Framework to guide implementation.
- C** Model greenhouse gas emissions to forecast and evaluate progress.

Note: See Public Health strategy **PH 2.1**, which focuses on strengthening Medford's community health, wellbeing, and resilience through equitable processes. These actions will apply across all areas of the plan's implementation, too.

Note: See Transportation strategy **T 1.1**, which involves advocating for better statewide transportation data which will support the greenhouse gas emissions modeling.

BE



Buildings & Energy

In the Buildings & Energy section, Medford will ensure that everyone has access to healthy homes and places to work that are affordable and meet their needs, that use very little energy and produce almost no climate pollution, that are powered by clean energy (like solar and wind power), and that keep residents safe during extreme weather.

Objective BE 2 SEE PAGE 23
Objective BE 3 SEE PAGE 25

Objective BE 1: Champion new buildings and redevelopment that make Medford a more affordable, resilient, and low-carbon city.

STRATEGY BE 1.1

Diverse & Affordable Housing

Expand diverse housing options in Medford to meet the needs of all ages, all family sizes, all (dis)abilities, and all income levels.

See page 80

- A Reduce zoning barriers to multifamily and mixed-use housing development.
- B Enable smaller and more diverse housing options through zoning updates.
- C Establish a Municipal Affordable Housing Trust (MAHT).
- D Foster affordable infill development.
- E Protect and continue to advance fair housing choice.
- F Support community efforts to create a Community Land Trust.
- G Conduct a displacement risk assessment.

STRATEGY BE 1.2

High-Performance New Buildings

Update Medford's zoning codes and the development review process to encourage highly energy efficient, resilient, and low-carbon new construction.

See page 84

- A Adopt environmental performance standards for large projects.
- B Offer incentives for exceptional energy performance.
- C Expand staff capacity to oversee building performance standards.

Flood-Resilient New Buildings

Require flood resilient design for new development that could see high flood risk.

See page 86

- A** Develop an online flood viewer to delineate areas with increasing flood risk.
- B** Update flood resilience building guidelines.
- C** Incentivize higher density in upland areas.

Net Zero Stretch Energy Code

Continue to advocate for a Massachusetts Stretch Energy Code that will put cities and towns on pace to meet net zero emissions by 2050.

See page 88

- A** Advocate for a net zero stretch code that aligns with 2050 carbon neutrality goals.
- B** Advocate for a regular update cycle.

Net Zero New Municipal Buildings

Lead by example by setting net zero energy and resilience standards for the construction of new municipal buildings.

See page 90

- A** Adopt performance-based procurement.
- B** Establish municipal building standards.

..... **Objective BE 2:** Retrofit existing buildings to be more efficient, resilient, and to have a smaller carbon footprint.

STRATEGY BE 2.1

Fuel Switching & Efficiency

Provide tools and resources to support fuel switching and energy efficiency retrofits.

See page 94

- A** Launch a campaign for energy efficient electric heating and cooling systems.
- B** Revive and expand building rehab programs for rental properties.
- C** Establish a data tracking protocol for fuel switching.
- D** Investigate additional financial incentives.

STRATEGY BE 2.2

Benchmarking & Energy Standards

Adopt energy benchmarking, disclosure, and performance policies to encourage energy upgrades in existing buildings.

See page 99

- A** Implement a benchmarking ordinance for large buildings.
- B** Adopt performance standards for benchmarked buildings.
- C** Advocate for statewide energy performance reporting requirements.
- D** Develop a rental licensing ordinance with energy efficiency standards.

Resources for Resilience Retrofits

Provide tools and resources for property owners and tenants to improve building resilience and prepare for climate hazards.

See page 103

- A Create a platform for ongoing dialogue about flood risk in Medford.
- B Develop an online building resilience toolkit.
- C Integrate climate resilience into first-time homebuyer courses.
- D Participate in the NFIP Community Rating System.
- E Prepare for securing federal resilience funding.

Municipal Building Retrofits

Lead by example by completing energy and resilience retrofits on all existing municipal buildings.

See page 107

- A Commission a strategic energy management plan.
- B Conduct deep energy retrofits.
- C Increase staff capacity for facility management.
- D Assess municipal buildings for flood vulnerability.



..... **Objective BE 3:** Build out resilient and renewable energy systems.

STRATEGY BE 3.1

Renewable Energy

Expand local renewable energy sources.

See page 112

- A** Launch a solar access campaign.
- B** Continue to procure on-site solar for municipal properties.
- C** Assess the opportunity for Medford Housing Authority community solar.
- D** Continue to support community-driven community solar projects.
- E** Authorize PACE financing.

STRATEGY BE 3.2

Energy Resilience

Increase Medford's energy resilience.

See page 116

- A** Seek opportunities to replicate resilient power systems.
- B** Encourage district scale energy solutions.
- C** Continue to ensure maintenance on existing natural gas infrastructure.



Ecosystems & Natural Environment

In the Ecosystems & Natural Environment section, Medford will ensure that our city has healthy and thriving ecosystems that are able to grow and adapt even with climate change, that help prevent flooding and keep temperatures cool on very hot days, and that support the health and wellbeing of all Medford residents.

Objective EN 1: Protect, restore, and grow Medford's natural systems for a more resilient city.

STRATEGY EN 1.1

Tree Canopy

Protect and grow the tree canopy in alignment with community goals and priorities.

See page 124

- A** Continue to build out Medford's tree inventory.
- B** Develop an urban forest master plan with community-defined tree planting goals.
- C** Proactively adopt anti-displacement policies to protect affordability.
- D** Create an urban forest technical manual.
- E** Develop tree succession plans for park trees.
- F** Introduce a tree protection ordinance.
- G** Create a tree fund.
- H** Expand staff capacity for tree efforts.
- I** Launch a tree ambassadors program.
- J** Build platforms for urban forestry conversation and collaboration.

STRATEGY EN 1.2

Ecological Performance Standards

Adopt ecological performance standards for new development.

See page 130

- A** Adopt new landscape performance standards for heat mitigation.
- B** Adopt new landscape performance standards for stormwater infiltration.
- C** Adopt new landscape performance standards for soil health.

Ecological Resilience

Enhance the resilience of land and water ecosystems to contend with new climate stresses.

See page 134

- A

Continue ecological restoration of parks and open spaces.
- B

Develop an invasive species mitigation plan.
- C

Regrade and revegetate river banks to prevent erosion.
- D

Establish a soils management program for parks and open spaces.
- E

Launch an educational campaign to support healthy soil.
- F

Evaluate adoption of pesticide and fertilizer use ordinances.
- G

Plant and raise awareness on native pollinator gardens.

.....

Objective EN 2: Mitigate flooding using nature-based solutions when possible.

Rainscaping

“Rainscape” Medford to better infiltrate stormwater.

See page 140

- A

Update the city’s stormwater regulations.
- B

Develop a green infrastructure design toolkit.
- C

Encourage rainscaping on private property.
- D

Reduce impervious surfaces on city-owned property.
- E

Evaluate open space acquisitions and protections based on climate resilience.
- F

Continue to collaborate regionally to infiltrate stormwater.

Stormwater Infrastructure

Continue to invest in maintenance and upgrades to the stormwater and sewer systems, accounting for climate change projections.

See page 146

- A Roll out Utility Asset Management Plan.
- B Continue to reduce inflow and infiltration (I&I).
- C Identify priority infrastructure upgrades based on climate risk and climate justice.
- D Expand the capacity of the stormwater system through green, blue, gray solutions.
- E Identify cost-sharing opportunities for stormwater projects.
- F Promote and expand the “Adopt-a-Drain” program.
- G Continue to coordinate regionally on timing of reservoir releases.
- H Explore the potential for a stormwater utility enterprise fund.

Riverine flood buffers

Reduce flood risk from the Mystic and Malden rivers caused by storms and sea level rise.

See page 150

- A Consider a riparian buffer overlay to prioritize living shorelines.
- B Work with DCR to “make room for the river.”
- C Continue to collaborate regionally on the resilience of the Amelia Earhart Dam.
- D Continue to collaborate regionally through the Mystic River Collaborative.

PH



Public Health

In the Public Health section, Medford will ensure that everyone has access to healthy neighborhoods, infrastructure, and resources that reduce health risks from climate change, pollution, and waste; that combat racism and other systems of oppression; and that expand resources for everyone to live healthy lives.

Objective PH 2 SEE PAGE 33

Objective PH 1: Create neighborhoods and infrastructure systems that support health.

STRATEGY PH 1.1

Healthy Neighborhoods

Adapt the city's zoning codes and development incentives to create healthier neighborhoods.

See page 158

- A Update zoning codes to support health outcomes.
- B Assess neighborhood-specific opportunities.
- C Create a "healthy Medford" development framework and checklist.

STRATEGY PH 1.2

High Heat Mitigation

Improve Medford's capacity to stay cool in periods of high heat.

See page 162

- A Expand access to community cooling sites.
- B Launch a "Cool Medford" outreach campaign.
- C Adopt design and material standards for cooler surfaces.
- D Update and implement the Mystic Avenue Corridor Green Infrastructure Plan.
- E Assess the impacts of high heat in Medford Public Schools.
- F Reintegrate drinking fountains in parks and public spaces.
- G Update emergency management plans to contend with high heat.
- H Advocate review of policies that affect access to water, heating, and cooling.
- I Advocate for MBTA investments in keeping transit cool.
- J Advocate for heat exposure occupational health and safety standards.

Food System Resilience

Increase local food system resilience.

See page 169

- A** Establish a Food Policy Council.
- B** Create neighborhood food access action plans.
- C** Develop a community food hub.
- D** Create a platform for grocery business continuity planning.
- E** Grow the city's community gardens and urban agriculture.
- F** Expand systems for food recovery.
- G** Increase the number of providers accepting food assistance.
- H** Expand city staff and resources dedicated to food resilience.

Waste Reduction

Make it easier to reduce, reuse, and recycle materials to restore or renew value, eliminate waste, and decrease pollution.

See page 174

- A** Commit to zero waste.
- B** Evaluate current recycling and waste policies to advance equitable service.
- C** Update private hauler regulations and recycling requirements.
- D** Roll out, promote, and develop curbside composting.
- F** Partner with students to advance Zero Waste Medford Public Schools.
- G** Launch targeted waste reduction initiatives with local businesses.
- H** Expand recycling education.
- I** Evaluate the local potential for construction material reuse.



..... **Objective PH 2:** Invest in Medford’s people and businesses for strong and thriving communities.

STRATEGY PH 2.1

Centering Equity

Design processes for partnering with and listening to community members based on procedural and structural equity.

See page 182

- | | |
|--|--|
| A Expand staff and resources dedicated to creating an inclusive and anti-racist city. | D Provide equitable compensation for participation on boards and committees. |
| B Grow the cultural consciousness of Medford’s city staff and leadership. | E Create more opportunities for neighborhood or ward representation. |
| C Build capacity for safe, accessible, and inclusive city meetings. | F Continue to see that Medford’s diversity is reflected in city leadership and staff. |

Sustainable Career Opportunities

Support workforce development and training programs that can support the transition to a low-carbon, just, and resilient future.

See page 187

- A** Partner to develop and promote facilities management training.
- B** Develop a city-sponsored youth employment program.
- C** Inventory and expand targeted career training in sustainable industries.

Building Community

Expand neighborhood resources and opportunities for building community.

See page 190

- A** Create a community resilience hub.
- B** Create platforms for coordination across Medford service providers.
- C** Collaborate to host and promote cultural events and festivals.
- D** Facilitate neighborhood block parties.
- E** Build multilingual support services for new residents.
- F** Continue to expand Medford's volunteer response systems.
- G** Evaluate the potential for a community resilience small grants program.

MEDFORD FAMILY NETWORK CONCERT
PHOTO BY CITY OF MEDFORD



T

Transportation

In the Transportation section, Medford will ensure that it is easy for Medford residents to get where they need to go by convenient and affordable public transportation, by safe and accessible sidewalks and paths, and by buses, cars, and trucks that use clean fuels and create no air pollution.

Objective T 2 SEE PAGE 39
Objective T 3 SEE PAGE 41



Objective T 1: Make it safer and easier to walk, bike, and take public transportation.



STRATEGY T 1.1

Transportation Advocacy

Advocate for transportation investments at the state level that are essential for enabling Medford to reach its climate goals.

See page 201

- A** Advocate for retaining and expanding MBTA service.
- B** Advocate for ongoing commitment to MBTA decarbonization.
- C** Advocate for infrastructure to support zero-carbon commuting.
- D** Advocate for the investigation of zero-fare transit.
- E** Advocate for improved statewide transportation data.

STRATEGY T 1.2

Public Transportation Investments

Invest in more equitable, accessible, and efficient public transportation systems.

See page 205

- A** Conduct an equity-centered community process for identifying transit priorities.
- B** Implement “bus transit priority” projects.
- C** Implement bus stop accessibility upgrades.
- D** Evaluate Medford Public School bus service to achieve equitable access.
- E** Explore additional mobility options to fill transit gaps.
- F** Hire a transportation planner to advance grant-funded transportation projects.

Safe Streets for All

Create safer, more accessible, and connected ways for walking, biking, scootering, pushing a stroller, rolling a wheelchair, or other modes.

See page 208

- | | |
|---|--|
| A Adopt Vision Zero. | G Launch a bike share program and evaluate opportunities for its expansion. |
| B Conduct a participatory mapping mobility study. | |
| C Set goals for an “all ages and abilities network.” | H Improve snow clearing to protect sidewalk and bike lane accessibility. |
| D Strengthen complete streets policy through zoning and local ordinance. | I Support and enforce driver awareness. |
| E Implement complete streets upgrades. | J Increase communication on roadway changes. |
| F Close gaps to create a seamless regional network of multi-use paths. | K Continue to work with state and regional partners to achieve mode shift. |

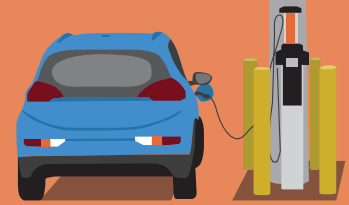
Accessible Neighborhoods

Update city codes and zoning ordinances so that new development contributes to neighborhoods accessible to all.

See page 213

- | | |
|---|---|
| A Encourage mixed-use development. | E Update bicycle parking requirements. |
| B Design for active streetscapes. | F Update motor vehicle parking requirements. |
| C Integrate multimodal connections in new development. | G Adopt transportation demand management (TDM) policy. |
| D Acquire land rights to construct bus shelters. | |

Objective T 2: Accelerate the transition to zero emission vehicles.



STRATEGY T 2.1

Electric Vehicle Charging

Expand access to electric vehicle (EV) charging stations.

See page 221

- A** Expand charging stations in city-owned lots.
- B** Adopt EV charging requirements for new development.
- C** Pilot on-street EV charging, to be scaled city-wide.
- D** Encourage EV charger installations in private lots.
- E** Expand staff capacity for sustainable transportation efforts.

STRATEGY T 2.2

Electric Vehicle Access

Expand access to electric vehicles (EVs).

See page 224

- A** Pilot an income-tiered EV car-share program.
- B** Advocate for income-tiered EV incentives and financial incentives for e-bikes.
- C** Incentivize transportation network companies to use only EVs by 2030.



BIKE LANE ON FELLSWAY
PHOTO BY CITY OF MEDFORD

Electric Municipal Fleets

Transition municipal fleets to electric and alternative fuel vehicles.

See page 226

- A Develop municipal fleet capital transition plan.
- B Use performance-based procurement for contracted fleets.

Objective T 3: Increase the resilience of transportation infrastructure to climate hazards.

Resilient Transportation Systems

Adapt transportation infrastructure to new risks from sea level rise, higher-intensity precipitation events, and changing temperatures.

See page 230

- A Integrate climate risk into transportation asset management.
- B Work with state agencies to assess risks to state infrastructure within Medford.
- C Coordinate with the MBTA to protect key MBTA facilities.

01

Medford Climate Action
and Adaptation Plan

The Context



Medford's Climate Vision

Medford is a place where everyone can thrive, now and for generations to come, ensuring that our future is just and equitable, resilient, healthy, and carbon neutral.

This vision for Medford now, and thirty years from now, was developed by community members and city staff as part of the Climate Action and Adaptation Planning process. Medford residents drafted the language for this vision as part of a public workshop. More community members tuned into the workshop by live broadcast on local television, and many others contributed ideas and language through an online survey. The purpose of this plan is to chart a course for how Medford will achieve our climate vision.



THE CONTEXT

What do we mean?

Just

Just means to be fair, ethical, and unbiased. A just city is one that not only works to uphold these values today, but also actively acknowledges and works to correct past injustices (instances that have been unfair, unethical, or biased) that have negatively affected people, families, and communities.

Equitable

Equitable is different than equal. While being equal emphasizes the same treatment for everyone, being equitable recognizes that individuals and communities face unequal challenges that deserve different levels of support. An equitable city meets people's unique needs so that everyone has an equal opportunity to succeed.

Resilient

Resilient refers to the ability to recover quickly from a difficult situation. A resilient city is one that has the capacity to respond, recover, and bounce forward in response to stresses and new challenges, such as climate change.

Healthy

Healthy means to be well—physically, mentally, and socially. A healthy city is one that supports thriving, vibrant, and active people, neighborhoods, and ecosystems, while minimizing toxins and circumstances that hurt our well-being, such as air and water pollution and climate change.

Carbon neutral

When we burn fossil fuels and process waste, we release carbon emissions into the atmosphere, driving climate change and putting our health in jeopardy. A carbon neutral city is one that produces almost no carbon emissions, while also counterbalancing those emissions by drawing carbon out of the atmosphere through healthy wetlands, forests, soil, and other natural systems. With other communities in the Metro Mayors Coalition, Medford has committed to achieving carbon neutrality by 2050.





The Big Picture Challenge

For generations, communities locally and globally have been calling for change, concerned by the unsustainable ways of living in the United States and much of the world.



Activities that have accelerated the growth of economies, cities, and suburbs—including burning fossil fuels to power industries, buildings, and vehicles; disposing waste and wastewater; and converting forests and wetlands into development and agriculture—continue to release large volumes of **greenhouse gases** into the atmosphere, particularly carbon dioxide. Greenhouse gases build up in the atmosphere, trap heat, and have been causing the average temperature on earth to rise faster than ever before.³ The future health of our city and planet now depend on drastically and rapidly reducing greenhouse gas emissions as soon as possible.

Yet climate change is only a symptom of a model of economic growth that continues to use resources

inefficiently and unsustainably, and that fails to invest in community and ecosystem health. Globally and locally communities contend with polluted air, poisoned waters, toxic soils, and degraded landscapes, which have been considered the costs of growing economies. In Medford, we have seen this pattern along the banks of the Mystic River, where leather tanneries and ship building in the 1800s, followed by chemical manufacturing and petroleum terminals in the 1900s, advanced the Greater Boston economy while also disposing untreated waste, heavy metals, and toxins into the Mystic River. Medford is still contending with the ongoing contamination of the Mystic River, in addition to flooding and rising temperatures associated with climate change.

Not everyone has been afforded access to the wealth generated by the country's economic growth, and the costs are just as inequitable. Air, soil, and water pollution, along with the impacts of climate change, are disproportionately borne by communities with lower political capital and financial resources to contest these hazards, namely Black, Indigenous, people of color, working class communities, and future generations. This pattern of unjustly displacing the costs of growth has in many ways enabled the climate crisis we face now. Addressing climate change therefore requires that we not only eliminate greenhouse gas emissions, but that we build just and equitable systems that restore and grow, rather than extract and diminish, the shared health and wealth of communities and ecosystems.



BANKS OF THE MYSTIC RIVER • IMAGE BY CALEB DRESSER

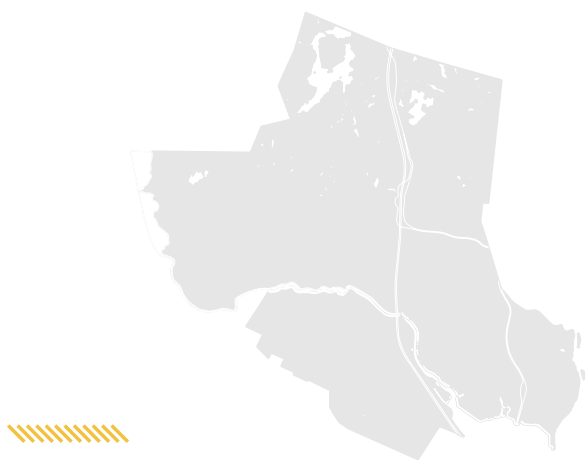
Addressing climate change requires that we not only eliminate greenhouse gas emissions, but that we build just and equitable systems that restore and grow, rather than extract and diminish, the shared health and wealth of communities and ecosystems.





BUILDINGS ABUTTING THE MYSTIC RIVER • IMAGE BY STEVE STRUMMER

In 2001, Medford became the first municipality in Massachusetts to develop a Climate Action Plan, calling attention to the risks associated with rising greenhouse gas emissions and committing to local climate leadership for a sustainable future.



Medford's first Climate Action Plan

In 2001, the International Panel on Climate Change (IPCC) reported a consensus among the scientific community that human activities were significantly changing the chemistry of the atmosphere, and had been since the early 1800s. That same year—alongside many other local governments as part of the ICLEI Cities for Climate Protection (CCP) Campaign—Medford became the first municipality in Massachusetts to develop a Climate Action Plan, calling attention to the risks associated with rising greenhouse gas emissions and committing to local climate leadership for a sustainable future. Medford's 2001 Climate Action Plan calculated the amount of greenhouse gas emissions generated by activity in Medford and mapped how the city can take action to use energy more efficiently and reduce the city's carbon footprint. Specifically, the 2001 Climate Action Plan set a goal to reduce municipal emissions by 20% and community-wide emissions by 10% from 1998 levels by 2010.

Over the past 20 years, Medford, Greater Boston, and Massachusetts have taken significant steps to increase energy efficiency, expand renewable energy, and support the growth of more sustainable communities. Medford met its goal to reduce municipal emissions 20% by 2010, and subsequently

What about Medford's community-wide emissions?

Have community-wide greenhouse gas emissions also decreased? After the initial citywide greenhouse gas emissions inventory in 2001, Medford did not calculate community-wide greenhouse gas emissions again until 2015. Medford now uses the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC) to calculate its emissions, which was developed in 2014. Although Medford's recent greenhouse gas inventories suggest that Medford has reduced community-wide emissions by roughly 30% since 1998 (the baseline in the 2001 inventory), we aren't effectively able to compare these results due to the different protocols. Between 2015 and 2019, community-wide greenhouse gas emissions have fluctuated, although limitations in data access have made it difficult to track trends; see page 58 for further details.

met two more municipal targets: 20% reduction in total municipal energy use from 2009 levels by 2014 (to achieve Green Communities status), and 20% reduction in building energy use per square foot from 2009 levels by 2020 (to accomplish the US Better Buildings Challenge). See the appendix for an overview of climate action in Medford between 2001 and 2021.

Yet despite progress in reducing energy consumption and greenhouse gas emissions, the urgency and our understanding of the scope of the problem have grown.



The need for transformational change

Yet despite progress in reducing energy consumption and greenhouse gas emissions, the urgency and our understanding of the scope of the problem have grown. In 2021, the IPCC released its 6th Climate Assessment reconfirming that a 2.0°C increase in global temperature (over pre-industrial levels) would have significantly more severe impacts than a 1.5°C increase, and that countries globally have less than a decade to change our emissions trajectory to stay within that lower threshold. Such a shift calls for rapid and significant transitions in energy, land use, transportation, buildings, and industry. As part of the Metro Mayors Coalition, Medford committed in 2017 to achieving net zero emissions by 2050. In 2021, through “An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy,” Massachusetts likewise committed to net zero emissions by 2050.

At the same time, we are already seeing the effects of climate change, and know the hazards will continue to grow even with drastic emissions reductions.

A temperature increase of 1-2°C — what’s the big deal?

An increase in temperature by 1-2°C may not seem significant, but small changes to average global temperatures can have major impacts on climate conditions. For example, during the last ice age, average temperatures were only around 5.6°C cooler than they are today. Any greenhouse gases we add to the atmosphere today will continue to drive increases in global temperatures decades from now.



FLOODING BEHIND CITY HALL • IMAGE BY CITY OF MEDFORD

Massachusetts is seeing hotter and drier summers, wetter winters and springs, and more intense storms: between 1958 and 2010, the amount of rainfall falling in the heaviest rain events increased by 70%.⁴ Sea levels off the coast of Massachusetts have risen eight inches since 1950, and the pace is accelerating—now rising at a rate of one inch per eight years for the past ten years.⁵

These changes bring new sources of vulnerability, including threats to our health and safety, strain on our economy, greater inequality, stress on our food systems and ecosystems, and higher risk of infrastructure failure. In 2019, Medford released its Climate Change Vulnerability Assessment, documenting the range of these risks.

The Climate Action and Adaptation Plan is therefore Medford’s plan to address these risks, and to change the systems that continue to undermine a healthy and sustainable future for all Medford residents.



The Climate Action and Adaptation Plan lays out the action Medford will take over the next five years, and the trajectory we'll take in the following decades, to minimize our carbon footprint, strengthen our city's resilience, and build a healthy and inclusive city for residents today and future generations.

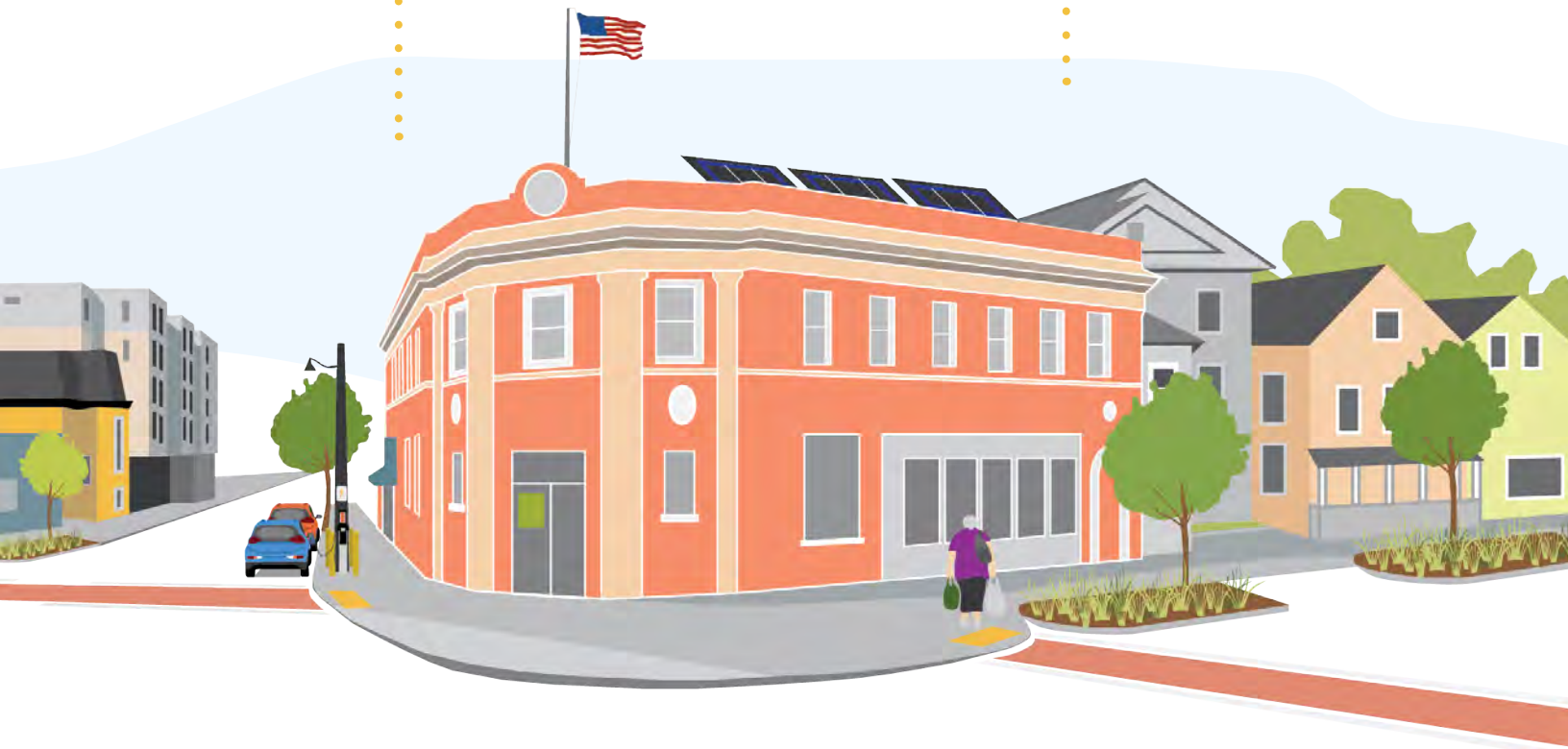


Committed to net zero carbon emissions by 2050

As part of the Metro Mayors Coalition, Medford committed in 2017 to achieving net zero emissions by 2050. In 2021, through “An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy,” Massachusetts likewise committed to net zero emissions by 2050.

What do we mean by “net zero” carbon emissions?

Activities such as clearing forests and burning fossil fuels release carbon dioxide into the atmosphere, while forests, wetlands, soils and other natural systems take carbon out of the atmosphere through carbon sequestration and storage. Currently, human activities are adding substantially more carbon dioxide into the atmosphere than can be removed by natural systems. “Net zero” carbon emissions means that we will nearly eliminate all carbon dioxide emissions from human activities, and any remaining emissions will be balanced by drawing an equivalent amount of carbon dioxide out of the atmosphere using natural systems.



Climate Change in Medford

Growing Climate Hazards

The Medford Climate Change Vulnerability Assessment documents the local effects of climate change that we are already seeing in Greater Boston and the changes we expect to see in the future—including hotter summers, more intense storms, rising sea levels, and more frequent flooding. The changes that we detect today are only indicators for the more significant changes that are projected to come. See the [Medford Climate Change Vulnerability Assessment](#) for more information.

February of 2015 when Medford received a record series of snowstorms.

Changes in precipitation and storm patterns

As the climate changes, warming ocean surface temperatures lead to higher levels of evaporation and greater moisture in the air—contributing to more precipitation and extreme weather events. By the end of the century, Medford is expected to see 3.5 more inches of precipitation per year, with much of that rain and snow coming during heavy storms, including blizzards, hurricanes, and nor'easters. With increasing storm intensity, more precipitation will fall in shorter periods of time, straining Medford's stormwater system and increasing the risk of flooding.

See pages 28-30 of the Medford Climate Change Vulnerability Assessment for more information.



SHOVELING SNOW • IMAGE FROM MEDFORD RESIDENT

Mayor Lungo-Koehn
and residents of 99
Riverside discussing
air conditioning
issues during July
2021 heat wave



HIGH HEAT DAY • IMAGE BY CITY OF MEDFORD

Changes in temperature

In Medford, average temperatures are expected to be 3°F warmer by 2030 and 3.5° - 9°F warmer by 2070. As temperatures increase, we will likely see more unseasonably hot days, record-breaking temperatures, and heat waves. The number of days we see above 90°F each year is predicted to increase from 11 days (the average in the 1990s) to around 30 days by 2030, and between 47 and 68 days above 90°F by 2070. Likewise, it used to be relatively rare to see a day over 100°F, but Medford will likely see between 6 and 16 days over 100°F per year by 2070. High heat can bring severe health risks.

See pages 19-25 of the Medford Climate Change Vulnerability Assessment for more information.

Changes in sea level

- Due in large part to melting ice sheets in the Arctic and changes in ocean circulation, sea levels off the coast of Massachusetts have risen eight inches since 1950, and the pace is accelerating—now rising at a rate of one inch per eight years for the past ten years. Climate Ready Boston projects that relative sea levels will increase 9 inches above 2013 levels by 2030, 21 inches by 2050, and 36 inches (three feet) by 2070. The Amelia Earhart Dam, which spans the Mystic River downstream from Medford, prevents the ocean tides from traveling upriver and protects Medford from sea level rise. However, by 2050, storm surge and precipitation from a 100-year storm in combination with sea level rise could overtop the dam, leading to flooding throughout a large part of Medford.

See pages 31-35 of the Medford Climate Change Vulnerability Assessment for more information.



AMELIA EARTHART DAM • IMAGE BY MAGIC PIANO

Climate Vulnerabilities

Vulnerabilities Enhanced by Climate Hazards

Climate hazards, such as heat waves and bigger storms, will exacerbate vulnerability in Medford and put strain on our infrastructure, ecosystems, and community health. Below are some of Medford's top concerns. The order in which they're listed has no bearing on their significance. See the [Medford Climate Change Vulnerability Assessment](#) for more information.

Transportation interruptions

Climate hazards can damage roads and rail lines, cause road closures, and delay or shut down public transit systems. The impact falls particularly hard on residents who rely on public transit to get to work, to grocery shop, or to get home from school, where transit interruptions can create serious financial, health, and safety risks.

Greater health risks

Climate change may increasingly take a toll on our physical and mental health, and potentially lead to higher rates of anxiety and depression. Climate change is expected to worsen air and water quality, increase our exposure to allergens and pathogens, and expand the risk of heat-related illnesses, such as heat stroke.

River and dam capacity

Heavy rain events, sea level rise, and storm surge will likely stress the capacity of the Amelia Earhart Dam which regulates water levels of the Mystic and its tributaries and blocks ocean tides from traveling upriver. Retrofits to the dam and allocating more room for the river to flood will be needed for reducing the risk of flooding along the Mystic, in South Medford, and in Wellington.

Housing insecurity

Housing affordability is already a pressing and growing challenge in Medford. High temperatures, flooding, and storms can damage houses and apartments, create unhealthy living conditions, and increase housing costs, thereby contributing to housing insecurity.



Stormwater system risks

Heavy precipitation can overwhelm the city's stormwater system, leading to flooding and large volumes of stormwater runoff. When stormwater systems are illegally connected to the city's sewer system, heavy rainfall can also lead to sanitary sewer overflows. All these outcomes degrade water quality and create health risks.

Stress on ecosystems

New diseases, pests, and invasive species can thrive in changing climate conditions and are beginning to threaten Medford's native ecosystems. Storms and temperature fluctuations can further damage the city's tree canopy. Warmer water temperatures and pollution that's carried into streams and rivers from stormwater runoff contribute to invasive aquatic species and toxic algal blooms.

Information access challenges

Not everyone in Medford has the same access to information, depending on age, languages spoken, social networks, or access to technology. The City has made it a priority to improve access to information, which will otherwise be a vulnerability in responding, adapting, and building resilience to climate hazards.

Power outages

Storms, flooding, and temperature extremes increase the likelihood of power outages, which can disrupt transportation, communication, and water systems; amplify health and safety risks; and create short- and long-term economic losses for businesses.

Food system vulnerability

One in nine Medford residents is already experiencing food insecurity; climate hazards can exacerbate insecurity by contributing to food loss, interruptions in food distribution, and challenges to food access. Droughts, floods, and pest outbreaks are also expected to affect food systems globally, and may lead to higher food prices locally.

Greater inequity

Racism and other forms of prejudice continue to shape who has access to high-paying jobs, quality education, political power, neighborhoods with amenities, and other resources. Being denied access to these resources creates social vulnerability, which amplifies the burden created by climate change, which then expands existing inequities.

.....

In order to build Medford's **community resilience**, we must strengthen systems, infrastructure, and relationships such that all residents have access to the resources and opportunities necessary to live healthy and fulfilling lives—both in an emergency and day-to-day. We must ensure our buildings and infrastructure systems can withstand or recover from climate hazards. And we will need to protect and expand the health of our ecosystems to reduce flooding, keep our neighborhoods cooler, support cleaner air and water, and to thrive despite climate stresses. See Section 2: Strategies and Actions for more details.

Medford's Greenhouse Gas Emissions

Medford emitted approximately 483,791 MTCO₂e of greenhouse gas emissions community-wide in 2019, which is roughly 8.4 MTCO₂e per person.



In 2015, Medford began using the Global Protocol for Community Greenhouse Gas Emissions Inventories (GPC) to annually track our greenhouse gas emissions. Medford's most recent greenhouse gas emissions inventory, completed in 2020, is for 2019. Medford emitted approximately 483,791 MTCO₂e of greenhouse gas emissions community-wide in 2019, roughly 8.4 MTCO₂e per person. It should be noted that due to limitations in data access, the transportation emissions data have remained constant in all inventories since 2015.

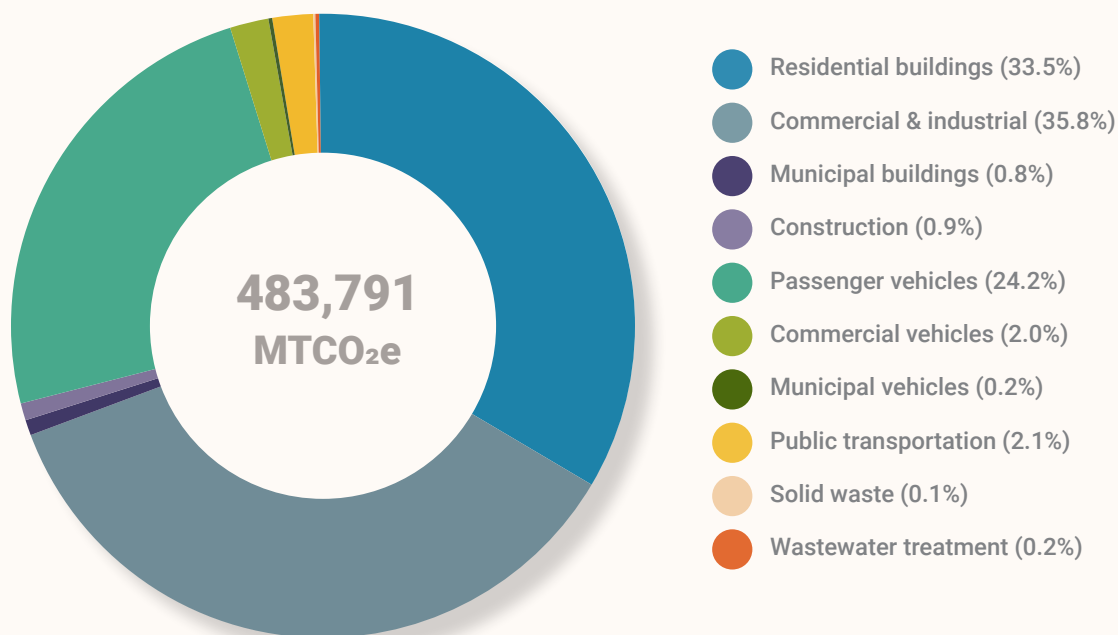
The use of electricity, natural gas, and fuel oil in buildings is the main driver of Medford's greenhouse gas footprint, accounting for over two thirds (71%) of our city's emissions. Nearly half of building emissions (33% of total emissions) come from residential buildings. Based on fuel source, 32% of emissions come from fuel oil, 43% from natural gas, and 25% from electricity. As we continue to expand the percentage of electricity generated by renewable energy, the greenhouse gas emissions associated with electricity generation will continue to decrease.

What is MTCO₂e?

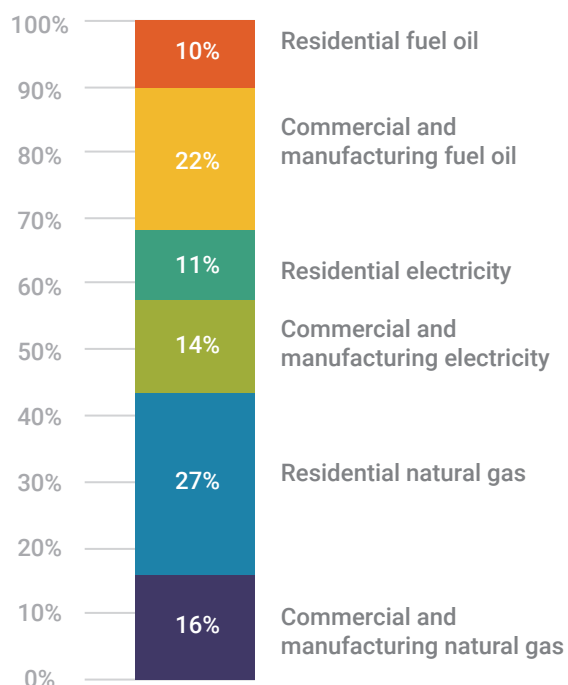
MTCO₂e is an abbreviation for "metric tons of carbon dioxide equivalents." Each greenhouse gas has a different capacity to trap heat, or "global warming potential." One molecule of methane, for example, has a much greater capacity to trap heat than one molecule of carbon dioxide. By expressing quantities of greenhouse gases in MTCO₂e, we are converting one metric ton of a greenhouse gas (such as methane) into the equivalent number of metric tons of carbon dioxide, based on their global warming potential, in order to compare and sum the emissions from various greenhouse gases.

Transportation within the city is responsible for roughly one third (29%) of Medford's emissions, with 95% of those emissions coming from on-road vehicles and 5% coming from the operation of the MBTA commuter rail and orange line in Medford. Less than 1% of Medford's emissions are produced from the incineration of solid waste and processing of wastewater.

Community Emissions By Sector



Building Emissions By Fuel Type



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In order to reach carbon neutrality in Medford, we will need to increase energy efficiency, expand renewable energy, and transition our buildings and transportation systems to run on electricity. We will need to support the design and development of walkable and transit-oriented neighborhoods to make it easier to travel in and around Medford without a private vehicle. And we will need to support the growth of a **circular economy** that reduces waste, creates new value from materials, and creates new economic opportunities for Medford residents in sustainable industries. Gaining access to better data will also be critical for modeling emissions reductions and tracking our progress towards carbon neutrality over time. See Section 2: Strategies and Actions for more details.

Developing this plan

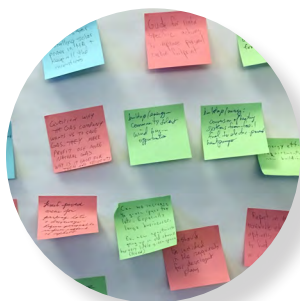


Building on past and ongoing initiatives

The Climate Action and Adaptation Plan (CAAP) builds on two decades of climate action in the city, including Medford's first Climate Action Plan developed in 2001, Medford's Local Energy Action Plan produced by MAPC in 2013, and annual greenhouse gas emissions tracking since 2015. The CAAP also draws on our growing understanding of climate vulnerability and what it will take to become a more resilient city, developed through the city's Municipal Vulnerability Preparedness workshops in 2018, the city's Climate Change Vulnerability Assessment published in 2019, and the first phase of the Resilient Medford Resilience Hubs process in 2020. Medford's ongoing work in open space planning, stormwater management, food security, housing affordability, community resilience, neighborhood walkability, and many other planning efforts also shaped the strategies; Medford's Climate Action and Adaptation Plan aligns with and builds on these many existing initiatives.

