

CLIMATE & ENERGY PLAN

WATERTOWN, MA



Adopted August 9, 2022

CONTENTS

Letter from City Manager	2
Letter from City Council	2
Acknowledgements	3
Acronyms	5
Plan at a Glance	6
What Motivates Us?	12
Climate Change in Watertown	13
Watertown’s Greenhouse Gas Emissions	15
Where Do We Go from Here?	17
Reducing Our Contribution to Climate Change	17
Enhancing Our Resilience to Climate Impacts	19
Climate Action in Watertown	21
Developing the Plan	23
Engaging Our Community	25
What We Heard	27
Our Plan	29
How to Read This Plan	30
Cross-Cutting Strategies	31
Buildings & Energy	33
Transportation & Mobility	41
Natural Resources	51
Infrastructure & Waste Management	59
Public Health & Community Preparedness	67
Glossary	75
Action Implementation Blueprints	76
References	117

LETTER FROM CITY MANAGER

Watertown is a vibrant community where people from diverse backgrounds and cultures come together and thrive. Our rich history of evolving industry and innovation informs a present commitment to developing equitably and sustainably. As challenges emerge, we face them together.

Climate change is the most pressing issue of our time, and we are already beginning to experience some of the impacts today. In Watertown, acting on climate change means preserving our unique neighborhoods and natural resources, while also enabling growth, technological innovation, and community well-being. *Resilient Watertown*, our Climate & Energy Plan, is a unified vision that outlines goals, strategies, and actions to drastically reduce our contribution to climate change and enhance our resilience to its impacts.

Resilient Watertown is the result of a collaborative process. We are grateful for the countless hours spent by members of the public, dedicated volunteers, and City staff for their contributions and active participation in meetings, workshops, surveys, and more. I am proud to join them in advancing Watertown's commitment to ensuring a sustainable and resilient future for all those who live, work, and play in Watertown.

Sincerely,

Tom Tracy

Watertown Acting City Manager

LETTER FROM CITY COUNCIL

We are pleased to support Watertown's Climate & Energy Plan, *Resilient Watertown*. This plan demonstrates Watertown's dedication to addressing climate change, a formidable challenge that we are prepared to face together.

Watertown is a community long committed to leadership and environmental stewardship. From our state designation