Setting the plan's vision and focus areas

Medford residents, organizations, businesses, and city staff guided the intentions for the Climate Action and Adaptation Plan. Through workshops (in-person and televised) and a survey shared online and through community events, Medford community members discussed climate vulnerability and the need for climate action, developed Medford's Climate Vision (see page 43), and identified key topic areas. This process established six core areas critical to climate action in Medford: Buildings & Energy, Ecosystems & Natural Environment, Public Health, Transportation, Social Equity, and Outreach & Education. The first four areas became the plan's focus areas. The remaining two areas—Social Equity and Outreach & Education—became cross-cutting focuses, since they were integral to how we approach the work across the other four focus areas.





Developing the strategies and actions

In winter 2019, residents and city staff formed four working groups to identify, draft, review, and iterate on a set of strategies for each of the four focus areas. In April 2020, the working group members, city staff, and additional interested community members continued to develop the strategies in an online Equity Workshop, hosted in partnership with All Aces, Inc., focusing on recognizing sources of inequity and achieving more equitable outcomes through climate action. Members of Medford's Haitian community also called attention to community needs and priorities at a community dinner hosted in Haitian Creole (originally part of a multilingual series, stopped short due to the pandemic). In spring 2021, the Outreach and Community Collaboration Working Group, made up of Medford residents of color and residents with lived experience with houselessness or financial insecurity in Medford, met over a series of meetings to highlight community priorities, add and revise strategies, and discuss ongoing processes for the City and community to collaborate in designing and implementing climate action. The actions in the plan are the direct result of these conversations.



Highlights from the process

Phase 1

Understanding climate vulnerabilities and existing climate action.

Phase 2

Defining the vision and focus areas for the Climate Action and Adaptation Plan.

Phase 3

Developing the Climate Action and Adaptation Plan strategies and actions.

Phase 4

Reviewing, revising, and launching the plan.

Phase 1

Community Climate Change Workshop

Community members came together at the Columbus Elementary School to discuss the findings from the Climate Change Vulnerability Assessment, community concerns, Medford's strengths, and ideas for building city resilience.

Visioning Survey

Community members provided ideas and input on the plan's vision and priority areas through the visioning survey, disseminated online and advertised in-person at community events.

City Staff Climate Change Workshop

City staff and regional stakeholders convened to discuss the findings from the Climate Change Vulnerability Assessment, and the need for various types of climate action across city operations and departments.

Tabling and Mobile Outreach

City of Medford interns and staff traveled to events and public community spaces to talk about climate change and to discuss with residents about their visions and goals for mitigating and adapting to climate change.

City and State-Level Staff Interviews

Interviews with over 20 city and state-level staff helped to catalogue existing and upcoming efforts across Medford's departments and state agencies to address climate change.

Phase 3

Focus Area Working Groups

Community members and city staff convened in four public working groups (one for each of the plan's focus areas). Over a series of meetings, the groups identified and developed climate strategies, drawing from the community input gathered to date.

Phase 2

Visioning Workshop

Community members and city staff joined a workshop to develop the plan's vision and identify priority focus areas. More community members tuned into the workshop by live broadcast on local television, and contributed ideas and language through an online survey.

Equity Workshop

The City in partnership with All Aces, Inc. hosted an online equity workshop, attended by working group members, city staff, and the public at large, to build a shared understanding and language around the ways that systemic racism continues to shape policy-making and to think critically about the plan's strategies to achieve more equitable outcomes.

Community Dinner

While the outbreak of the COVID pandemic halted the multilingual community dinner series, the City in partnership with Medford Family Network hosted one, small, outdoor dinner (following CDC restrictions) right before the weather turned frigid!

Outreach & Community Collaboration Working Group

The OCC Working Group focused on centering the voices and priorities of residents from Medford's Haitian, Arab, Asian, and Latinx communities, as well as residents with lived experience facing houselessness and/or financial insecurity in Medford.

Phase 4

Community Review

[Placeholder to discuss the community review process]

CAAP Launch

[Placeholder to include mention of the launch.]

Just the beginning: collaborative processes for implementation

Each action in this plan is only a seed; the upcoming years will require further collaborative work to develop the details of each project, program, or policy, and the processes for how they will be implemented. Advancing the plan's actions will need the ongoing input, insight, and participation of the whole Medford community, guided in particular by the experiences of Medford residents who will be disproportionately impacted by climate change. Medford's Climate Equity Council (see overarching action 1.A) will be one structure to support this ongoing collaboration.

02

Medford Climate Action
and Adaptation Plan

Strategies & Actions



Overview

The following pages outline how Medford will invest in an equitable, just, healthy, resilient, and carbon neutral future for today’s residents and future generations.

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This section starts with Medford’s commitment to climate equity and how that commitment shapes the strategies and how we will implement them.

It then covers the strategies, starting with one overarching strategy related to the plan’s next steps for implementation.

The rest of the plan's strategies fall across four focus areas: Buildings & Energy, Ecosystems & Natural Environment, Public Health, and Transportation.

Roadmap





The difference between equality, equity, and justice.

Equity is not equality. While equality emphasizes equal treatment, equity recognizes that individuals and communities face unequal challenges that deserve different levels of support in order to make the outcomes fair. Equity responds to people's different needs by prioritizing actions that reduce risk and harm for communities facing social, economic, political, and environmental injustices. Justice refers to fixing the system (and correcting for past injustice) to offer equal access to both tools and opportunity. See page 68 for more details.



Commitment to Climate Equity

Equitable and just action to address climate change is critical to creating a healthier, more sustainable, and resilient Medford.

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How do equity and justice relate to climate change?

Climate change presents the greatest threat to communities already experiencing deep-rooted **structural inequity**, including low-income communities and Black, Indigenous, and communities of color. Structural inequity occurs when organizations, government systems, or social systems intentionally or unintentionally operate in a biased way, providing advantages for some people and marginalizing or disadvantaging others. It persists when corrective action to restore justice is not taken.

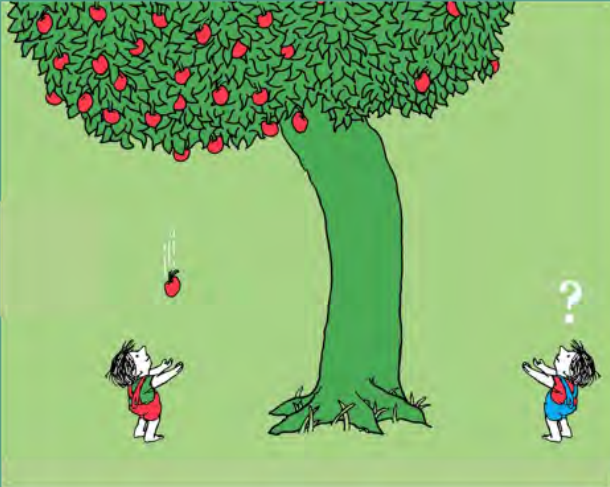
The term **“frontline communities”** acknowledges that—due to structural inequity—low-income communities and Black, Indigenous, and communities of color are often living and working at the frontlines

What do we mean by “frontline community?”

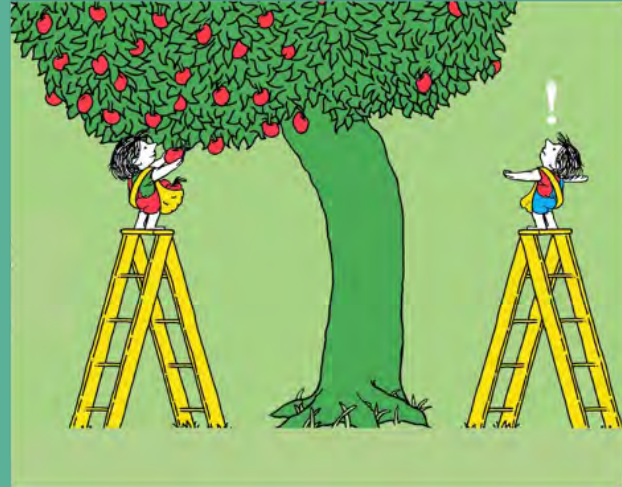
The term “frontline communities” refers to the fact that **low-income communities and Black, Indigenous, and communities of color are often subjected to the first and worst impacts of pollution and climate change because of existing inequities.**

against the “first and worst” impacts of pollution and climate change with fewer resources to respond. Conversely, those who have benefited most from traditional systems have a higher capacity to protect themselves from climate impacts. As the impacts of climate change accumulate, so does the urgency of addressing these equity challenges.

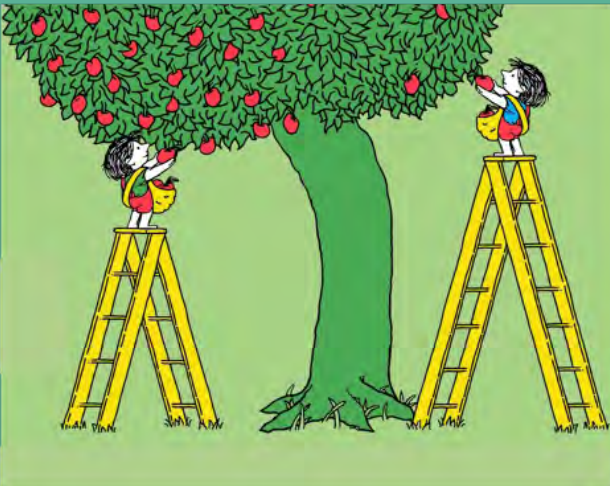
The difference between equality, equity, and justice



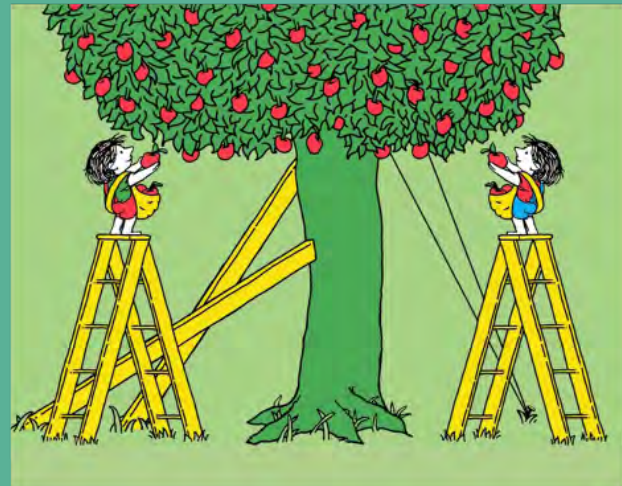
Inequality - unequal access to opportunities



Equality - evenly distributed tools and resources



Equity - custom tools that identify and address inequity



Justice - fixing the system to offer equal access to both tools and opportunity

.....

Without a deliberate focus on just and equitable strategies, the policies and programs Medford implements to address climate change could exacerbate inequity. Below are four examples across our four focus areas to consider:

Buildings & Energy

Solar campaigns and technical assistance programs are helping residents across the United States to install solar panels on their homes. Yet research shows that rooftop solar is not reaching low income communities and communities of color at the same rate, potentially due to lower rates of home ownership, lower median income or access to credit, or social capital (“who you know”).⁶ Consequently, wealthier and white communities, which already tend to face fewer environmental health hazards than low-income communities and communities of color, benefit even more from the environmental benefits of solar panels and the associated cost savings on their utility bills. To consciously counteract this pattern, we must design programs to prioritize equitable access.

See strategy BE 3.1 for how Medford plans to address this challenge.

Ecosystems & Natural Environment

Cities are focusing on the growth of their urban forests because of the incredible benefits trees provide in mitigating climate risks and supporting health. Yet due to a long history of discriminatory housing practices, segregation, and disinvestment, neighborhoods in the United States are highly segregated by race and income, and neighborhoods with more white residents, homeowners, and higher income residents tend to have much more robust tree canopies than neighborhoods with more residents of color, renters, or lower income residents.⁷ Without actively working towards neighborhood-specific tree planting goals, city tree planting programs can exacerbate existing inequities by accelerating tree planting where it’s most convenient—such as along streets already designed for street trees—rather than where they are most needed. At the same time, “greening” neighborhoods can also increase property values and lead to housing insecurity and community displacement. Therefore efforts to expand the urban tree canopy must support community-defined priorities at a neighborhood level and be paired with policy to protect housing affordability.

See strategy EN 1.1 for how Medford plans to address this challenge.



Public Health

Municipalities across the United States are establishing public cooling shelters in response to the increasing severity and frequency of heat waves. However, research shows that many of these cooling shelters are often difficult to access (not at a walkable distance and/or difficult to reach with public transportation) for communities without private access to cooling measures. This convergence of inaccessibility often coincides with Black, Indigenous, communities of color, low-income communities, and senior communities. As such, these cooling shelters, and similar protection programs, will continue to miss the communities they are designed to support until we include the communities who are intended to use them and prioritize equitable access to health protection resources.

See strategy PH 1.2 for how Medford plans to address this challenge.



Transportation

Many federal, state, and local governments offer tax credits and/or rebates for buying an electric vehicle (EV) to decrease the cost and encourage more people to buy EVs. The majority of rebates and tax credits, however, only benefit people above a particular income threshold who can purchase a new vehicle. Residents who don't have a driveway or don't own their home are also less able to install an EV charger. Consequently, wealthier homeowners are better able to benefit from the program incentives and the long-term cost and air quality benefits of owning an EV. If cities focus solely on transitioning to electric

vehicles—without also prioritizing investments in safe, easy, and sustainable public transportation—city investments will continue to favor people for whom car ownership is an option, while disadvantaging residents who are unable to own or drive a car due to age, disability, or income.

See strategy T 1.2 and T 2.2 for how Medford plans to address these challenges.



Ensuring that all Medford residents have the opportunity to live healthy, happy, and prosperous lives in Medford for generations to come requires that policies and programs in Medford contribute to a more equitable and just city. Committing to climate equity requires that decision-making processes prioritize and center the experiences of community members who have traditionally been underrepresented in planning processes and who will be most affected by climate change. It means that we seek to dismantle the structures that create, maintain, and uphold environmental and climate injustice, and actively work to design and implement anti-racist policies. It means that we work to provide all people—regardless of where they are starting from—with the resources and infrastructure to achieve their potential. In doing so, everyone benefits from a more just and equitable city.

4 Guiding Principles for Climate Equity in Medford

Below are four guiding principles for ensuring that programs, projects, and policies advance climate equity in Medford. These principles shaped the development of the objectives, strategies, and actions in the Climate Action and Adaptation Plan, and have the opportunity to continue to shape the plan’s implementation.



Oftentimes, the ability of the strategies to advance climate equity goals depends most on how they are implemented. The Climate Equity Implementation Framework (see the appendix) includes a set of questions for each guiding principle to steer implementation of the plan in ways that advance climate equity.

1. Cultivate Belonging and Diversity

Cultivating belonging and diversity means that programs, projects, and policies help to ensure that all Medford residents—regardless of race or ethnicity, income, gender identity, sexual orientation, accessibility needs, English proficiency, age, religion, background, or how long they’ve lived in Medford—feel they belong here in Medford. By cultivating belonging and diversity, residents see themselves in the history and current stories celebrated in Medford, whether through school curricula, public art, names of parks, or awards and recognition. With this cultivation, Medford residents feel represented by public officials, feel respected and validated at public meetings, and feel that they have the resources and support to become Medford’s next decision-makers. Acting on this principle requires us, as a city and community, to reckon with how governance and local culture continue to reinforce implicit biases and assumptions about who is a “Medford resident,” which limits who feels welcome in helping to shape Medford’s future. Cultivating belonging and diversity is the first step in ensuring everyone has a voice in creating a sustainable and resilient future for all residents.

2. Create Equitable Access to Resources and Communication

Creating equitable access to resources and communication means that climate programs, projects, and policies allocate available resources equitably, prioritizing communities who will be most affected by climate change. Doing so helps to ensure that all residents—regardless of race or ethnicity, income, gender identity, sexual orientation, accessibility needs, English proficiency, age, religion, background, or how long they’ve lived in Medford—have the resources to achieve their potential and to lead healthy and fulfilling lives. Resources can include programs, information, tools, and opportunities, ranging from sustainable transportation options, to quality healthcare, to ways to save money on utilities. Communication refers to the many ways we share and learn about these resources. Equitable communication could look like adapting Medford’s resources to reflect the diverse languages spoken by Medford residents, above and beyond English, or by providing interpretation services so that every Medford resident can have their voice heard. By acting on this principle, the city is committing to building its cultural competency and breaking down communication and information barriers, such that all residents are able to benefit from our city’s climate investments.

3. Facilitate Inclusive Decision-Making

Facilitating inclusive decision-making means that Medford organizations, residents, and the city work in partnership to address the climate crisis: Decisions are made in ways that draw on community members’ lived experiences, that defer to community members who

have been historically underrepresented in planning processes, and that involve community members who will be most affected by climate change. Processes that facilitate inclusive decision-making shift the relationship from “city as lead problem-solver” to “city as collaborator” in supporting community-centered and community-led solutions, particularly for solutions that will advance climate equity. Acting on this principle in the implementation of the CAAP will mean that the city seeks ongoing opportunities for democratic participation, community ownership of projects, and community partnerships to determine the most effective ways to design a program, implement a policy, or share information.

4. Design and Implement Anti-Racist Policies

Designing and implementing anti-racist policies means that Medford adopts policies that acknowledge racial injustice, that amend existing racial disparities, and that prevent future harms to Black, Indigenous, and People of Color within institutions and social, economic, and political systems. When policies aim to ameliorate all forms of social inequality (for example, as it applies to income, age, ability, gender, and other factors), policies can often neglect the role racism plays in making race the greatest predictor of social disparities. To become an equitable city it will be important for Medford’s climate projects, programs, and policies to be explicitly anti-racist while addressing equity in all forms. Anti-racist climate policies reduce the disproportionate burden created by climate change on Black, Indigenous, and People of Color, and ensure that benefits from climate action are shared equitably regardless of race. Accountability mechanisms in anti-racist policies ensure that all policies are continuously improved to center equity and social justice.



These principles were
used in the design, and
will continue to guide the
implementation of the
Medford Climate Action
and Adaptation Plan

Strategies & Actions



Overarching Strategy 1

Continue to advance the ongoing implementation of the plan in ways that are collaborative, equitable, and data-driven.

What's useful to know

Medford's Climate Action and Adaptation plan puts forth an ambitious set of actions for working towards an equitable, just, resilient, healthy, and carbon neutral city immediately and over the next ten years. The following three actions relate to overarching components for implementation to ensure the ongoing process is collaborative, equitable, and data-driven, and ultimately accountable to our climate goals.

Actions

OV 1.A

Create a Climate Equity Council.

Create a Climate Equity Council composed of and led by Medford residents from **frontline communities**, namely low-income communities and Black, Indigenous, and communities of color, with the acknowledgment that due to long-standing **structural inequities**, frontline communities are most likely to experience the first and worst effects of climate change. Medford has long had an Energy and Environment Committee that provides the City

with technical expertise on specific energy and environmental topics. The Climate Equity Council will bring additional and critical lived expertise, as well as technical expertise, to advise the ongoing development and implementation of equitable climate mitigation and adaptation programs and policies in Medford.

OV 1.B

Use the Climate Equity Framework to guide implementation.

Use the Climate Equity Implementation Framework, included as an appendix in the Climate Action and Adaptation Plan, to guide the development and implementation of the plan's actions in ways that are consistent with the City's climate equity goals.

OV 1.C

Model greenhouse gas emissions to forecast and evaluate progress.

Complete greenhouse gas emissions modeling to further inform the pace of implementation and scale

of adoption that will be needed for the City to meet targeted benchmarks in greenhouse gas emissions reductions over time. Work with state and regional partners to improve emissions and transportation data to inform this modeling.

ALSO:

See strategy PH 2.1, which focuses on strengthening Medford’s community health, wellbeing, and resilience through equitable processes. These actions will apply across all areas of the plan’s implementation, too.

ALSO:

See strategy T 1.1, which involves advocating for better statewide transportation data which will support the greenhouse gas emissions modeling.

BE

Buildings & Energy



Medford's buildings are the "building blocks" of our community. They shape our neighborhoods and create our homes, businesses, schools, offices, places of worship, and community spaces. Even so, these buildings currently don't meet the collective needs of Medford residents and in some cases, they're failing to support a just and sustainable future.

Renting or owning a home in Medford is becoming increasingly unaffordable. It's harder to find a home that fits the needs of raising a family, being a student, or aging-in-place. Many of Medford's older buildings are drafty and inefficient, and the energy we use in buildings is

Medford is working to ensure all Medford residents have access to homes, workplaces, schools, and other spaces that support the health and resilience of our community and planet.

contributing to two-thirds of the greenhouse gas emissions generated in Medford.

As the climate changes, we will increasingly need buildings that keep people cool in the summer, warm in the winter, and protected during a storm. We need reliable and renewable sources of energy to power those buildings and businesses, in order to mitigate climate change while also creating financial savings and economic opportunity for Medford residents. These goals require that we upgrade existing buildings and our way of constructing new buildings to ensure Medford's neighborhoods can be affordable, resilient, and low-carbon for current residents and future generations.

Generally speaking, there are three major steps for reducing and nearly eliminating greenhouse gas emissions from buildings and the energy sector: 1) Ensure that buildings use energy as efficiently as possible; 2) Transition building systems (systems that use energy for heating, cooling, cooking, etc.) to electric systems; and 3) Expand renewable energy such that all electricity comes from renewable sources as soon as possible. In some particular instances (such as for certain industrial processes) it is not as viable to run operations on electricity; in these specific cases, low-carbon fuel sources such as biofuels will need to increasingly meet this demand.

In addition to reducing emissions, the Buildings and Energy section focuses on increasing the resilience of buildings and energy systems—in other words, ensuring that buildings and energy systems can continue to operate effectively with growing climate hazards, such as more intense storms, sea level rise, and higher temperatures. Energy efficient design, ensuring that buildings maintain comfortable temperatures even in a power outage, design strategies to keep indoor spaces cooler during periods of high heat, and flood resilient design will all be integral to designing more resilient buildings.

Secure, stable, and healthy housing that meets the needs of residents of all ages, all family sizes, and all income levels is fundamental to a sustainable and resilient future, and to addressing climate change. Resilient and energy efficient buildings that are run on renewable energy must be affordable and attainable for all Medford residents such that everyone has access to the economic, environmental, and health benefits these buildings provide.

Objective BE1: Champion new buildings and redevelopment that make Medford a more affordable, resilient, and low-carbon city.

Medford's Housing Production Plan (2021) documents the need for new buildings—specifically new housing—in Medford. Currently one-third of residents are burdened by housing costs, meaning more than 30% of household income goes towards housing and utilities. Secure and affordable housing is a prerequisite for Medford to be a resilient city, including diverse housing that meets residents' needs, regardless of income, age, household size, or accessibility requirements. If that new housing, and particularly affordable housing, is also energy efficient, resilient, and low carbon, we decrease our carbon footprint as a city, create utility cost savings for residents, build **community resilience**, and expand who has access to the environmental, economic, and health benefits of higher performance buildings.

Years of data now show that **high performance buildings** that meet sustainability and resilience goals can be constructed cost-competitively with conventional lower-performance buildings. In fact, Boston recently completed a study that showed that Boston's Department of Neighborhood Development could cost-effectively achieve **carbon neutrality** for all new affordable housing construction. The same study found that the increase in cost for constructing zero emission buildings in the Boston area tends to be less than 2.5% before incentives and rebates; when accounting for currently available incentives and rebates, zero emissions buildings are less expensive to build, and are also less expensive to operate over the long-term.⁸



RENDERING OF THE NEW MEDFORD PUBLIC LIBRARY • IMAGE BY SCHWARTZ/SILVER ARCHITECTS

A **net zero energy building** is a highly energy efficient building that produces as much renewable energy on site each year as the building's total annual energy usage. If the building produces more renewable energy on site than it consumes (through solar power, for example) it is often referred to as a net-positive energy building. A Passive House building (certified under Passive House Institute US or PHIUS) is also a highly energy efficient building that uses specific design principles to keep indoor temperatures comfortable in all seasons while minimizing energy use to meet strict limits. Due to the control of heat and energy loss, Passive House buildings are particularly resilient, allowing occupants to shelter in place safely and comfortably even through extreme events, such as power outages. All types of buildings,

ranging from single-family and multi-family homes, to low-rise commercial buildings, to skyscrapers can be built to net zero energy and passive house standards.

Strategy BE 1.1.

Expand diverse housing options in Medford to meet the needs of all ages, all family sizes, all abilities, and all income levels.

What's useful to know

Over the past decade, owning or renting a home in Medford has become less affordable. The median rent in Medford was \$2,300 in 2019, which is \$500 per month above what would be affordable for an individual earning the median income among renters.⁹ Likewise, the median sales price for a single family home was around \$565,000 in 2019, which is \$280,000 higher than what a household earning the median income could afford. As residents pay more of their income toward housing, it creates financial insecurity, reduces disposable income, and makes families more vulnerable to emergencies with unexpected costs.

If this trend continues, many long-term Medford residents will no longer be able to afford to live in the city, and the lack of affordability will also limit new residents who can call Medford home. This financial burden and the displacement it creates erodes our community resilience. By contrast, homes that are affordable and accessible—for big and small households, at all stages of life, and all income levels—play an essential role in making sure all residents have the resources they need to thrive in Medford.

In order to be a resilient city, we must recognize and undo discriminatory patterns that have created, and continue to create, vulnerability for households and communities.

Fair access to housing (or “fair housing choice”) is integral to this goal. Discrimination and segregation are deeply ingrained in the history of housing policy in the United States, including Medford’s.¹⁰ Policies that have restricted access to housing on the basis of race, particularly for Black families—through exclusionary zoning laws, discriminatory real estate practices, and predatory lending, for example—have long been used as tools to perpetuate segregation, leading to unequal access to resources and opportunities, constricted opportunities for wealth accumulation via homeownership, and large socioeconomic disparities. In other words, the legacies of racist housing policies and practices, and how they are unintentionally or covertly perpetuated today, have played a primary role in engendering social vulnerability, and therefore climate vulnerability.

We will not be able to achieve a future where all Medford residents have access to resilient, carbon neutral, and affordable housing without dismantling the barriers to accessing housing. And we will be ultimately unsuccessful at building our collective resilience as a city unless we recognize and undo the discriminatory patterns that have created, and continue to create, vulnerability for households and communities.

In 2019, Medford adopted an inclusionary housing policy to encourage the development of quality affordable housing. The inclusionary zoning ordinance requires all new developments with ten or more housing units to make a portion of the units affordable: 10% for ten-unit developments up to 15% for 50 or more units. This policy is one step of many in expanding diverse and affordable housing options in Medford.

Medford's Housing Production Plan (2021) outlines a roadmap for expanding the mix of housing choices in Medford to become an increasingly welcoming, diverse, intergenerational, and inclusive city. In particular, the Housing Production Plan sets a goal to create 600 new subsidized homes¹¹ by 2025 through new construction, redevelopment, or rehabilitation of existing buildings. It also seeks to address the gap in the number of smaller units in the city, which can support affordability and better meet the needs of students and older adults. The actions below are in alignment with and/or build on the steps outlined in the city's Housing Production Plan. Through supporting higher density and walkable neighborhoods, these actions also support our carbon mitigation goals.

Actions

BE 1.1.A

Reduce zoning barriers to multifamily and mixed-use housing development.

In developing Medford's Comprehensive Plan, update zoning codes in districts that already permit multifamily and/or **mixed-use development** to create more flexible density and dimensional standards, reduce parking requirements, and/or mitigate other zoning barriers that currently hinder multifamily and mixed-use (re)development opportunities, particularly for affordable housing. Develop a community-driven vision for expanding multifamily and mixed-use development along specific transit-oriented corridors and areas including Mystic Ave, Wellington Station Area, Boston Ave/Ball Square, Medford Square, and West Medford Square, and rezone to allow these uses where needed. This action should be implemented in alignment with action T 1.4.A (encourage mixed-use development) and T 1.4.F (update parking requirements).

BE 1.1.B

Enable smaller and more diverse housing options through zoning updates.

Update zoning codes to enable smaller and diverse housing options, particularly in single-family zoning districts. Allow **accessory dwelling units (ADUs)** by right (without need for special review or approval) in all residential districts. Identify certain circumstances to allow the conversion of large single-family homes into two or more units to support historic preservation, smaller housing units, and/or specifically affordable housing.

BE 1.1.C

Establish a Municipal Affordable Housing Trust.

Establish a Municipal Affordable Housing Trust (MAHT) that would allow the City to collect funds for local initiatives to create and protect affordable housing. A MAHT can also acquire, sell, or lease property to support affordable housing goals.

What's an accessory dwelling unit (ADU)?

An accessory dwelling unit (ADU) is a second smaller home on the same lot as a single-family house that creates additional housing options without necessarily changing the building footprint or the built character of a residential neighborhood. ADUs can be located within the main house, such as a basement apartment, or in a separate outbuilding, such as a backyard cottage or an apartment above a garage. ADUs increase the number of small rental units integrated throughout neighborhoods, make existing homes more affordable by providing a source of rental income, and help older adults stay in their homes as they age. ADUs can also foster supportive and multi-generational living environments by enabling more flexible ways for family members, such as a parent or grandparent, to live nearby.

BE 1.1.D

Foster affordable infill development.

Permit infill development for affordable deed-restricted single-family housing on small vacant lots that currently fall below minimum lot size thresholds in single-family housing districts. There are currently 550 vacant lots that meet this description, a portion of which could be used for affordable infill development. For lots that are City-owned, transfer to the Municipal Affordable Housing Trust (see action III) to facilitate the development of affordable housing by mission-based developers.

BE 1.1.E

Protect and continue to advance fair housing choice.

Conduct an updated Analysis of Impediments for Fair Housing Choice (AI) to identify barriers to fair housing, such as discriminatory or predatory practices, and actions to address, reduce, and eliminate those barriers. Track and report progress over time by updating the analysis every three to five years. Hire project consultants and project advisors that bring lived experience.

BE 1.1.F

Support community efforts to create a Community Land Trust.

Support community efforts to create a **Community Land Trust** that could contribute to the creation and protection of affordable housing options. Municipal support for CLTs can take the form of policy commitments, enabling legislation, administrative resources, funding, land transfers, or other approaches depending on community needs.

BE 1.1.G

Conduct a displacement risk assessment.

Work with neighboring universities and community groups to evaluate changes in demographics and property values in Medford's neighborhoods, susceptibility to gentrification, and risk of displacement for Medford communities due to rising cost of living. Use this information in a wider community process to evaluate and identify anti-displacement approaches and to tailor housing assistance to neighborhood needs.

ALSO:

See strategy BE 2.3, which includes efforts to integrate information on energy efficiency and building resilience strategies into first-time homebuyer courses, while also expanding promotion and funding for those programs to make resources (including down payment and closing cost assistance) available to more residents.

Relevant Precedents

- See [case studies](#) in "Community Land Trusts" by Local Housing Solutions.
- See [case studies](#) in "Where is Gentrification Happening in Your City? Using Mapping to Understand Gentrification and Prevent Displacement" by Data-Smart City Solutions.
- See ["Gentrification and Neighborhood Change: Helpful Tools for Communities"](#) by the University of Illinois at Chicago.

What's a community land trust (CLT)?

A community land trust (CLT) is a community-run, nonprofit landholding organization that helps to enable affordable homeownership and preserve the affordability of those homes over the long term. CLTs are governed by a board made up of community members, including CLT homebuyers and renters and public representatives, designed to ensure community-held decision-making around building shared wealth and protecting the affordability of a neighborhood or city. In the most common CLT model, the CLT retains ownership of a parcel of land, while an individual or family purchases the home and leases the land from the CLT in a long-term (often 99-year), renewable lease. This arrangement makes homeownership more affordable since buyers purchase only the home and not the land. The homebuyer agrees to resell the home at a price that will be affordable to limited-income buyers, which keeps the home affordable in perpetuity. The homeowner is also able to build some equity through appreciation of the home in a shared equity model, as well as establish credit and financial stability. CLTs can also serve renters through long-term leases protected from price increases.

Strategy BE 1.2.

Update Medford's zoning codes and the development review process to encourage highly energy efficient, resilient, and low-carbon new construction.

What's useful to know

Building standards are set at the state level through the Massachusetts State Building Code, and municipalities do not have the legal authority to require stricter building standards. Nevertheless, cities and towns in Massachusetts can regulate land and building use through the local zoning code in order to protect the health, safety, and welfare of their constituents, including measures that mitigate climate change and reduce risk from climate hazards. Municipalities can also offer incentives through zoning and the development review process to encourage the development of buildings that exceed minimum requirements in the state building code.

Zoning code requirements or incentives may encourage projects above a certain size or within a specific district to achieve greater energy efficiency, lower water usage, use renewable energy and storage, apply passive survivability standards, or integrate other features to promote building resilience and sustainability. Oftentimes, this is most easily accomplished by requiring or incentivizing new developments to meet existing certifications such as the Energy Star Zero Energy Ready Homes; Zero Energy Certification from the International Living

Future Institute (ILFI); PHIUS+ from Passive House Institute US; or LEED Gold or LEED Platinum from the U.S. Green Building Council.

Boston, Cambridge, and Somerville, for example, require that large development projects over a designated square footage or those eligible for site plan review meet certain environmental performance requirements in order to minimize negative environmental impacts, promote the sustainability and climate resilience of the cities, and ensure quality of life for current and future residents. Eligible projects must meet performance thresholds based on the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) rating systems. Somerville also requires that any new development in the city's Master Planned Development overlay district meet Zero Carbon or higher from the International Living Future Institute; or PHIUS+ from the Passive House Institute US, unless it's a lab building which must meet LEED Platinum standards.

To encourage energy efficient and resilient buildings for a wider range of new construction projects, many jurisdictions are also beginning to offer incentives such

as density bonuses for projects that meet exceptional performance standards such as for net zero energy, net zero energy ready, or certified passive house buildings.

Actions

BE 1.2.A

Adopt environmental performance standards for large projects.

Update Medford zoning ordinances to require that eligible new development projects (such as buildings over a certain square footage, buildings requesting zoning variances, and/or buildings receiving public funding) meet bold environmental performance standards (such as Passive House, Zero Carbon, or LEED Platinum certifiable). Consider offering more than one pathway in order to provide developers more flexibility in meeting the City's goals.

BE 1.2.B

Offer incentives for exceptional energy performance.

Offer incentives through the zoning or development review process, such as density bonuses, reduced building permit fees, or streamlined development review processes, for new construction that meets exceptional energy performance such as all-electric net zero energy or certified Passive House buildings.

BE 1.2.C

Expand staff capacity to oversee building performance standards.

Provide regular training for city staff on high performance building certification requirements, reviewing energy models, and enforcing building energy codes. Increase staffing as necessary to provide increased scrutiny on these items.

ALSO:

See [strategy EN 1.2](#) for updates to city code and development review process to improve stormwater management and heat resilience in new construction.

ALSO:

See [strategy PH 1.1](#) for revisions to the development review process that will incentivize new developments to integrate features—including resilience features—in order to meet a “healthy neighborhoods score.”

Relevant Precedents

- See [LEED requirements for large developments in Somerville, Boston, and Cambridge](#).
- See [Somerville requirements for PHIUS+ or Zero Carbon \(ILFI\) within the Master Plan Development Overlay district](#).
- See [Bellevue, WA city code](#), which offers additional floor area ratio (FAR) building incentives to developers that achieve various tiers in energy performance.

Strategy BE 1.3

Require flood resilient design for new development that could see high flood risk.

What's useful to know

With climate change, flooding will become an increasing risk in Medford. The combined effects of heavier rainfall, storm surge, and sea level rise make it more challenging to simultaneously manage large volumes of water draining through the watershed, swelling the Mystic and Malden rivers, and coming in from Boston Harbor. Larger storms and heavier rainfall can overwhelm the city's drainage system, creating flooding in Medford's neighborhoods and streets. The Amelia Earhart Dam, which spans the Mystic River just downstream of Medford, currently prevents the ocean tides from traveling up river, yet the combined effects of storm surge and sea level rise may overtop the dam as early as 2050, causing significant flooding in parts of Medford. As part of the Resilient Mystic Collaborative, the City of Medford is currently assessing infrastructure projects to mitigate coastal flood risk. Even with these infrastructure projects, it will be important for new development in the city to account for best known flood risk to design for, protect against, and recover from flood events.

Establishing resilient building standards for new development can help new development mitigate flood risk. Boston adopted Coastal Flood Resilience Design Guidelines in 2019, which provide developers, business owners, and residents a clear set of standards and

best practices for designing properties to withstand or recover from coastal flooding. Boston is in the process of adopting a resilience overlay district which will delineate areas of the city that are vulnerable to coastal flooding over the long-term (accounting for sea level rise and storm surge projections through 2070 - 2100). All development projects within the overlay district that are subject to Boston's Article 80 Small and Large Project Review will be required to undergo Resilience Review and meet the Coastal Flood Resilience Design Guidelines. The City of Cambridge is likewise updating its zoning codes to require new development to meet resilience design standards based on "long-term flood elevations" in the city. The long-term flood elevations are delineated in the City's FloodViewer, an online map platform, and are based on modeling of riverine flooding, localized flooding, and flooding from sea level rise and storm surge in 2070.

It will be important for the City of Medford to ensure that new buildings prepare for the combined effects of coastal, riverine, and localized flooding for at least fifty years into the future, as most buildings built today are designed to last fifty years. It will likewise be important that the City's zoning requirements provide a mechanism for the flood elevations and boundaries to be updated regularly as knowledge of flood risk evolves.

Actions

BE 1.3.A

Develop an online flood viewer to delineate areas with increasing flood risk.

Develop an online flood viewer that delineates areas of the city that are expected to see increasing flood risk due to the combined effects of heavier precipitation, sea level rise, and storm surge. Identify long-term flood elevations (i.e., modeled for a year at least fifty years in the future) to account for the typical lifespan of buildings built today. Establish mechanisms to update the flood viewer at regular intervals to account for new data or changes in flood risk.

BE 1.3.B

Update flood resilience building guidelines.

Update and further develop building design guidelines for new development for mitigating flood risk, including specifications for elevating and/or flood-proofing ground floors, basements, and critical building systems. The building guidelines will provide developers and project owners with a set of best practices and will serve as a basis for the development review process for new construction in areas with elevated flood risk. Starting at a specified date, new development within areas with high flood risk as specified by the City's flood viewer (see action 1.3.A) will be required to meet flood resilience building guidelines.

BE 1.3.C

Incentivize higher density in upland areas.

As part of Medford's Comprehensive Master Planning Process, identify areas that may be suitable for higher density development based on higher elevation and reduced flood risk. Consider updating zoning regulations to alleviate barriers or incentivize higher density mixed-use development in those locations. Prioritize areas in proximity to public transit connections (see strategy T 1.4), and ensure new development policies are paired with efforts to mitigate gentrification risk (see strategy BE 1.1).

ALSO:

See strategy EN 1.2 for updates to city codes and development review process to improve stormwater management in new construction.

ALSO:

See objective EN 2 for strategies to reduce localized and coastal flooding through green and gray infrastructure.

Relevant Precedents

- See Boston, MA [Coastal Flood Resilience Design Guidelines](#).
- See Cambridge, MA [FloodViewer](#) which will help guide flood resilient building requirements for new construction.

Strategy BE 1.4.

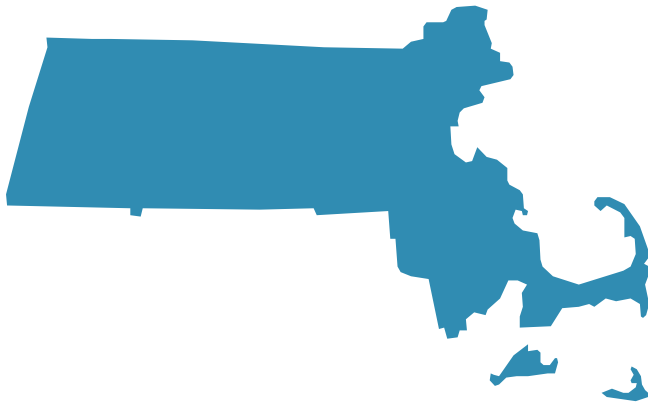
Continue to advocate for a Massachusetts Stretch Energy Code that will put cities and towns on pace to meet net zero emissions by 2050.

What's useful to know

In Massachusetts, building standards are determined at the state level through the Massachusetts State Building Code, and are updated every three years to align with the most recent International Energy Conservation Code (IECC). Over a decade ago, many communities in Massachusetts wanted the ability to require more energy efficient buildings, and in 2009, Massachusetts became the first state to adopt an appendix to the Base Energy Code ("base code"), called the Stretch Energy Code ("stretch code").

The stretch code sets energy performance standards (as opposed to prescriptive requirements) to guide the construction of higher efficiency buildings. All Massachusetts municipalities have the option to adopt the stretch code in lieu of the base code, and 289 have adopted the stretch code as of March 2021. Cities and towns that adopt the stretch code can be designated a "Green Community" and receive additional financial support from the state for energy efficiency efforts and code compliance. Medford was one of the first communities in Massachusetts to adopt the stretch code and become a certified Green Community in 2010.

While the Massachusetts Board of Building Regulations and Standards (BBRS) recently updated the base code by adopting IECC 2018 (implemented in 2020), the stretch code has not been updated on the same schedule. There has also been growing recognition that to meet carbon neutrality by 2050 in Massachusetts, we will need a stretch code that requires new construction to meet net zero energy performance, similar to those adopted by New York, California, and Washington D.C. In March 2021, Governor Baker signed a significant climate bill into law: An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy. Among many other policy steps, the new law requires the adoption of a new opt-in stretch code with a pathway for net zero buildings. Over the next 18 months (through September 2022), the Department of Energy Resources and BBRS will develop a definition for "net zero building," specify net zero building performance standards, and outline how the requirements may phase in for different building types. Municipalities, advocacy groups, and the public will be able to weigh in on this process through public hearings.



Actions

BE 1.4.A

Advocate for a net zero stretch code that aligns with 2050 carbon neutrality goals.

Through coordinated research and demonstrated public support with other Massachusetts municipalities, advocate for the adoption of a net zero energy stretch code that will enable Medford and Massachusetts to reach carbon neutrality by 2050. Such a stretch code necessitates all-electric building construction as soon as possible in order to effectively decarbonize the building stock by 2050. Traditionally, updates to the stretch code are automatically adopted by participating municipalities; if the new stretch code requires readoption, adopt the new stretch code within one year of its release.

BE 1.4.B

Advocate for a regular update cycle.

Advocate for the Board of Building Regulations and Standards to establish a regular update cycle for the Stretch Energy Code in alignment with the Base Energy Code update cycle to ensure predictable and regular advancements to the Stretch Energy Code.

What's a net zero building?

A net zero building is a building that either produces no greenhouse gas emissions, or generates enough renewable energy to offset the emissions it produces. Ideally, the building is highly energy efficient, rather than simply offsetting large energy loads with renewable energy sources. There is some variation in how a net zero building can be defined; for example, some definitions require net zero buildings to be all-electric, while others permit fossil fuel use for specific end uses while achieving net zero emissions through renewable energy offsets. The 2021 Massachusetts climate legislation requires the Department of Energy Resources and the Board of Building Regulations and Standards to develop a definition for the new Massachusetts stretch code.

Relevant Precedents

- See [Stretch Energy Codes with net zero energy pathways for California, New York, and Washington D.C.](#)

Strategy BE 1.5

Lead by example by setting net zero energy and resilience standards for the construction of new municipal buildings.

What's useful to know

The City has the responsibility to lead by example in meeting our Buildings and Energy climate goals, including ensuring that the construction of new municipal buildings meets high-performance, resilience, and **net zero energy** standards whenever possible. In fall 2020, the City completed construction of the City's new police station, which is an all-electric facility and highly energy efficient for buildings of its type. The facility has also been designed to withstand future flood risks, and is elevated by two feet. In fall 2021, the City also completed construction of the new Medford Public Library, which is an all-electric net zero energy building with onsite solar generation. Moving forward, the City will adopt policies and procurement processes to formalize and prioritize net zero energy, low carbon, and resilient buildings for all new municipal buildings.

A net zero energy building is a highly energy efficient building that produces as much renewable energy on site each year as the building's total annual energy usage. **Net zero energy ready** buildings have the same level of energy efficiency, and are designed with the assumption that the building's energy needs could

be met with on-site renewable energy at a later date. Studies show that both net zero energy and net zero energy ready buildings can be built cost competitively to conventional, lower performance buildings.

Performance-based procurement is one approach used by local governments to commission the design and construction of new municipal buildings to meet higher performance standards without increasing costs. Through performance-based procurement, the City would issue a request for proposals (RFP) with a specified maximum budget for the project and specific environmental goals at various tiers (i.e., "required," "highly desirable," and "if possible," with the latter specifying net zero energy buildings). In their proposals, firms commit to the highest level of environmental performance feasible for their firm, given the allocated budget. This approach guarantees a level of environmental performance at the outset of the project, and encourages innovation without increasing design and construction costs.

Actions

BE 1.5.A

Adopt performance-based procurement.

Adopt performance-based procurement for the design and construction of new municipal buildings to achieve the highest level of building performance feasible without increasing costs.

BE 1.5.B

Establish municipal building standards.

Establish building standards that require new municipal buildings and those undergoing substantial renovation to meet net zero energy requirements wherever possible, and net zero energy ready when necessary. Include stipulations that such buildings must avoid carbon-intensive building materials and prioritize materials that sequester carbon wherever feasible. Include stipulations that the construction and renovation of new municipal buildings must evaluate the risks posed by climate change over the useful life of the project and include design features critical to minimizing that risk.

Relevant Precedents

- See Boston's December 2019 [executive order](#) requiring that all new municipal buildings in the City of Boston be "net zero carbon onsite" whenever feasible.
- See Somerville's definition for "net zero energy ready" in the city's [zoning ordinances](#) (adopted December 2019).

Objective BE2:

Retrofit existing buildings to be more efficient, resilient, and to have a smaller carbon footprint.

Buildings in Medford include commercial buildings and offices, civic buildings and schools, university and institutional buildings, and over 24,000 housing units, ranging from high-rise apartments to single-family homes. Collectively, these buildings were responsible for emitting over 343,991 metric tons of carbon dioxide equivalents (MTCO₂e) in 2019. Roughly 47% percent of those emissions came from residential buildings, and 52% from commercial, institutional, and industrial buildings. These emissions from the existing building stock account for roughly two-thirds of the greenhouse gas emissions in Medford.

Medford's housing stock is relatively old—the majority of buildings (54%) were built before 1940, and the vast majority (82%) are over 40 years old. While a large proportion of these homes have likely been

retrofitted since their first construction, the overall age of the building stock points to the significant opportunity to improve energy efficiency through higher performance building envelopes, windows, and heating and cooling systems upgrades. More efficient systems will reduce utility costs, both for heating in the winter and for air conditioning as our summers continue to get warmer with climate change. Currently, it's estimated that 63% of homes in Medford are heated with natural gas, 19% with oil, 15% with electricity, and 2% with propane. Switching to efficient electric systems, which can then be powered by renewable sources, will be critical to meeting our carbon neutrality goals.

More energy efficient buildings are also more resilient buildings; they keep people cooler in the summer and warmer in the winter—even in the event of a power



SNOWY MEDFORD STREET • PHOTO BY TROY SANKEY

outage. Building retrofits will also be important for preparing Medford's existing buildings for greater flood risk from heavy rainfall, storms, and sea level rise, which for specific properties may include elevating properties, retrofitting ground floors, or a variety of flood-proofing mechanisms in order to manage flood risk. Roughly 44% of housing units are rental units, and 33% are single family detached homes. In order to increase the sustainability and resilience of Medford's existing buildings, it will be important to find solutions that work for homeowners, property owners, and renters.

Energy efficient buildings provide better protection in extreme weather, have cheaper utility bills, and produce fewer greenhouse gas emissions—contributing to a more affordable, resilient, and low-carbon community.

Strategy BE 2.1.

Provide tools and resources to support fuel switching and energy efficiency retrofits.

What's useful to know

An energy efficient building is one that can keep us warm in the winter and cool in the summer while using very little energy. A building that uses less energy has cheaper utility bills and produces fewer greenhouse gas emissions—contributing to a more affordable, resilient, and low-carbon community. This strategy focuses on providing tools and resources to residents and businesses to improve energy efficiency and to convert heating and cooling systems that use fossil fuels to heat pump systems. Heat pumps are highly energy efficient, run on electricity, and provide both heat and air conditioning. As soon as Medford's electricity is supplied by 100% renewable sources, heat pump systems will no longer produce any greenhouse gas emissions.

Homeowners have a clear incentive to pursue energy efficiency investments because they can achieve cost savings over a relatively short payback period, but rental property owners don't necessarily have an incentive to make these investments since tenants are often responsible for the utility bills. This "split incentive" has created a pattern where rental properties are much less efficient than owner-occupied housing, and renters tend to pay disproportionately

Roughly two-thirds of all greenhouse gas emissions in Medford come from existing buildings. Switching to efficient electric systems, which can then be powered by renewable sources, will be critical to meeting our climate goals.

more for utilities. Across the United States, rental properties have shown to use 10% more energy per square foot than owner-occupied homes built since 1980, and 35% more energy for buildings built before 1940.¹² In Medford, older residential properties are disproportionately within neighborhoods with lower median incomes.¹³ At the same time, a fifth (21%) of all Medford households are both lower income and cost burdened, meaning over 30% of household income goes towards housing and utility costs.

Financial incentives, financing tools, and accessible information will be important for making retrofits easier and more affordable for Medford residents and businesses, and programs tailored to rental

properties will be key to decreasing energy use and the disproportionate cost burden on renters. Medford will need deliberate approaches for connecting residents and businesses with resources—designed in partnership with Medford community groups and specifically **frontline communities**—to expand access to energy retrofits in ways that collectively mitigate the climate crisis, reduce housing cost burdens, and advance energy justice.

In the past, Medford has used Community Development Block Grant (CDBG) funding to support building rehabilitation programs, which can be reinstated to support such retrofits. Mass Save is a statewide program that currently offers rebates and incentives for electric heat pump heating and cooling systems, electric heat pump hot water heaters, home insulation, and energy efficient appliances—all of which will support Medford's climate goals. The LEAN Multifamily Program, administered by the Low-income Energy Affordability Network (LEAN) and Massachusetts Energy Efficiency Program Administrators (utilities), provides energy efficiency retrofits for affordable housing in the state. Programs through Rebuilding Together, Inc., Massachusetts Rehabilitation Commission, Veterans Affairs Regional Loan Center, and Department of Public Health Weatherization Assistance Program could also be leveraged through a building retrofit campaign.

Medford is committed to expanding access to energy retrofits in ways that collectively mitigate the climate crisis, reduce housing cost burdens, and advance energy justice.

More about Mass Save

Mass Save is a statewide program that provides financial incentives, services, training, and information to help residents and businesses save energy and money to support an energy efficient and clean energy future in Massachusetts. Mass Save is sponsored by Massachusetts' electric and gas utility companies, working closely with the Massachusetts Department of Energy Resources (DOER), and is funded by the energy efficiency charge on all customers' electric and gas bills. Starting with the 2019-2021 Three-Year Energy Efficiency Plan, Mass Save also now provides incentives for fuel switching (e.g., from oil to electric heating), an important step towards beneficial electrification. Check out the Mass Save website (masssave.com) for more information on rebates, incentives, and other resources on electric heat pump heating and cooling systems, electric heat pump hot water heaters, home insulation, and energy efficient appliances.

Actions

BE 2.1.A

Launch a campaign for energy efficient electric heating and cooling systems.

Launch an informational campaign in collaboration with paid community liaisons to accelerate the adoption of energy efficient electric heating and cooling systems in Medford. Encourage Medford residents to take advantage of relevant programs through a coordinated and widespread marketing and outreach program with materials and information in multiple languages, designed for a range of audiences, as well as tailored to communities that have been consistently underrepresented in energy efficiency programs. Address common barriers to implementation, and develop a platform to promote “clean energy success stories” with testimonials from community members that have transitioned to electric and/or renewable heating and cooling systems.

BE 2.1.B

Revive and expand building rehab programs for rental properties.

Reinstitute and expand the funds allocated to the city’s federally-funded building rehabilitation programs, with a specific focus on retrofits for rental properties to increase energy efficiency, building resilience, and occupant health. Establish a funding priority for properties that rent to households using housing vouchers to promote fair housing, reduce barriers for residents participating in the rental voucher program, and to support rental properties in meeting HUD Housing Quality Standards.¹⁴

BE 2.1.C

Establish a data tracking protocol for fuel switching.

Establish a data tracking protocol for annually recording the percentage and total number of residences and businesses in Medford that heat their building with a given heat energy source (e.g., natural gas, oil, electricity, etc.) in order to track the city’s progress in fuel switching over time. Simultaneously log annual Mass Save data for Medford for the amount of rebates and other incentives allocated for fuel switching and efficiency upgrades within the city.

BE 2.1.D

Investigate additional financial incentives.

Explore options for offering additional financial incentives to support the informational campaign (see action BE 2.1.A). Consider offering discounted rates for air-source heat pumps, ground-source heat pumps, and solar hot water for a set period of time through a City-coordinated bulk procurement program (e.g., HeatSmart / CoolSmart programs). Consider implementing a local tax rebate for building owners who install air-source heat pumps, ground-source heat pumps, or solar hot water in rental units to complement available federal tax credits.

ALSO:

See [strategy BE 2.2](#), which involves launching an energy benchmarking program, which will help to identify and prioritize some of Medford’s largest energy consumers for energy retrofit programs.

ALSO:

See [strategy BE 3.1](#), which includes authorizing PACE financing in Medford, which will enable a new source of financing for energy efficiency upgrades and renewable energy systems for commercial and industrial buildings, buildings owned by a nonprofit, and multifamily residential buildings with five or more units.

ALSO:

See [strategy BE 2.3](#), which includes developing an online building resilience toolkit to provide residents with resources, information, and financing mechanisms for resilient building retrofits—including energy efficiency retrofits—that will better protect residents in the face of extreme weather.

Relevant Precedents

- See HeatSmart / CoolSmart programs in Somerville, Melrose, and many other Massachusetts cities and towns.
- See Mass Save, Massachusetts Clean Energy Center (Mass CEC), and the Center for EcoTechnology (CET) for supporting programs.
- See [Somerville Energy Efficiency Now \(SEEN\)](#) program for an example initiative.



Check out these resources!

"Go Green Medford" is the City of Medford's website for initiatives in the city related to the environment, energy, and climate change. The website is updated regularly with the latest information about resources and programs available to residents, including opportunities to improve energy efficiency, reduce greenhouse gas emissions, and save money on utility bills. See: medfordenergy.org/gogreen/

The City of Medford's "Welcome" web page provides resources and information for new Medford residents who have recently moved to the city. Among these resources, residents can sign up for the WaterSmart Program or for a Mass Save Energy Audit.

See: medfordma.org/welcome-to-medford/

Strategy BE 2.2.

Adopt energy benchmarking, disclosure, and performance policies to encourage energy upgrades in existing buildings.

What's useful to know

Energy benchmarking and disclosure policies help to increase awareness of how much energy a building uses, and improve transparency about energy costs for potential owners and renters. By increasing transparency, energy benchmarking and disclosure policies encourage and create demand for energy efficiency improvements in the real estate market.

Under an energy benchmarking program, building owners measure their energy use intensity (the energy used per square foot) in order to compare to past performance or to the performance of other peer buildings that are similar in size, use, occupancy, and geographic location or climate. Many programs employ ENERGY STAR Portfolio Manager, which is a free online tool provided by the U.S. Environmental Protection Agency (EPA) that allows building owners to calculate an ENERGY STAR score (ranging from 1-100) that evaluates the building's energy performance in a consistent and comparable way.

Boston and Cambridge each have energy reporting, benchmarking, and disclosure policies, which apply to public/government, non-residential, and multifamily residential buildings over certain size thresholds. In

Energy benchmarking and disclosure policies help to increase awareness of how much energy a building uses, and improve transparency about energy costs for potential owners and renters.

Medford, school and municipal buildings have been benchmarked since 2003 and 2009, respectively (see strategy BE 2.4 for further details).

Reporting frequency varies based on the program's design: some benchmarking and disclosure programs require that buildings report their energy performance annually; others require that information be released to potential buyers or renters at the point of sale or lease. As of spring 2021, the Massachusetts State Legislature is reviewing a bill that would require residential property owners in the Commonwealth of Massachusetts to complete an energy assessment and associated energy performance label at the time of sale.

BUILDINGS & ENERGY

While benchmarking and disclosing energy performance has shown to drive energy efficiency investments, many cities have found that such initiatives won't result in the savings needed to reach carbon neutrality by 2050. Consequently, many cities are adopting phased performance requirements, which go into effect after several years of benchmarking and reporting. It's important that any performance indicators set in Medford are based on greenhouse gas emissions to encourage electrification and decarbonization in addition to energy efficiency.

Actions

BE 2.2.A

Implement a benchmarking ordinance for large buildings.

Implement a reporting/disclosure ordinance for commercial and multifamily residential buildings over a particular size threshold that will require eligible buildings to track and disclose energy use and greenhouse gas emissions. Consider requiring benchmarking for water usage as well. Lead focus groups to gather input from property-owners, managers, renters, real estate brokers, and other relevant sectors in the design and implementation of the programs; include outreach, education, and training initiatives as part of program implementation.

BE 2.2.B

Adopt performance standards for benchmarked buildings.

Adopt performance standards for benchmarked buildings after a set period of benchmarking (e.g., three years), specifically focused on greenhouse gas emissions reductions. Pair this policy with relevant technical assistance, subsidy programs, tax credits, loans, and rebates (see strategy BE 2.1) to ensure that retrofits are not cost prohibitive or affect the affordability of renting a unit in a multifamily building. Lead focus groups to gather input from property-owners, managers, renters, real estate brokers, and other relevant sectors in the design and implementation of performance standards; include outreach, education, and training initiatives as part of program implementation.

BE 2.2.C

Advocate for statewide energy performance reporting requirements.

Support statewide legislation that calls for residential property owners to complete an energy assessment and associated energy performance label at the time of sale. Advocate for these energy assessments to fall under the umbrella of Mass Save services at no cost to homeowners. Consider adopting a local ordinance if the statewide bill does not proceed that requires property owners to publish information on the energy efficiency of a building (or average utility costs) when a property is put on the market for sale or lease.

BE 2.2.D

Develop a rental licensing ordinance with energy efficiency standards.

Develop a rental licensing ordinance and program, involving registration, inspection, and eventually retrofits for noncompliant rental units to address known health, safety, and energy efficiency issues in Medford's rental housing. Launch a working group that will evaluate options for the design and implementation of an ordinance and program that will improve equity in the quality of Medford's rental housing stock and reduce both utility costs and greenhouse gas emissions, while also protecting housing affordability, mitigating the risk of displacement, and reducing burdens on small-scale landlords. To the extent practicable, align Medford's program with Somerville's (currently under development) to create consistency across town boundaries.

ALSO:

See strategy BE 2.1, which involves expanding information and resources to support property owners in energy efficiency upgrades.

ALSO:

See strategy BE 3.1, which includes authorizing PACE financing in Medford, which will enable a new source of financing for energy efficiency upgrades and renewable energy systems for commercial and industrial buildings, buildings owned by a nonprofit, and multifamily residential buildings with five or more units.

Relevant Precedents

- See [BuildingRating.org](https://www.buildingrating.org/) for an inventory of statewide and municipal benchmarking and disclosure programs, including information on Boston's and Cambridge's policies.
- See [case studies](#) in "Better Rentals, Better City" report by the Rocky Mountain Institute (2018) as well as the Rocky Mountain Institute Efficiency Standards for Rentals [Action Guide](#).

Leading the way!

The City of Medford has been benchmarking all city buildings against other municipal buildings using Energy Star Portfolio Manager since 2009, and has been benchmarking Medford Public School buildings since 2003.



MEDFORD CITY HALL
PHOTO BY CITY OF MEDFORD

Strategy BE 2.3.

Provide tools and resources for property owners and tenants to improve building resilience and prepare for climate hazards.

What's useful to know

Climate change is expected to bring more extreme weather. Hotter temperatures, heavier rainfall, and bigger storms can cause flooding, power outages, building damage, and unhealthy living conditions. Upgrades to buildings can help keep residents safe during power outages and in periods of extreme heat or cold—for example, through improving insulation, upgrading windows, investing in solar and storage energy systems, shading the building or property, and installing heat pumps for energy efficient air conditioning (all of which also reduce carbon emissions). Other building interventions—including basement drainage, waterproofing, or on-site stormwater management—can prepare buildings for heavy rain and flood events to prevent damage to homes, businesses, and belongings.

In addition to localized flooding from heavy rainfall, the Medford Climate Change Vulnerability Assessment highlights areas in the city that could see a much higher risk of flooding over the next fifty years due to increasing sea levels and storm surge. Areas along Mystic Valley Parkway are predicted to experience flooding from a 1% annual chance flood by 2030, and much of South Medford, Wellington, and Medford

Square are predicted to experience flooding from a 1% annual chance flood by 2050 when water from Boston Harbor could overtop the Amelia Earhart Dam (see strategy EN 2.3 for more details). Owners of buildings with high flood risk may consider more significant building retrofits such as elevating or floodproofing. For properties that could see extensive damage (thereby losing significant property value), property owners may want to work with the City and Commonwealth on property acquisition (or “buyouts”), funded by the Federal Emergency Management Agency (FEMA).

That being said, Medford is working with neighboring communities as part of the Mystic River Collaborative to evaluate a number of large infrastructure projects with the goal of protecting Medford neighborhoods and adjacent communities from flooding due to storm surge and sea level rise. While all assessments are preliminary, these flood barriers could significantly reduce coastal and riverine flood risk through 2070. It will be important for the City of Medford to continue to collaborate in ongoing efforts with the Mystic River Collaborative, and to develop new platforms for sharing and discussing information around flood risk with Medford residents as flood risk in the city continues to evolve.

Actions

BE 2.3.A

Create a platform for ongoing dialogue about flood risk in Medford.

Create a platform for ongoing dialogue about flood risk in Medford that will provide transparent and accessible information on flood projections and planned investments to mitigate flood risk, as well as facilitated conversations to discuss community concerns and priorities. Enable this dialogue through materials and events in multiple languages, through print and digital materials, and through in-person or online gatherings. Ensure that the voices of **frontline communities** in Medford are centered in the dialogue and in designing how information is communicated.

BE 2.3.B

Develop an online building resilience toolkit.

Develop a series of online tools and information to support residents in learning about approaches and financing mechanisms for resilient building retrofits that will better protect residents in the face of high heat, storms, high wind, power outages, and flooding. Work with community members, and frontline communities in particular, to design the toolkit and to ensure that resources and information are accessible, relevant, and useful.

BE 2.3.C

Integrate climate resilience into first-time homebuyer courses.

Work with the North Suburban HOME Consortium to include information, tools, and resources on energy efficiency retrofits and building resilience strategies

in first-time homebuyer (FTHB) courses. In alignment with the recommendations in Medford's Housing Production Plan, expand promotion efforts so that more Medford residents are aware of the program, and consider allocating additional Community Preservation Act funding to the program in order to increase the amount of assistance available and/or the number of homebuyers eligible to participate.

BE 2.3.D

Participate in the NFIP Community Rating System.

Become an eligible community under the FEMA National Flood Insurance Program (NFIP) Community Rating System (CRS) such that Medford's climate resilience efforts accrue points under the program and work towards flood insurance policy discounts for residents and businesses.

BE 2.3.E

Prepare for securing federal resilience funding.

Identify city staff responsible for tracking, securing, and managing prospective federal hazard mitigation, resilience, and disaster recovery funding, such as HUD-administered Community Development Block Grant Disaster Recovery (CDBG-DR) funds, and funding from the FEMA-administered Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) program, and the Building Resilient Infrastructure and Communities (BRIC) program. Proactively complete reporting and planning requirements to ensure that funding can be efficiently secured and disbursed before, during, and after

an emergency as relevant. Use the climate equity framework in identifying projects for funding.

ALSO:

See [strategy EN 2.3](#), which involves ongoing collaboration with the Resilient Mystic Collaborative to support infrastructure projects that would reduce flood risk from sea level rise and storm surge.

ALSO:

See [strategy BE 2.1](#), which includes reviving and expanding federally-funded building rehabilitation programs for rental properties that can not only support energy efficiency improvements, but also resilience retrofits and health and safety improvements.

Relevant Precedents

- See the City of Cambridge [FloodViewer](#), which is an online interactive map that helps residents, businesses, and developers evaluate the flood risk of their property. Cambridge is developing an accompanying guide to support property owners with climate change preparedness.
- See Springfield's [Healthy Homes](#) site for building owners, renters and landlords.

What's the first-time homebuyer program?

First-time homebuyer (FTHB) programs provide information and financial support for individuals and families looking to buy a home for the first time. Medford's FTHB program is run by the North Suburban HOME Consortium, which runs a workshop 6-7 times a year to provide support in the homebuying process. Residents whose incomes fall below specified gross income thresholds can also receive an interest-free forgivable loan up to \$7,500 for a single-family home or condo or \$8,500 for a two-family home to help cover down payments or closing costs. Find more information [on the City of Medford website](#).



What's the NFIP Community Rating System?

Medford participates in the FEMA National Flood Insurance Program (NFIP), which means that the City adopts and enforces floodplain management standards in zones with high flood risk, and in turn, residents are eligible to purchase NFIP flood insurance and to receive disaster assistance for flood-related damage. Communities that participate in the NFIP are also eligible to participate in the Community Rating System (CRP), a program where cities and towns can implement extra measures beyond minimum floodplain management requirements to provide protection from flooding, which then allows residents to receive discounts on flood insurance policy premiums. Medford does not yet participate in the Community Rating System.

THE MYSTIC RIVER
PHOTO BY CALEB DRESSER

Strategy BE 2.4.

Lead by example by completing energy and resilience retrofits on all existing municipal buildings.

What's useful to know

In alignment with the City's Energy Efficiency and Resource Efficiency Policy (first established in 2005), the City continually works to improve energy and resource efficiency with a commitment to achieving "the highest possible level of energy efficiency and sustainability in all facilities and operations." In ideal scenarios, this means pursuing deep energy retrofits to make city buildings highly energy efficient and net zero energy ready such that these buildings could become net zero energy buildings with the installation of on-site renewable energy (see Objective BE 3). Retrofits would also consider flood resilience, passive survivability, and solar and storage backup power wherever possible.

The City continues to track energy use in municipal buildings and pursue retrofits that can achieve high savings. However, knowing how to best improve building energy efficiency often requires energy audits, which can be expensive and can become out-of-date within a few years if the City is not able to pursue the recommended retrofits at that time. Consequently, it can be difficult to assess opportunities for energy savings across entire municipal portfolios without long-term strategic planning.

Strategic energy management (SEM) planning is a targeted process for setting and achieving long-term energy performance goals across a building portfolio through continuous improvements and ongoing evaluation to ensure retrofits are performing as intended and that the City is achieving persistent savings. SEM planning can both lead by example for the private sector, and identify the level of investment needed by the City for public buildings to lead by example. Currently, Medford doesn't have facility managers for public buildings other than school facilities. The City will need increased staff capacity in order to continuously minimize the municipal carbon footprint from city buildings.

Relevant Precedents

- See ["The State of Strategic Energy Management in the Northeast" by Northeast Energy Efficiency Partnerships \(NEEP\)](#).

Actions

BE 2.4.A

Commission a strategic energy management plan.

Commission a strategic energy management plan (SEMP) for decarbonizing the municipal building portfolio based on ISO 50001, a voluntary international standard for managing and improving energy performance. Include Medford Public Schools and Medford Housing Authority facilities in the SEMP. Conduct targeted accompanying energy audits as needed in order to pursue deep energy retrofits.

BE 2.4.B

Conduct deep energy retrofits.

Use the strategic energy management plan to begin implementation of deep energy retrofits for municipal buildings, including beneficial electrification of building systems.

BE 2.4.C

Increase staff capacity for facility management.

Increase city staff for facility management to oversee energy management and facility retrofits and to implement a tracking system for municipal building systems maintenance.

BE 2.4.D

Assess municipal buildings for flood vulnerability.

Assess municipal buildings for vulnerability to water damage due to localized flooding and oversaturated groundwater tables. Evaluate the potential for this risk to increase over time with larger storm events, in addition to the increasing risk of riverine flooding. Pursue state or federal hazard mitigation funding for municipal building retrofits, in alignment with action BE 2.3.E.

ALSO:

See strategy BE 1.5, which involves establishing sustainability and resilience standards for new municipal buildings and substantial renovations.

ALSO:

See strategy BE 3.1, which involves expanding renewable energy generation on municipal properties.

ALSO:

See strategy BE 3.2, which involves seeking opportunities to expand resilient power systems, particularly on municipal properties.

ALSO:

See strategy PH 2.2, which involves working with career development partners to develop opportunities for facilities management training.



Leading the way

For decades, the City has been investing in the efficiency of municipal buildings and operations to save both resources and taxpayer dollars. As part of the U.S. Department of Energy (DOE) Better Buildings Challenge, Medford set and met its goal to reduce municipal building energy consumption per square foot 20% from 2009 levels by 2020 across 21 municipal buildings. Medford also completed energy audits for all Medford Public School buildings through the National Grid Whole Building Assessment Program in 2009, followed in 2010 by the implementation of energy efficiency measures for five middle and elementary schools through federal grant support. Likewise, the City has upgraded all 4,500 street lights owned by the City of Medford to network-controlled LED fixtures, which use 60% less electricity and have longer life spans and lower maintenance costs. The new efficient street lights have a pay-back period of about two years, and the City is expected to save \$250,000 annually in electricity costs. While all of these projects have helped to reduce the carbon footprint of Medford's municipal buildings and operations, there is still significant progress ahead of us in decarbonizing the municipal building stock.

Objective BE3:

Build out resilient and renewable energy systems.

Achieving carbon neutrality in Medford and Massachusetts will require a transformation in our energy systems, including an accelerated shift away from fossil fuels and expansion of local and regional renewable and resilient energy sources. The Massachusetts Renewable Portfolio Standard (RPS) in combination with the Commonwealth's Clean Energy Standard (CES) require that a percentage of electricity sold by utilities and competitive retail suppliers must come from renewable sources, and that this percentage incrementally increases over time. The 2021 Massachusetts climate bill, "An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy," requires that the RPS increase by 3% each year from 2025-2029 to set the state on a path to carbon neutrality. This means that year after year, the electricity we use will produce fewer greenhouse gas emissions.

Many municipalities, including Medford, have looked for ways to transition to renewable electricity at a faster rate than what is required by the Commonwealth. Municipalities in Massachusetts have the right to procure electricity on behalf of their constituents—either acting alone or in partnership with other municipalities—by aggregating the electric demand of their residents and businesses to gain greater buying power on the electricity market. This process, called "municipal aggregation" or "community choice aggregation" is one way towns and cities can transition towards a greater percentage of renewable energy in their electricity supply faster than is required by utility companies under the Massachusetts RPS and CES.

Medford implemented a municipal aggregation program starting in the winter of 2019, which is



MEDFORD WIND TURBINE • PHOTO BY CITY OF MEDFORD

designed to provide cost-effective, stable electricity rates while encouraging procurement and growth in renewable electricity. All Medford residents and businesses are enrolled in a rate class that includes 5% more renewable electricity than required in Massachusetts. Residents and businesses can opt out of this rate class to the “Medford Basic” level, which includes no additional renewable electricity, or opt up to the “Medford Premium Local Green” rate class which meets electricity demand with 100% local renewable electricity. The percentage of renewable energy sources and electricity rates will be reevaluated every three years with the goal of increasing the percentage of renewable energy while remaining cost-competitive.

In addition to procuring renewable electricity through municipal aggregation, Medford continues to support

and incentivize the build out of renewable energy infrastructure within the city as a way to further expand the amount of renewable electricity generated locally. Solar generation, battery storage, and microgrids can also serve as a way—in addition to utility investments that will be needed to strengthen grid infrastructure—to increase energy resilience in Medford as we work to decarbonize the energy sector and continue to see increasing risk of disruption from climate hazards.

Strategy BE 3.1.

Expand local renewable energy sources.

What's useful to know

The expansion of renewable energy in Medford will decrease our dependence on fossil fuels, contribute to cleaner air, and help to mitigate the climate crisis. Locally-owned solar power also creates a way for residents to reduce their energy bills, and have more control over where their energy comes from. To date, rooftop solar installations have been largely inaccessible for the majority of people around the country and in Medford—for anyone who does not own their home, does not have the financial means or credit, or does not have a roof suitable for solar, for example. Research has also shown that the benefits of solar power are not reaching communities of color at the same rate as white communities, potentially due to lower rates of home ownership, lower median income or access to credit, or social capital (“who you know”).

Medford will need solutions that expand access to solar, and that specifically work to eliminate disparities by race and income. A wide number of growing solutions will be integral to expanding access, including financing tools and expanded state incentives for low-income households, community campaigns, and community solar models where residents can procure electricity from a solar installation located somewhere else in the community.

Over the past decade, the City of Medford has been working to expand local renewable energy sources on city properties. The City erected its first wind turbine at the McGlynn and Andrews School complex in 2009, which generates roughly 170 megawatt-hours (MWh) of electricity each year, or 10% of the McGlynn School's electricity demand. The wind turbine saves the City \$25,000 each year in electricity bills and reduces Medford's greenhouse gas emissions by roughly 133 tons per year. The City has also installed solar panels on the Department of Public Works building, the new police station, and the new library, and will soon install solar panels on the Andrews School—totaling 975 kW of rooftop solar.

To support the expansion of renewable energy installations on homes and businesses throughout Medford, the City of Medford, Commonwealth of Massachusetts, volunteers, residents, and small business owners collaborated to launch Solarize Medford in 2013, a cooperative effort to spread the word on the environmental and economic benefits of solar electricity and to break down barriers to solar installation. Through this program, the Medford community installed 222.5 kW of solar power in

household solar arrays, and a 99 kW array was installed at Tufts University. Medford also adopted a citywide solar ordinance in 2019. All residential projects with ten or more units and residential or non-residential projects over 10,000 square feet must include solar on 50% or more of the project roof area, as well as 90% or more of any uncovered parking structures. The following actions build on these successes to further expand local renewable energy solutions in Medford and more equitable access to the benefits of solar power.

Actions

BE 3.1.A

Launch a solar access campaign.

Launch a solar campaign to provide information, resources, financing, and technical assistance to residents, businesses, and nonprofit organizations to expand local solar (plus storage) installations in Medford, and specifically to reduce barriers to accessing solar for renters, low income homeowners, and communities of color. Through a competitive bidding process, select a preferred solar energy provider to facilitate the campaign and solar installations. The ideal provider will bring extensive experience in facilitating solar installations for communities that have traditionally experienced barriers to solar access. Ensure that the selection of the solar provider and the campaign process is advised and guided by a steering committee made up of community members who are renters, low income homeowners, and persons of color.

BE 3.1.B

Continue to procure on-site solar for municipal properties.

Continue to expand on-site solar on municipal properties to save taxpayer dollars and to meet more of the City's electricity load with local renewable energy. Pursue opportunities for the City to own the solar installation and the electricity generated outright. Invest in new roofs and structural upgrades for Medford Public Schools in order to make on-site solar feasible on school buildings. Implement this action in alignment with efforts to expand resilient solar and storage systems (see strategy BE 3.2), and with the City's strategic energy management planning (see strategy BE 2.4).

BE 3.1.C

Assess the opportunity for Medford Housing Authority community solar.

Investigate options for installing solar at Medford Housing Authority sites, including the feasibility of hosting a community solar array that could supply power and cost savings directly to tenants.

BE 3.1.D

Continue to support community-driven community solar projects.

Continue to support community-driven initiatives to launch community solar and battery storage installations in Medford.

What's community solar?

Community solar provides renters, homeowners, organizations, and businesses equal access to the economic and environmental benefits of solar power regardless of who owns their building or whether the building is suitable for solar. The solar array is located within the community, often on leased land, and is shared by multiple community members who either buy a portion of the panels or subscribe to a portion of the energy produced. Participating community members receive credit on their electricity bills for their share of the power produced.

Relevant Precedents

- See Melrose, MA solar campaign in partnership between the City of Melrose, Melrose Energy Commission, Resonant Energy, and Boston Solar company.
- See Denver Housing Authority's community solar array and associated Solar Training Academy.
- See the East Bay Community Energy Battery Back-up Program in Oakland, CA.

BE 3.1.E

Authorize PACE financing.

Adopt a PACE resolution to authorize Medford's participation in PACE Massachusetts, which will enable a new source of financing for renewable energy systems and energy efficiency upgrades for commercial and industrial buildings, buildings owned by a nonprofit, and multifamily residential buildings with five or more units.

ALSO:

See [strategy PH 2.2](#), which includes supporting targeted career development in sustainable industries, including careers in renewable energy fields.

ALSO:

See [strategy BE 3.2](#), which involves solar plus storage installations to expand resilient power systems in Medford.

What's PACE financing?

Property Assessed Clean Energy (PACE) financing programs allow property owners to finance the upfront costs for energy improvements (including renewable energy systems and energy efficiency upgrades) and repay over time (typically 10-20 years) through a betterment assessment on the property, paid through their property tax bill. This financing method allows the clean energy loan to be attached to the property, and to transfer to the new owner when a property is sold. In Massachusetts, PACE financing is currently available for commercial and industrial buildings, buildings owned by a nonprofit, and multifamily residential buildings with five or more units. A municipality must opt in to PACE Massachusetts for residents to be eligible for PACE financing. See the [MassDevelopment website](#) for more information. .

SOLAR PANELS READY TO BE INSTALLED ON THE ROOF
OF THE NEW MEDFORD PUBLIC LIBRARY
PHOTO BY SCHWARTZ SILVER

Strategy BE 3.2.

Increase Medford's energy resilience.

What's useful to know

A resilient power system is one that can respond and adapt to changing conditions, and can withstand and recover quickly from disruptions. More intense storms, higher temperatures, and flooding may compromise our energy systems, and power outages can interrupt businesses and services, damage or disrupt critical infrastructure, and create health risks. (See the Medford Climate Change Vulnerability Assessment for more details.) Medford works closely with National Grid, the city's electricity and natural gas utility, to reduce the risk of power outages, protect Medford's power lines, and eliminate vulnerability in gas lines. National Grid has been actively replacing the city's aging gas lines in several neighborhoods per year in order to reduce the likelihood of gas leaks and the risk of disruption during climate hazards in the interim period as we transition away from fossil fuels.

Cities can also improve energy resilience and reduce the impact of power outages by expanding the use of solar-plus-storage systems and microgrids. Solar-plus-storage systems include battery storage, which stores excess energy produced by solar panels for later use, and can be used for backup power. A microgrid is a small, local electricity network that connects to the main electricity grid, but has the capacity to operate independently if, for example, the main grid is experiencing power outages. Microgrids can serve a single building or campus, or with regulatory support

they can serve an area with a number of property owners. Solar-plus-storage systems and microgrids can provide alternative and more sustainable solutions for resilient backup power over diesel generators, which sit idle most of the time (provide no day-to-day benefits), consume fossil fuels, contribute heavily to noise and air pollution, and require a reliable source of diesel fuel (which can be compromised in emergency situations) in order to operate over prolonged periods of time.

Many communities are working to advance climate justice by prioritizing resilient power solutions for buildings used specifically by residents who are, or who are likely to be, disproportionately affected by climate change—including older adults, residents with disabilities, residents with low or no income, youth, recent immigrants, and communities of color. Partnerships that can cluster multiple public and private facilities in a microgrid system, or that share battery storage, are one avenue to reach this goal. The City of Medford installed a solar-plus-storage, off-grid capable system at the Department of Public Works in the spring of 2021, and has started the procurement process for a similar system at the Andrews Middle School with the goal of having it operational by May 2022. The City will be investigating opportunities to replicate resilient power systems throughout the city, and specifically projects that can support climate justice.

Actions

BE 3.2.A

Seek opportunities to replicate resilient power systems.

Evaluate the performance of the solar-plus-storage systems at the Department of Public Works and Andrews Middle School and assess the viability of expanding solar-plus-storage, off-grid capable systems to other municipal buildings throughout Medford. Specifically seek opportunities for buildings that serve residents disproportionately affected by climate change, including Medford Housing Authority buildings and additional Medford Public Schools, and consider opportunities to cluster district-scale energy solutions with non-municipal buildings, such as medical facilities, community centers, or resilience hubs (see strategy PH 2.3). Publish case studies and seek opportunities to share learnings from the two solar-plus-storage systems as a way to encourage the replication of resilient power systems in neighboring communities.

BE 3.2.B

Encourage district scale energy solutions.

Use the development review process to encourage large developments to consider microgrids and other district scale energy solutions to achieve efficiency gains and greenhouse gas emissions reductions; require that any new development of two or more buildings with a total floor area over 200,000 gross square feet evaluate the feasibility of using a microgrid or district energy system.

BE 3.2.C

Continue to ensure maintenance on existing natural gas infrastructure.

Continue to coordinate with National Grid to replace and maintain aging existing natural gas infrastructure to protect against gas leaks, increase efficiency, and enhance resilience during the interim period as Medford shifts away from fossil fuels.

Relevant Precedents

- See San Francisco's [Resilient Solar and Storage Roadmap](#) developed to support the buildout of solar and storage backup power throughout the city.
- See ongoing work to develop a microgrid in Northampton, MA that covers the city's Department of Public Works, the Cooley Dickinson Hospital, and the Smith Vocational and Agricultural High School, which also serves as an emergency shelter.

Ecosystems & Natural Environment



Medford's natural systems are some of our biggest assets in facing climate change—from the Middlesex Fells and the Mystic River, to our pocket parks and neighborhood street trees. These natural resources support our health and protect the city, keeping our neighborhoods cooler on hot days, soaking up stormwater to prevent flooding, capturing air pollution, and slowing the effects of global climate change.

The Ecosystems and Natural Environment (EN) section includes strategies to build our climate resilience in collaboration with natural systems, focusing on the following outcomes:

Carbon sequestration: Healthy soils, wetlands, vegetation, and trees capture and store carbon dioxide. This process, called carbon sequestration, reduces the amount of carbon dioxide pollution in the atmosphere, and slows and reverses global climate change. It is estimated that Medford's urban forest sequesters 1,300 tons of carbon dioxide per year.¹⁵ While this is only a small fraction of Medford's emissions on an annual basis, protecting this capacity to sequester and store carbon will be critical to reaching carbon neutrality. Also, although much more difficult to quantify citywide, healthy soils and wetlands can sequester magnitudes more carbon dioxide, making them critical resources in slowing climate change.

Stormwater management: Trees, vegetation, wetlands, and healthy soils—as well as engineered landscapes such as green roofs, bioswales, and stormwater planters—slow, infiltrate, capture, filter, absorb, and evapotranspire rainwater. All of these functions together help to reduce the volume of stormwater runoff in city neighborhoods, protect our water quality, and prevent flooding. It is estimated that Medford's urban forest alone absorbs 30.6 million gallons of rainwater per year, reducing stormwater management costs by over \$273,000 annually.¹⁶


Heat mitigation: Green spaces, such vegetated areas and green roofs, don't hold as much heat as man-made surfaces, such as asphalt, steel, and brick. Plants also help to keep air temperatures cooler on hot days through transpiration (a plant's version of sweating) and trees reduce heat by providing shade. Studies have shown that surfaces in the shade are often 20-45°F cooler than surfaces in the sun, and evapotranspiration by plants and trees can reduce peak summer temperatures by 2-9°F.¹⁷

Community health: Trees, vegetation, wetlands, and healthy soils help to trap and filter pollutants, including air pollution that comes from roadway traffic and water pollution from heavy metals, organic chemicals, and excess nutrients. It is estimated that Medford's urban forest captures 115,000 pounds of air pollutants each year (including CO, NO₂, O₃, SO₂, PM_{2.5}, and PM₁₀), thereby reducing asthma and respiratory health issues in the city.¹⁸ Parks and open spaces also play an important role in reducing stress and supporting our mental health and wellbeing.



While these ecosystem services offer amazing benefits, they can only build our collective resilience under two conditions. First, our city's ecosystems must be able to adapt to climate change. Climate change will bring new threats to ecosystems including new pests and diseases, invasive species, and climate stress (such as exceptionally wet or dry seasons). Along with strengthening ecosystem services in Medford, the Ecosystems & Natural Environment section focuses on how Medford can continue to restore and enhance ecosystem health, connectivity, and biodiversity in order to ensure Medford's natural systems can adapt and thrive despite these changing conditions.

Second, to be a more resilient city all Medford residents must be able to benefit from these ecosystem services, including the health benefits of a lush tree canopy or pocket park, and the protection from high heat or flooding created by climate change. The Ecosystems & Natural Environment section focuses on equitably expanding the tree canopy, open spaces, and stormwater retention, while also working proactively and collaboratively to ensure that the nature-based solutions designed to build our community resilience don't inadvertently raise the cost of living and lead to community displacement. Strategies to maintain affordability and invest in communities must go hand-in-hand with expanding green systems and building ecosystem health to ensure that both resilient ecosystems and communities can continue to put down roots in Medford.



Medford's natural systems can support our city's resilience under two conditions: 1) our ecosystems must be able to adapt to climate change, and 2) all residents must be able to benefit from the incredible services they offer.



MIDDLESEX FELS
PHOTO BY JACK MCGOLDRICK

Objective EN1: Protect, restore, and grow Medford's natural systems for a more resilient city.

Medford has rich natural resources. Roughly 2,200 acres of forests and fields, wetlands and vernal pools, streams and reservoirs make up the Middlesex Fells, offering a unique ecological and recreational resource shared between Medford, Winchester, Stoneham, Malden, and Melrose. The Mystic River State Reservation stretches along the banks of the Mystic with walking paths connecting adjacent communities and reclaimed wetlands protecting the health of the river and aquatic ecosystems. In addition to these state-owned networks, Medford has 28 city-owned parks that cover nearly 600 acres. Collectively, Medford's 1,800 acres of forests, recreation, and open spaces make up approximately 32% of the city, the majority of which is permanently protected. Vegetated yards, gardens, and trees on private land further contribute to the city's tree canopy and the natural systems that bring the city resilience benefits.

Development pressure, environmental pollution, and climate change all add stress on these resources. Objective EN 1 aims to protect, restore, and grow Medford's natural systems through policy, programs, and land management practices applicable to both public and private land. Development patterns and land management practices can enhance or inhibit ecological functioning: while best practices associated with nature-based solutions and low-impact development approaches have gained widespread appreciation for their cost-effectiveness and multiple co-benefits, they must be strategically incorporated into Medford's land use policies, technical manuals, and regulations in order to maximize their potential for enhancing resilience.

Medford is lucky in that currently 100% of Medford's residents live within a 10-minute walk of a park or



MYSTIC RIVER, WEST MEDFORD PHOTO BY JACK MCGOLDRICK

open space, a rate much higher than the national average (55%). Yet we still have significant work to do to ensure that all of our parks are quality parks, that routes for walking are comfortable, safe, and cool, and that no community in Medford experiences the disproportionate burden of high heat or flooding created by climate change. Part of restoring, expanding, and protecting Medford's natural resources involves reversing past environmental injustices, and investing in community solutions that enhance the health and strength of ecosystems and neighborhoods in tandem. This work requires collaboration and coordination across sectors, community groups, and city departments such that ecosystem goals likewise bring equitable economic development, climate resilience, and public health benefits.

Strategy EN 1.1.

Protect and grow the tree canopy in alignment with community goals and priorities.

What's useful to know

Medford's urban forest plays an essential role in slowing climate change and building our **community resilience**. Healthy trees reduce or slow stormwater runoff, prevent erosion, protect air and water quality, cool neighborhoods on hot days, help to reduce energy bills, and make walking and biking more inviting by providing beauty and shade. Our urban forest also sequesters carbon dioxide, reducing the primary driver of climate change.

The City planted over 1,000 trees between 2010 and 2020 to both maintain and grow the city's tree canopy. Medford has been designated a "Tree City USA" by the National Arbor Day Foundation for 23 years, and received the "Tree City USA Growth Award" for 11 years, which recognizes innovation and resource commitment to urban forestry. In 2019, the city was awarded a grant for a Medford Canopy Improvement Initiative, which was used to plant new trees in areas of low tree coverage. Even so, the City recognizes the need to ramp up the rate of tree planting in order to sustain a robust tree canopy that can increase our resilience to climate change.

Healthy, mature trees are a long-term investment. They provide the greatest present-day resilience benefits and help to support the health of other nearby trees,

creating a significant incentive to not only plant trees, but to protect the trees we have. Medford adheres to MGL ch. 87, regarding public shade trees. Residents are not allowed to cut, trim, or remove public shade trees, but are encouraged to submit requests regarding inspection, pruning, removal, and planting of public trees. Medford has no regulations, however, to protect trees on private property unless they are in a Resource Area or Resource Area Buffer. Many cities have adopted tree protection ordinances to encourage the preservation of neighborhood trees and to deter the removal of trees during new construction.

Climate change poses increasing threats to our urban forest, including the spread of invasive pathogens, damage due to higher intensity storms, and increased climate stress.

Climate change poses increasing threats to our urban forest, including the spread of invasive pathogens, damage due to higher intensity storms, and increased climate stress. The wooly adelgid, for example, is an invasive insect that has spread to Massachusetts

in part due to warming temperatures, and has led to the die off of a number of Eastern Hemlock trees in the Middlesex Fells. To build the ecological resilience of the tree canopy, Medford's Forestry Division transitioned from planting primarily three species of trees to approximately two dozen species. These new species are expected to be better suited to warmer temperatures and a diversity of species increases the overall resilience of the canopy against pests or disease.

To continue to expand the benefits of our urban forest, Medford must protect our existing healthy trees, maintain the resilience of the urban forest, and continue to grow the tree canopy coverage over time. New programs, resources, regulations, and creative sources of funding will be necessary to expand the capacity of our current Forestry Division to meet the needs of the urban forest. Most importantly, Medford will need a framework for protecting and expanding the canopy in line with neighborhood priorities to best advance health, resilience, and climate justice goals. In 2019, the Medford Energy and Environment Committee developed the Medford Tree Report to address many aspects of protecting the tree canopy; the actions below align with and build on those recommendations.

Actions

EN 1.1.A

Continue to build out Medford's digitized tree inventory.

Continue performing an inventory of Medford's street trees, park trees, and trees on other public lands

in order to track changes in Medford's tree canopy over time. Record all newly planted trees in the City's digitized tree maps, and develop methods to improve forest record keeping by creating a more centralized place to log tree parameters, including date planted, location, species, trunk diameter, overall health of the tree, and maintenance needs.

EN 1.1.B

Develop an urban forest master plan with community-defined tree planting goals.

Develop an urban forest master plan that outlines the state of the urban forest, threats to the urban forest, and goals and priorities for equitably expanding the city's tree canopy in ways that support and protect resilience, health, and affordability goals in Medford. In collaboration with community groups, and specifically environmental justice communities in Medford, establish tree canopy targets by neighborhood or Census block group, and criteria for where to prioritize tree planting. Example criteria may include areas with low tree coverage, high impervious cover, in environmental justice neighborhoods, and along sidewalks and multi-use paths where people walk, bike, and wait for public transportation. Identify when and where coordinated policies, such as efforts to protect neighborhood affordability (see action 1.1.C), will be critical prerequisites for expanding the tree canopy. For each neighborhood, use a participatory mapping process to identify "priority spots" for tree planting based on the prioritization criteria. Investigate opportunities for urban orchards and gauge public support. Develop systems for monitoring, data collection, and reporting to track progress toward the tree canopy goals, and



HARRIS PARK
PHOTO BY CITY OF MEDFORD

Medford meets the Trust for Public Land goal for park access!

The Trust for Public Land (TPL) publishes the “ParkScore” index, which is considered the gold standard for comparing park systems in cities across the United States, and measures walkable park access through the related ParkServe project. TPL has set the goal that there is a park within a ten-minute walk for every person in the United States. According to [ParkServe](#), Medford has reached that goal! 100% of Medford residents live within a 10-minute walk to a park. Even though that goal has been reached, Medford has more work to do to invest in quality parks and routes for walking that will build our collective resilience to climate change.

collaborate with state agencies to consider tree canopy goals across land owned and managed by the Commonwealth.

EN 1.1.C

Proactively adopt anti-displacement policies to protect affordability.

Use the City's displacement risk assessment (see action BE 1.1.G) to understand where and when the expansion of tree canopy and green space could create risks for existing residents due to rising property values. In alignment with the Urban Forest Master Plan, work across departments and community organizations to pair location-specific anti-displacement strategies with tree canopy and greening initiatives. The goal of this action is to take a proactive approach to protecting affordability and expanding earning potential of residents such that all Medford residents can benefit from green urban spaces regardless of income without fear of displacement.

EN 1.1.D

Create an urban forest technical manual.

Create an urban forest technical manual specific to Medford with guidelines for native species selection, tree planting, care, maintenance, and monitoring practices that aim to expand the long-term health of the tree canopy, and protect and enhance tree resilience to climate change. Align tree planting design standards, monitoring, and maintenance practices with sidewalk and path pavement design standards, monitoring, and maintenance practices to support accessibility and promote walking and biking

as primary modes of transportation (see strategy T 1.3). This manual should be designed for use by city staff, and act as the reference standard within Medford's land use and development regulations (see strategy EN 1.2).

EN 1.1.E

Develop tree succession plans for park trees.

Develop succession plans for trees in existing parks, which consider the projected lifespans, health, species diversity and suitability, and potential threats in order to plan for tree planting, removal, and tree care (and associated budgets) over multiple years in order to meet specific goals for biodiversity and tree canopy coverage over the long-term. Account for recommendations for expanding the tree canopy in parks in alignment with the city's Open Space and Recreation Plan. Collaborate with state agencies to consider the succession of tree canopy across land owned and managed by the Commonwealth.

EN 1.1.F

Introduce a tree protection ordinance.

Draft and adopt a tree protection ordinance that would help to protect Medford's tree canopy on private land. Such an ordinance would protect against degradation of the tree canopy by, for example, requiring property owners to obtain a permit prior to tree removal, and prohibiting clear-cutting and removal of significant trees to the extent practicable. Payments to the Tree Fund (see action EN 1.1.G), or planting replacement trees on-site, on an adjacent site with permission, or on public land identified as a



NEW STREET TREES IN SOUTH MEDFORD •
PHOTO BY CITY OF MEDFORD

Medford priority location (see action EN 1.1.B) may be suitable alternatives. Exemptions will be included for trees that are dead, diseased, pose safety risks, impede accessibility, or other specific concerns as outlined in the ordinance. Evaluate if and when exemptions may be appropriate to accommodate solar panel installations, which may be best negotiated on a case-by-case basis.

EN 1.1.G

Create a tree fund.

Establish a tree fund to accept payments and donations to expand funding for urban forestry. A Memorial Tree Program and/or Remembering Pets Through Trees Program could create opportunities for residents to purchase a tree to be planted in honor of a person or pet. Further donations could be encouraged through an optional donation line item on residents' water bills. Any fees for tree removal as part of a tree ordinance could also capitalize the tree fund. This fund will expand funding for programs and staffing, public education, some tree planting, and advancing tree care for improved tree survival and health above the City's current budget.

EN 1.1.H

Expand staff capacity for tree efforts.

Expand staff capacity for tree efforts, including an arborist, an expanded team of foresters, as well as administrative staff that can support procurement, contracts, permits, and coordination on tree planting across city departments and capital projects. Consider launching a Junior Forester Program to hire students who could support communications and tree care. Look into potential partnerships with

graduate forestry programs to support these efforts, and collaborate with local organizations such as Friends of the Fells and the Center for Citizenship and Social Responsibility (CCSR).

EN 1.1.I

Launch a Tree Ambassadors Program.

Launch a Tree Ambassadors Program, which would involve hiring and training a cohort of Medford residents to take on specific tree care, including watering, weeding, reapplying mulch, and monitoring for pest and disease outbreaks. An effective program will save the City money by ensuring new trees survive and by protecting the health of the city's tree canopy. Consider opportunities to align the development of a Tree Ambassadors Program with the development of the City's Youth Employment Program (see action PH 2.2.B).

EN 1.1.J

Build platforms for urban forestry conversation and collaboration.

Develop a multilingual website for Medford's urban forestry that will catalog informational resources, share news updates, highlight "Medford Tree of the Week" articles, and provide a platform to engage residents in planting, protecting, and caring for trees on private property. In alignment with strategy EN 1.1, residents will also be able to request a new street tree, request tree inspections, request stump removal, and sign up for or apply for tree planting or tree care initiatives, such as the Tree Ambassadors Program. This action could be led by a Tufts Tisch Summer Fellow, managed through Smartsheets and associated forms.

Relevant Precedents

- See [Greening the Gateway Cities Program](#), and particularly their system for prioritizing tree planting in areas that have lower tree canopy, older housing stock, higher wind speeds, and a larger renter population.
- See "[Greening without Gentrification](#)" report and case studies by Rigolon and Christenson, 2019.
- See the City of Tacoma, WA [Urban Forest Manual](#), which provides specifications for planning, designing, installing, and maintaining trees for new development and city projects.
- See the Cambridge, MA [Urban Forest Master Plan](#).
- See the Holyoke, MA [Urban Forest Equity Plan](#).
- See the Cambridge, MA "Water-by-Bike" Tree Ambassador Program.
- See the [Sustainable Development Code](#) case studies for "Process to Resolve Tree Interference with Solar Access."

Strategy EN 1.2.

Adopt ecological performance standards for new development.

What's useful to know

Medford is projected to grow between now and 2030, as more people move to the city to take advantage of the many wonderful aspects of Medford, such as our proximity to Boston, our significant open spaces, public transportation connections, and quality schools.¹⁹ A large number of residential, institutional, and commercial developments have broken ground in recent years, and the city is seeing significant development interest, particularly with the extension of the MBTA Green Line.

While new development can put pressure on our parks and natural systems, it can also play a role in creating and enhancing green space, tree canopy, and healthier ecosystems in the city.

While new development can put pressure on our parks and natural systems, it can also play a role in creating and enhancing green space, tree canopy, and healthier ecosystems in the city. Medford's current site plan review process maintains provisions for the

protection of neighboring properties from detrimental impacts of a development that could be avoided by adequate landscaping, and encourages the protection of natural resources and soil drainage capacity on site. Many cities are adopting new performance standards for development and redevelopment that specifically target ecological and resilience goals, such as particular rates for onsite stormwater infiltration and storage, landscape requirements to help mitigate the urban heat island effect, and post-construction soil standards to prevent soil degradation.

The City of Somerville, for example, integrates all of these goals in their zoning ordinances through a "Green Score," with the recognition that a single set of standards can achieve multiple goals. Development projects are required to meet a minimum Green Score, and encouraged to meet an ideal Green Score, both of which vary based on the project type. Scores are received based on the incorporation of soil characteristics, groundcover, plants, trees, and engineered landscapes (e.g., rain gardens, bioswales, green roofs, etc.). Features that have a greater capacity to meet stormwater infiltration, heat mitigation, carbon sequestration, or ecosystem health goals are weighted more heavily. This system creates a flexible yet consistent approach for developers to meet the city's

goals that is tailored to the needs of different land uses. It will be important for Medford to assess new development standards based on what's most suitable for Medford's specific context, while also considering opportunities to align standards with neighboring jurisdictions so that development projects across municipalities are held to similar standards.

Actions

EN 1.2.A

Adopt new landscape performance standards for heat mitigation.

Update city ordinances and the site plan review process to encourage new development and redevelopment to mitigate the urban heat island effect through the incorporation of green space and natural systems. Consider a points-based system whereby developers must meet a specific set of points, awarded based on the integration of natural systems (e.g., plantings, trees, green roofs, green walls, etc.). Features that have a greater capacity to mitigate heat would receive greater points; likewise, the preservation of existing trees would receive more points than new tree plantings. These guidelines can be incorporated either as a standalone requirement, or as part of a Green Score with the other actions in this strategy.

EN 1.2.B

Adopt new landscape performance standards for stormwater infiltration.

Update city ordinances and the site plan review process to encourage new development



TREE PLANTING • PHOTO BY CITY OF MEDFORD

and redevelopment to capture, infiltrate, and evapotranspire more stormwater on site to reduce stormwater volume, flood risk, and stress on the stormwater system. Updated standards should prioritize the use of low impact development (LID) and green infrastructure systems in order to create landscapes that simultaneously achieve other heat mitigation, ecosystem, and health benefits. See action 2.1.A for further details. These guidelines can be incorporated either as a standalone requirement as part of the city's stormwater regulations, or as part of a Green Score with the other actions in this strategy.

EN 1.2.C

Adopt new landscape performance standards for soil health.

Update city ordinances and the site plan review process to encourage new development and redevelopment to meet healthy soil standards, which ensure soil in the city can better infiltrate stormwater, sequester carbon, reduce erosion, and support ecological health. Consider standards that would require developments to meet one of four options: 1) Leaving native soil and vegetation undisturbed and protecting it from compaction during construction; 2) Amending existing site topsoil or subsoil on site to meet specifications; 3) Removing and stockpiling existing topsoil during grading, reapplying, and amending the soil in place to meet specifications; or 4) Importing a topsoil mix, including compost, to achieve an appropriate pH and sufficient soil organic matter and depth. These guidelines can be incorporated either as a standalone requirement, or as part of a Green Score with the other actions in this strategy.

ALSO:

See [strategy EN 1.1](#), which includes the adoption of a tree protection ordinance that would discourage the removal of existing trees on land throughout the city, including during new development or redevelopment.

ALSO:

See [strategy PH 1.2](#), which includes updates to city ordinances related to building materials and surfaces that also ensure new development helps to mitigate the urban heat island effect.

Relevant Precedents

- See Somerville, MA [Zoning Ordinance \(2019\)](#) Green Score requirements.
- See Cambridge, MA [“Cool Factor” recommendations from the Resilience Zoning Task Force](#) (city code updates under development as of 2021).
- See Seattle, WA [“Green Factor” code requirement](#).
- See Portland, OR [Stormwater Management Requirements](#), which are based on a hierarchy of infiltration and discharge solutions.
- See King County, WA [Post-Construction Soil Standard](#) for preserving and restoring healthy soils on developments.
- See [precedents in the Medford Tree Report](#) developed by the Medford Energy and Environment Committee.



Quantifying the benefits of trees!

Medford's tree canopy covers 30% of the city. It's estimated that our urban forest:

- Absorbs **30.6 million gallons** of rainwater per year, reducing stormwater management costs by over \$273,000 annually;
- Sequesters an estimated **1,300 tons** of carbon dioxide each year (and stores substantially more carbon in its biomass);
- Captures **115,000 pounds** of air pollutants each year (including CO, NO₂, O₃, SO₂, PM_{2.5}, PM₁₀), thereby reducing asthma and respiratory health issues in the city.

(Estimates from the Medford Open Space and Recreation Plan Update 2019-2026.²⁰)

Strategy EN 1.3.

Enhance the resilience of land and water ecosystems to contend with new climate stresses.

What's useful to know

Medford and neighboring cities, state agencies, local organizations, and volunteers have worked for decades to rebuild the ecological health of forests, green spaces, wetlands, and water systems in Greater Boston. Yet we can still see the legacy of centuries of urbanization and growth of polluting industries that led to compacted and contaminated soils, poor water quality, fragmented habitat, and degraded native ecosystems—and we are still working to develop new practices to mitigate our future impact.

Unfortunately, ecosystems that are already stressed or compromised are more vulnerable to the effects of climate change. Water systems that already contend with high levels of pollutants can become severely compromised with greater volumes of stormwater runoff from higher intensity storms. Invasive species, which have a higher capacity to adapt to changing climate conditions, can flourish in disturbed soil conditions. Likewise, areas with low species biodiversity will be more vulnerable to the spread of pests and plant diseases.

A large number of restoration projects have helped to improve the city's ecological resilience in recent years. The Rivers Edge development project in Wellington, which was once a former industrial district

We will need to continue to restore and strengthen biodiversity, landscape connectivity, and healthy habitats so that our open spaces and ecosystems can evolve and adapt to new stresses over time.

with a severe legacy of contamination, now includes reclaimed tidal marshland with passive open space and restored wetlands that provide habitat and improve water quality. Numerous collaborative initiatives between the City, the Department of Conservation and Recreation (DCR), the Mystic River Watershed Association (MyRWA), and many other community groups have combat the spread of invasive species at Torbert Macdonald Park, along the Mystic River, at the Brooks Estate, and in the Middlesex Fells. A number of other efforts have worked to restore water quality; see objective EN 2 for more detail.

To ensure that Medford's ecosystems can flourish in a changing climate, we will need to continue to restore and strengthen biodiversity, landscape connectivity,

and healthy habitats in ways that allow our open spaces and ecosystems to evolve and adapt to new stresses over time. The Medford Open Space and Recreation Plan Update (2019-2026) sets a series of goals and objectives that include restoring wetlands to improve ecological function and native habitat, protecting water quality and important natural resource areas and buffer zones, managing the presence of exotic invasive vegetation, and restoring and maintaining the ecological integrity of Medford's natural systems to better contend with climate change and increase the resilience of the city. The plan also inventories Medford's parks and open spaces, and identifies specific interventions to enhance the capacity

of these spaces to cope with the effects of climate change. Medford's Departments of Public Works and Parks and Recreation are currently developing a plan for how park maintenance and processes may need to adjust to climate change in order to maintain open spaces that can both support healthy ecosystems and healthy communities. The actions in this strategy build on these past efforts and align with the goals of the Open Space and Recreation Plan Update.

Actions

EN 1.3.A

Continue ecological restoration of parks and open spaces.

Continue to perform ecological restoration in parks and open spaces in line with the park-specific recommendations in the Open Space and Recreation Plan Update (2019-2026) to increase the health and resilience of ecological systems, maximize their capacity to contend with new climate stresses, and expand benefits such as capturing stormwater, sequestering carbon, cooling air temperatures, and filtering air pollution. Continue to collaborate with DCR and local organizations to advance restoration activities on state land.

EN 1.3.B

Develop an invasive species mitigation plan.

Work with DCR, the Conservation Commission, MyRWA, Friends of the Fells, Friends of the Mystic River, Medford-Brooks Estate Land Trust, and other community groups to develop an invasive species



FISHING ON THE MYSTIC RIVER • PHOTO BY DADEROT

ECOSYSTEMS & NATURAL ENVIRONMENT

mitigation plan for Medford. Incorporate resources, educational materials, and public outreach to encourage management of invasive species on private land.

EN 1.3.C

Regrade and revegetate river banks to prevent erosion.

Regrade and revegetate the banks of the Mystic and Malden rivers to prevent erosion, and to create better ecological function and habitat. Focus on opportunities to “make room for the river” through living shorelines, in alignment with strategy EN 2.3.

EN 1.3.D

Establish a soils management program for parks and open spaces.

Work with state agencies and community groups to systematically measure the health of the cities’ soils based on microbial content, soil organic matter, soil structure, nutrient levels, and the minimization of heavy metals and organic pollutants—factors that are key to creating living, fertile ecosystems, improving soil structure, increasing the capacity of the soil to hold water, and for increasing soil carbon content. Based on the findings, work with community groups to identify priority open spaces for soil health improvements, and set goals for improving soil health on those sites. Pilot new land management practices on the priority sites, such as application of compost and other soil amendments. Measure changes in soil health metrics over time, and based on the success of the pilots, expand land management practices to open spaces citywide.

EN 1.3.E

Launch an educational campaign to support healthy soil.

Based on the soil management practices developed in action EN 1.3.D, launch an initiative to transform yards in Medford to sites with healthy soil. This would be done through workshops, community demonstration projects, online materials, informational yard signs, and other creative ways to build momentum around soil health in Medford.



MOVIES THE PARK • PHOTO BY CITY OF MEDFORD

EN 1.3.F

Evaluate adoption of pesticide and fertilizer use ordinances.

Consider adopting pesticide and fertilizer use ordinances in Medford, which restrict the use of synthetic products, and in some cases restrict the timing of fertilizer applications, in order to protect the health of residents, pets, waterways, soils, and ecosystems. Evaluate models in neighboring jurisdictions and assess the benefits and potential challenges of adopting similar models in Medford.

EN 1.3.G

Plant and raise awareness on native pollinator gardens.

Plant native pollinator gardens in areas where the City maintains plantings in order to support pollinator species, provide habitat, improve soil health, prevent erosion, improve water quality, and create beautiful spaces that require less fertilizer or water. Integrate educational signage to address misconceptions that such plantings are poorly maintained, to share the benefits of wildflower meadows, and to encourage native pollinator gardens on private land.

Relevant Precedents

- See the South Portland, ME [Invasive Plant Assessment and Management Plan](#).
- See the Phoenix, AZ [Compost Turf Study](#), which involved a two-year pilot study to test compost application in parks to improve soil health, turf quality, and water usage.
- See soil testing and organic soil amendments used in many parks in Boston, including the Common, the Public Garden, the Mall, and the Rose Kennedy Greenway.
- See the Portland, ME [pesticide use ordinance](#).
- See the South Portland, ME [landcare management ordinance](#).

Objective EN2:

Mitigate flooding using nature-based solutions when possible.

The Boston Harbor Watershed covers roughly 76 square miles across 22 communities north of Boston. Medford, including the ponds and reservoirs in the Middlesex Fells, the Mystic Lakes, and the Mystic and Malden rivers, are located within the Mystic River Watershed, a subwatershed of the Boston Harbor Watershed. Urban development has altered much of the area's natural hydrology: dam construction, fill and dredging, and the expansion of impervious surfaces have channeled and redirected water flows and prevented water from soaking back into the ground locally. Most significantly, in the 1960s the lower Mystic River was dredged and straightened to make room for Interstate 93, wetlands were filled to form what is now Wellington, and the construction of the Amelia Earhart Dam disconnected the rivers from the Harbor to regulate the height of the rivers and water flow. After the construction of the dam, the Mystic

and Malden rivers became freshwater and Medford has since been no longer exposed to ocean tides.

As climate change brings higher intensity storms and sea level rise, Medford is expected to see increasing flood risk, particularly if seawater overtops the Amelia Earhart Dam. Higher intensity storms with heavier precipitation are also expected to create more riverine and inland flooding, which will exacerbate the flooding Medford already sees today. The majority of Medford's current flooding problems are associated with deficiencies in the City's drainage system and the manipulation of the natural hydrology over time. In some cases, older stormwater infrastructure can no longer accommodate the volume of stormwater runoff created by new development. In other cases, siltation blocks or restricts brooks and streams that are part of the drainage system, or debris from roads



GREEN ROOF ON THE TISCH LIBRARY, TUFTS UNIVERSITY

PHOTO BY JOHN PHELAN

or from residents dumping yard waste block pipes and culverts. All of these incidents lead to local flooding in Medford neighborhoods, which will further intensify with larger storms.

Objective EN 2 focuses on reducing flood risk through continued investment in our stormwater system, infrastructure projects to mitigate coastal flooding, and through maximizing the use of **low impact development** and **nature-based solutions** where possible. Through systems such as bioswales, rain gardens, stormwater planters, green roofs, permeable pavements, and other green infrastructure systems—as well as living shorelines and reclaiming wetlands along the rivers—low impact development and nature-based solutions help to buffer, collect, infiltrate, and evapotranspire water, reducing stress on the stormwater system, mitigating flood risk, and helping

to restore the natural hydrology. It will be important to prioritize and co-develop solutions with communities that will be most disproportionately impacted by climate change to mitigate this burden, advance climate justice, and most effectively support our city's collective resilience.

Strategy EN 2.1.

“Rainscape” Medford to better infiltrate stormwater.

What’s useful to know

Medford is a densely developed city. Approximately 56% of land area in the city is covered with impervious surfaces, including streets, sidewalks, parking lots, and building roofs. In addition to making the city hotter (see strategy PH 1.2), these impervious surfaces prevent water from soaking into the soil. When it rains, stormwater runs off impervious surfaces, creating faster and larger flows of water that can overwhelm the city’s stormwater system, contribute to flooding, and carry pollutants from urban surfaces into lakes, rivers, and wetlands.

Heavily compacted urban soils can also contribute to stormwater runoff. The Medford Open Space and Recreation Plan Update (2019-2026) assessed the ability of Medford’s parks and open spaces to infiltrate stormwater, and found that 30 of Medford’s 31 parks would see stormwater runoff flowing off the site with rain events greater than one inch of precipitation. “Rainscaping” Medford will therefore require approaches across all types of land—public and private, street edges, yards, parking lots, and open spaces—to increase stormwater infiltration across the city.

“Rainscape” is a play on the word landscape. It refers to low impact development and landscaping practices

Approximately 56% of land area in the city is covered with impervious surfaces, including streets, sidewalks, parking lots, and building roofs.

that manage stormwater on site and encourage rainwater to soak back into the ground. Rain gardens, bioswales, stormwater planters, green roofs, rainwater harvesting systems, permeable pavements, and other types of **green infrastructure** are all examples of rainscaping. For the past several years, the City has coordinated a joint purchase of rain barrels each spring, which are offered at a 40% discount to residents to capture and hold stormwater on site. In 2016, the City conducted a citywide assessment to identify and evaluate suitable locations for green infrastructure to absorb and filter stormwater, which led to the installation of the Wright’s Pond rain garden.

In 2019, the City commissioned a study that modeled the drainage systems in South Medford, and a number of interventions to minimize flood risk, including reducing impervious cover, adopting new stormwater regulations citywide, and installing neighborhood-wide and site specific green infrastructure systems. The



What are impervious surfaces?

Impervious surfaces are materials such as asphalt and concrete that prevent water from passing through and soaking into the ground. Water runs off impervious surfaces, contributing to larger or quicker flows of water. Streets, sidewalks, parking lots, and building roofs are all impervious surfaces in Medford. By contrast, pervious surfaces allow water to percolate into the soil. Grass, mulch, vegetated areas, and green roofs are all pervious surfaces. Permeable pavements and pavers are a type of porous pavement that also allow water to infiltrate into the ground.

study indicated that removing significant amounts of impervious surfaces (50% - 75% of catchment impervious area), particularly in areas upstream of flood-prone areas, could have moderate effects on mitigating flooding. Strategically located green infrastructure installations can reduce the amount of impervious area that is directly connected to a water body or the drainage system—thereby reducing the associated runoff, even if the impervious surface cannot be removed. Updating stormwater regulations to require new development and redevelopment projects to retain higher quantities of rainfall on site had the most significant effect on reducing flood volumes in South Medford. Ultimately, a suite of approaches across public and private properties, streetscapes and parks, and through both projects and policies will be needed to rainscape Medford.

Actions

EN 2.1.A

Update the city's stormwater regulations.

Update the city's stormwater regulations to encourage higher rates of stormwater retention, infiltration, evapotranspiration, and groundwater recharge on site, and smaller areas of impervious surface. Ensure that standards align with projections for increasing precipitation intensity through at least 2070. Consider requiring new development and redevelopment to retain stormwater on site such that the post-construction peak discharge rate from a 2070 10-year 24-hour storm is equal to or lower than that

of the pre-construction peak discharge rate from a 2070 2-year 24-hour storm—in alignment with flood modeling and associated recommendations for South Medford, completed in June 2019.²¹

EN 2.1.B

Develop a green infrastructure design toolkit.

Develop a green infrastructure design toolkit that includes print and online resources, flyers, and infographics that share information on the design, installation, operation, and maintenance of green infrastructure systems based on regional best practices that are most applicable in Medford. The toolkit will provide guidelines for the use of trees, soils and substrates, planted areas, engineered green infrastructure systems, and permeable pavements, as well as how those features are best used across different types of properties to maximize stormwater infiltration and low impact development practices.

EN 2.1.C

Encourage rainscaping on private property.

Work with organizations, businesses, and residents to conduct rainscaping demonstration projects on private property to demonstrate options for storing stormwater on site in line with the green infrastructure design toolkit (see action EN 2.1.B). Continue to provide discounted rain barrels to residents through bulk purchasing, and explore additional outreach and incentive programs to encourage the installation of other stormwater solutions, such as rain gardens, bioretention

systems, green roofs, permeable paving, or depaving strategies. Ensure any incentives (such as rebates) eliminate accessibility barriers (see relevant precedents at the end of this section).

EN 2.1.D

Reduce impervious surfaces in city-owned properties.

Identify opportunities to reduce impervious surfaces in city-owned properties, including city facilities, schoolyards, the public right-of-way, public parking lots, and public open spaces through retrofits that remove excess pavement, integrate green infrastructure, and use permeable pavements wherever feasible. Review and reconsider the sites identified in the City's 2016 green infrastructure site suitability study, and prioritize locations that are best able to reduce flooding for communities that will be disproportionately impacted by climate change. Seek feedback from residents in low-lying areas both in the solution's design and in evaluating the effectiveness of the intervention. When feasible, use schools and parks as demonstration sites for low impact development and engage students as designers.

EN 2.1.E

Evaluate open space acquisitions and protections based on climate resilience.

Evaluate opportunities to acquire new open space parcels and/or permanently protect existing open space parcels based on their ability to best support the city's climate resilience through infiltrating stormwater, mitigating flooding, and/or lowering



VETERANS MEMORIAL PARK, MYSTIC RIVER, AND SURROUNDING NEIGHBORHOODS • PHOTO BY CALEB DRESSER

ambient temperatures. The majority of open space in the city is already protected. Rather than universally protecting all remaining open space, evaluate the city's competing priorities and expand and protect open space in ways that are most strategic for an affordable and climate resilient city.

EN 2.1.F

Continue to collaborate regionally to infiltrate stormwater.

Continue to work with neighboring municipalities through the Resilient Mystic Collaborative to expand low impact development practices and increase stormwater infiltration at a watershed scale.

ALSO:

See strategy EN 2.2, which includes exploring a Stormwater Utility Enterprise Fund. With a stormwater utility, fees are often charged based on the amount of impervious surface on a property; because property owners can receive credits on their stormwater utility bill for reducing impervious surfaces, a Stormwater Utility Enterprise Fund can be a primary way to encourage “rainscaping” throughout the city.

ALSO:

See strategy EN 1.2, which encourages new development and redevelopment to integrate natural systems, vegetated areas, and healthy soils on site for stormwater management, heat mitigation, and ecological benefits through updates to the city’s zoning ordinances and site plan review process. These standards would complement and work in alignment with the stormwater regulations.

ALSO:

See strategy EN 1.3, which focuses on increasing soil health in parks and open spaces, which will expand the capacity of soils to infiltrate stormwater.

ALSO:

See strategy EN 1.1, which involves protecting and growing the city’s tree canopy, which supports the hydrological cycle and helps to manage stormwater by intercepting rainfall, slowing runoff, transpiring water from the soil, and improving infiltration.

ALSO:

See strategy T 1.4, which includes updating parking regulations for new development and redevelopment, which will help to reduce the expansion of impervious areas in Medford.

Relevant Precedents

- See the Seattle, WA [RainWise](#) program which provides rebates to residents and nonprofit community organizations for installing stormwater solutions, and offers additional financing mechanisms to reduce financial barriers for low income residents.
- See Cambridge, MA updates to stormwater regulations, which are focusing on 2070 design storm criteria.
- See Denver, CO [Ultra-Urban Green Infrastructure Guidelines](#).



What is “green, blue, and gray infrastructure?”

Green infrastructure is a method for using plants and small-scale systems such as rain gardens, street trees, green roofs, gravel wetlands, and infiltration trenches to manage stormwater at its source in an urban environment. Green infrastructure supports healthier ecosystems and helps to restore the natural hydrology of a site by allowing water to soak into the ground.

Blue infrastructure refers to a range of water features that play a role in storing stormwater, such as lakes, rivers, streams, ponds, and wetlands. Gray infrastructure includes drains, pipes, pumps, and water treatment plants that collect, transport, and treat stormwater.

While cities traditionally invested heavily in gray infrastructure to manage stormwater, public works departments are now increasingly seeking opportunities to expand green-blue infrastructure due to its ecological benefits, its ability to help restore the natural hydrology of a site, and its ability to help reduce strain on the city’s gray infrastructure system. Ultimately, green, blue, and gray infrastructure will all play a role in Medford’s stormwater system to reduce flooding.

Strategy EN 2.2.

Continue to invest in maintenance and upgrades to the stormwater and sewer systems, accounting for climate change projections.

What's useful to know

The majority of Medford's current flooding problems are associated with deficiencies in the city's drainage system, driven by older and undersized infrastructure, and blockages in pipes, culverts, brooks, and streams. Much of the ongoing work of the Engineering Department involves efforts to reduce stress on the stormwater system and to improve its efficiency in handling stormwater, both to minimize polluted runoff and flooding today as well as to prepare for larger volumes of stormwater in the future.

In 2019, the City commissioned citywide drainage modeling that looked at Medford's stormwater management system under future climate scenarios to identify areas of the city that are likely to see increased flood risk. The flood maps generated from this modeling are now used to help inform future capital planning projects and development projects in order to better prepare for and ameliorate flooding. The City often enters into agreements for working together with private property owners or organizations on stormwater improvement projects.

The Engineering Department continues to resolve localized flooding areas due to intense storm events,

Upgrades to the city's stormwater infrastructure will be critical to prepare for higher intensity storms with climate change.

and works with the Resilient Mystic Collaborative to manage flooding in the upper Mystic region. Stormwater runoff upstream can have downstream cumulative effects in Medford, as does water released from upstream reservoirs. Medford's Engineering Department coordinates with the Town of Winchester on the timing of water releases from the Winchester Reservoirs, which are located in Middlesex Fells and owned and managed by the Town of Winchester, to manage water levels and mitigate flooding.

Large volumes of stormwater runoff also increase the risk of sanitary sewer overflows (SSOs), which are when untreated or partially treated sewage is discharged from the municipal sanitary sewer due to too much volume, a blockage, or other problem. SSOs often result from too much inflow and infiltration (I/I)

into the sewer system. “Infiltration” refers to when groundwater seeps into sewer pipes through cracks, leaky joints, or faulty connections. “Inflow” refers to stormwater that is dumped into the sewer system through an illicit connection, such as from a rainwater downspout or a basement sump pump. The City has undertaken studies to identify and address sources of infiltration and inflow, including replacing pipes, lining leaky pipes, conducting smoke tests to identify illicit connections, and implementing a sump pump disconnection program.

To strategically track and prepare for upcoming repairs and upgrades to the stormwater system, the City completed its Utility Asset Management Plan in 2020, which created an inventory and status report of every pipe in the city. With all stormwater assets, maintenance needs, timelines for replacement, and potential vulnerabilities logged in a utility asset management software, the City can systematically plan for and allocate resources to infrastructure maintenance, replacements, or upgrades to prevent any larger issues, particularly with heightening strain on the system from climate change.

Actions

EN 2.2.A

Roll out Utility Asset Management Plan.

Roll out the Utility Asset Management Plan and system software, which inventories and catalogs data on all water, sewer, and drainage infrastructure assets in the city and will be used to track and plan

for maintenance and upgrade investments over the long term. Establish a protocol for tracking flood incidents, and for incorporating this data and climate vulnerability projections into asset management planning.

EN 2.2.B

Continue to reduce inflow and infiltration.

Find and fix legacy connections between catch basins and sanitary sewer pipes, and reline any cracked pipes to address inflow and infiltration into pipes throughout the city. These steps have been completed for three streets in North Medford, and would be highly beneficial to complete citywide.

EN 2.2.C

Identify priority infrastructure upgrades based on climate risk and climate justice.

Use the hydraulic/hydrological modeling of Medford’s stormwater management systems under future climate scenarios, in conjunction with the city’s knowledge of areas that experience frequent flooding, to prioritize upgrades to stormwater systems in the city’s capital improvement plan. Of those sites, prioritize locations that affect communities in Medford that will be disproportionately affected by climate change, and work with community groups to define the problem and solution.

EN 2.2.D

Expand the capacity of the stormwater system through green, blue, and gray solutions.

Starting with the priority sites (see action 2.2.C), combine green, blue, and gray infrastructure to manage stormwater, prioritizing water infiltration where possible and particularly upstream, and storage and conveyance where necessary. Continue to identify opportunities to expand water storage through underground storage tanks in the city's open spaces.

EN 2.2.E

Identify cost-sharing opportunities for stormwater projects.

Develop a protocol for sharing costs for stormwater management projects with private development, whereby development permits in specific situations may be contingent on addressing a stormwater management project on a predefined list of critical capital improvements. Prioritize projects that mitigate flooding particularly for communities in Medford that will be disproportionately affected by climate change. Evaluate whether linkage fees could be used to support storm sewer investments.

EN 2.2.F

Promote and expand the "Adopt-a-Drain" program.

Promote and expand the city's online interactive "Adopt-a-Drain" platform. The program website shows the locations of the city's storm drains and provides a

way for volunteers and community groups to "adopt" a drain near their house or work. Adopting a storm drain involves inspecting the drain on a regular basis; clearing any leaves, trash, or debris; and reporting any problems to the City to help keep drains clear and water flowing. As part of the promotion and expansion of the program, develop a process for sending out alerts to program volunteers to check on their drains before a forecasted storm to make sure that storm drains are ready for the anticipated rainfall. Raise awareness of the platform through marketing and outreach, and investigate regional partnerships to expand the platform among more cities in the watershed.

EN 2.2.G

Continue to coordinate regionally on timing of reservoir releases.

Continue to collaborate within neighboring towns in the Mystic River Watershed to manage heavy precipitation events, and to reduce the cumulative stress on drainage systems in downstream areas. In particular, work with the Town of Winchester to ensure that water released from the Winchester Reservoirs offsets rather than coincides with peak stormwater flows during heavy rain events, which can otherwise overwhelm the drainage system and lead to flooding in West Medford.

EN 2.2.H

Expand engineering staff capacity.

Expand engineering staff capacity to review stormwater permit applications, to roll out the Utility Asset Management Plan, and to develop and oversee

the expansion of green, blue, and gray infrastructure projects.

EN 2.2.J

Explore the potential for a Stormwater Utility Enterprise Fund.

Monitor the implementation of Stormwater Utility Enterprise Funds in peer cities, such as Somerville, and discuss the challenges, benefits, and preliminary outcomes with peer city staff. Begin community conversations to explore Medford's receptiveness to a stormwater utility, and expand education and outreach to discuss how a stormwater utility can be a way to support upgrades to the city's stormwater system, protect clean water, and reduce flood risk.

Relevant Precedents

- See Somerville, MA [stormwater infiltration and storage systems at Symphony Park, Nunziato Field, and many other parks in the city.](#)
- See adopt a catch basin programs in Vancouver, Canada; New Orleans, LA; and Northfield, MN.
- See Newton, MA [Stormwater Utility and Credit Program](#); Northampton, MA [Stormwater and Flood Control Utility](#); along with [programs in over twenty other Massachusetts towns.](#)
- See the Portland, ME [Stormwater Credit Manual.](#)



Adopt a storm drain!

Interested in adopting a storm drain near your home or work? Find more information on the [City of Medford website](#), and adopt a storm drain using the City's [storm drain map](#)!

What is a Stormwater Utility Enterprise Fund?

A stormwater utility would operate similarly to other utilities (water, sewer, gas, electric) in that it would collect a fee from property owners for a service—in this case, to cover the cost of safely collecting, transporting, treating, and disposing stormwater coming off their property. The fee would be charged to properties based on the amount of impervious surface on their land, which means that properties that create less stormwater runoff pay less. Properties can receive credits on their stormwater utility bill by removing impervious surfaces or incorporating **low impact development practices**. A Stormwater Utility Enterprise Fund is a key way that municipalities in Massachusetts are covering costs for necessary stormwater upgrades to meet more stringent statewide environmental regulations and to prepare for climate change. As of 2021, over twenty Massachusetts municipalities have instituted a stormwater utility.

Strategy EN 2.3.

Reduce flood risk from the Mystic and Malden rivers caused by storms and sea level rise.

What's useful to know

Although Medford is not on the coast, the Mystic and Malden rivers were originally tidal, and saltwater used to reach as far as the lower Mystic Lakes. The Amelia Earhart Dam, which was built in 1966 and spans the Mystic River just downstream of Medford, now prevents the ocean tides from traveling upriver and regulates water levels in the Mystic and Malden rivers. At high tide, the gates close to prevent seawater from Boston Harbor from flowing upriver. At low tide, the gates open to allow the rivers to drain into the harbor. Most of the time, this system keeps the water level of the rivers similar to mid-tide in the harbor.

During heavy rain events, water levels in the Mystic River and its tributaries can swell. The dam can release this excess water to prevent flooding, unless the storm coincides with high tide. During high tide, a set of pumps launch river water over the dam into the ocean to lower the level of the rivers. To date, the pumps have had adequate capacity to handle all heavy storms. With the anticipation of more intense storms, the Massachusetts Department of Conservation and Recreation (DCR) is investigating adding a fourth pump to expand pumping capacity or to serve as backup if one of the other pumps were to fail.

With climate change, higher intensity storms and sea level rise are projected to eventually overtop the dam, and could cause significant flooding in Medford.

With climate change, higher intensity storms and sea level rise are projected to eventually overtop the dam, and could cause significant flooding in Medford. While sea level rise alone is not projected to overtop the dam until close to 2100 (the dam protects Medford from up to 5.6 feet, or 67 inches, of sea level rise above typical tides), the combined effects of sea level rise and storm surge will likely overtop the dam much sooner. Current modeling suggests that the 1% annual chance storm in 2050 will overtop the dam. See the Medford Climate Change Vulnerability Assessment for further detail and flood maps.

Pumping capacity will also be critical if the dam is overtopped. By 2070, the 1% annual chance coastal storm combined with sea level rise could spill 3,400 acre-feet of floodwater into communities upriver, including Medford. DCR is currently pursuing and

evaluating a number of retrofit options, including hardening to prevent damage to the dam's electrical systems from overtopping, elevating the dam, and extending a floodwall, which would collectively prevent water from flanking or overtopping the dam in the 1% annual chance coastal storm through 2070. As part of the Resilient Mystic Collaborative, Medford and neighboring cities are also exploring a number of large infrastructure projects at specific locations designed to protect Medford and neighboring cities from coastal flooding.

In addition to building flood protection barriers, many communities are identifying ways to accommodate flooding through nature-based solutions. "Living shorelines" use vegetation and other natural materials to act as a buffer for flooding, stabilize the shoreline, reduce erosion, and provide habitat for diverse ecosystems. They are also less likely than bulkheads, seawalls, and other hard structures to redirect the force of floodwaters elsewhere, such as adjacent properties. Incorporating living shorelines into expanded parks and open spaces that are periodically designed to flood would help to protect neighborhoods, strengthen ecosystems, and build Medford's resilience.

Actions

EN 2.3.A

Consider a riparian buffer overlay to prioritize living shorelines.

As part of Medford's Comprehensive Master Planning Process, identify areas that may benefit from no new

As part of the Resilient Mystic Collaborative, Medford and neighboring cities are exploring a number of large infrastructure projects designed to protect Medford and neighboring cities from coastal flooding. Many communities are also identifying ways to accommodate flooding through nature-based solutions.

construction based on proximity to the banks of the Mystic and Malden rivers and heightened flood risk. Consider adopting a riparian buffer overlay district in such areas that would prioritize the protection of existing pervious open space, encourage the conversion of impervious surfaces to pervious, institute a no net increase in impervious surface rule for redevelopment, and prohibit new development to the extent practicable.

EN 2.3.B

Work with DCR to "make room for the river."

Coordinate with DCR to address adaptation and resilience approaches along the Mystic River, including how to best use land along the river as floodable recreation space. Consider integrating

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living shorelines, wetlands, and recreational features such as paths that are designed to accommodate floodwaters. Consider the long-term evolution towards more salt-tolerant species in open spaces adjacent to the river.

EN 2.3.C

Continue to collaborate regionally on the resilience of the Amelia Earhart Dam.

Continue to work with DCR, regional partners, and neighboring jurisdictions regarding the capacity of the Amelia Earhart Dam to mitigate flooding. Coordinate the release of water at the Mystic Dam and gatehouse in conjunction with any increase in runoff to the Mystic River with DCR to ensure the Amelia Earhart Dam pumps are able to accommodate increased flow. Continue to collaborate with DCR and regional jurisdictions to evaluate options for raising and hardening the Amelia Earhart Dam.

EN 2.3.D

Continue to collaborate regionally through the Resilient Mystic Collaborative.

Continue to collaborate regionally with other members in the Boston Harbor Watershed as part of the Resilient Mystic Collaborative to evaluate infrastructure strategies that can mitigate coastal flooding in Medford and neighboring communities through 2070 or longer.

ALSO:

See strategy BE 1.3, which includes updates to the city's zoning ordinances to encourage flood-resilient new construction.

ALSO:

See strategy BE 2.3, which involves developing a community platform for ongoing dialogue about flood risk in Medford, as well as tools and resources for increasing the flood-resilience of existing buildings.

ALSO:

See strategies EN 2.1 and EN 2.2, which both focus on expanding the effectiveness and capacity of drainage systems and stormwater storage systems to attenuate flooding.

Relevant Precedents

- See Salem, MA [living shoreline project](#) in Collins Cove.
- See [Corktown Common](#), a floodable urban park in Toronto, Canada.

What's a "living shoreline"?

A living shoreline uses natural materials such as plants, sand, or rock to stabilize shorelines, reduce erosion, provide valuable habitat, and strengthen coastal resilience. Unlike bulkheads, sea walls, or other hard structures, living shorelines grow over time, contributing to healthier ecosystems and a greater flood buffer.

Public Health



Climate change brings new health risks. In Medford, we may see surges in heat-related illness due to abnormally hot days and heat waves, and more hospital visits caused by emergencies during extreme weather. Storms, heat, and flooding can bring power and water outages, which create serious secondary health effects—such as losing access to potable water, groceries, heat in the winter, emergency care, medications, or other life necessities. Degradation of air and water quality, changes in our exposure to mold and pathogens, as well as higher levels of anxiety associated with these threats are also underlying stressors that will continue to take a toll on our physical and mental health and wellbeing.

Health equity and resilience are inextricably tied: by addressing climate change we reduce the unequal health risks, and by building more equal access to health and wellbeing we strengthen resilience to new stresses like climate change.

The Public Health section focuses on reducing these risks from climate change, but it also takes a holistic perspective on community health to support resilience. We know that health is the cumulative result of all our daily experiences, shaped by where we live, work, learn, and play. We also know that these experiences are wildly unequal, and that these disparities are created and reinforced by structural inequities and prejudices.

Segregation, discriminatory policies, and unequal allocation of opportunity and investment have long dictated who has access to certain neighborhoods and homes, jobs and schools, food, healthcare, physical and psychological safety, resources, and opportunities to live long, healthy, and prosperous lives. We have recently seen the unequal health burden of the COVID-19 pandemic on communities of color, and we are beginning to see the outsized risks of climate change on frontline communities.

The Public Health section therefore seeks to build the resources for good health in Medford for all residents today and for future generations, while also addressing the root causes of health inequities and social vulnerability—like discrimination, greater exposure to risks, poverty, lack of access to economic opportunities, and uneven power to participate in policy decision-making. The Public Health strategies focus on physical aspects of the city such as the design of our neighborhoods, our food systems, our waste systems, as well as the ways we invest in Medford residents and businesses to create stronger and more connected communities. Health equity and resilience are inextricably tied; by building the health and wealth of Medford communities, we expand our capacity to respond to any new stressor, whether that's the COVID-19 pandemic, economic downturns, or climate change.

Objective PH1: Create neighborhoods and infrastructure systems that support health.

For centuries, city decision-makers have planned neighborhoods and infrastructure systems to contend with health risks. In the late 1800s, the installation of sanitation systems in the United States helped to curb sewage in city streets, polluted water systems, and cholera outbreaks; in 2020, cities redesigned sidewalk and street use to allow for social distancing and expanded IT infrastructure to help students work from home to help prevent the spread of COVID-19. While the focus of the health risks continue to evolve, the built environment still plays a key role in shaping our health. Continuing to improve how we design neighborhoods and infrastructure systems will be critical to achieving better health outcomes in the face of climate change.

Many approaches to improving health in cities, have in fact prolonged and morphed our health risks.

To prevent incompatible land uses from locating next to each other (such as a polluting industry next to a home) we adopted zoning that separates land uses. And yet universally segregating land uses has contributed to sprawl, large distances between homes and jobs, a high dependence on private vehicles and gasoline, and air pollution and greenhouse gas emissions. Similarly, cities manage solid waste by burying it in landfills or sending it to incinerators on the edges of, or outside, city boundaries. Yet, the ongoing expansion of landfills and incineration facilities creates more greenhouse gas emissions and/or toxic outputs, and continues to fuel material production and consumption. Both of these systems relocated rather than eliminated the health problem, contributing to ever-growing risks for communities and our planet. At the same time, these patterns reinforce systemic inequities whereby



HARRIS SPLASH PAD PHOTO BY CITY OF MEDFORD

the people bearing the greatest burden—those with the longest commutes or living next to highways, landfills, or incinerators—are the people with the least amount of political power to contest or change this situation.

In what ways can Medford create safe spaces to live, work, and learn; limit exposure to toxins and risk; and create access to resources that allow all residents to live healthy and fulfilling lives? The strategies in Objective PH 1 focus on how the design of our neighborhoods, infrastructure systems, and material flows can better contribute to the collective health of our communities and the planet, particularly with the growing risks from climate change. Our goal is to nourish the attributes that support good health locally—green spaces, healthy foods, quality jobs, and safe housing, for example—while also creating

regional **circular economies** that reuse materials and eliminate the need for toxic waste disposal. By closing health and wealth disparities, we create stronger economies and healthier neighborhoods for everyone today and for future generations.

Strategy PH 1.1.

Adapt the city's zoning codes and development incentives to create healthier neighborhoods.

What's useful to know

Comprehensive plans, zoning codes, and the development review process are all ways that cities and towns shape their future growth. A comprehensive plan maps out a community's long-term vision and goals, and zoning ordinances serve as the regulatory framework to permit or prohibit activity in line with that community vision. Through the development review process, a city can further facilitate private investments that support neighborhood needs or meet city objectives. Medford started its Comprehensive Master Planning Process in the spring of 2021, and the city's zoning ordinances and development review process will be updated as part of that process. Both provide the opportunity to guide future development in ways that support a healthier and more resilient city.

Zoning codes and the development review process can support smart growth—that is, development patterns that mix a diversity of housing and commercial types; that make walking, biking, and taking public transportation easy; and that preserve parks, open spaces, and tree canopy. These factors shape social determinants of health, including access to affordable homes, quality jobs, healthy food, parks and open spaces, and places to build community. Zoning codes can mitigate health risks—by requiring flood resilient building design, materials that reduce the heat island

effect, or design decisions to buffer against near-highway air pollution. Through the incorporation of public open space, community spaces, community gardens, and places of refuge, development can help facilitate a sense of safety, community, and wellbeing.

A large number of building and district-scale standards and certifications are now used to advance healthier buildings and neighborhoods—such as those offered by the U.S. Green Building Council, the International Living Future Institute, and the International WELL Building Institute. Many cities have drawn on these certifications or specific standards in developing zoning ordinances, city codes, or development checklists as best practice standards for creating healthier and more sustainable buildings and neighborhoods. Studies now show that incorporating these features into building projects can meet city goals without adding any extra cost for developers. The following actions take a comprehensive approach to evaluating how land use and development standards can facilitate the growth of healthy and sustainable neighborhoods and districts in Medford.

Actions

PH 1.1.A

Update zoning codes to support health outcomes.

Conduct a comprehensive review and update to Medford's city codes and zoning ordinances to better disincentivize development patterns that work against health outcomes and to encourage patterns that achieve health, resilience, and sustainability goals, which are often aligned. This step will occur as part of the City's Comprehensive Master Planning Process. See "relevant precedents" below for applicable frameworks.

PH 1.1.B

Assess neighborhood-specific opportunities.

Conduct a neighborhood-specific evaluation of Medford's neighborhoods and business districts based on attributes that affect health outcomes—such as walkability, park access, transit access, food access, proximity to highway noise and air pollution, among other factors. Work with residents and businesses in each neighborhood or district to identify additional parameters and priorities that may not have been identified through the assessment. Identify ways to adjust the city's zoning and development review process in order to facilitate projects that mitigate health disparities.

PH 1.1.C

Create a "healthy Medford" development framework and checklist.

Create a development framework and checklist that provides developers with the expectations that the City has for new developments, based on health, resilience, and sustainability goals. This checklist will include healthy design parameters for the site and building to be integrated under best case scenarios, such as connections to adjacent multi-use paths, bicycle racks, permeable surfaces, community gardens, spaces of refuge or spaces that can accommodate resilience hubs (see strategy PH 2.3), efforts to monitor and improve indoor air quality, among others. This checklist would align with requirements for vegetation and green space (see strategy EN 1.2).

ALSO:

See strategy BE 1.1, which works to create strong, diverse, and welcoming communities through the protection and expansion of affordable housing in Medford, along with policies to prevent displacement and housing discrimination.

ALSO:

See strategy EN 1.2, which involves updating zoning codes and the development review process to better incorporate green spaces and natural systems in new development and redevelopment projects to mitigate heat, prevent flooding, protect air and water quality, and support physical and mental wellbeing.

ALSO:

See [strategy T 1.4](#), which involves updating city codes and zoning ordinances so that new development contributes to walkable, transit-oriented communities.

ALSO:

See [strategy BE 1.2](#), which involves updating zoning codes and the development review process to encourage high performance buildings that keep building occupants safer and healthier, particularly during temperature extremes.

ALSO:

See [strategy BE 1.3](#), which involves updating zoning and building design guidelines to reduce health and safety risks from flooding.

ALSO:

See [strategy PH 1.3](#), which includes potential zoning amendments to allow for and encourage small grocery stores in residential districts, where commercial uses are currently prohibited, in order to mitigate food deserts.

Relevant Precedents

- See the [“Healthy Development Checklist”](#) developed by the Riverside University Health System - Public Health.
- See [“Health in the Development Review Process”](#) developed by the American Planning Association.
- See [“How to Create and Implement Healthy General Plans”](#) developed by ChangeLab Solutions and Rami + Associates.
- See [“Reinventing Development Regulations”](#) (2017) by Barnett and Blaesser.
- See the [“TOD Standard”](#) (Version 3, 2017) by the Institute for Transportation and Development Policy.
- See the U.S. Green Building Council [LEED for Neighborhood Development](#) (LEED ND) rating system for healthy neighborhood design parameters.
- See Waterfront Toronto’s [Green Building Standards](#), which include requirements for spaces of refuge among many other forward-thinking health, sustainability, and resilience parameters.

What's the urban heat island effect?

Surfaces common in cities, including asphalt, steel, and brick, absorb and re-emit more heat from the sun than natural landscapes such as forests, grass, and bodies of water. As a result, urban areas can experience much warmer temperatures than nearby rural areas, a pattern called the “urban heat island effect.” The geometry and spacing of buildings can also trap heat within the city, and human activities (such as driving a car) discharge heat, which also contribute to warmer city temperatures. As a result, urban areas can be up to 7°F hotter than outlying areas during the day, and up to 5°F hotter at night.²²



Strategy PH 1.2.

Improve Medford's capacity to stay cool in periods of high heat.

What's useful to know

Climate change is expected to increasingly bring record hot temperatures and more frequent heat waves. By 2050, Medford could see three times as many days over 90°F per year than we saw on average between 1970 and 2000, as well as more frequent days where temperatures surpass 100°F. High temperatures and prolonged exposure to heat can cause heat exhaustion and heat stroke, worsen mental health, and exacerbate chronic health conditions such as asthma, heart disease, kidney disease, and diabetes, among many other stresses to health and wellbeing. High heat has shown to disproportionately affect low income residents, linguistically isolated residents, and residents of color, and can be more dangerous for older adults, youth, residents who work in environments with higher exposure to heat, and residents living with disabilities or who take certain medications.²³ In other words, much of the Medford community will be highly affected by high temperatures and mitigating the health impacts from heat is a priority for climate justice.

Surfaces in the city, such as dark-colored pavement and building roofs, absorb and radiate a significant amount of heat from the sun. This "urban heat island

effect" makes urban areas hotter than surrounding rural areas, and especially urban areas with fewer green spaces or street trees. According to a heat island analysis conducted by the Metropolitan Area Planning Council (MAPC), Medford Square, West Medford around the MBTA commuter rail station, South Medford in the neighborhoods near the Medford Public Library, South Medford directly south of Harvard

Due to the urban heat island effect, parts of Medford Square, West Medford, South Medford, and Wellington are all in the 5% hottest areas in the MAPC region.

Street, Medford High School, and areas in Wellington near the McGlynn and Andrews Middle Schools are all in the 5% hottest areas in the MAPC region.²⁴ In 2017, MAPC completed the Mystic Avenue Corridor Green Infrastructure Plan for the City, which identified approaches for addressing exposure to extreme heat along Mystic Avenue, in particular. Adapting Medford's



MAIN STREET, SOUTH MEDFORD • PHOTO BY CITY OF MEDFORD

streetscapes to retain less heat, through the tree canopy, green spaces, and with materials with high solar reflectance, will be critical for reducing surface and air temperatures, particularly for areas of the city that currently have high exposure to heat.

At the same time, high outdoor temperatures lead to high indoor temperatures, which can persist even after the heat drops outdoors. It is well known that Americans spend a significant portion (80-90%) of their time inside, and that high temperatures can lead to social isolation, particularly for people who live alone.²⁵ Many Medford households do not have access

to air conditioning in their homes; for many other households, operating air conditioning units increases financial insecurity, financial tradeoffs, and the risk of electricity shut offs due to high energy costs. Protecting residents against these tradeoffs, and improving energy efficient cooling options for homes and buildings throughout the city—such as through the installation of air-source heat pumps, which offer highly energy efficient air conditioning—will be key to adapting to heat in Medford. These retrofits will be particularly important for the city’s rental units, which tend to be less efficient than owner-occupied homes (see strategy BE 2.1 for further details).

Additionally, widespread access to areas in the city where residents can go to cool off, both indoors and outdoors, will help prevent heat-related illness during heat waves as well as help work against risks of social isolation. The Medford Public Library, Senior Center, and City Hall are three air-conditioned locations in the city where residents can go to stay cool, along with the High School Pool, Tufts Pool, Wright’s Pond, and water spray areas at Capen Park, Dugger Park, and Harris Park. Yet for many residents, the passes required for Tufts Pool and Wright’s Pond are cost-prohibitive, transportation to these sites can be difficult, and residents have highlighted that many parks would benefit from more shade. The City’s Open Space and Recreation Plan sets goals for expanding access to open space resources, specifically water access, and improving heat mitigation in parks. Both expanding access and awareness of these locations will be important for preparing for hotter temperatures.



The role of cooling sites in community supporting resilience

Widespread access to areas in the city where residents can go to cool off, both indoors and outdoors, will help prevent heat-related illness during heat waves as well as help work against risks of social isolation.

HARRIS SPLASH PAD
PHOTO BY CITY OF MEDFORD

Actions

PH 1.2.A

Expand access to community cooling sites.

Launch a participatory mapping process to collectively map public areas in the city where residents go to cool off. These areas may include parks and open spaces, public pools and bodies of water, fountains and splash pads, public air conditioned buildings, and the City's designated cooling shelters. Collectively identify gaps (areas with very few cooling sites) and access barriers, which may relate to cost, transportation, handicap accessibility, hours of operation, cultural or language barriers, among other factors. Work with community partners to expand access to cooling sites based on community needs and priorities, prioritizing the needs of people who are disproportionately affected by high heat, including low income residents, linguistically isolated residents, residents of color, older adults, youth, residents who work in environments with higher exposure to heat, and residents living with disabilities. Consider how these sites play a role in combating social isolation during periods of high heat, and help to build social connections to draw on in emergencies.

PH 1.2.B

Launch a "Cool Medford" outreach campaign.

Collaborate with community partners and healthcare providers to launch a "Cool Medford" outreach campaign that uses creative marketing and media to provide tips and resources for dealing with higher temperatures, before and during a heat wave. Provide multilingual resources and information on

preventing heat-related illness; building retrofits that can help keep indoor spaces cooler and save homeowners money; heat-related tips for employees and employers; the City's indoor and outdoor cooling sites; and how to give or receive help in a heat emergency. Establish ways that residents and businesses can provide information back to the City in order to continuously improve information, resources, and public spaces for staying cool, prioritizing insight and recommendations from community members who are likely to be disproportionately affected by high heat.

PH 1.2.C

Adopt design and material standards for cooler surfaces.

As part of the city's zoning and site plan review process, encourage new development and redevelopment projects to incorporate shade structures, "cool roofs," and "cool pavements" that meet specified solar reflectance standards. These standards could be incentivized as part of a points-based system, such as through a Green Score (see strategy EN 1.2), although should receive lower point values than green roofs or vegetated areas which offer a larger range of co-benefits.

PH 1.2.D

Update and implement the Mystic Avenue Corridor Green Infrastructure Plan.

Identify projects and opportunities to implement the Mystic Avenue Corridor Green Infrastructure Plan, developed in 2017, which focuses on interventions to reduce the urban heat island effect along Mystic

PUBLIC HEALTH

Ave. Ensure that all future planning initiatives related to Mystic Ave rezoning, development, or capital improvements reflect the Green Infrastructure Plan.

PH 1.2.E

Reintegrate drinking fountains in parks and public spaces.

Reintegrate public drinking fountains throughout the city in order to expand free public access to water. Adopt standards for integrating drinking fountains in park renovations, and plan for drinking fountains and associated hookups to potable water as part of park capital planning. Seek additional opportunities for integrating drinking fountains in public spaces throughout the city; consider both permanent fixtures as well as fixtures that can be temporarily deployed on fire hydrants during periods of extreme heat.

PH 1.2.F

Assess the impacts of high heat in Medford Public Schools.

Assess the impacts of high heat in Medford Public Schools, and whether the buildings are able to maintain comfortable temperatures to adequately support health, focus, and learning. Pursue building retrofits to improve indoor air quality and thermal comfort year-round and specifically during extreme temperatures.

PH 1.2.G

Update emergency management plans to contend with high heat.

Continue to update and maintain heat emergency protocols, triggered by the heat index, including alert systems, channels of communication, procedures for

opening and providing access to cooling shelters, and ensuring the resilience of those facilities. Work with Medford service providers and **frontline communities** to identify challenges to effective and equitable heat response procedures, and to vet and improve procedures. Consider cultural, language, accessibility, health, and personal needs, including, for example, shelter or cooling center options where residents with pets can bring their animals.

PH 1.2.H

Advocate review of policies that affect access to water, heating, and cooling.

Work with state and regional partners to advocate for a review and update to policies that regulate utility shut offs and requirements around HVAC provision to best protect the health and safety of residents during extreme heat and cold temperatures. Ensure that provisions align with New England seasons and account for changing temperatures with climate change. For example, state laws requiring that buildings be able to provide heat into June can inadvertently prevent buildings from switching to air conditioning when needed. Advocate for protection against electricity and water shut offs during extreme heat.

PH 1.2.I

Advocate for MBTA investments in keeping transit cool.

Advocate for MBTA investments in monitoring temperatures in buses, trains, and train stations and ensuring that all vehicles and transit stations have adequate systems for keeping transit riders cool during high temperatures.

PH 1.2.J

Advocate for heat exposure occupational health and safety standards.

In alignment with the Metro Mayors Coalition Heat Preparedness Plan, advocate at the federal (OSHA) and state level for the adoption of specific heat exposure occupational health and safety standards to improve prevention planning and enforcement. Advocate for enhancing occupational health and safety surveillance programs to better track changes in occupational heat exposure and patterns of injury and illness in relation to climate changes.

ALSO:

See strategy EN 1.1, which focuses on expanding Medford's tree canopy. Action 1.1.B, in particular, involves identifying priority areas for growing the city's urban forest by focusing on areas with low tree canopy and high exposure to heat, among other factors. The Trust for Public Land surface temperature data will be used as a prioritization factor in this process.

ALSO:

See strategy EN 1.2, which involves updating zoning codes and the development review process to better incorporate natural systems in new development and redevelopment projects, with a specific focus on their capacity to mitigate heat.

ALSO:

See strategy BE 1.2, which focuses on providing information and incentives to help property owners and tenants increase building energy efficiency and switch to electric and renewable building systems. Many building retrofits that improve

energy efficiency—such as improving insulation or shading south-facing windows—help keep indoor temperatures comfortable on hot days. Electric air-source heat pumps provide both heating and cooling, and therefore switching to these building systems will also expand access to efficient air conditioning.

ALSO:

See strategy BE 3.2, which includes replicating resilient power systems in the city, including planning for the installation of backup power at shelter facilities to reduce their risk of losing cooling capacity during periods of extreme heat.

ALSO:

See strategy T 1.4, which includes acquiring land rights to install bus shelters throughout Medford, which can provide shade and help protect residents riding public transit from the effects of high heat.

ALSO:

See strategy PH 2.3, which includes expanding and tailoring Medford's volunteer-led "Are You Ok?" program to also extend help to Medford residents during climate emergencies. The program was designed during the COVID-19 pandemic to help identify and offer assistance to residents who may need support, and can be adapted to connect residents with transportation to cooling locations.

Relevant Precedents

- See Somerville, MA "[Keeping Cool in Hot Weather](#)" webpage.
- See Cambridge, MA "[Cool Factor](#)" [recommendations](#) from the Resilience Zoning Task Force (city code updates under development as of 2021).



MICRO FOOD PANTRY
PHOTO BY CITY OF MEDFORD

Strategy PH 1.3. Increase local food system resilience.

What's useful to know

The global and local impacts of climate change on food production, distribution, access, and affordability are complex and uncertain. Droughts, floods, and new pests introduced by climate change are expected to bring increasing volatility for global food systems, with the potential to create a net rise in food prices. In New England, agriculture and fisheries will likely be challenged by shifts in growing seasons, pest outbreaks, warming oceans, and ocean acidification. At a city scale, Medford's food systems may be most acutely affected by interruptions in regional distribution and local food access, including closures of roads, public transit, grocery stores, and corner stores due to storms and flooding.

While climate change brings new issues for access and affordability, one in nine Medford households already lacks access to sufficient healthy food, illustrating the vulnerability in our food systems currently. Parts of South Medford and Wellington are considered "food deserts," where a significant portion of residents live at least one mile from a supermarket, or live at least a half mile from a supermarket and do not have access to a vehicle.²⁶ In other instances, Medford residents live within proximity to a large grocery store, but prices are above the means of most residents in the area. Medford Public Schools

estimates that 45% of students district-wide are eligible for free or reduced lunch, and the Greater Boston Food Bank, which works with 190 municipalities within Eastern Massachusetts, has identified Medford as a "priority city" in their efforts to address food insecurity.²⁷ In other words, our systems for growing, producing, distributing, pricing, and accessing food are already failing to function in ways that support all residents. Creating a more resilient food system requires that we start with these challenges.

The City of Medford maintains that access to affordable, healthy, culturally-appropriate, and nutritionally-balanced meals is a human right; a resilient food system is one where that right is fulfilled for all residents now and for generations to come, both on a daily basis and in an emergency. In 2017, Medford convened a Food Security Task Force, which outlined a vision for a food secure Medford and the City's first Food Security Plan. In 2020, Medford's Mayor, City Council, and School Committee committed to make Medford hunger-free by 2028. While we still have a ways to go, our resources for a healthy, regenerative, resilient, and inclusive food system are growing. Since 2016, Medford now has three community gardens, and in 2020, Medford welcomed the opening of the Mystic Community Market, a market-style pantry for

healthy groceries. Moving forward, we will continue to expand ways to grow, choose, produce, transport, and share nutritious and sustainable food, building the connections and community infrastructure for a multifaceted and resilient food system. This strategy builds on the recommendations outlined by the Food Security Task Force in order to do so.

Actions

PH 1.3.A

Establish a Food Policy Council.

Continue to establish a Food Policy Council in Medford where community service providers, Medford city staff, and residents who have experienced/are experiencing food insecurity work together to shape policies, programs, and projects for a more resilient food system. Compensate members who are serving as Medford residents to remove financial barriers to participation (see strategy PH 2.3). In particular, the Food Policy Council will assess gaps or breakdowns in food production, distribution, and access during the COVID-19 pandemic as a lens for understanding future food system vulnerabilities with climate hazards—such as, for example, the need for expanded out-of-school nourishment opportunities when schools are closed.

PH 1.3.B

Create neighborhood food access action plans.

Evaluate access to affordable and healthy food options on a neighborhood basis in Medford.

Investigate a suite of complementary options for mitigating food deserts both through expanding transportation options and through bringing food options closer. Transportation options may include improving bus routes and para-transit options for accessing grocery stores, improving bike path connections, or launching an electric vehicle car-share pilot program in areas with low vehicle access (see strategy T 2.2). Expanding neighborhood food proximity may include zoning amendments to allow for and incentivize small grocery stores in residential zoning districts where they are currently prohibited, working with grocery stores and regional partners to expand income-tiered or affordable grocery delivery programs, expanding hours or locations for the farmer's market, or working with the Chamber of Commerce to explore mobile markets and pop-up food businesses as a joint way to grow new businesses and mitigate food deserts in Medford. Implement this action in coordination with strategy PH 1.1.2.

PH 1.3.C

Develop a community food hub.

Partner with Medford food pantries, service providers, and community groups to develop a community space for food education and mutual aid with a community kitchen, affiliated community farm, and cold storage for gleaning initiatives. The goal of the center would be to serve as a multilingual and multicultural community space where neighbors of all ages, abilities, and backgrounds can celebrate and share in growing, preparing, and eating nourishing food. The food center will focus on building a discourse about the root causes of food insecurity,



WINTHROP STREET COMMUNITY GARDEN
PHOTO BY [NEED CREDIT](#)

breaking down the stigma around food insecurity, and building networks for collective care, drawing from lessons learned from the COVID pandemic. The community food hub may be in a new location, or build off current community assets, and will be implemented in alignment with the city's resilience hubs (see strategy PH 2.3).

PH 1.3.D

Create a platform for grocery business continuity planning.

Work with grocery stores and corner stores to develop business continuity plans to prevent temporary or long-term store closures, inventory loss, and loss of community access to food and other supplies. Consider road network vulnerabilities, distribution warehouses, storage capacity, and potential transferable lessons gleaned from supply and distribution challenges during the COVID-19 pandemic. Encourage relationships between grocery businesses, restaurants, pantries, the community food hub (see action PH 1.3.C), and other mutual aid spaces to most effectively share excess or otherwise unearmarked food (see action PH 1.3.F).

PH 1.3.E

Grow the city's community gardens and urban agriculture.

Develop an Equitable Community Garden Plan that creates a vision for community gardens in Medford as shared community resources for enhancing local food production, distribution, and access. As part of Medford's Comprehensive Master Planning Process, revise city codes and zoning to better support small-

scale urban agriculture and to make land available for urban agriculture and community gardens to meet the increasing demand for garden plots. To support just and equitable access to healthy food, garden or agricultural plot allocations will include priority for community members with low or no incomes, people of color, and recent immigrants whenever possible.

PH 1.3.F

Expand systems for food recovery.

Work with community partners to expand food recovery from restaurants, grocery stores, produce markets, or dining facilities to both address food insecurity and reduce food waste. As part of the Equitable Community Garden Plan (see action PH 1.3.E), identify ways to facilitate food gleaning from community gardens and participating private gardens to be distributed through low-cost or no-cost food shares.

PH 1.3.G

Increase the number of providers accepting food assistance.

Assess the number of locations within Medford that currently accept federal and state food assistance services such as WIC, SNAP/EBT, and HIP, and the amount of dollars that are spent locally through those services. Enlist more stores, markets, and community supported agriculture (CSA) programs to accept food assistance programs, which will both increase food affordability and increase dollars spent locally.

PH 1.3.H

Expand city staff and resources dedicated to food resilience.

Expand city staff and resources dedicated to collaborating with residents and community groups to enhance community resources, food security, and food system resilience.

ALSO:

See strategy T 2.2, which includes launching a pilot income-tiered electric vehicle car share program. Locating this car share program in food desert neighborhoods would double as a way to expand access to food options.

ALSO:

See strategy PH 2.3, which includes expanding resilience hubs in Medford, which are community spaces designed to host a range of services and resources. The food hub or other food services (community kitchen, pantry, social assistance, community space for events, etc.) may be integrated into one or more resilience hubs.

ALSO:

See strategy EN 1.1, which includes developing an urban forest master plan, including investigating opportunities and public support for urban orchards.

Relevant Precedents

- See [“The Stop” Community Food Center](#) in Toronto.
- See the [Mack Park Food Farm](#) in Salem, MA.
- See the [Somerville Community Growing Center](#) in Somerville, MA.
- See the [Sustainable Development Code](#) sample codes and case studies for supporting urban agriculture and mitigating food deserts.
- See urban farming ordinances in [Revere, MA](#) and [Somerville, MA](#).
- See [“Municipal Strategies to Increase Food Access”](#) by the Massachusetts Department of Public Health and Pioneer Valley Planning Commission.

Strategy PH 1.4.

Make it easier to reduce, reuse, and recycle materials to restore or renew value, eliminate waste, and decrease pollution.

What's useful to know

Less than 1% of Medford's greenhouse gas emissions come from waste, including the incineration of solid waste and wastewater treatment. Medford's solid waste is currently shipped to the Wheelabrator Saugus waste-to-energy facility where the waste is burned, the heat is used to produce electricity, and the residual ash is sent to an ash landfill. While incineration significantly reduces greenhouse gas emissions compared to a landfill—and includes the added benefit of electricity production—the ash produced contains heavy metals and toxic compounds, such as dioxins, that are harmful to the environment and human health. The Wheelabrator Saugus facility was scheduled to close in 1996 due to environmental concerns, but it has been granted a number of extensions and expansions to continue to dispose of ash beyond the original limit. There are ongoing concerns that equipment malfunctions and the lack of a lining on the landfill will continue to release toxins into the air, water, surrounding wetlands, and neighboring communities; large storms brought by climate change increase this risk.

A new solution is urgently needed, and the most long-term, sustainable option is to nearly eliminate the need for solid waste disposal altogether. About 80% of the materials being sent to the Wheelabrator Saugus facility don't need to be sent there; these include food waste, paper, cardboard, glass, metals, certain plastics, textiles, electronics, mattresses, and other materials that can be composted or recycled. Even accounting for the shipping of recycled material, recycling materials saves three to five times more energy compared to burning those materials for electricity.²⁸ Material reuse and recycling industries also create more jobs than traditional waste disposal, and present new opportunities for businesses to save money.²⁹ Starting in 2014, MassDEP implemented an organic waste ban that requires businesses and institutions that dispose of one ton or more of food or other organic waste per week to recycle (e.g., compost) this waste. An economic analysis of the ban conducted in 2016 showed that it generated \$175 million in economic activity, and contributed to the creation of 900 local jobs.³⁰

Medford continues to make progress on reducing trash disposal, in part driven by the leadership of our city's youth. In 2018, a group of Medford High School students created an online petition calling for the elimination of plastic bags in the city, which received more than 600 resident signatures and led to the City's plastic bag ordinance to phase out the use of thin-film plastic bags at retail establishments. Students at

A new solution is urgently needed for managing waste, and the most long-term sustainable option is to nearly eliminate the need for solid waste altogether.

Medford Public Schools have likewise advocated for composting across the school district; in 2019, the City initiated a Zero Waste Assessment of Medford Public Schools, kickstarted by a technical assistance grant from MassDEP, to assess the feasibility. In May 2021, the City received a grant to install recycling dumpsters at the schools which will expand capacity for recycling. In 2019, the City also partnered with the Tufts University Department of Urban and Environmental Policy and Planning to have graduate students research options and the feasibility of citywide composting programs.³¹ As of July 2021, Medford rolled out composting services with a preferred vendor, which will include support for low-income residents to alleviate costs. All of these initiatives will help Medford divert more material from the solid waste stream. Becoming a zero waste city brings great opportunity—to conserve resources, protect public health, reduce

emissions, build new material reuse and recycling industries, and create sustainable jobs.

Actions

PH 1.4.A

Commit to zero waste.

Make a citywide commitment to achieving zero waste, through which Medford will track its efforts to conserve resources, reduce pollution, recover materials, create new value, and strengthen a just and sustainable economy. Launch a Medford Zero Waste Task Force for working towards the city's zero waste goals, and advocate for a zero waste commitment at the state level. Consider working regionally with other North Shore communities that currently send waste to Wheelabrator Saugus to implement zero waste initiatives across the North Shore.

PH 1.4.B

Evaluate current recycling and waste policies to advance equitable service.

Evaluate trash and recycling services citywide, considering policies, receptacles, service providers, and costs to identify where residents and businesses may not have equitable access to recycling and trash services. Work with community liaisons who have strong connections to households in their building or neighborhood to conduct outreach, to share information on the City's trash and recycling goals, and to learn from residents and businesses about: what is working, and what isn't? Use this information to shape updated policies and services.



What do we mean by zero waste?

Zero waste is a goal to minimize (and eventually eliminate) all waste by using resources more efficiently, and by recycling materials and products back into nature or the marketplace to be reused again. It requires a “whole system” approach, including designing products better to reduce the toxicity and the amount of materials used, and creating new industries, markets, and processes to reuse and recycle products and materials. While the ultimate goal is to have no materials sent to incinerators or landfills, in practice, zero waste targets set by cities throughout the United States and globally generally refer to 90% of waste diverted from the waste stream.

MEDFORD RECYCLING AND COMPOST BINS
PHOTO BY CITY OF MEDFORD

PH 1.4.C**Update private hauler regulations and recycling requirements.**

Update private hauler regulations to mandate that haulers accept recycling in addition to trash pickup for residences and businesses not on city trash/recycling pickup. Currently haulers are only required to remove trash. Explore model waste hauler ordinances and evaluate the feasibility of requiring haulers to collect recycling for free. Following the updates to the private hauler regulations, adopt requirements that owners of multifamily and commercial buildings not on city trash/recycling pickup offer recycling infrastructure or services for tenants. Require that commercial businesses recycle cardboard, paper, glass, plastic, and metal waste. Use the insight from action PH 1.4.B to shape these policies.

PH 1.4.D**Continue to roll out, promote, and develop curbside composting.**

Contract with a preferred vendor to provide Medford households discounted rates for curbside composting, with a further subsidized rate that alleviates costs for low-income households. Develop an informational campaign to promote the program. Streamline information and resources to encourage commercial properties to also partake in curbside composting.

PH 1.4.E**Partner with students to advance Zero Waste Medford Public Schools.**

Partner with students and Medford Public School staff who are interested in leading a Zero Waste Team for Medford Public Schools. The Zero Waste Team would identify goals and launch campaigns, programs, and initiatives, with support from the City, to reduce, reuse, repurpose, and recycle waste items at Medford Public Schools.

PH 1.4.F**Launch targeted waste reduction initiatives with local businesses.**

Partner with retailers, events, and food service establishments to reduce packaging and single use plastics, and encourage the use of sustainable products. Initiatives could include branding, marketing, or recognition for single-use plastic reduction efforts or technical assistance in identifying suppliers for compostable alternatives. Collaborate with students involved in the Center for Citizenship and Social Responsibility (CCSR) on aligned efforts, and partner with the Chamber of Commerce to recognize “waste innovation champions” in Medford who adopt leading practices to minimize waste.

PH 1.4.G

Expand recycling education.

Work with community partners to launch an education and information campaign to build awareness around recycling protocols, to produce informational resources, and to encourage good recycling practices. Align with initiatives to build awareness on composting (see action 1.4.D).

PH 1.4.H

Evaluate the local potential for construction material reuse.

Work with a graduate student class or research team to evaluate the potential benefits and challenges of adopting a deconstruction and construction material reuse policy. Objectives of the study include identifying deconstruction and material reuse best practices and policy examples, quantifying the construction waste produced in the city, setting targets for construction waste reduction, evaluating the viability of material reuse markets in the region, and working with the local construction industry to identify opportunities and challenges for adopting a deconstruction and construction material reuse policy.

ALSO:

See strategy PH 1.3, which addresses food recovery and can help reduce food waste.

Relevant Precedents

- See zero waste planning case studies in “The Zero Waste Masterplan: A Guide to Building Just and Resilient Zero Waste Cities” by the Global Alliance for Incinerator Alternatives (GAIA).
- See “How Communities Have Defined Zero Waste” by the US Environmental Protection Agency.
- See Boston, MA “Zero Waste Boston” plan.
- See municipal composting program case studies in the “Organics Diversion in the City of Medford, Massachusetts” report produced by Tufts University Department of Urban and Environmental Policy and Planning.



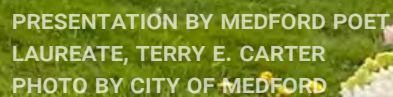
What about wastewater treatment?

A large portion of Medford's waste emissions come from treating wastewater. All of Medford's residential, commercial, and industrial wastewater is sent to the Deer Island Sewage Treatment Plant, which is owned and operated by the Massachusetts Water Resources Authority (MWRA). The Deer Island facility was built in 2000 and takes advantage of a number of systems to recycle waste energy and material, and to reduce greenhouse gas emissions. The facility's 12 anaerobic digesters break down organic waste and produce a compressed and drier waste sludge, along with biogas. This sludge is sent to MWRA's pelletizing facility where it is turned into fertilizer pellets for gardening and landscaping. The biogas is burned in boilers, generating nearly all the facility's heat for the buildings and treatment processes, as well as electricity. Since 2006, MWRA has been tracking greenhouse gas emissions generated by facility operations and the treatment of municipal wastewater, and has implemented renewable energy and energy efficiency programs to continue to drive down greenhouse gas emissions. From 2006 to 2018, MWRA cut its greenhouse gas emissions by roughly one third.³² MWRA continues to investigate opportunities for co-digestion (processing food waste and wastewater together), which can significantly increase biogas production and allow for more efficient generation of heat and electricity.

Objective PH2: Invest in Medford's people and businesses for strong and thriving communities.

Whereas Objective PH 1 focuses on the physical aspects of the city such as the design of our neighborhoods, our food systems, and our waste systems, Objective PH 2 focuses on people: how we make decisions equitably, build authentic relationships, expand our skills, and collaborate effectively to create healthy and thriving communities. These aspects are all related to supporting “social cohesion,” or strong relationships and a sense of solidarity to achieve shared wellbeing. A community that fights exclusion and marginalization, advances trust, and fosters a sense of belonging has a greater capacity to adapt to new stresses and protect collective health and wellbeing, particularly in the face of climate change.³³

Investing in our people requires us to address the underlying drivers of health disparities and vulnerability, in particular inequitable access to resources, opportunities, and political voice. By dismantling these barriers, we create more informed, inclusive, and just climate policies that benefit all Medford residents. We create pathways for all residents to participate in, contribute to, and benefit from the growth of a regenerative economy. And we expand the community spaces, collaborative platforms, and collective wisdom for meeting community needs and building a healthy and thriving future for all Medford residents.

[illegible]

1. The first step is to identify the problem.
 2. The second step is to define the problem.
 3. The third step is to analyze the problem.
 4. The fourth step is to develop a solution.
 5. The fifth step is to implement the solution.
 6. The sixth step is to evaluate the solution.

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 6. The sixth step is to evaluate the solution.
 7. The seventh step is to monitor the solution.
 8. The eighth step is to maintain the solution.
 9. The ninth step is to improve the solution.
 10. The tenth step is to document the solution.

Strategy PH 2.1.

Design processes for partnering with and listening to community members based on procedural and structural equity.

What's useful to know

In June 2020, Medford launched the first of several Community Conversations on Racism. The conversation came in the wake of George Floyd's murder in Minneapolis and a surge in local and national reckoning on how racism continues to be a civil rights and public health crisis in the United States. The City asked about people's lived experiences regarding race and racism in Medford, steps Medford can take to end racism, how Medford can be effective in community policing for all members of the community, and how the City can better communicate to all residents. Following the conversation, the City released the City of Medford's Social Justice Roadmap, a living document that will be continuously updated and that reports on initiatives, programs, and policies to address concerns brought up in the community conversation, and ongoing efforts to become a more equitable, inclusive, and anti-racist city.

In particular, the roadmap addresses efforts to advance procedural and structural equity in Medford, and specifically, ways to break down barriers in how community members are able to learn about, participate in, and make decisions with respect to policies and programs that affect their lives. A just

and equitable, resilient, and carbon neutral future in Medford will only be achievable if community members who have been historically excluded from local decision-making processes—many of whom are already experiencing the impacts of climate change most acutely—are positioned to both lead and participate in ongoing decision-making to achieve our climate goals. Part of this process involves identifying and addressing the systems and barriers that continue to lead to that exclusion.

In the spring of 2021, with funding from the Massachusetts Municipal Vulnerability Preparedness (MVP) program, the City hired five Community Liaisons who bring strong ties to populations in Medford that have been consistently underrepresented in local government. The Community Liaisons are working with City staff to host community listening sessions, build stronger relationships and communication methods, and to co-facilitate the design process for community-driven programs and policies. This process will identify ways to continue to break down barriers and to center the voices of **frontline communities** in the city's climate action. The actions below align with both these efforts and those underway in the Social Justice Roadmap.

Actions

PH 2.1.A

Expand staff and resources dedicated to creating an inclusive and anti-racist city.

Expand Medford's Offices of Diversity and Human Resources (or alternative office) in order to dedicate more staff and resources to creating an inclusive and anti-racist city. The expanded office will help build Medford's capacity for transparent, culturally-conscious, and relationship-focused dialogues between the city and community, particularly among Medford's communities of color and low income communities, in order to develop more inclusive planning processes and to review and develop policy and programs that support equity in the city.

PH 2.1.B

Grow the cultural consciousness of Medford's city staff and leadership.

Institute racial equity and implicit bias training for all city staff to encourage equitable and anti-racist policy-making. Require cultural sensitivity training as part of the onboarding process for participating in Medford's boards and committees and for all new city staff.

PH 2.1.C

Build capacity for safe, accessible, and inclusive city meetings.

Provide training to city staff, elected officials, and representatives of boards and committees on how to facilitate safe spaces and manage meetings in ways

What are procedural and structural equity?

Procedural equity refers to the process (procedure) for making decisions. An equitable process, such as when developing or implementing programs or policies, is when the people who will be affected by those decisions are involved in ways that are inclusive, accessible, and authentic.

Structural equity refers to recognizing that "the playing field is not equal." To achieve structural equity, programs and policies must acknowledge and account for the fact that historical, cultural, and institutional patterns and prejudices have routinely and structurally given advantages to certain groups (such as residents that are white, affluent, able-bodied, cisgender, heterosexual, and English-speaking), while creating chronic and cumulative disadvantages for people with identities that differ from the ones listed above.

Procedural and structural equity are critical to developing and implementing climate policies and programs that can reduce the disproportionate harm caused by climate change on frontline communities, mitigate the root causes of that disproportionate harm, and ensure that climate action policies do not reinforce existing inequities. Creating a more resilient, sustainable, and thriving city requires that we meet that vision for all residents.

PUBLIC HEALTH

that focus on listening, respect, and understanding of cultural differences. Institutionalize policies and systems for making information and city meetings widely accessible for all residents, regardless of language, income, resources, or disability. Adopt protocols such as consistent translation of materials; American Sign Language and spoken language interpretation; expanded meeting times, locations, and formats (in-person and virtual); public transit and ADA accessibility for in-person meeting locations; and childcare for in-person meetings. Regularly seek feedback from community members in order to evolve systems as needed, so that the design of meetings and information continue to meet community needs over time.

PH 2.1.D

Provide equitable compensation for participation on boards and committees.

Develop a sustained model for financially compensating community members to participate on committees, working groups, and advisory boards for city planning initiatives in order to break down financial barriers and support equitable participation in city governance. Evaluate the equity implications of current committee stipends, and develop a standardized compensation structure and policy that values both technical and lived expertise. Adopt regular payment schedules as opposed to disbursing stipends every six months to further break down financial barriers to participation. Institute a simple application structure, and widely promote the positions via community organizations, faith-based organizations, the Medford Housing Authority, Medford Public Schools, and other groups.

PH 2.1.E

Create more opportunities for neighborhood or ward representation.

Evaluate options for increasing representation in city governance by neighborhood or ward. Options could include creating a neighborhood advisory council with representation from each of Medford's eight wards, or exploring transitioning to a city council structure where council members are elected by ward. This could also include making a conscious effort to consider geographic diversity when staffing boards and commissions. Neighborhood representation will better help to ensure that city governance is accountable to all neighborhoods in Medford and can help to advise on the implementation of climate action and adaptation strategies that involve neighborhood-specific approaches—for example, in setting neighborhood-specific tree canopy priorities (see strategy EN 1.1), in identifying areas to cool off and barriers to accessing those sites (see strategy PH 1.2), and in evaluating neighborhood access to affordable food (see strategy PH 1.3). Neighborhood or ward representatives can also serve as liaisons between their respective neighborhoods and the City by sharing information, gathering feedback, and inviting residents to participate in workshops, events, or other planning efforts.

PH 2.1.F

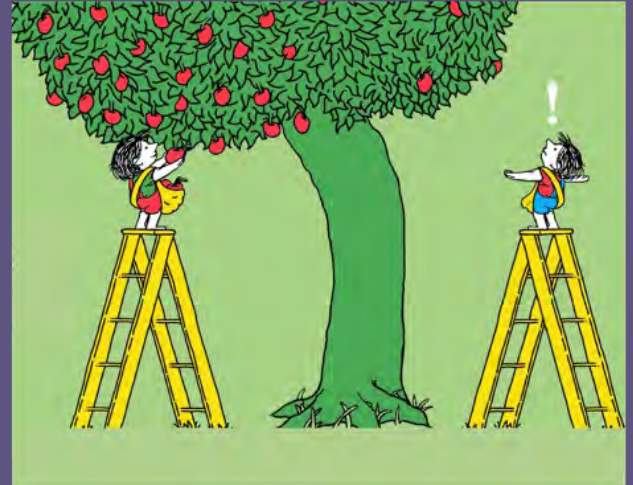
Continue to see that Medford's diversity is reflected in city leadership and staff.

Set goals for increasing the diversity of city leadership and staff and for making local boards and commissions more representative of Medford's

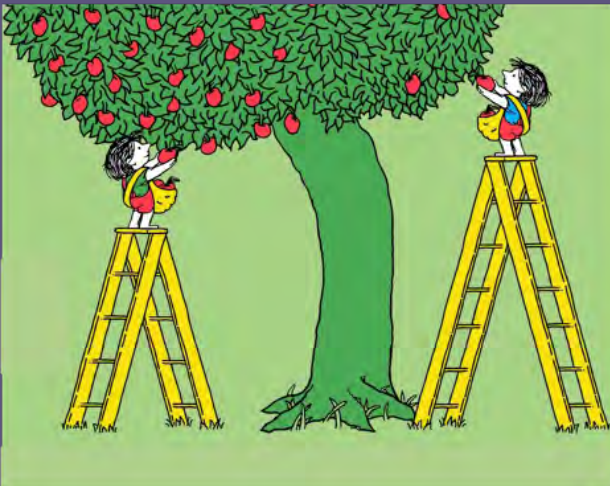
The difference between equality, equity, and justice



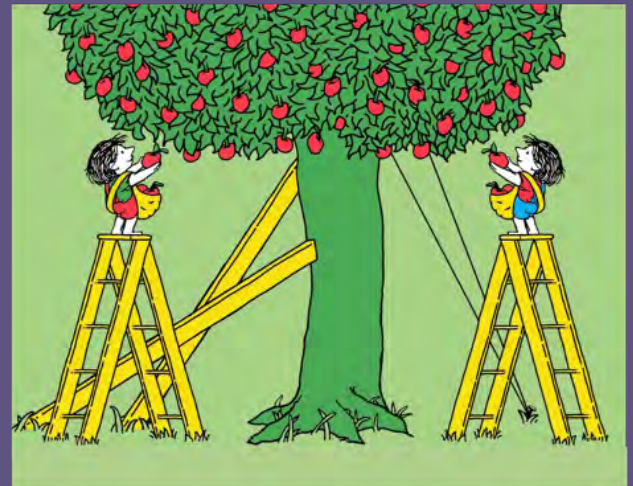
Inequality - unequal access to opportunities



Equality - evenly distributed tools and resources



Equity - custom tools that identify and address inequity



Justice - fixing the system to offer equal access to both tools and opportunity

residents. Expand and maintain diversity through equitable recruitment, hiring, and retention supports, including developing working environments that can be flexible or accommodating to diverse family, health, or transportation challenges or needs. Regularly evaluate progress towards meeting those goals.

ALSO:

See [overarching strategy 1.1](#), which includes launching a Climate Equity Council made up of members of Medford's frontline communities, namely low-income communities and Black, Indigenous, and communities of color, with the acknowledgment that due to long-standing structural inequities, frontline communities are most likely to experience the first and worst effects of climate change.

ALSO:

See [overarching strategy 1.1](#), which includes using the Climate Action and Adaptation Plan's Climate Equity Implementation Framework (included in the appendix of the plan) to guide the plan's implementation.

City of Medford's Social Justice Roadmap

The City of Medford's [Social Justice Roadmap](#) is a living document that will be continuously updated and that reports on initiatives, programs, policies, and ongoing efforts to become a more equitable, inclusive, and anti-racist city. In particular, the Social Justice Roadmap works to respond to many of the issues highlighted during Medford's first [Community Conversation on Racism](#).

Relevant Precedents

- See the Government Alliance on Race and Equity (GARE) [racial equity toolkits](#).
- See "[The Planner's Playbook - A Community-Centered Approach to Improving Health and Equity](#)" by ChangeLab Solutions.
- See "[The Spectrum of Community Engagement to Ownership](#)" by the Movement Strategy Center.
- See the King County, WA [Equity Cabinet](#).
- See the All Aces Inc. Learning Community "[IntentionallyAct.com](#)."
- See the [National Implicit Bias Network](#).

Strategy PH 2.2.

Support workforce development and training programs that can support the transition to a low-carbon, just, and resilient future.

What's useful to know

Transitioning to a low-carbon economy requires a workforce equipped with the skills to lead that transition, including people knowledgeable in energy efficiency technologies as well as constructing, retrofitting, and operating **high performance buildings**. It calls for new skillsets, for example, in renewable energy systems, electric vehicles and charging systems, material reuse and recycling technologies, as well as nature-based solutions such as green infrastructure, green roofs, and adaptive forest management. At the same time, local climate policies that catalyze growth in sustainable industries can be a driver for economic recovery and sustainable livelihoods—a critical opportunity as Medford, the state, and the country work to rebuild employment after the COVID-19 pandemic.

While **decarbonizing** the economy creates new markets, industries, and jobs, it also brings the opportunity to strengthen a more inclusive, just, and ultimately **regenerative economy**. A regenerative economy is one where our work and livelihoods continuously restore and build (as opposed to exploit and diminish) the long-term health and wellbeing of people and natural systems. Our ability to successfully

transition to a regenerative economy depends on economic systems that allow everyone to meaningfully participate in that transition—particularly for residents who have been excluded from current economic systems or who are transitioning from fossil fuel dependent industries. Wider access to workforce development, reskilling and upskilling, and business models that create more inclusive economic mobility and collective wealth will be critical.

Medford has a long history as a manufacturing center, and has many organizations locally and regionally that are equipping both youth and adults with vocational and technical skills to build, advance, or change careers—including, for example, Medford Technical Vocational High School (MTVHS), Medford Technical Institute Adult Education, Tufts Learning Center, Tufts at Tech, Best Hospitality Training, among many other organizations and companies supporting targeted workforce development. Students in the carpentry program at MTVHS, for example, learn about green building products, energy-efficient installation techniques and mechanical systems, and solar power. Vocational, technical, and career advancement programs will be important partners in building

pathways for Medford residents to build skills, careers, and business ventures that can lead the growth of Medford's low-carbon and regenerative economy.

Actions

PH 2.2.A

Partner to develop and promote local facilities management training.

Work with career development partners to develop a local facilities management training program with a focus on energy efficiency and building decarbonization, and specifically for municipal facilities management positions. Increase the number of municipal building operators with Building Operator Certification. Develop advancement opportunities for incumbent maintenance staff.

PH 2.2.B

Develop a city-sponsored youth employment program.

Develop a youth employment program in Medford that will connect youth and young adults with summer job opportunities to build professional skills and connections, and to create safe and productive spaces for youth to spend time in the summer. Such a program would facilitate job opportunities by providing subsidized wages for youth that work with selected employers, and by supporting youth with job readiness training and other resources. Consider opportunities to align city climate initiatives with youth employment options, including the tree ambassadors program (see strategy EN 1.1).

PH 2.2.C

Inventory and expand targeted career training in sustainable industries.

Partner with local and regional businesses, unions and industry trade groups, and vocational training organizations to identify skill gaps in growing sustainability industries and to develop aligned career training programs. In particular, target career paths that meet new needs driven by city climate action policy, such as construction trades focused on high efficiency heating, ventilation, and air conditioning (HVAC), solar photovoltaic and solar thermal, and electric heat pump technologies to meet the need for building retrofits and carbon-neutral new construction. Prioritize the recruitment and retention of Medford residents who face systemic and cumulative barriers to economic opportunity, including veterans, residents with disabilities, low income residents, formerly incarcerated residents, and Black, Indigenous, and residents of color.

Relevant Precedents

- See [Building Operator Certification for Boston's multifamily housing maintenance professionals](#).
- See [NYC Retrofit Accelerator](#) and training resources.
- See [Evergreen Cooperatives in Cleveland](#), a partnership between anchor institutions and the City of Cleveland for equitable wealth creation in sustainable industries.
- See ["Cities Developing Worker Co-ops: Efforts in Ten Cities"](#) by the Imagined Economy Project.

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**Image permissions
pending!**

Strategy PH 2.3.

Expand neighborhood resources and opportunities for building community.

What's useful to know

Many community resilience solutions already exist in Medford. We have people, organizations, and community groups that are facilitating social connections; supporting safe, stable, and affordable homes; strengthening our physical and mental health; expanding access to healthy foods; cultivating resilient ecosystems; elevating voices and civic participation; and nourishing culture and creativity. All of these resources are important assets in Medford as climate change magnifies existing challenges, ranging from economic insecurity to strain on mental health. We also know that we will need to continue to bolster these resources by building our capacity to coordinate across organizations and by supporting the expansion of resources and programs to meet the needs of more Medford residents. Many residents have highlighted the lack of “front doors” to social services in Medford, the challenges in getting to know one’s neighbors, and the difficulty in finding suitable community spaces to build social connections. Social capital, or the strength of relationships between people and their community, plays an important role in being able to cope and adapt both during emergencies and day-to-day.

The COVID-19 pandemic has given us a clear precedent for how the need for resources, information,

Social capital, or the strength of relationships between people and their community, plays an important role in being able to cope and adapt both in emergencies and day-to-day.

and community support expands in a prolonged health emergency. Early in the pandemic, the City quickly launched the volunteer-run “Are You Ok?” program to help identify and offer assistance to residents who may need support, including Medford’s more than 11,000 residents over age 60. Teams of volunteers work with Ward Captains, Companion Callers, Response Teams, and Program Coordinators to check in on neighbors on a weekly basis, and to follow up as needed by connecting residents to relevant services. Through the program, Medford has been building a network of neighbors helping neighbors to break down social isolation and respond to emergency needs.

In 2020, the City and partner agencies also completed a six-month community process, funded by the Massachusetts Municipal Vulnerability Preparedness (MVP) Program, to address questions including:

What's a resilience hub?

Resilience hubs are neighborhood community spaces with a variety of programs and services that build relationships, promote preparedness, and support health and well-being. These programs are located within a resilient and sustainable building, often with features such as solar power, rainwater capture, or community gardens. In an emergency, these spaces may act as communication centers, distribution centers, or emergency shelters. As part of the initial community conversations in 2020, community organizations in Medford shared a vision for resilience hubs in Medford that centered on four themes:

1. **Social connection:** Resilience hubs are multi-use gathering centers that bring together residents with diverse backgrounds.
2. **Community engagement:** Resilience hubs serve as centers for community organizing and supporting community-driven policies.
3. **Information access:** Resilient hubs act as centralized communications centers to share information on local resources.
4. **Collaborative response:** Resilience hubs are places to integrate regional efforts in supporting community resilience.

What do Medford residents need in order to be most prepared for emergencies? What do our community provider organizations need to do their work in emergencies? How can we work together to support Medford residents? The report “Resilient Medford, Resilience Hubs” summarizes the findings from this process and outlines steps for enhancing partnerships and communication, social connectedness, information access, resource access, and community preparedness in ways that place equity at the forefront of those efforts. Specifically, the report explores creating resilience hubs in Medford, including how resilience hubs could meet community needs, and potential locations for a pilot site. The goal of Medford resilience hubs would be to create just and inclusive community spaces that offer opportunities for building connections and support health and wellbeing. The City is now collaborating with a team of Community Liaisons, a coalition of service providers, and **frontline communities** to continue to develop and implement a vision for enhancing community resilience in Medford.

Actions

PH 2.3.A

Create a community resilience hub.

Continue to work with Medford residents, and specifically Medford frontline communities, to identify programming and services for a pilot community resilience hub. Evaluate sites in the city that can serve as a pilot resilience hub, outline necessary steps for acquiring or co-renting a preferred site, and assess potential retrofits to enhance the sustainability and the resilience of the

MEDFORD FAMILY NETWORK CONCERT
PHOTO BY CITY OF MEDFORD



facility. Given the preferred site, develop a business and operations plan, and any shared use agreements and memoranda of understanding to identify roles and responsibilities for using the site. Launch the pilot resilience hub and work with community members to evaluate its success in supporting community connections, health and wellbeing, youth resources, community organizing, equitable access to resources, and in meeting community needs in an emergency.

PH 2.3.B

Create platforms for coordination across Medford service providers.

Continue to convene a coalition of Medford service providers to develop a Resilient Communications Plan that outlines processes for strengthening partnerships and communication between providers, residents, and the City. Develop a multilingual, interactive online tool that can connect residents with community organizations that offer services or resources both in an emergency or day-to-day. Identify opportunities for co-locating or co-hosting services within a resilience hub, and for expanding “front doors” to social services within Medford.

PH 2.3.C

Collaborate to host and promote cultural events and festivals.

Collaborate with community groups and Medford students to host, sponsor, and promote events and festivals that celebrate Medford’s diversity, expand cultural awareness and understanding, and create spaces for building community in Medford.



MEDFORD RESIDENTS ARRIVING AT THE SENIOR CENTER
PHOTO BY CITY OF MEDFORD

PH 2.3.D

Facilitate neighborhood block parties.

Make it easy to understand where and how residents can host neighborhood block parties as a way to get to know one’s neighbors and build a sense of community. Develop a protocol and specific department in charge of overseeing permits, and create an accessible and streamlined system for residents to apply for a permit and host the block party in line with safety guidelines.

PH 2.3.E

Build multilingual support services for new residents.

Collaborate with Medford community partners to formalize systems for supporting new Medford residents, including those who have newly immigrated to the United States and residents who face a language barrier in accessing the supports that Medford offers. Continue to invest in a system that connects residents to a point person who speaks their native language, who is a Medford resident, and who is hired by the City to help answer questions.

Find more here!

“Resilient Medford, Resilient Hubs”

See the Resilience Medford, Resilient Hubs report at the following link: [\(link\)](#)

Community Liaison Program

For more information on the Community Liaison program, see: [\(link\)](#)

“Are You Ok?” Services

To sign up for resident services through the “Are You Ok?” program see: [\(link\)](#)

“Are You Ok?” Volunteering

Learn more about the “Are You Ok?” program and how to volunteer at: [\(link\)](#)

While a translation phone line can provide translated information, a point person can offer more nuanced support based on lived experience in navigating the same systems, as well as an ongoing relationship as a community liaison.

PH 2.3.F

Continue to expand Medford’s volunteer response systems.

Continue to support and expand Medford’s volunteer response systems, building off the “Are You Ok?” program, such that the program provides targeted help during climate hazards, such as extreme heat or storms. Include training for community volunteers on climate hazards, preparedness, and response, and systems for connecting and transporting residents to emergency shelters or cooling centers. For example, volunteers can help residents with disabilities who don’t have air conditioning at home to register for the RIDE in advance of high heat events.

PH 2.3.G

Evaluate the potential for a community resilience small grants program.

Work with service providers and community groups to evaluate opportunities for a small grants program that could provide funding to community organizations and community groups for projects that build community strength, health, and resilience. A goal of the small grants program would be to expand the capacity of organizations in ways that best support existing community resilience needs, and that would prioritize projects led by and benefiting communities in Medford that are likely to

be disproportionately affected by climate change—namely, residents with low or no income, residents of color, youth, older adults, and residents with disabilities.

ALSO:

See [strategy PH 1.1](#), which involves developing a “healthy Medford” development framework and checklist to provide developers with a set of best practices to include when possible—including incorporating places of refuge or spaces that could accommodate a resilience hub.

ALSO:

See [strategy PH 1.3](#), which involves creating a community space for food-related education and services, with a community kitchen, affiliated community garden, and cold storage for gleaning initiatives. This programming may be integrated with a Medford resilience hub.

ALSO:

See [strategy BE 3.2](#), which includes the development of resilient power systems in the city, including planning for the installation of solar and storage and potential microgrids at clustered community facilities. Any resilience hub in the city would be considered as a key candidate for sustainable backup power.

Relevant Precedents

- See the [Urban Sustainability Directors Network \(USDN\) resources on resilience hubs](#).
- See the [Margaret Fuller Community Center](#) in Cambridge, which serves as a hub for community resources and is investigating strategies to play a role as a [resilience hub](#).
- See Berkeley, CA [Community Resilience Center Program](#).
- See Somerville, MA [“Keep Cool Somerville”](#) program launched with MAPC which awards funding to community pilot projects and support to community organizations.

T

| Transportation



Medford will need a high-quality transportation network to reach our state and local climate goals—one that enables all residents of all abilities, all income levels, and all neighborhoods to get to the places they want to go safely, easily, reliably, and sustainably.

Such a transportation system builds community resilience by providing access to places, resources, and opportunities, including jobs, education, homes, and healthcare. In a high-quality transportation system, all parts—including public transportation, shuttles, school buses, private vehicles, bicycles, scooters, and other modes—are either powered by clean energy or human power, producing no greenhouse gas emissions or air pollutants. Such a



The City of Medford is committed to creating a high quality transportation network in Medford that meets the needs of all Medford residents without compromising the health of people and the planet.

transportation system thereby meets the needs of all Medford residents without compromising the health of people and the planet.

Currently, transportation is not accessible nor affordable for many Medford residents. Many of the infrastructure projects built in the 1900s, Interstate-93 in particular, initially increased the efficiency of commuting by car, while also disconnecting neighborhoods and reinforcing a reliance on vehicle travel. Partly as a result, roughly one third of Medford's greenhouse gas emissions come from our transportation system, with the vast majority (93%) coming from private personal and commercial vehicles.³⁴ Communities along Medford's most heavily-traveled routes experience the effects of these emissions most acutely as vehicle emissions irritate eyes and lungs, exacerbate asthma, and can lead to respiratory and cardiovascular disease. Rising temperatures from climate change are expected to exacerbate poor air quality, and interruptions in transit due to storms, high heat, or flooding disproportionately affect residents with the fewest transportation options.³⁵ All of these aspects of Medford's transportation systems currently work against our community resilience and a sustainable future.

Creating an accessible, equitable, resilient, and carbon neutral transportation network will involve 1) making it easier for all residents to get around without a private vehicle, 2) shifting all vehicles in the city to zero emission vehicles, and 3) building the resilience of our transportation system to climate hazards. Because transportation networks span well beyond the city, it will be important for Medford to both advocate for action at the state level and collaborate with neighboring towns, regional planning agencies and other regional organizations in order for our city to reach its transportation-related climate goals.

Objective T1: Make it safer and easier to walk, bike, and take public transportation.

Objective 1 focuses on creating safer, easier, and more accessible options to move about the city—whether by the T, bus, shuttle, bicycle, scooter, walking, or in a wheelchair. Robust public transportation systems and safe streets for everyone make transportation more affordable and the city more accessible. Making it easier to get from place-to-place without a private vehicle reduces the number of miles we travel in a vehicle, which helps to mitigate climate change and the health impacts from air pollution.

How do Medford residents currently travel? Between 2014 and 2018, Medford residents commuted to work by these means:³⁶

- 59% drove alone,
- 21% took public transit,

- 9% carpooled,
- 5% walked,
- 4% worked from home, and
- 1.5% biked.

In order to meet the city's resilience, equity, and carbon neutrality goals, Medford is aiming for the vast majority of commuting trips in Medford to be taken by public transit and active transportation modes, with less than a quarter taken by people driving alone. As part of this goal, Medford seeks to repair the relationships and restore the connectivity that once existed in Medford before it was disconnected by large infrastructure (such as I-93).

A city's transportation infrastructure and street design influence travel decisions. Convenient bus routes, accessible sidewalks, and safe bicycle lanes



CURTIS JACKSON AND HIS SON ADRIAN AT THE WEST MEDFORD OPEN STUDIOS BIKE SKILLS CLINIC • PHOTO BY PATRICK BIBBINS

can make it easier to travel without a car, while wide roads with high-speed traffic can make it harder. The website Walk Score evaluates cities throughout the United States based on how easy it is to walk, bike, and take transit. Scores range from zero (very hard) to 100 (very easy). Medford has an average walk score of 67 (ranked as “somewhat walkable: some errands can be accomplished on foot”), a transit score of 50 (just meeting the threshold of “good transit: many nearby public transit options”), and a bike score of 60 (ranked as “bikeable: some bike infrastructure”). The table on page 204 compares these scores with our neighbors.

Medford has a large number of projects underway—including the MBTA Green Line extension, the Clippership Connector shared path along the Mystic River, a pilot inbound peak hour bus lane on Mystic

Ave, and many complete streets projects, for example—that will play a significant role in making Medford more walkable, bikeable, and transit-oriented. The Climate Action and Adaptation Plan builds on these projects, identifying additional infrastructure investments, policies, and programs that will help make it easier, safer, and more inviting to walk, ride a bike, and take public transit in Medford.



COVID-19 and commuting

Between 2014 and 2018, roughly 4% of working residents in Medford worked from home. This percentage increased dramatically in 2020 during the COVID-19 pandemic. Likewise, public transit ridership decreased substantially in 2020, driven by the combined effects of more people working from home and the fear of virus transmission on the T and MBTA buses. In the spring of 2020, ridership dropped to less than 10% of normal volume on the T, and to about 20% of normal volume on buses. Through the following fall and winter, ridership stabilized at roughly 25% normal volume for subways and 40% for buses.³⁷ While it is difficult to predict if and how long these patterns will persist beyond the pandemic, it is reasonable to expect that working from home remains an option for many Medford residents. At the same time, Medford and other communities in Greater Boston will encourage the rebound in public transit use after the pandemic ends and as research continues to support the limited correlation between public transit use and virus transmission.

Strategy T 1.1.

Advocate for transportation policy and investments at the state level that are essential for enabling Medford to reach its climate goals.

What's useful to know

The MBTA (Massachusetts Bay Transportation Authority) operates nearly all public transportation in Medford. The “T”—including the commuter rail, local rail, and bus networks— connects Medford residents and people working in Medford to neighborhoods throughout Greater Boston. The Lowell Line commuter rail stops in West Medford, and the extension of the Green Line will connect Lechmere Station in Cambridge to Tufts University in Medford. Once completed, the extension will add six new T stations in Medford and Somerville, and is estimated to increase ridership by 50,000 passengers per day. The MBTA runs local and express bus routes throughout much of Medford, and also operates the RIDE, a door-to-door paratransit service.

The T already plays an important role in reducing Medford’s carbon footprint, and the expansion of public transportation service will be paramount in our ability to reach equity, sustainability, and resilience goals. In particular, we will need investments that continue to drastically improve the efficiency, accessibility, and reliability of routes and service in order to make public transportation a primary transportation method in

Medford by 2050. The Massachusetts Decarbonization Plan models a 70% increase in transit service, in line with some of the most aggressive transit plans currently conceived for the Metro-Boston region.³⁸ As part of the Better Bus Project, the MBTA is embarking on a full bus network redesign to make transit a more competitive alternative to driving, to make transportation more equitable, and to maximize access to opportunities.

The MBTA will also need to become a carbon neutral transit system for Medford and the Commonwealth to achieve carbon neutrality by 2050. As of January 2021, the MBTA now procures 100% of its electricity load from renewable energy.³⁹ Also in 2021, the MBTA announced its plan for transitioning to a fully zero emissions bus fleet over the next few decades in alignment with Massachusetts’s decarbonization goals. As part of this plan, the MBTA is procuring 80 new battery electric buses to be deployed in 2023, upgrading and modernizing its maintenance facilities to accommodate electric bus fleets, and taking immediate steps to use cleaner running vehicles in the interim to reduce greenhouse gas emissions and air pollutants.

We will need investments that continue to drastically improve the efficiency, accessibility, and reliability of routes and service in order to make public transportation a primary transportation method in Medford by 2050.

Because the MBTA is operated by the Commonwealth, Medford is not able to directly shape decisions that relate to system-wide service or capital investments. It will be important for our city, in partnership with neighboring cities, to advocate for investments that will greatly support these goals. Advocacy will involve both building evidence and data as to why investments are required, and working with neighboring cities, supporting organizations, and community members to lobby for these investments.

Actions

T 1.1.A

Advocate for retaining and expanding MBTA service.

Advocate for the retention of Medford's existing MBTA service, the expansion of MBTA service, as well as more funding for the MBTA to support these investments. In particular, advocate for expanded express bus service in Medford, which will be fundamental to reducing commuting trips by a private

vehicle. Work with community groups who have been traditionally underrepresented in transportation planning and who are more likely to experience disproportionate effects from climate change to develop a set of Medford-based priorities in service expansion and service improvements to inform the city's advocacy (see strategy T 1.2).

T 1.1.B

Advocate for ongoing commitment to MBTA decarbonization.

Advocate for the MBTA to transition to a zero-emissions bus fleet by 2035, in line with other major public transportation systems (see relevant precedents at the end of this section). Advocate for a fully carbon neutral MBTA system by 2045.

T 1.1.C

Advocate for infrastructure to support zero-carbon commuting.

Advocate for investments at MBTA stations that support zero-carbon commuting, including improved bike accommodations on trains and buses, and the continued build out of bike shelters and electric vehicle chargers at MBTA stations.

T 1.1.D

Advocate for the investigation of zero-fare transit.

Advocate for a task force or similar process to evaluate, pilot, and/or implement zero-fare transit, either for certain MBTA lines or for the network as a whole. Advocate for a greatly simplified payment system as an additional avenue for making public transit easier.



THE T AT WELLINGTON STATION • PHOTO BY HUTIMA

T 1.1.E

Advocate for improved statewide transportation data.

Advocate for advancements in statewide data collection, modeling, and reporting to create a standardized method for calculating transportation emissions by jurisdiction over time.

ALSO:

See strategy T 2.2, which includes advocating at the state level for income-tiered electric vehicle incentives, including assessing models that could provide larger rebates for lower-income residents.

Relevant Precedents

- The Los Angeles County Metropolitan Transportation Authority (Metro) has committed to transitioning to a zero-emissions bus fleet by 2028. The San Francisco Municipal Transportation Agency (SFMTA) has committed to an all-electric bus fleet by 2035. King County Metro (transit agency serving Seattle and surrounding county) has committed to a zero emissions fleet by 2040.

How do Medford streets compare?

How does Medford compare to neighboring cities in terms of walkability, bikeability, and transit access? Based on “WalkScore,” Medford falls into the “somewhat walkable,” “good transit,” and “bikeable” categories. Cities such as Somerville and Chelsea score higher for walkability and transit access, while Somerville and Arlington score higher for bikeability.

Walk Score	Transit Score	Bike Score
90-100 = walkers’ paradise	90-100 = riders’ paradise	90-100 = bikers’ paradise
70-89 = very walkable	70-89 = excellent transit	70-89 = very bikeable
50-69 = somewhat walkable	50-69 = good transit	50-69 = bikeable
25-49 = mostly car dependent	25-49 = some transit	0-49 = somewhat bikeable
0-24 = fully car dependent	0-24 = minimal transit	
1. Somerville (89)	1. Somerville (64)	1. Somerville (89)
2. Everett (83)	2. Chelsea (57)	2. Arlington (65)
3. Chelsea (81)	3. Malden (53)	3. Medford (60)
4. Malden (72)	4. Medford (50)	4. Malden and Everett (52)
5. Medford and Arlington (67)	5. Everett (49)	5. Chelsea (47)
6. Winchester (38)	6. Arlington (48)	6. Winchester (43)
	7. Winchester (29)	

Strategy T 1.2.

Invest in more equitable, accessible, and efficient public transportation systems.

What's useful to know

Many changes to public transportation in Medford—including MBTA schedules, operations, and whether bus fleets run on electricity—will require advocacy at the state level (see strategy T 1.1). Even so, there are many actions Medford can take to improve public transportation in the city in ways that will increasingly reduce greenhouse gas emissions and air pollutants, improve access to jobs and schools, and explicitly meet the needs of Medford residents who cannot afford, cannot operate, or choose not to rely on private vehicles. The T and the commuter rail, bus networks, fixed-route shuttle services, on-demand vehicles, and school buses are some of the many modes that will all play a role in creating an integrated transportation system that is more equitable, accessible, and efficient.

One key way Medford can make bus travel easier and more accessible is through investments in infrastructure and street design. Through the Better Bus Project, the MBTA is collaborating with municipalities and MassDOT to implement bus transit priority projects, which can help reduce travel times for passengers specifically on highly congested bus routes. Dedicated bus lanes, combined bus and bike lanes, and adaptive traffic signals (traffic lights that can

prioritize buses, as well as cyclists and pedestrians) are some of the types of projects that can make bus transit more efficient. In 2020, Medford and Somerville received a MassDOT grant for the installation of a dedicated bus lane along Mystic Ave that runs from Main Street in Medford to McGrath Highway in Somerville. The Better Bus Project is also upgrading bus stops to make all stops ADA accessible, and expanding real-time information at bus stops through solar-powered signage. In January 2021, Medford also received a grant to install two new bus shelters.

In addition to supporting travel via the MBTA, Medford can also play a role in expanding local mobility options to supplement MBTA transit and provide more equitable access to transportation options. SCM Transportation is a local nonprofit that operates a fleet of paratransit vehicles and provides on-demand, door-to-door services for older adults and residents with disabilities. Medford Public Schools provides school bus service for elementary and middle school students, and a small portion of high school students. Evaluating ways to expand similar and additional services to more residents, including free access to school and more accessible “first and last mile” options, will help build a more connected and equitable transit system.

Actions

T 1.2.A

Conduct an equity-centered community process for identifying transit priorities.

Work with Medford community liaisons to conduct outreach, host events, and develop materials and platforms for community input to identify top priorities for making public transit in Medford more equitable, accessible, and efficient. The process will center the lived experiences of communities of color, low income communities, residents with disabilities, and residents who speak limited English. The priorities identified through this process will inform the City's advocacy with the MBTA (see strategy T 1.1) and will identify specific transit gaps that the City may be able to fill—through school bus service, shuttles, on-demand services, or other “last mile” options that can connect people to their final destination (see action T 1.2.E).

T 1.2.B

Implement “bus transit priority” projects.

Work with the MBTA and MassDOT, in conjunction with the Better Bus Project, to implement bus transit priority projects, including traffic signal prioritization and designated bus (or hybrid bus/bike) lanes, to improve bus travel efficiency on key routes in Medford. “Bus transit priority” projects specifically refer to projects that help to make bus travel more efficient on highly congested routes.

T 1.2.C

Implement bus stop accessibility upgrades.

Work with the MBTA and MassDOT, in conjunction with the Better Bus Project, to ensure all bus stops in Medford are ADA accessible. Upgrade adjacent sidewalks, road crossings, and intersections simultaneously to make sure the approach to the bus stops are likewise safe and accessible. Integrate bus shelters whenever possible (see strategy T 1.4); work with the MBTA to develop creative funding mechanisms to expand bus shelters.

T 1.2.D

Evaluate Medford Public School bus service to achieve equitable access.

Evaluate transportation options to Medford Public Schools with the goal of providing free and equitable access to in-person education for all Medford students. Assess how bus service routes, costs, schedules, and reliability (of MBTA and school buses) may result in inequitable access to and from school, or a disproportionate burden for families, depending on neighborhood, income or resources, work schedules, or other circumstances. Through an advisory board or other structure, ensure that the study is developed and informed by parents and students of color, low income parents and students, and families with children with disabilities. Based on the findings, outline a pathway and timeline for implementing equitable school transportation. Evaluate how equitable solutions can likewise reduce carbon emissions and prioritize options that advance the city towards carbon neutrality, whereby no household feels the need to drive a child to school.

Consider collaborating with the Safe Routes to School Program at MassDOT, and integrating into the Medford Public Schools Wellness Policy.

T 1.2.E

Explore additional mobility options to fill transit gaps.

Explore additional mobility options to fill transit gaps, drawing from identified community needs and priorities (see action T 1.2.A). Consider options such as on-demand services and demand-responsive shuttles that can supplement service provided by the MBTA and SMC Transportation, fill key gaps in frequented routes, provide more last mile options, and create a more integrated transit system.

T 1.2.F

Hire a transportation planner to advance grant-funded transportation projects.

Hire a transportation planner to focus on the development of sustainable transportation projects, including assessing transportation needs, applying for grants, overseeing the implementation of projects, and following up on additional needs. Sustainable transportation projects include bus transit priority projects as well as projects to expand bikeways and complete streets (see strategy T 1.3).



BUSES AT WELLINGTON STATION • PHOTO BY PI

Relevant Precedents

- See [“Via to Transit,”](#) a pilot on-demand service in Seattle that connects residents in specific environmental justice neighborhoods to light rail or bus stations for the same price as the bus fare.
- See the dedicated bus lane projects (pilots and permanent installations) in Somerville, Everett, and Arlington.

Strategy T 1.3.

Create safer, more accessible, and connected ways for walking, biking, scootering, pushing a stroller, rolling a wheelchair, or other modes of transportation.

What's useful to know

The ability to safely and easily walk, bike, scooter, or travel by other human-powered means makes a city more accessible, affordable, and equitable; helps to reduce private vehicle use; improves air quality; and reduces greenhouse gas emissions. The way we design our streets in Medford can have a big effect on whether it feels safe and easy to travel around Medford without a vehicle. "Complete streets" are a type of street design that prioritizes safe and comfortable travel by people of all ages, abilities, and incomes by all modes of transportation. Features such as carefully-designed separated bike lanes, accessible sidewalks, and frequent and safe opportunities to cross the street create safer ways to get to school, work, the grocery store, and to other life necessities.

The City of Medford and community groups, including Walk Medford and the Medford Bicycle Advisory Commission (MBAC), have been working for many years to make Medford a more accessible city for walking, biking, and other modes. MBAC first produced the city's Bicycle Infrastructure Master Plan in 2016, which is a living document that recommends bike-

related infrastructure improvements throughout the city and new bike pathways to create a more robust bike network in Medford. Also in 2016, the City adopted a complete streets policy, which outlines the City's commitment to implementing complete streets best practices during road upgrades whenever practicable. In conjunction with this policy, a Complete Streets Committee made up of city staff and residents tracks and measures progress on complete streets implementation, and recommends complete streets projects for the City to pursue.

Building on both these initiatives, the City has installed ADA accessible sidewalks, new signs and street markings, curb extensions, and other features to increase bicyclist and pedestrian safety and visibility at intersections including Main Street at Medford Street, High Street at Allston, West Medford Square, Medford Square, and Winthrop Circle—in addition to dedicated bike lanes along Boston Ave. Recently, Medford received grant funding from MassDOT to improve and prioritize pedestrian and bicyclist travel on certain streets around the Roberts School and Brooks

Elementary School through the Safe Routes to Schools Program. The Clippership Connector, a half-mile multi-use path along the Mystic River, is projected to be completed in 2022, connecting Medford Square, the Andrews/McGlynn Schools, and Riverbend Park and providing tremendous connectivity benefits by linking formerly disjointed regional off-road paths.

All of these projects work to reconnect the city, and make the city more accessible for people traveling by foot, bike, scooter, or other modes. Supportive efforts—such as bike share programs to improve access to bikes, and campaigns to raise driver awareness—will be additional ways to make these modes safer and easier in Medford. With the recognition that no one mode of travel (such as bicycling) will be suitable for all Medford residents, the goal is to create streets that accommodate all types of travel while relieving as many barriers as possible. The following projects, policies, and programs further advance that progress in creating safe and accessible travel options for all ages and abilities.

Actions

T 1.3.A

Adopt Vision Zero.

Join Boston, Cambridge, and Somerville in adopting Vision Zero, and work with the Massachusetts Vision Zero Coalition to design streets, adopt policies, track data, and monitor progress towards zero traffic fatalities or severe injuries in Medford as well as the MAPC region. (See more information on Vision Zero and the Coalition at visionzerocoalition.org.)

T 1.3.B

Conduct a participatory mapping mobility study.

Conduct a mobility study to advance Medford's Vision Zero goal that evaluates pedestrian and bicyclist safety, comfort, and accessibility for all intersections and arterials in the city. Develop this study in partnership with community liaisons who bring experience with transportation barriers (e.g., physical or cognitive disabilities, residents that primarily speak a language other than English, among others). With the community liaisons, gather insight from the community using participatory mapping and crowdsourced data to document routes Medford residents take and the challenges they encounter. Identify top priority problem areas that disconnect areas of the city or create barriers for pedestrian and bicycle access to jobs, resources, or services.

T 1.3.C

Set goals for an “all ages and abilities network.”

Drawing from the mobility study, set goals in collaboration with community liaisons for creating an “all ages and abilities network,” which would link high-priority areas through protected or separated bikeways and safe pedestrian routes. Work with community groups who have been traditionally underrepresented in transportation planning and who are more likely to experience disproportionate effects from climate change to consider differences in needs, resources, personal preferences, and culture in the design of the network. Seek ways to integrate assistive technology for people with disabilities.

TRANSPORTATION

T 1.3.D

Strengthen complete streets policy through zoning and local ordinance.

Adopt a complete streets ordinance in line with the City's complete streets policy that requires all publicly- and privately-funded road projects in the city to incorporate complete street design features and infrastructure in new construction and/or reconstruction of roads, unless specific exemptions apply. State-owned roads within the City of Medford will comply to the extent possible, subject to MassDOT guidelines and standards. Consider specific instances where the incorporation of protected bike lanes should be incorporated. Update the City's zoning ordinances to include complete streets

requirements in the City's subdivision rules and regulations, and incorporate complete streets design features and/or requirements for safe pedestrian and bicycle path access as part of the City's site plan review requirements.

T 1.3.E

Implement complete streets upgrades.

Continue implementing complete streets upgrades for all street construction and reconstruction projects in line with the City's complete streets policy and ordinance (see action T 1.3.D). Seek additional opportunities to upgrade existing roads with complete street design features based on community priorities identified through the mobility study and recommendations from the Bicycle Infrastructure Master Plan. This process will help ensure that road improvements are appropriate to the specific context; for example, pedestrians and cyclists should have greater physical separation from motor vehicles as roadway speeds increase. In particular, Medford will continue to improve the safety of routes for walking and biking to our neighborhood schools as part of the broader "all ages and abilities network." Consider opportunities for which road safety and traffic calming features can simultaneously reduce idling and greenhouse gas emissions, such as through modern roundabouts and mini roundabouts as opposed to four-way stops.

T 1.3.F

Close gaps to create a seamless regional network of multi-use paths.

Work with state agencies and regional partners to complete segments of commuter-friendly multi-use



HARVEST YOUR ENERGY FESTIVAL, 2014 •
PHOTO BY PATRICK BIBBINS

paths that will close gaps in a regional network and help to reduce car traffic by creating more seamless routes for bicycle and pedestrian travel. In particular, continue to collaborate with state agencies to extend the Wellington Greenway path along the Malden River north to Route 16; to connect Torbert MacDonald Park to the Wellington Greenway and T station via the Wellington/Route 28 underpass; and to complete the South Medford Connector, linking Medford Square to the paths at the junction where Mystic Valley Parkway crosses the Mystic River.

T 1.3.G

Launch a bike share program and evaluate opportunities for its expansion.

Launch a bike share program in collaboration with Malden through the installation of three BlueBike stations in each city. Monitor the success of the initial phase and the need for outreach and education to support its further expansion. Develop an equity advisory board to assess and identify solutions for greater accessibility, such as credit-free payment options and adaptive fleets that could include recumbent bikes, cargo bikes, child-sized bikes, or other models to fit a wider range of people's needs. Continue to identify potential public and private funding sources to support the pilots and its expansion, including working with developers pursuing projects in Medford.

T 1.3.H

Improve snow clearing to protect sidewalk and bike lane accessibility.

Update the city's snow clearing ordinance to improve sidewalk and bike lane accessibility in the winter,

including shifting the responsibility of sidewalk clearing to the building owner and updating methods of enforcement. Ensure that the City has the staff and resources for effective oversight, education and awareness-building, and related program support for sidewalk clearing, as well as sufficient equipment and personnel for clearing bike lanes. Evaluate and mitigate any disproportionate burden created by the ordinance on low-income households, residents with disabilities, and seniors. Consider developing an online app where residents who aren't able to shovel the sidewalk adjacent to their home can ask for help, thereby improving sidewalk accessibility and decreasing the use of fines or other penalties for enforcing sidewalk clearing. Through an app, residents can flag that they need help with snow clearing, claim a sidewalk to shovel, and/or indicate that they have completed the shoveling help requested. Consider alternative models for a "buddy system," or opportunities to link with youth job programs, to best meet the needs of residents that may be unlikely or unable to use a computer or phone-based app.

T 1.3.I

Support and enforce driver awareness.

Collaborate with statewide and regional initiatives and bike and pedestrian advocacy organizations that are working to raise driver awareness on sharing the road safely and seamlessly with pedestrians and cyclists. Use the City's marketing resources, including billboard space and pedestrian-scale Soofa Signs, to build awareness. In coordination with campaign messaging, draw attention to the city's Vision Zero goal (see action T 1.3.A) and its street upgrades

TRANSPORTATION



WINTHROP STREET BIKE LANE IN PROGRESS •
PHOTO BY PATRICK BIBBINS

for traffic calming and safer streets (see action T 1.3.E) to build awareness of the goals and benefits. Seek opportunities to enforce safer driving, such as through supporting statewide legislation that will enable traffic cameras, which have the potential to increase road safety while combating racial bias in traffic enforcement.

T 1.3.J

Increase communication on roadway changes.

Increase communication regarding planned changes to roadway design, adjustments to traffic patterns, and construction schedules with neighboring residents and businesses and the broader Medford community through methods such as flyers, door hangers, or other outreach. Ensure that information is shared in multiple languages, and includes an accessible way for residents to reach out with concerns.

T 1.3.K

Continue to work with state and regional partners to achieve mode shift.

Continue to work with MassDOT, MBTA, DCR, MAPC, Boston Region MPO, Walk Medford, Walk Boston, and other local, regional, and state partners to identify, track progress, and strategically advance mode shift goals in Greater Boston. Continue to collaborate with local regional agencies and neighboring communities on coordinated grants and infrastructure projects that support complete streets or public transit across municipal boundaries.

Relevant Precedents

- See actions taken by Boston, Cambridge, and Somerville as part of the [Vision Zero Coalition](#).
- See the City of Austin's [All Ages and Abilities Network](#).
- See Chicago's ["Adopt-A-Sidewalk"](#) interactive map to support snow shoveling in the city.
- See Detroit's [adaptive bike share fleet](#), designed to meet a much broader range of community needs.

Strategy T 1.4.

Update city codes and zoning ordinances so that new development contributes to neighborhoods accessible to all.


What's useful to know

If planned and designed well, new development in Medford can contribute to a more energy efficient building stock (see strategy BE 1.2), and greater access to safe and affordable housing (see strategy BE 1.1). New development can also have an effect on making neighborhoods more walkable, bikeable, and transit-oriented, and by contributing to complete neighborhoods.

Complete neighborhoods are neighborhoods where Medford residents, regardless of age, income, or ability, can easily access daily life amenities—including quality and affordable housing, healthy food, open space, schools and civic spaces, and other services—within an easily walkable or bikeable area. Clustering a mix of commercial and residential uses, repositioning vehicle parking to the back of buildings, incentivizing developments with limited parking, and integrating space for bus stops, bike paths, walking paths, and bike parking into a project's site are some of the many ways new development can support more walkable, bikeable, and transit-oriented communities.

Complete neighborhoods are neighborhoods where Medford residents, regardless of age, income, or ability, can easily access daily life amenities within an easily walkable or bikeable area.

A city's comprehensive plan, land use code, and zoning are some of the most important tools for guiding the future of new development. In 2021, Medford launched a planning process to develop its citywide Comprehensive Master Plan, a plan that will outline the Medford community's vision, goals, and implementation strategy for land use, transportation, open space, housing, and other areas related to the city's future growth over the next ten years. As part of Medford's Comprehensive Master Planning Process, the City will be updating its land use codes; the following actions will be integrated into that process to make Medford's growth increasingly climate-ready.



What's mixed-use development, and why does it matter?

Traditionally, cities and towns in Massachusetts and nationwide have divided their land into zoning districts in which certain building types and building densities are either permitted or prohibited (a system called Euclidean zoning). While this type of zoning helped to separate industrial noise and pollution from residential neighborhoods, it also has led to greater neighborhood segregation, urban sprawl, more pavement, and a greater dependence on cars because basic necessities are located further from our homes. As we look to create more resilient, sustainable, and equitable communities, many cities and towns including Medford are adopting “smart growth” principles. Among other aspects, smart growth focuses on clustering a mix of building uses, transportation options, and housing types to meet the needs of all residents within specific areas, while at the same time preserving open space.

Clustering homes, civic buildings, shops, and offices within a walkable area—or mixed-use development—makes it easier to live, work, and play all within a neighborhood. Mixed-use development can be horizontal (homes and small businesses in the same block, for example) or vertical (shops on the first floor of a building and apartments on the second floor, for example). Mixed-use development makes it easier to reach daily necessities without a car, reducing transportation costs, as well as our carbon emissions.

Actions

T 1.4.A

Encourage mixed-use development.

Conduct a comprehensive review of the city's zoning codes, identify opportunities and constraints for the expansion of mixed-use development, and update zoning codes to mitigate constraints. In particular, identify opportunities to support commercial development to complement the city's planned growth in housing, as outlined by Medford's Housing Production Plan.

T 1.4.B

Design for active streetscapes.

Update design guidelines for development and redevelopment that support safe, vibrant, and interesting streetscapes to encourage walking and biking in Medford. In mixed-use and commercial districts, design guidelines may relate to ground floor uses and recommendations for active sidewalk use (such as seating and sidewalk cafes), in addition to guidelines for lighting, first floor windows, set-back and build-to lines, landscaping, among other considerations.

T 1.4.C

Integrate multimodal connections in new development.

Work with development projects through the site plan review process to include pedestrian paths; bikeway connections; and easy access by foot or bike to bus stops or T stations within the development

site. Require new development to provide at least one safe pedestrian connection to the surrounding neighborhood.

T 1.4.D

Acquire land rights to construct bus shelters.

Work with private developers to acquire land rights for constructing bus shelters and expanding sidewalks, in partnership with the MBTA and MassDOT (in alignment with strategy T 1.2). Due to the narrowness of sidewalks in many locations throughout the city, land rights must be acquired for bus stop construction so as not to make narrow sidewalks ADA noncompliant. Land rights could include a transfer of land ownership, land easements, or other solution and should include maintenance agreements where applicable.

T 1.4.E

Update bicycle parking requirements.

Integrate covered and non-covered bicycle parking requirements for new development and substantial redevelopment of commercial and multifamily residential buildings, and update design guidelines for bicycle racks and storage lockers for both short-term and long-term facilities. Consider requiring locker rooms and shower facilities for commercial developments above particular size thresholds.

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T 1.4.F

Update motor vehicle parking requirements.

Conduct a parking utilization study and update parking requirements in the city's zoning code accordingly. In particular, evaluate the implications for eliminating parking minimum requirements for new development, and consider whether parking maximums may be appropriate for specific transit-oriented locations. Incentivize shared parking options for new development and the use of "park once districts" where a single parking facility serves a larger walkable area. This shift is consistent with cities across the country recognizing that parking minimums continue to create a surplus of off-street parking, increase demand for driving, increase housing costs, hinder walkability and bikeability, and reduce the efficiency of public transit systems, as well as contribute to the urban heat island effect and urban stormwater challenges. Ensure that updated requirements align with the recommendations outlined by Medford's Commission on Parking Policy and Enforcement.

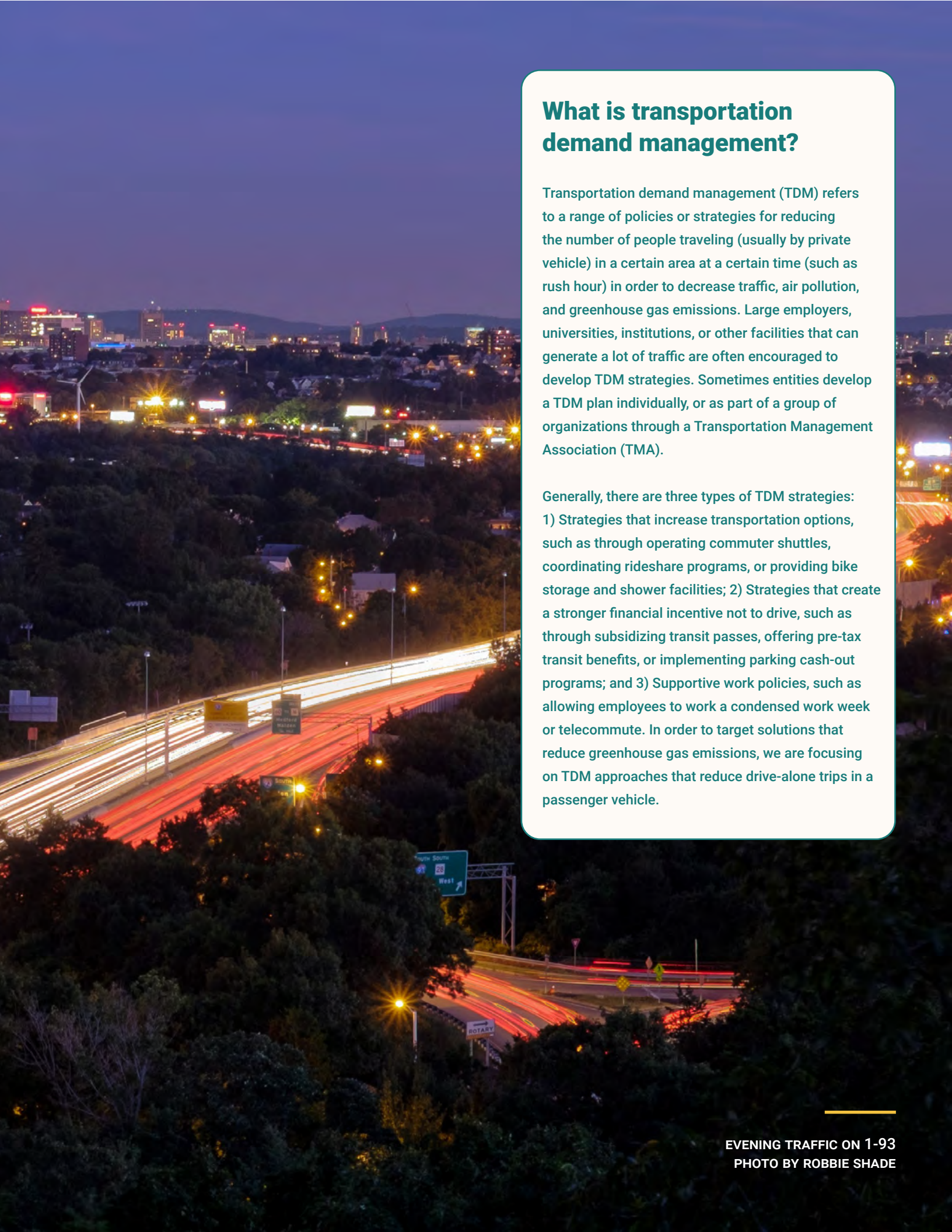
T 1.4.G

Adopt transportation demand management (TDM) policy.

Adopt a transportation demand management ordinance whereby large commercial and institutional developments and/or large employers must develop a transportation demand management plan, designed to reduce private vehicle trips to the site.

Relevant Precedents

- See the Center for Active Design's [Assembly: Civic Design Guidelines](#), a guide for creating walkable, connected, authentic, and active streetscapes that also build community identity, social connections, and civic trust.
- See [TDM requirements implemented by Boston and Cambridge](#).
- See Seattle, WA [Bicycle Parking Guidelines](#), which include requirements for bike parking and storage, as well as locker and shower facilities.



What is transportation demand management?

Transportation demand management (TDM) refers to a range of policies or strategies for reducing the number of people traveling (usually by private vehicle) in a certain area at a certain time (such as rush hour) in order to decrease traffic, air pollution, and greenhouse gas emissions. Large employers, universities, institutions, or other facilities that can generate a lot of traffic are often encouraged to develop TDM strategies. Sometimes entities develop a TDM plan individually, or as part of a group of organizations through a Transportation Management Association (TMA).

Generally, there are three types of TDM strategies: 1) Strategies that increase transportation options, such as through operating commuter shuttles, coordinating rideshare programs, or providing bike storage and shower facilities; 2) Strategies that create a stronger financial incentive not to drive, such as through subsidizing transit passes, offering pre-tax transit benefits, or implementing parking cash-out programs; and 3) Supportive work policies, such as allowing employees to work a condensed work week or telecommute. In order to target solutions that reduce greenhouse gas emissions, we are focusing on TDM approaches that reduce drive-alone trips in a passenger vehicle.

Objective T2: Accelerate the transition to zero emission vehicles.

Even as we continue to make it easier to take public transportation, ride a bike, and walk in Medford, we know that a large number of miles will still be driven in personal and commercial vehicles. Medford is committed to reducing vehicle emissions as quickly as possible to meet our greenhouse gas reduction targets, combat the climate crisis, reduce roadway air pollution, and make Medford a healthier place to live. Objective 2 focuses on ways Medford can support and accelerate the transition of all vehicles in the city—including buses, municipal fleets, private fleets, and personal vehicles—to zero-emission vehicles.

Massachusetts state law requires the Department of Environmental Protection (MassDEP) to adopt vehicle emission regulations in line with those set by the state of California, which was granted a waiver by the U.S. EPA under the Clean Air Act to adopt advanced

clean car standards above national regulations.

Research in other jurisdictions continues to show that maintaining stricter fuel economy standards not only has enormous health benefits and lowers operational costs for vehicle owners, but also plays a significant role in reducing a city's greenhouse gas emissions between now and 2050 as the vehicle stock turns over and becomes more efficient. Medford has and will continue to support more rigorous federal fuel efficiency standards.

Furthermore, in July 2020, Governor Baker signed a Memorandum of Understanding (MOU) that commits Massachusetts to working with a coalition of other states to accelerate the market for zero emission medium-duty and heavy-duty vehicles (such as trucks, vans, and buses), and to adopting the Advanced Clean Trucks (ACT) regulation recently



ELECTRIC VEHICLE CHARGING • PHOTO FROM SHUTTERSTOCK

set by California. The ACT will require medium- and heavy-duty vehicle manufacturers to sell zero-emission vehicles as an increasing percentage of their total sales. The California Air Resources Board (CARB) is likewise developing the Advanced Clean Cars II regulation, which will phase out the sale of internal combustion engine vehicles (ICEV) by 2035. Assuming California's preemption waiver remains in effect, Massachusetts will also adopt the same phase-out timeline.

These state and federal regulations will help to rapidly expand the market for electric vehicles nationally and locally, and will play a key role in Medford's goal to reach 100% zero emission vehicles within Medford by 2050. As the percentage of electricity generated by renewable energy increases over time (see the Buildings and Energy section), the

amount of greenhouse gas emissions produced by electric vehicles will continue to decrease. State and federal grants and incentives for electric vehicles and charging infrastructure, in addition to changes in building codes, will likewise be instrumental in our transition.

Medford will continue to advocate in favor of EV-supportive policy, while taking steps to ensure our city policy and capital planning promotes and accelerates EV adoption within the city. More specifically, the City will be taking bold steps to expand electric vehicle charging networks, making charging infrastructure more accessible to both renters and homeowners, and prioritizing ways to ensure all Medford residents can benefit from zero emission vehicles regardless of income.

What is a zero emission vehicle (ZEV)?

A zero emission vehicle is a vehicle that does not produce harmful exhaust (emissions) while the vehicle is in use. Harmful emissions include carbon dioxide, carbon monoxide, nitrogen and sulfur oxides, ozone, volatile organic compounds (VOCs), heavy metals, particulate matter, and other compounds known to have a negative impact on the health of people and the environment. Battery electric vehicles (BEVs) and hydrogen fuel cell electric vehicles (FCEVs) are two types of zero emissions vehicles. Plugin hybrid electric vehicles (PHEVs) and conventional hybrid vehicles are near-zero emission vehicles since they also use internal combustion engines to extend their driving range. In all cases, the effectiveness of these vehicles in curbing the climate crisis will depend on whether the electricity to recharge the vehicle batteries and the hydrogen to power the fuel cells is likewise produced by renewable and emission-free technologies. Massachusetts and Medford are working to transition the electric grid to increasingly renewable sources, meaning that electric vehicles charged in Medford will produce fewer and fewer greenhouse gas emissions over time.

ELECTRIC CAR
PHOTO BY REVISION ENERGY



Strategy T 2.1.

Expand access to electric vehicle charging stations.

What's useful to know

A widespread, robust, and visible network of electric vehicle (EV) charging stations makes electric vehicle ownership easier. It also gives people the confidence that chargers are accessible and that EVs can be a reliable and preferable vehicle option in Medford. In other words, the visibility of charging stations at highly frequented locations such as shopping centers, grocery stores, and public lots helps to accelerate EV adoption.

Medford has 23 publicly accessible electric vehicle charging stations as of May 2021 (including 22 Level 2 chargers and one Level 3 charger).⁴⁰ The charging stations at Medford High School and City Hall were installed by the City in the summer of 2019 with grant funding through the National Grid Electric Vehicle Charging Station Program, and the City is continuing to work with a charging station provider to evaluate additional sites. The charging stations not installed by the City are located at Tufts University, shopping centers, and car dealerships throughout the city.

Yet research shows that over 80% of EV owners charge at home, followed second by charging at work,⁴¹ making it important that we begin thinking about

electric vehicle charging infrastructure as an integral part of new development. Cities and states have begun integrating requirements into building codes and local ordinances that parking spaces must include EV charging infrastructure or be “EV-ready,” meaning the parking space has the conduit and wiring in place with sufficient electrical capacity to install an EV charger at a later point in time. Studies show that installing the infrastructure upfront during construction can reduce the cost of installation by 64-75% compared to retrofitting a building or parking structure after it is built.⁴² Likewise, it is often difficult to retroactively integrate charging infrastructure at multifamily housing sites; ensuring that apartment buildings are designed to accommodate EV charging from the outset will be important for expanding access to charging stations for Medford’s renters.

Many residents in Medford do not have access to off-street parking, and many medium and small businesses in Medford use on-street parking for their employees and customers. An important part of expanding access to charging stations in Medford will include piloting and expanding charging stations suitable for on-street parking, as well as developing the regulatory parameters to support that infrastructure in Medford.

TRANSPORTATION

Actions

T 2.1.A

Expand charging stations in city-owned lots.

Continue to invest in electric vehicle charging stations in city-owned lots and public parking spaces, with the goal of twelve charging stations or more installed by 2025.

T 2.1.B

Adopt EV charging requirements for new development.

Update city zoning ordinances to require commercial and residential new developments with off-street parking to equip a certain percentage of parking spaces with EV charging stations and consider requiring that all additional spaces meet EV-ready parameters. New standards will help increase the accessibility of EV charging equipment for renters when applied to multifamily apartment buildings. New standards would also apply to any new city-owned facilities.

T 2.1.C

Pilot on-street EV charging, to be scaled city-wide.

Collaborate with National Grid to conduct a pilot for on-street EV charging to explore its integration with existing electrical infrastructure (utility poles and streetlights), maintenance concerns, design guidelines, as well as permitting and use stipulations. Drawing on the findings from the pilot, scale the model to make EV charging increasingly accessible to Medford residents without access to off-street parking, particularly for renters and small businesses. Coordinate the pilot and expansion with the City's broader transportation planning efforts, such as the

planned integration of bus and bike lanes, in order to identify the best locations for on-street EV parking versus other transportation amenities.

T 2.1.D

Encourage EV charger installations in private lots.

Lead an education and outreach campaign across businesses and commercial lots in Medford, sharing information on available tax credits, rebates, and grant programs to support EV charger installation. Pair financing information with testimonials and case studies from other local businesses who have installed EV chargers.

T 2.1.E

Expand staff capacity for sustainable transportation efforts.

Hire a staff person to lead and oversee actions related to the transition to zero emission vehicles, including the expansion of EV charging stations in Medford, EV-share programs, and the city's EV capital transition plan.

Relevant Precedents

- See the City of Boston's [Electric Vehicle Readiness Policy for New Developments](#).
- See [case studies](#) included in [AchiEV: Model State and Local Policies to Accelerate EV Adoption Policy Toolkit](#) (2018) by Sierra Club and Plug In America.
- See [database](#) of EV codes in other US cities developed by the Southwest Energy Efficiency Project (SWEET), in addition to the SWEET EV Infrastructure Building Codes: [Adoption Toolkit](#).



What do we mean by Level 2 and Level 3 chargers?

There are a number of different types of electric vehicle chargers. A "Level 1" charger uses a standard 120-volt power source (such as a standard wall outlet), and can take 20 to 40 hours to charge a fully electric vehicle. A "Level 2" charger uses a 240-volt power source, and can charge a car 3 to 7 times faster than a Level 1 charger, depending on the car and charger. Most public charging stations are Level 2. A "Level 3" charger, which is also called a DC fast charger (DCFC), uses a 480-volt power source. Because of the higher voltage and direct flow of DC current into the battery without conversion, a DC fast charger can charge an electric vehicle in as little as 30 minutes.

Strategy T 2.2.

Expand access to electric vehicles.

What's useful to know

As of the summer of 2020, there were nearly 32,000 electric vehicles registered in Massachusetts (roughly 1.5% of registered vehicles), 54% of which are battery electric vehicles (BEVs) and 46% plug-in hybrid electric vehicles (PHEVs).⁴³ According to the Massachusetts 2050 Decarbonization Roadmap Study, we can expect to see 500,000 EVs registered by 2030 at the current rate of EV adoption, and yet over one million electric vehicles must be registered by 2030 to be on pace for the Commonwealth to meet its decarbonization goals by 2050.⁴⁴

This difference points to the need for EV-supportive policy in order to accelerate adoption—including breaking down cost barriers. The price of light-duty electric vehicles has decreased significantly in the past few years, and when accounting for fuel and maintenance costs, EVs have been shown to be cheaper to own and operate over the lifespan of the vehicle than many internal combustion engine options.⁴⁵ By 2025, we can expect the price of most light-duty vehicles to be comparable to internal combustion vehicles, making them an easy choice for many residents.⁴⁶ Nevertheless, the upfront cost for owning or leasing a new or lightly used vehicle will still remain a cost barrier for many residents.

There are a number of financial incentives to help reduce the cost of an electric vehicle. New BEV and PHEV purchases are eligible for a federal income tax

credit up to \$7,500 to help incentivize the purchase of electric vehicles. While the tax credit helps to increase the affordability of EVs, a large number of residents are not able to take advantage of the full tax credit (or any tax credit) if their taxable income is below what would result in \$7,500 in federal income tax withheld. Residents who lease a vehicle are also not able to take advantage of the federal tax credit.

The Massachusetts Offers Rebates for Electric Vehicles (MOR-EV) program through the Department of Energy Resources provides rebates for purchasing or leasing electric vehicles—up to \$2,500 for a BEV or fuel cell electric vehicle (FCEV) and up to \$1,500 for a PHEV. Other states, including California and Maine, offer expanded rebates for low-income residents. The Clean Cars 4 All program, operated through participating California air quality districts, offers up to \$9,500 for the purchase of a new or used EV, where the highest incentives are earmarked for participants with the lowest incomes, living in disadvantaged communities, and that choose the cleanest vehicle technologies.⁴⁷

As Medford works towards becoming a carbon neutral, resilient, and more equitable community, our goal is to make electric vehicles accessible to residents regardless of income. This goal makes the electrification of MBTA buses a top priority, and also points to the opportunity to expand vehicle share programs, particularly with electric vehicles. Affordable, electric vehicle-share options can allow more people

to reap the benefits of EVs, while also filling a mobility need for residents who don't own a car and when public transportation is not an option.

Actions

T 2.2.A

Pilot an income-tiered EV car-share program.

Pilot an electric vehicle car-share program with sliding rates based on income to expand affordable access to electric vehicles and transportation options for residents without a private vehicle. Collaborate with organizations and residents located in Medford's environmental justice neighborhoods to identify locations and design the program based on resident needs. Consider models whereby the EV car-share program could be run by a new or existing local organization, led and staffed by members of the community, to also create economic development opportunities.

T 2.2.B

Advocate for income-tiered EV incentives and financial incentives for e-bikes.

Advocate for the state to evaluate an income-tiered model for Massachusetts electric vehicle rebates that would provide larger rebates for lower-income residents. The study would evaluate options that would maximize both overall EV adoption and access across all income groups. Advocate for the state to extend rebates or other financial incentives for e-bike purchases, which can offer an alternative, lower-cost,

electric vehicle option that makes it easier and more comfortable to travel longer distances and more feasible to carry cargo by bike.

T 2.2.C

Incentivize transportation network companies to use only EVs by 2030.

Progressively incentivize transportation network companies (TNCs) to transition to electric vehicles, with the eventual requirement that any rideshare vehicles licensed in the city must be electric by 2030. Incentives can include adapted pricing structures or fee exemptions, preferential access to curb space, affiliated electric vehicle rental programs, priority in licensing, or other incentives.

ALSO:

See [strategy T 1.1](#), which involves advocating for the MBTA to set carbon reduction targets such as transitioning to a zero-emissions bus fleet by 2035.

Relevant Precedents

- See [Boston's income-tiered electric vehicle car-share program](#) based in Roxbury.
- See [Los Angeles's income-tiered electric vehicle car-share program \(BlueLA\)](#), operated by Blink Mobility.
- See the [Our Community CarShare pilot program](#) launched by the Sacramento Metropolitan Air Quality District.
- See ["Emerging Policy Approaches to Electrify Ride-hailing in the United States"](#) by the International Council on Clean Transportation.

Strategy T 2.3.

Transition municipal fleets to electric and alternative fuel vehicles.

What's useful to know

To lead by example, many cities throughout the United States are working to transition their municipal fleets fully to electric vehicles. With over 450 battery electric light-duty passenger vehicle models on the market (such as sedans and small SUVs)⁴⁸ and with significant growth of battery electric buses in the past few years, municipalities are finding electric vehicles to be cost-competitive, and even cheaper over the lifespan of the vehicle when accounting for savings in fuel and maintenance costs.^{49,50}

To date, however, Medford's fleet of vehicles largely consists of vehicle types without a cost-competitive electric vehicle alternative on the market. Out of Medford's 180 vehicles, just over 10% are light-duty passenger vehicles, with the majority of those police vehicles. Cities across the United States have just started piloting police equipment in electric vehicles in the last few years. The remaining 90% of Medford's fleet includes light-, medium-, and heavy-duty trucks, including fire trucks, loaders, and street cleaners. Industry research reports that electric vehicle technology for these vehicles is improving rapidly, and will likely be ready for adoption within the next 10 years.⁵¹

Medford also contracts out a number of services to companies that operate their own vehicle fleets. All waste haulers directly contracted by the City are owned and operated by Waste Management, which has taken innovative steps to reduce its carbon footprint, including through running a portion of its fleet on renewable natural gas that is generated naturally through decomposition in their landfills.⁵² The City also contracts out its school buses, which are currently owned and operated by Eastern Bus Company, Inc. Today electric school buses cost roughly two to three times as much as a diesel school bus,⁵³ but are predicted to reach cost parity with diesel buses between 2025 and 2030 based on full lifespan costs.⁵⁴

State and federal grants have in the meantime helped to close cost gaps. The Volkswagen (VW) settlement, whereby VW agreed to pay \$14.7 billion after evading vehicle emissions standards, is a significant source of funding allocated to states to support emissions-reducing transportation investments. Through VW funds, MassDEP provides financial incentives to public entities to buy or lease EVs through the MassEVIP Fleet Incentives Program, and supports fleet electrification through Open Solicitation Grants.

Actions

T 2.3.A

Develop municipal fleet capital transition plan.

Develop a capital transition plan for transitioning municipal vehicles and lawn-care equipment to electric and alternative fuel vehicles. Set targets for which vehicles must transition by when, driven by average vehicle lifespans and age of vehicles, to meet the City's 2050 carbon neutrality goal. For each type of vehicle, the City will plan for a pilot phase to monitor vehicle performance. Where applicable, the City will consider alternative fuel options, such as E85 (flex fuel), biodiesel, or renewable diesel. Consider opportunities to integrate e-bikes into the city fleet to meet specific transportation needs. The municipal fleet capital transition plan will be revisited and updated every two years to adjust for changes in the market and developing technology.

T 2.3.B

Use performance-based procurement for contracted fleets.

Integrate performance-based procurement into all future bid processes for contracted fleet services, such as for school buses and waste disposal services. Under such a system, the City will define a maximum budget in addition to minimum, advantageous, and exemplary performance thresholds. Exemplary performance, for example, would include an all-electric fleet. Bidders will be asked to achieve the highest level of performance per the given budget, encouraging the cleanest fleet possible for no additional cost.



ELECTRIC SCHOOL BUS • PHOTO BY UNIVERSITY RAILROAD

Relevant Precedents

- See the Town of Uxbridge, MA [Municipal Vehicle Fleet Transition Plan](#).
- See the City of Minneapolis, MN [Electric Vehicle Study Final Report](#).
- See results of the Fremont, CA Police Department [EV Pilot Program](#).

Objective T3:

Increase the resilience of transportation infrastructure to climate hazards.

The Medford Climate Change Vulnerability Assessment documents some of the primary ways climate change will strain our transportation systems—by causing interruptions and delays, damaging infrastructure, and increasing maintenance costs. The MBTA is already susceptible to interruptions from extreme weather; stronger and more frequent rain and snow storms are likely to exacerbate interruptions and delays. Likewise, localized flooding, debris, and downed trees and powerlines may increasingly block and cause damage to roadways, bike paths, and sidewalks. By 2070, the combined effects of sea level rise and the 1% annual chance storm (a storm that has a 1% chance of occurring in a given year) is projected to cause

substantial roadway flooding, particularly along Mystic Valley Parkway, and in Wellington and South Medford, unless new flood barriers can be installed to mitigate this risk (see strategy EN 2.3).

At the same time, climate change is expected to bring higher temperatures, including warmer winters, periods of extreme heat, and heat waves. With warmer winters, Massachusetts roads see more freeze-thaw cycles where water seeps into cracks and freezes, causing the asphalt to crack and buckle. Asphalt can also buckle when temperatures exceed 90 degrees F, due to thermal expansion. Likewise, transit authorities often reduce train speeds when temperatures exceed 90 degrees F to reduce stress



FLOODING ON YALE STREET • PHOTO BY JOHN GRAVELIN

on railways, which can expand and buckle at higher temperatures. By 2070, Medford is expected to see over 62 days over 90 degrees F.

Interruptions in transportation due to storms, high heat, or flooding compromises our community resilience and disproportionately affects residents with the fewest transportation options.⁵⁵ It will be important for the City of Medford, in partnerships with state and federal agencies, to prepare for the maintenance costs associated with greater strain on transit systems, and to protect the ongoing function of safe, connected, and redundant transportation options.

Interruptions in transportation due to storms, high heat, or flooding compromises our community resilience and disproportionately affects residents with the fewest transportation options.

Strategy T 3.1.

Adapt transportation infrastructure to new risks from sea level rise, higher-intensity precipitation events, and changing temperatures.

What's useful to know

Over the past few years, the City of Medford has been working to better monitor climate risk, and to use that information to inform infrastructure maintenance and upgrades. In 2019, the City developed flood maps and hydraulic/hydrological modeling of Medford's stormwater management systems under future climate scenarios to identify areas of the city, including roadways, that are likely to see increased flood risk. These flood maps are now used to help inform future capital planning projects and development projects of potential flood vulnerability. The engineering department also launched a pavement management program in 2020, which includes 12 months of data collection, analysis, and reporting. This process will generate an inventory of pavement maintenance needs.

Moving forward, it will become increasingly important to integrate climate projections into the City's transportation asset management, including considering climate hazards in the potential lifespan of transportation infrastructure, and tracking changing maintenance costs due to climate stress to inform

Moving forward, it will become increasingly important to integrate climate projections into the city's transportation asset management.

infrastructure improvements. Prioritizing investments that support safe and reliable transportation for Medford's communities of color, low income residents, and residents with disabilities will be important to mitigating the disproportionate burden caused by climate change and to supporting equitable access to resources and opportunity for all Medford residents.

Actions

T 3.1.A

Integrate climate risk into transportation asset management.

Use the hydraulic/hydrological modeling of Medford’s stormwater management systems under future climate scenarios (conducted in 2019), in conjunction with the City’s knowledge of areas that experience frequent flooding, to assess flood vulnerability of roads, rail lines, and bike and pedestrian networks. Identify priority pinch points or most problematic areas, and specifically areas that fall within environmental justice neighborhoods or that would affect transportation access for residents with disabilities. Prioritize upgrades to these sites in capital improvement plans.

T 3.1.B

Work with state agencies to assess risks to state infrastructure within Medford.

Work with MassDOT and DCR as part of the Statewide Climate Change Adaptation Plan to understand the extent to which critical transportation infrastructure assets within Medford are at risk due to changes in temperatures and future flooding. This analysis includes an assessment of future flood elevations and extent, velocity, and erosive potential of channels adjacent to state-owned critical assets.

T 3.1.C

Coordinate with the MBTA to protect key MBTA facilities.

Coordinate with the MBTA to mitigate flood, heat, and storm risks along MBTA corridors and to increase the resilience of key MBTA facilities, including rapid transit maintenance facilities and bus depots. Continue to strengthen and formalize communication with MBTA staff to identify and address climate risk.

Relevant Precedents

- See the [framework](#) for how Portland, OR integrates equity, sustainability, and risk assessment into its transportation asset management planning in the Portland Bureau of Transportation Strategic Plan (2019-2022) under Goal 3: “Deliver Smart Investments to Maintain our Transportation System.”

03

Medford Climate Action
and Adaptation Plan

Implementation & Next Steps






Implementation

The implementation matrix on pages 234 - 273 summarizes the Climate Action and Adaptation Plan strategies, including the timeline for implementation, targeted milestones to track progress, financing mechanisms, and city stewards for coordinating implementation. All of these features contribute to the ongoing prioritization and successful implementation of the plan's strategies.

► Key to reading the matrix

Timeline

-  Indicates the targeted timeframe for implementing the action.
-  Indicates that the action will require ongoing implementation over the course of the designated timeframe.
-  Indicates that the action will require advocacy at the state level.

Milestones

The milestones specify the progress that the City is committed to making by a particular date. These milestones will help Medford track our progress and keep us accountable to our climate action and adaptation goals.

City Steward

The city steward is the city department responsible for the implementation of the action. In many cases, local, regional, or state partners will lead the work or serve as crucial partners; the city steward will coordinate from the city-side.

Financing Mechanisms

The financing mechanisms highlight funding streams, grants, incentives, and programs that are either most suitable or that could be tapped to fund implementation. Most often the financing mechanism would be employed by the City, but non-municipal financing mechanisms are noted when relevant. See page 276 for a full list of acronyms and further information on the financing mechanisms mentioned.

Implementation Matrix

Overarching

Strategy	#	Actions
O 1.1 Plan Implementation: Next Steps Continue to advance the ongoing implementation of the plan in ways that are collaborative, equitable, and data-driven.	O 1.1.A	Create a Climate Equity Council.
	O 1.1.B	Use the Climate Equity Framework to guide implementation.
	O 1.1.C	Model greenhouse gas emissions to forecast and evaluate progress.

NOTE: As with the rest of the plan, the milestones and city stewards in this matrix, in particular, are currently under review by city staff and the community and are subject to change.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Climate Equity Council launched by 2022	General fund	Office of PDS
			Climate Equity Framework in operation by 2022	N/A	Office of PDS
			Greenhouse gas emissions modeling completed by 2023	MVP Action Grants, General Fund	Office of PDS

Buildings & Energy

Strategy

#

Actions

Objective BE 1: Champion new buildings and redevelopment that make Medford a more affordable, resilient, and low-carbon city.

BE 1.1 Diverse & Affordable Housing

Expand diverse housing options in Medford to meet the needs of all ages, all family sizes, all (dis)abilities, and all income levels.

- | | |
|----------|--|
| BE 1.1.A | Reduce zoning barriers to multifamily and mixed-use housing development. |
| BE 1.1.B | Enable smaller and more diverse housing options through zoning updates. |
| BE 1.1.C | Establish a Municipal Affordable Housing Trust (MAHT). |
| BE 1.1.D | Foster affordable infill development. |
| BE 1.1.E | Protect and continue to advance fair housing choice. |
| BE 1.1.F | Support community efforts to create a Community Land Trust. |
| BE 1.1.G | Conduct a displacement risk assessment. |

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Zoning updates to take effect by 2025	N/A (supportive funding: Planning Assistance Grants)	Office of PDS (housing staff)
			Zoning updates to take effect by 2025	N/A (supportive funding: Planning Assistance Grants)	Office of PDS (housing staff)
			MAHT established by 2023	CPA funding, Inclusionary Zoning payments, linkage funds	Office of PDS (housing staff)
			Zoning updates to take effect by 2025	Planning Assistance Grants, CPA or CDBG funding for gap financing	Office of PDS (housing staff)
			Analysis of impediments (AI) completed by 2023	CDBG funding	Office of PDS (housing staff)
			N/A	CPA funding	Office of PDS (housing staff)
			Displacement risk assessment completed by 2023	CDBG funding	Office of PDS (housing staff)

Buildings & Energy

Strategy	#	Actions
BE 1.2 High-Performance New Buildings Update Medford's zoning codes and the development review process to encourage highly energy efficient, resilient, and low-carbon new construction.	BE 1.2.A	Adopt environmental performance standards for large projects.
	BE 1.2.B	Offer incentives for exceptional energy performance.
	BE 1.2.C	Expand staff capacity to oversee building performance standards.
BE 1.3 Flood-Resilient New Buildings Require flood resilient design for new development that could see high flood risk.	BE 1.3.A	Develop an online flood viewer to delineate areas with increasing flood risk.
	BE 1.3.B	Update flood resilience building guidelines.
	BE 1.3.C	Incentivize higher density in upland areas.
BE 1.4 Net Zero Stretch Energy Code Continue to advocate for a Massachusetts Stretch Energy Code that will put cities and towns on pace to meet net zero emissions by 2050.	BE 1.4.A	Advocate for a net zero stretch code that aligns with 2050 carbon neutrality goals.
	BE 1.4.B	Advocate for a regular update cycle.
BE 1.5 Net Zero New Municipal Buildings Lead by example by setting net zero energy and resilience standards for the construction of new municipal buildings.	BE 1.5.A	Adopt performance-based procurement.
	BE 1.5.B	Establish municipal building standards.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Zoning updates to take effect by 2025	N/A	Community Development Board
			Zoning updates to take effect by 2025	N/A	Community Development Board
			Staff capacity expanded by 2023	General fund	Building Department
			Online flood viewer developed by 2025	MVP Action Grants	Office of PDS (climate staff)
			Guidelines developed by 2025, required in flood risk areas by 2028	MVP Action Grants	Office of PDS (climate staff)
			Zoning updates to take effect by 2025	N/A (supportive funding: Planning Assistance Grants)	Office of PDS (climate staff)
			Net zero stretch code adopted by 2024	N/A	Office of PDS (Director)
			N/A	N/A	Office of PDS (Director)
			Performance-based procurement protocols adopted by 2023	N/A	DPW (Facilities Division)
			Municipal building standards adopted by 2023	General fund	Office of PDS (climate staff)

Strategy	#	Actions
Objective BE 2: Retrofit existing buildings to be more efficient, resilient, and to have a smaller carbon footprint.		
BE 2.1 Fuel Switching & Efficiency Provide tools and resources to support fuel switching and energy efficiency retrofits.	BE 2.1.A	Launch a campaign for energy efficient electric heating and cooling systems.
	BE 2.1.B	Revive and expand building rehab programs for rental properties.
	BE 2.1.C	Establish a data tracking protocol for fuel switching.
	BE 2.1.D	Investigate additional financial incentives.
BE 2.2 Benchmarking & Energy Standards Adopt energy benchmarking, disclosure, and performance policies to encourage energy upgrades in existing buildings.	BE 2.2.A	Implement a benchmarking ordinance for large buildings.
	BE 2.2.B	Adopt performance standards for benchmarked buildings.
	BE 2.2.C	Advocate for statewide energy performance reporting requirements.
	BE 2.2.D	Develop a rental licensing ordinance with energy efficiency standards.
BE 2.3 Resources for Resilience Retrofits Provide tools and resources for property owners and tenants to improve building resilience and prepare for climate hazards.	BE 2.3.A	Create a platform for ongoing dialogue about flood risk in Medford.
	BE 2.3.B	Develop an online building resilience toolkit.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Campaign launched by 2023	Mass Save incentives, MassCEC incentives, federal tax incentives	Energy and Environment Committee
			Building rehab program relaunched by 2023	CDBG funding	Office of PDS (housing staff)
			Protocol for data tracking established by 2022	N/A	Assessor's Office
			N/A	Bulk procurement programs, local tax incentives	Office of PDS (climate staff)
			Benchmarking adopted by 2024, enforced by 2025	General fund, MAPC TAP	Office of PDS (climate and economic development staff)
			Performance requirements adopted by 2028	General fund, MAPC TAP	Office of PDS (climate and economic development staff)
			N/A	N/A	Office of PDS (climate and economic development staff)
			Rental licensing ordinance adopted by 2024, enforced by 2025	General fund, MAPC TAP	Office of PDS (climate, housing, and economic development staff)
			Platform with materials and ongoing events launched by 2025	MVP Action Grants, MAPC TAP	Office of PDS (climate staff)
			Resilience toolkit launched by 2025	MVP Action Grants, MAPC TAP	Office of PDS (climate staff)

Strategy	#	Actions
(continued)	BE 2.3.C	Integrate climate resilience into first-time homebuyer courses.
	BE 2.3.D	Participate in the NFIP Community Rating System.
	BE 2.3.E	Prepare for securing federal resilience funding.
BE 2.4 Municipal Building Retrofits Lead by example by completing energy and resilience retrofits on all existing municipal buildings.	BE 2.4.A	Commission a strategic energy management plan.
	BE 2.4.B	Conduct deep energy retrofits.
	BE 2.4.C	Increase staff capacity for facility management.
	BE 2.4.D	Assess municipal buildings for flood vulnerability.
Objective BE 3: Build out resilient and renewable energy systems.		
BE 3.1 Renewable Energy Expand local renewable energy sources.	BE 3.1.A	Launch a solar access campaign.
	BE 3.1.B	Continue to procure on-site solar for municipal properties.
	BE 3.1.C	Assess the opportunity for Medford Housing Authority community solar.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Integration of climate resilience into FTHB courses by 2024	CPA funding	Office of PDS (climate and housing staff)
			CRS participation by 2023	N/A	Engineering Office
			Trainings and prerequisite documentation underway by 2023	N/A	Office of PDS, Engineering Office, Health Department (Emergency Management)
			Strategic energy management plan commissioned by 2025	Green Communities Grants	DPW (Facilities Division)
			Deep energy retrofits underway by 2026	Green Communities Grants, ESCOs, bonds	DPW (Facilities Division)
			Facilities Director hired by 2021; Staff increased by 2023	General fund	DPW (Facilities Division)
			First building assessment completed by 2023	Federal funding (e.g., HMA, FMA, BRIC); CPA funding	DPW (Facilities Division), Office of PDS
			Campaign launched by 2023	MAPC TAP, MassCEC EmPower (for campaign); SMART, PPAs, PACE	Energy and Environment Committee
			1.5 MW of municipal on-site solar (in total) installed by 2025	Green Communities Grants, SMART, PPAs	Office of PDS (climate staff), DPW (Facilities Division)
			Medford Housing Authority sites evaluated for community solar by 2023	Green Communities Grants, SMART, PPAs, PACE	Office of PDS (climate staff), Medford Housing Authority

Buildings & Energy

Strategy	#	Actions
(continued)	BE 3.1.D	Continue to support community-driven community solar projects.
	BE 3.1.E	Authorize PACE financing.
BE 3.2 Energy Resilience Increase Medford's energy resilience.	BE 3.2.A	Seek opportunities to replicate resilient power systems.
	BE 3.2.B	Encourage district scale energy solutions.
	BE 3.2.C	Continue to ensure maintenance on existing natural gas infrastructure.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Ongoing	SMART	Office of PDS (climate staff)
			PACE financing authorized by 2023	N/A	Office of PDS (climate and economic development staff)
			Resilient power system at Andrews School installed by 2022	MassCEC funding, SMART, PPAs	Office of PDS (climate staff)
			Zoning updates to take effect by 2025	MassCEC funding	Community Development Board, Engineering Office
			Ongoing	Utility funding	Engineering Office

Ecosystems & Natural Environment

Strategy

#

Actions

Objective EN 1: Protect, restore, and grow Medford's natural systems for a more resilient city.

EN 1.1 Tree Canopy

Protect and grow the tree canopy in alignment with community goals and priorities.

EN 1.1.A Continue to build out Medford's tree inventory.

EN 1.1.B Develop an urban forest master plan with community-defined tree planting goals.

EN 1.1.C Proactively adopt anti-displacement policies to protect affordability.

EN 1.1.D Create an urban forest technical manual.

EN 1.1.E Develop tree succession plans for park trees.

EN 1.1.F Introduce a tree protection ordinance.

EN 1.1.G Create a tree fund.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Inventory fully built out by 2022	UCFC Grants, linkage funds; Tree fund (see action EN 1.1.G)	DPW (Tree Warden)
			Urban forest master plan (UFMP) developed by 2025	MVP Action Grants, MAPC TAP, UCFC Grants, linkage funds	DPW (Tree Warden)
			Anti-displacement strategies identified in alignment with UFMP by 2025	MVP Action Grants, MAPC TAP, linkage funds	Office of PDS (housing staff)
			Urban forest technical manual developed by 2025	UCFC Grants, MVP Action Grants, linkage funds	DPW (Tree Warden)
			Tree succession plans in operation by 2026	UCFC Grants, linkage funds	DPW (Tree Warden)
			Tree protection ordinance adopted by 2022	UCFC Grants, linkage funds	Energy and Environment Committee
			Tree fund established by 2025	Donations and fees to capitalize fund	DPW (Tree Warden)

Ecosystems & Natural Environment

Strategy	#	Actions
(continued)	EN 1.1.H	Expand staff capacity for tree efforts.
	EN 1.1.I	Launch a tree ambassadors program.
	EN 1.1.J	Build platforms for urban forestry conversation and collaboration.
EN 1.2 Ecological Performance Standards Adopt ecological performance standards for new development.	EN 1.2.A	Adopt new landscape performance standards for heat mitigation.
	EN 1.2.B	Adopt new landscape performance standards for stormwater infiltration.
	EN 1.2.C	Adopt new landscape performance standards for soil health.
EN 1.3 Ecological Resilience Enhance the resilience of land and water ecosystems to contend with new climate stresses.	EN 1.3.A	Continue ecological restoration of parks and open spaces.
	EN 1.3.B	Develop an invasive species mitigation plan.
	EN 1.3.C	Regrade and revegetate river banks to prevent erosion.
	EN 1.3.D	Establish a soils management program for parks and open spaces.
	EN 1.3.E	Launch an educational campaign to support healthy soil.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Arborist and 3 new staff supporting tree efforts hired by 2024	UCFC Grants (for professional training); Tree fund (see action EN 1.1.G)	DPW (Commissioner)
			Tree ambassadors program established by 2025	UCFC Grants, Tree fund (see action EN 1.1.G)	DPW
			Multilingual website launched by 2025	UCFC Grants, Tree fund (see action EN 1.1.G)	DPW, Office of PDS (climate staff)
			Landscape performance standards to take effect by 2025	MVP Action Grants, linkage funds	Community Development Board
			Landscape performance standards to take effect by 2025	MVP Action Grants, linkage funds	Community Development Board, Engineering Office (City Engineer)
			Landscape performance standards to take effect by 2025	MVP Action Grants, linkage funds	Community Development Board
			Complete ecological restoration of Carr Park by 2024	MET Grants, PARC Grants, linkage funds, DER Priority Projects Program	Office of PDS
			Invasive species mitigation plan developed by 2024	Linkage funds	Conservation Commission
			Develop plans and technical specifications by 2026	MET Grants, DER Priority Projects Program, FSUWR Grants	Office of PDS
			Soils management program established by 2025	MVP Action Grants, linkage funds	DPW (Parks Division)
			Healthy soil campaign launched by 2026	MVP Action Grants, linkage funds	DPW (Parks Division), Office of PDS (climate staff)

Ecosystems & Natural Environment

Strategy	#	Actions
(continued)	EN 1.3.F	Evaluate adoption of pesticide and fertilizer use ordinances.
	EN 1.3.G	Plant and raise awareness on native pollinator gardens.
Objective EN 2: Mitigate flooding using nature-based solutions when possible.		
EN 2.1 Rainscaping “Rainscape” Medford to better infiltrate stormwater.	EN 2.1.A	Update the city’s stormwater regulations.
	EN 2.1.B	Develop a green infrastructure design toolkit.
	EN 2.1.C	Encourage rainscaping on private property.
	EN 2.1.D	Reduce impervious surfaces on city-owned property.
	EN 2.1.E	Evaluate open space acquisitions and protections based on climate resilience.
	EN 2.1.F	Continue to collaborate regionally to infiltrate stormwater.
EN 2.2 Stormwater Infrastructure Continue to invest in maintenance and upgrades to the stormwater and sewer systems, accounting for climate change projections.	EN 2.2.A	Roll out Utility Asset Management Plan.
	EN 2.2.B	Continue to reduce inflow and infiltration (I&I).

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Pesticide and fertilizer ordinances adopted by 2025, if deemed feasible	N/A	Conservation Commission
			3 native pollinator gardens with educational signage planted by 2023	General fund	Community Garden Commission
			Stormwater regulations to take effect by 2023	General fund	Engineering Office (City Engineer)
			Green infrastructure toolkit published by 2025	MS4 Municipal Assistance Grants, MVP Action Grants, linkage funding	Engineering Office (City Engineer)
			Launch an education campaign by 2024	MS4 Municipal Assistance Grants, MVP Action Grants, linkage funding	Office of PDS
			Net decrease in city-owned impervious surfaces by 2030 from 2020 baseline	CDBG funding, Resilient Communities Program, MVP Action Grants	Engineering Office (City Engineer)
			Strategy for open space acquisition / protection outlined by 2025	Planning Assistance Grants, CPA funding, linkage funds	Office of PDS
			Ongoing.	MS4 Municipal Assistance Grants, MVP Action Grants	Engineering Office (City Engineer)
			UAMP, including ability to track climate vulnerability, in operation by 2023	General fund	Engineering Office (City Engineer)
			TBD	SRF Clean Water Program, bonds	Engineering Office (City Engineer)

Ecosystems & Natural Environment

Strategy	#	Actions
(continued)	EN 2.2.C	Identify priority infrastructure upgrades based on climate risk and climate justice.
	EN 2.2.D	Expand the capacity of the stormwater system through green, blue, gray solutions.
	EN 2.2.E	Identify cost-sharing opportunities for stormwater projects.
	EN 2.2.F	Promote and expand the “Adopt-a-Drain” program.
	EN 2.2.G	Continue to coordinate regionally on timing of reservoir releases.
	EN 2.2.H	Explore the potential for a stormwater utility enterprise fund.
EN 2.3 Riverine flood buffers Reduce flood risk from the Mystic and Malden rivers caused by storms and sea level rise.	EN 2.3.A	Consider a riparian buffer overlay to prioritize living shorelines.
	EN 2.3.B	Work with DCR to “make room for the river.”
	EN 2.3.C	Continue to collaborate regionally on the resilience of the Amelia Earhart Dam.
	EN 2.3.D	Continue to collaborate regionally through the Mystic River Collaborative.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Develop priority list by 2024	N/A	Engineering Office (City Engineer)
			TBD	CDBG funding, MVP Action Grants, §604b Grant Program	Engineering Office (City Engineer)
			Evaluation of linkage fees to support stormwater funding by 2024	Public / private partnerships	Engineering Office (City Engineer), Office of PDS
			Develop protocol for volunteer contacts by 2022	MS4 Municipal Assistance Grants, MVP Action Grants	Office of PDS
			Ongoing	N/A	Engineering Office (City Engineer)
			Feasibility of stormwater utility enterprise fund assessed by 2026	§604b Grant Program	Engineering Office (City Engineer)
			Adopt riparian buffer overlay by 2026, if deemed feasible and beneficial	Planning Assistance Grants, linkage funds	Community Development Board, Office of PDS
			Build first floodable park on DCR land by 2027	BRIC Grants, Resilient Communities Program, CDBG funding	Office of PDS
			TBD	BRIC Grants	Office of PDS, Engineering Office
			Ongoing	BRIC Grants, MVP Action Grants	Office of PDS, Engineering Office, Health Department (Emergency Management)

Public Health

Strategy

#

Actions

Objective PH 1: Create neighborhoods and infrastructure systems that support health.

PH 1.1 Healthy Neighborhoods

Adapt the city's zoning codes and development incentives to create healthier neighborhoods.

PH 1.1.A Update zoning codes to support health outcomes.

PH 1.1.B Assess neighborhood-specific opportunities.

PH 1.1.C Create a "healthy Medford" development framework and checklist.

PH 1.2.A Expand access to community cooling sites.

PH 1.2.B Launch a "Cool Medford" outreach campaign.

PH 1.2.C Adopt design and material standards for cooler surfaces.

PH 1.2.D Update and implement the Mystic Avenue Corridor Green Infrastructure Plan.

PH 1.2 High Heat Mitigation

Improve Medford's capacity to stay cool in periods of high heat.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Zoning updates to take effect by 2025	N/A (supportive funding: Planning Assistance Grants)	Office of Outreach and Prevention, Office of PDS
			First assessment completed prior to zoning updates by 2025	One Stop Grants, Planning Assistance Grants	Office of Outreach and Prevention
			Framework and checklist in use by 2025	One Stop Grants, Planning Assistance Grants	Office of Outreach and Prevention, Office of PDS (economic development)
			Participatory mapping process completed by 2023	CPA funding, CDBG funding, linkage fees, MAPC TAP	Health Department, Recreation Department
			Campaign launched by 2023	MVP Action Grants, MAPC TAP, CvRF-MP funding	Health Department
			Zoning updates to take effect by 2025	N/A	Building Department, Community Development Board
			First Mystic Ave green infrastructure project completed by 2025	CDBG funding, One Stop Grants, MAPC TAP, public private partnerships	Community Development Board

Strategy	#	Actions
(continued)	PH 1.2.E	Reintegrate drinking fountains in parks and public spaces.
	PH 1.2.F	Assess the impacts of high heat in Medford Public Schools.
	PH 1.2.G	Update emergency management plans to contend with high heat.
	PH 1.2.H	Advocate review of policies that affect access to water, heating, and cooling.
	PH 1.2.I	Advocate for MBTA investments in keeping transit cool.
	PH 1.2.J	Advocate for heat exposure occupational health and safety standards.
PH 1.3 Food System Resilience Increase local food system resilience.	PH 1.3.A	Establish a Food Policy Council.
	PH 1.3.B	Create neighborhood food access action plans.
	PH 1.3.C	Develop a community food hub.
	PH 1.3.D	Create a platform for grocery business continuity planning.
	PH 1.3.E	Grow the city's community gardens and urban agriculture.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Drinking fountains installed in first round of park renovations by 2023	CPA funding, CDBG funding, MAPC TAP, linkage fees	Office of PDS
			Temperature assessments completed for all Medford Public Schools by 2024	MAPC TAP, MVP Action Grants	DPW (Facilities Division), Office of PDS, Medford Public Schools
			Emergency management plans updated by 2023	MVP Action Grants, MAPC TAP, CvRF-MP funding	Health Department (Emergency Management)
			Policy review completed by 2023	N/A	Mayor's Office, Health Department (Emergency Management)
			Systematic improvements in ensuring cool transit systems by 2025	MBTA operating budget	Mayor's Office, Health Department (Emergency Management)
			State-level occupational heat exposure standards adopted by 2025	N/A	Mayor's Office, Health Department (Emergency Management)
			Food Policy Council established by 2022	ARPA Funding	Department of Health
			Neighborhood food access action plans completed by 2025	MVP Action Grants, Planning Assistance Grants, MAPC TAP	Department of Health, Food Policy Council
			Community food hub in operation by 2025	State funding (e.g., FSI Grants, Urban Agriculture Grants), Mass Food Trust	Department of Health, Food Policy Council
			All grocery and corner stores engaged by 2025	MVP Action Grants	Office of PDS (economic development staff), Food Policy Council
			Equitable Community Garden Plan completed by 2025	State funding (e.g., Urban Agriculture Grants), MVP Action Grants	Community Garden Commission, Food Policy Council

Strategy	#	Actions
(continued)	PH 1.3.F	Expand systems for food recovery.
	PH 1.3.G	Increase the number of providers accepting food assistance.
	PH 1.3.H	Expand city staff and resources dedicated to food resilience.
PH 1.4 Waste Reduction Make it easier to reduce, reuse, and recycle materials to restore or renew value, eliminate waste, and decrease pollution.	PH 1.4.A	Commit to zero waste.
	PH 1.4.B	Evaluate current recycling and waste policies to advance equitable service.
	PH 1.4.C	Update private hauler regulations and recycling requirements.
	PH 1.4.D	Roll out, promote, and develop curbside composting.
	PH 1.4.E	Partner with students to advance Zero Waste Medford Public Schools.
	PH 1.4.F	Launch targeted waste reduction initiatives with local businesses.
	PH 1.4.G	Expand recycling education.
	PH 1.4.H	Evaluate the local potential for construction material reuse.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Net increase in volume of food recovered by 2023	State funding (e.g., FSI Grants)	Department of Health, Food Policy Council
			Net increase in providers accepting food assistance by 2023	State funding (i.e., Healthy Incentives Program), General fund (for outreach)	Department of Health, Food Policy Council
			First new position for food system resilience created by 2022	General fund	Mayor's Office, Office of Human Resources
			Zero waste commitment announced by 2025	MassDEP funding (e.g., SMRP Municipal Grants)	Mayor's Office, Office of PDS (climate staff)
			Updated equitable policies and services implemented by 2023	MassDEP funding (e.g., SMRP Municipal Grants)	Office of PDS (climate staff)
			Private hauler regulations and requirements updated by 2025	MassDEP funding (e.g., SMRP Municipal Grants)	Board of Health
			Roll out low-income subsidy by 2022; Increase participation to 1,000 households by 2023	General fund	Office of PDS (climate staff)
			Implement composting in 2 schools by 2022	MassDEP funding (e.g., SMRP Municipal Grants)	Office of PDS (climate staff)
			First round of waste innovation champions recognized by 2025	Recycling Loan Fund, public private partnerships	Office of PDS (economic development staff)
			Increase recycling to 30% of solid waste by weight by 2025	MassDEP funding (e.g., SMRP Technical Assistance Grants)	Department of Public Works
			Construction material reuse assessment completed by 2026	University partnerships	Office of PDS (climate staff)

Strategy

#

Actions

Objective PH 2: Invest in Medford's people and businesses for strong and thriving communities.

PH 2.1 Centering Equity

Design processes for partnering with and listening to community members based on procedural and structural equity.

PH 2.1.A

Expand staff and resources dedicated to creating an inclusive and anti-racist city.

PH 2.1.B

Grow the cultural consciousness of Medford's city staff and leadership.

PH 2.1.C

Build capacity for safe, accessible, and inclusive city meetings.

PH 2.1.D

Provide equitable compensation for participation on boards and committees.

PH 2.1.F

Create more opportunities for neighborhood or ward representation.

PH 2.1.G

Continue to see that Medford's diversity is reflected in city leadership and staff.

PH 2.2 Sustainable Career Opportunities

Support workforce development and training programs that can support the transition to a low-carbon, just, and resilient future.

PH 2.2.A

Partner to develop and promote facilities management training.

PH 2.2.B

Develop a city-sponsored youth employment program.

PH 2.2.C

Inventory and expand targeted career training in sustainable industries.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Two additional staff hired by 2023	General fund	Mayor's Office, Office of Human Resources
			Racial equity and implicit bias training for staff instituted by 2022	General fund	Office of Human Resources
			Training and protocols instituted by 2022	General fund	Office of Human Resources
			Institute equitable compensation protocols by 2022	General fund	Office of Human Resources
			Neighborhood representation expanded by 2025	N/A	Mayor's Office
			Set diversity goals by 2023	N/A	Office of Human Resources
			Training program available for Medford residents by 2025	MassCEC funding, Workforce Training Fund	Office of PDS (economic development staff), Medford Public Schools
			Youth employment program launched by 2023	General fund	Office of Human Resources, Office of PDS
			Process for identifying skill gaps and career paths underway by 2026	MassCEC funding, Workforce Training Fund	Office of PDS (economic development staff), Medford Public Schools

Strategy	#	Actions
PH 2.3 Building Community Expand neighborhood resources and opportunities for building community.	PH 2.3.A	Create a community resilience hub.
	PH 2.3.B	Create platforms for coordination across Medford service providers.
	PH 2.3.C	Collaborate to host and promote cultural events and festivals.
	PH 2.3.D	Facilitate neighborhood block parties.
	PH 2.3.E	Build multilingual support services for new residents.
	PH 2.3.F	Continue to expand Medford's volunteer response systems.
	PH 2.3.G	Evaluate the potential for a community resilience small grants program.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			First community resilience hub launched by 2025	MVP Action Grants	Office of Outreach and Prevention
			Resilient Communications Plan completed by 2022	MVP Action Grants	Office of Outreach and Prevention
			Begin promoting events on the city website and calendar by 2022	General fund	Communications Director
			Block parties hosted with regularity by 2023, based on accessible protocols	N/A	Mayor's Office, Communications Director
			TBD	MVP Action Grants	Office of Outreach and Prevention
			Expanded program launched by 2023	MVP Action Grants, ARPA / CARES Funding	Health Department (Emergency Management)
			Small grants program launched by 2026, if deemed feasible	Public-private partnership for seed funding	Office of PDS, Office of Outreach and Prevention

Transportation

Strategy

#

Actions

Objective T 1: Make it safer and easier to walk, bike, and take public transportation.

T 1.1 Transportation Advocacy

Advocate for transportation investments at the state level that are essential for enabling Medford to reach its climate goals.

T 1.1.A

Advocate for retaining and expanding MBTA service.

T 1.1.B

Advocate for ongoing commitment to MBTA decarbonization.

T 1.1.C

Advocate for infrastructure to support zero-carbon commuting.

T 1.1.D

Advocate for the investigation of zero-fare transit.

T 1.1.E

Advocate for improved statewide transportation data.

T 1.2 Public Transportation Investments

Invest in more equitable, accessible, and efficient public transportation systems.

T 1.2.A

Conduct an equity-centered community process for identifying transit priorities.

T 1.2.B

Implement “bus transit priority” projects.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Net increase in Medford MBTA service by 2025, in line with EJ priorities	FTA Grant Programs, ARPA Funding, state bonds, TCI funding	Engineering Office (Director of Traffic & Transportation)
			Zero emissions bus fleet by 2035 and carbon neutral MBTA system by 2045	FTA Grant Programs (i.e., Low-No Grant Program), TCI funding, bonds	Office of PDS (Director)
			Improved bicycle accommodations on all trains, buses, and at stations by 2025	FTA Grant Programs, ARPA Funding, state bonds	Engineering Office (Director of Traffic & Transportation), Office of PDS (Director)
			MassDOT assessment of zero-fare transit feasibility by 2026	State transportation funding (multiple sources)	Mayor, Office of PDS (Director)
			Standardized data for emissions calculations available by 2024	State transportation funding (multiple sources)	Office of PDS (Director)
			Community process formalized and first set of priorities submitted by 2023	MVP Action Grants, MAPC TAP, private grants (e.g., Barr Foundation)	Engineering Office (Director of Traffic & Transportation), Office of PDS (Director)
			Bus efficiency on major routes improved by 2025	State funding (e.g., Complete Streets, Community Connections), TCI funding	Engineering Office (Director of Traffic & Transportation)

Transportation

Strategy	#	Actions
(continued)	T 1.2.A	Implement bus stop accessibility upgrades.
	T 1.2.B	Evaluate Medford Public School bus service to achieve equitable access.
	T 1.2.C	Explore additional mobility options to fill transit gaps.
	T 1.2.D	Hire a transportation planner to advance grant-funded transportation projects.
T 1.3 Safe Streets for All Create safer, more accessible, and connected ways for walking, biking, scootering, pushing a stroller, rolling a wheelchair, or other modes.	T 1.3.A	Adopt Vision Zero.
	T 1.3.B	Conduct a participatory mapping mobility study.
	T 1.3.C	Set goals for an “all ages and abilities network.”
	T 1.3.D	Strengthen complete streets policy through zoning and local ordinance.
	T 1.3.E	Implement complete streets upgrades.
	T 1.3.F	Close gaps to create a seamless regional network of multi-use paths.
	T 1.3.G	Launch a bike share program and evaluate opportunities for its expansion.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			All bus stops in Medford ADA accessible by 2026	State funding (e.g., Complete Streets, Community Connections), TCI funding	Engineering Office (Director of Traffic & Transportation)
			Assessment completed by 2023	General fund, MAPC TAP	Medford Public Schools
			Additional first/last-mile service options piloted by 2026	State funding (e.g., Community Connections)	Engineering Office (Director of Traffic & Transportation)
			Transportation planner hired by 2024	General fund	Office of PDS (Director)
			Vision Zero adopted by 2022	N/A	Office of PDS (Director)
			Priorities identified through mobility study by 2023	MVP Action Grants, MAPC TAP, private grants (e.g., Barr Foundation)	Office of PDS
			Goals established by 2023	Same as T 1.3 B	Office of PDS
			Ordinance and zoning updates in effect by 2025	N/A (supportive funding: Planning Assistance Grants)	Office of PDS and Engineering Office
			CHECK WITH TIM AND TODD	State funding (e.g., Complete Streets, Community Connections)	Engineering Office
			Regional network of multi-use paths completed by 2025	State funding, PPPs	Office of PDS
			Pilot launched by 2022; Expanded with accessibility features by 2026	State funding (e.g., Community Connections), PPPs	Engineering Office (Director of Traffic & Transportation)

Strategy	#	Actions
(continued)	T 1.3.H	Improve snow clearing to protect sidewalk and bike lane accessibility.
	T 1.3.I	Support and enforce driver awareness.
	T 1.3.J	Increase communication on roadway changes.
	T 1.3.K	Continue to work with state and regional partners to achieve mode shift.
T 1.4 Accessible Neighborhoods Update city codes and zoning ordinances so that new development contributes to neighborhoods accessible to all.	T 1.4.A	Encourage mixed-use development.
	T 1.4.B	Design for active streetscapes.
	T 1.4.C	Integrate multimodal connections in new development.
	T 1.4.D	Acquire land rights to construct bus shelters.
	T 1.4.E	Update bicycle parking requirements.
	T 1.4.F	Update motor vehicle parking requirements.
	T 1.4.G	Adopt transportation demand management (TDM) policy.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Ordinance and supporting programs in effect by 2024	General fund, MAPC TAP	Mass in Motion Coordinator
			Expanded driver awareness campaign in Medford and region by 2024	Grants (e.g., NSC Safe System Innovation Grants)	Mayor's Office (Director of Communications)
			Protocol for sharing information on roadway changes in effect by 2022	General fund	Mayor's Office (Director of Communications)
			Ongoing	General fund	Engineering Office (Director of Traffic & Transportation)
			Zoning updates to take effect by 2025	N/A (supportive funding: Planning Assistance Grants)	Office of PDS (economic development and housing staff)
			Zoning updates to take effect by 2025	N/A (supportive funding: Shared Streets, Commonwealth Places)	Office of PDS
			Zoning updates to take effect by 2025	N/A	Community Development Board
			Four new bus shelters installed by 2024	Public / private partnerships	Engineering Office
			Bicycle parking requirements to take effect by 2025	N/A	Community Development Board
			Vehicle parking requirements to take effect by 2025	N/A	Office of PDS and Director of Parking
			TDM policy to take effect by 2026	N/A	Office of PDS and Community Development Board

Strategy

#

Actions

Objective T 2: Accelerate the transition to zero emission vehicles.

T 2.1 Electric Vehicle Charging

Expand access to electric vehicle charging stations.

T 2.1.A Expand charging stations in city-owned lots.

T 2.1.B Adopt electric vehicle charging requirements for new development.

T 2.1.C Pilot on-street EV charging, to be scaled city-wide.

T 2.1.D Encourage EV charger installations in private lots.

T 2.1.E Expand staff capacity for sustainable transportation efforts.

T 2.2 Electric Vehicle Access

Expand access to electric vehicles.

T 2.2.A Pilot an income-tiered EV car-share program.

T 2.2.B Advocate for income-tiered EV incentives and financial incentives for e-bikes.

T 2.2.C Incentivize transportation network companies to use only EVs by 2030.

T 2.3 Electric Municipal Fleets

Transition municipal fleets to electric and alternative fuel vehicles.

T 2.3.A Develop municipal fleet capital transition plan.

T 2.3.B Use performance-based procurement for contracted fleets.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			Twelve charging stations or more installed in city-owned lots by 2023	State incentives	Office of PDS (economic development staff)
			EV charging requirements to take effect by 2025	N/A	Office of PDS and Community Development Board
			Pilot installed by 2023, with first phase expansion by 2026	Utility financing	Office of PDS (economic development staff)
			12 publicly accessible chargers installed by 2025 in private lots	National Grid incentives, State incentives	Office of PDS (economic development staff)
			Staff person hired by 2024	General fund	Office of PDS (Director)
			Income-tiered EV car-share pilot launched by 2026	State funding, PPPs	Office of PDS
			Income-tiered EV incentives and E-bike incentives by 2024	N/A	Office of PDS (Director), Engineering Office (Director of Traffic & Transportation)
			TNC vehicles operating in Medford to be EVs by 2030	N/A	Office of PDS
			Municipal fleet capital transition plan developed by 2023	National Grid Fleet Advisory Services, Green Communities, MassEVIP Fleets	DPW (Fleet Manager)
			Performance-based procurement adopted by 2023	N/A	Medford Procurement Office

Strategy

#

Actions

Objective T 3: Increase the resilience of transportation infrastructure to climate hazards.

T 3.1 Resilient Transportation Systems

Adapt transportation infrastructure to new risks from sea level rise, higher-intensity precipitation events, and changing temperatures.

T 3.1.A

Integrate climate risk into transportation asset management.

T 3.1.B

Work with state agencies to assess risks to state infrastructure within Medford.

T 3.1.C

Coordinate with the MBTA to protect key MBTA facilities.

Timeline			Milestones	Financing Mechanisms	City Steward
Immediate Next Step	Near-Term (before 2025)	Mid-Term (after 2025)			
			TBD	General fund	Engineering Office
			TBD	N/A	Engineering Office, Health Department (Emergency Management)
			Ongoing	MassDOT / MBTA funding	Engineering Office, Health Department (Emergency Management)



TUFTS DIVERSITY STAIR
PHOTO BY CITY OF MEDFORD

Next steps

Partnerships will be crucial for creating a healthy and resilient future—within Medford, Greater Boston, New England, and globally. Medford’s success will be heavily influenced by the Commonwealth’s commitment to achieving carbon neutrality, strengthening public transportation systems, investing in infrastructure resilience, deploying public access electric vehicle charging networks, and advancing building energy codes, in particular. These state-level efforts will be further enabled by multi-state initiatives and by federal policy and funding streams. Advocacy across these scales is thus key to Medford’s Climate Action and Adaptation Plan. Medford’s involvement in the Metro Mayors Coalition, Resilient Mystic Collaborative, and other local partnerships build our city’s capacity to plan, implement, and advocate for solutions at larger scales.

At the same time, Medford’s climate plan can not be implemented without the widespread involvement of Medford residents, community organizations, businesses, institutions, and city departments. The upcoming years will require collaboration to develop the details of the projects, programs, and policies outlined in the plan—processes that must be guided, first and foremost, by the lived expertise of Medford residents who will be disproportionately impacted by climate change. As part of already underway initiatives and integral to this plan, the City of Medford has committed to adapting the ways that we communicate and collaborate as a City and community to be more inclusive, welcoming, and equitable. The transformation required to meet the challenges of the climate crisis will touch everyone, and everyone must be able to meaningfully participate in creating a just, equitable, resilient, healthy, and carbon neutral future.

And, because this future must be co-created, the plan should be seen as “living.” The pathways outlined in the Climate Action and Adaptation Plan will continue to be updated and adapted as conditions change, whether in policy, technology, community needs, or the emergence of new risks like the coronavirus pandemic. Yet as we continue to adapt, our city’s commitment will not: the City of Medford has committed to taking bold and immediate action to reduce greenhouse gas emissions, strengthen our resilience, and create a future where all residents can live healthy and fulfilling lives.

As such, the strategies outlined in this plan are deliberately on fast timelines, reflecting the magnitude and urgency of action required. They are also only a first step, encapsulating the action that must be taken now and over the course of the next five to ten years. Further phases of action will be needed, in addition to tracking and reporting, to ensure progress and to hold ourselves accountable to meeting Medford’s 2050 goals. This course of action is no small task, but we are building on years of energy and climate initiatives in Medford, and we are equipped with the will, wisdom, and experiences of the Medford community to chart this path forward. It is with this collective commitment that we can make Medford a place where everyone can thrive, now and for generations to come.

Funding Mechanisms

Abbreviated Name	Full Name (click for link to more information)
§604b Grant Program	Clean Water Act Section 604(b) Grant Program: Water Quality Management Planning
ARPA Funding	American Rescue Plan Act of 2021 Funding
BRIC Grants	Building Resilient Infrastructure and Communities Grant Program
CDBG Funding	Community Development Block Grant Funding
Commonwealth Places	MassDevelopment Commonwealth Places Program
Community Connections	Boston Region Metropolitan Planning Organization Community Connections Program
Complete Streets	MassDOT Complete Streets Funding Program
CPA Funding	Community Preservation Act Funding
CvRF-MP Funding	Coronavirus Relief Funding - Municipal Program
DER Priority Projects	Division of Ecological Restoration Priority Project Program
ESCOs	Energy Service Companies
FMA Grants	Flood Mitigation Assistance Grants
FSI Grants	Food Security Infrastructure Grant Program
FSUWR Grants	Five Star and Urban Waters Restoration Grant Program
FTA Grant Programs	Federal Transit Administration Grant Programs
Green Communities Grants	Green Communities Grants
HMA Grants	Hazard Mitigation Assistance Grant Program
Low-No Grant Program	Low or No Emission Grant Program
MAPC TAP	Metropolitan Area Planning Council Technical Assistance Program
MassCEC Incentives	Massachusetts Clean Energy Center Incentive Programs
Mass Food Trust	Mass Food Trust Program
Mass Save Incentives	Mass Save Rebates, Incentives, Technical Assistance
MET Grants	Massachusetts Environmental Trust Grants
MS4 Municipal Assistance Grants	Municipal Separate Storm Sewer System Municipal Assistance Grants
MVP Action Grants	Municipal Vulnerability Preparedness Action Grants
One Stop Grants	Massachusetts Community One Stop for Growth Program
PACE	Property Assessed Clean Energy
PARC Grants	Parkland Acquisitions and Renovations for Communities Grant Program
Planning Assistance Grants	Executive Office of Energy and Environmental Affairs Planning Assistance Grants
PPAs	Power Purchase Agreements
Resilient Communities Program	National Fish and Wildlife Foundation Resilient Communities Program
Shared Streets	Shared Streets and Spaces Grant Program
SMART	Solar Massachusetts Renewable Target Program
SRF Clean Waters Program	State Revolving Fund Loan Program - Clean Waters Program
TCI Funding	Transportation and Climate Initiative
UCFC Grants	Urban and Community Forestry Challenge Grants
Urban Agriculture Grants	Massachusetts Urban Agriculture Grant Program
Workforce Training Fund	Executive Office of Labor and Workforce Development Workforce Training Fund

Key Terms

Circular economy

A circular economy refers to system for producing and consuming products where nothing is wasted. All materials are repurposed and kept in use, instead of being disposed. Through better design and consideration of a product lifecycle, and expanded repair and reuse, circular economies expand the lifespan of products, support the regeneration of natural systems, and eliminate the need for waste disposal.

Community resilience

Community resilience refers to the capacity of a community to respond, recover, and bounce forward in response to stresses and challenges, such as climate change. Aspects such as social connections, access to resources, stable housing, and quality transportation contribute to greater community resilience. Greater community resilience makes a city better able to cope with climate hazards.

Community solar

Community solar provides renters, homeowners, organizations, and businesses equal access to the economic and environmental benefits of solar power regardless of who owns their building or whether the building is suitable for solar. The solar array is located within the community, often on leased land, and is shared by multiple community members who either buy a portion of the panels or subscribe to a portion of the energy produced. Participating community members receive credit on their electricity bills for their share of the power produced.

Decarbonize

Decarbonize means to reduce or eliminate carbon. By “decarbonizing” our buildings or energy systems, we are switching to systems that produce fewer or no carbon emissions.

Frontline communities

The term “frontline communities” refers to the fact that low-income communities and Black, Indigenous, and communities of color are often subjected to the first and worst impacts of pollution and climate change because of existing inequities.

Greenhouse gases

Greenhouse gases are gas molecules in the atmosphere that trap heat and warm the planet. Naturally occurring greenhouse gases are important for keeping the earth warm enough for plant and animal life; however, human activities have caused the concentration of greenhouse gases in the atmosphere to increase significantly. Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO_x), and fluorocarbons are all greenhouse gases that are released into the atmosphere by human activities, leading to climate change. For the most part, climate plans focus their efforts predominantly on carbon dioxide because it’s the primary driver of climate change. It’s therefore common for the CAAP to refer to “carbon emissions” and reducing our “carbon footprint” when focusing on greenhouse gas emissions reductions.

Green infrastructure

Green infrastructure is a method for using plants and small-scale systems such as rain gardens, street trees, green roofs, gravel wetlands, and infiltration trenches to manage stormwater at its source in an urban environment. Green infrastructure supports healthier ecosystems and helps to restore the natural hydrology of a site by allowing water to soak into the ground.

High performance building

High performance buildings are buildings that achieve a higher level of energy efficiency or higher levels of

greenhouse gas emissions reductions than what is required by building codes or other regulations. High performance buildings also tend to achieve higher standards in terms of resilience, water conservation, occupant health, and other sustainability parameters. The International Living Future Institute, Passive House Institute US, and the US Green Building Council are several of many organizations that certify high performance buildings that meet particular benchmarks.

Impervious surfaces

Impervious surfaces are materials such as asphalt and concrete that prevent water from passing through and soaking into the ground. Water runs off impervious surfaces, contributing to larger or quicker flows of water. Streets, sidewalks, parking lots, and building roofs are all impervious surfaces in Medford. By contrast, pervious surfaces allow water to percolate into the soil. Grass, mulch, vegetated areas, and green roofs are all pervious surfaces. Permeable pavements and pavers are a type of porous pavement that also allow water to infiltrate into the ground.

Low impact development

From the US Environmental Protection Agency, "the term low impact development (LID) refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat."

Mixed-use development

Mixed-use development is characterized as pedestrian-oriented development that mixes residential, commercial, cultural, institutional, and/or industrial uses. Mixed-use development can be horizontal (homes and small businesses in the same block, for example) or vertical (shops on the first floor of a building and apartments on the second floor, for example). Mixed-use development makes it easier to reach daily necessities without a car, reducing transportation costs, as well as carbon emissions. Mixed use is one of the ten principles of "Smart Growth," because it makes cities and towns more walkable and sustainable.

MTCO₂e

MTCO₂e is an abbreviation for "metric tons of carbon dioxide equivalents." Each greenhouse gas has a different capacity to trap heat, or "global warming potential." One molecule of methane, for example, has a much greater capacity to trap heat than one molecule of carbon dioxide. By expressing quantities of greenhouse gases in MTCO₂e, we are converting one metric ton of a greenhouse gas (such as methane) into the equivalent number of metric tons of carbon dioxide, based on their global warming potential, in order to compare and sum the emissions from various greenhouse gases.

Nature-based solutions

Nature-based solutions are projects or approaches that use natural systems (such as forests, soils, and wetlands) to reduce climate impacts and support community resilience, such as by sequestering and storing carbon, mitigating flooding, and keeping temperatures cooler.

Net zero emissions

Net zero emissions means that Medford will nearly eliminate all greenhouse gas emissions from human activities, and any remaining emissions will be balanced by drawing carbon dioxide out of the atmosphere using natural systems (such as forests and wetlands).

Net zero energy building

A net zero energy building is a highly energy efficient building that produces as much renewable energy on site each year as the building's total annual energy usage.

Net zero energy ready building

Net zero-energy-ready buildings have the same level of energy efficiency as a net zero energy building, but are designed with the assumption that the building's energy needs could be met with on-site renewable energy at a later date.

Procedural equity

Procedural equity refers to the process (procedure) for making decisions. An equitable process, such as when

developing or implementing programs or policies, is when the people who will be affected by those decisions are involved in ways that are inclusive, accessible, and authentic.

Regenerative economy

A regenerative economy is one where our work and livelihoods continuously restore and build (as opposed to exploit and diminish) the long-term health and wellbeing of people and natural systems.

Resilience hub

Resilience hubs are neighborhood community spaces with a variety of programs and services that build relationships, promote preparedness, and support health and well-being. These programs are located within a resilient and sustainable building, often with features such as solar power, rainwater capture, or community gardens. In an emergency, these spaces may act as communication centers, distribution centers, or emergency shelters.

Social capital

Social capital is the strength of relationships between people and their community. Social capital is an important factor in whether people are able to cope and adapt both during emergencies and day-to-day.

Structural equity

Structural equity refers to recognizing that “the playing field is not equal.” To achieve structural equity, programs and policies must acknowledge and account for the fact that historical, cultural, and institutional patterns and prejudices have routinely and structurally given advantages to certain groups (such as residents that are white, affluent, able-bodied, cisgender, heterosexual, and English speaking), while creating chronic and cumulative disadvantages for people with identities that differ from the ones listed above.

Transportation demand management

Transportation demand management (TDM) refers to a range of policies or strategies for reducing the number of people traveling by private vehicle in a certain area at a

certain time (such as rush hour) in order to decrease traffic, air pollution, and greenhouse gas emissions.

Urban heat island effect

Surfaces common in cities, including asphalt, steel, and brick, absorb and re-emit more heat from the sun than natural landscapes such as forests, grass, and bodies of water. As a result, urban areas can experience much warmer temperatures than nearby rural areas, a pattern called the “urban heat island effect.” The geometry and spacing of buildings can also trap heat within the city, and human activities (such as driving a car) discharge heat, which also contribute to warmer city temperatures. As a result, urban areas can be up to 7°F hotter than outlying areas during the day, and up to 5°F hotter at night.

Urban heat island effect

A zero emission vehicle is a vehicle that does not produce harmful exhaust (emissions) while the vehicle is in use. Harmful emissions include carbon dioxide, carbon monoxide, nitrogen and sulfur oxides, ozone, volatile organic compounds (VOCs), heavy metals, particulate matter, and other compounds known to have a negative impact on the health of people and the environment. Battery electric vehicles (BEVs) and hydrogen fuel cell electric vehicles (FCEVs) are two types of zero emissions vehicles.

Zero waste

Zero waste is a goal to minimize (and eventually eliminate) all waste by using resources more efficiently, and by recycling materials and products back into nature or the marketplace to be reused again. It requires a “whole system” approach, including designing products better to reduce the toxicity and the amount of materials used, and creating new industries, markets, and processes to reuse and recycle products and materials. While the ultimate goal is to have no materials sent to incinerators or landfills, in practice, zero waste targets set by cities throughout the United States and globally generally refer to 90% of waste diverted from the waste stream.

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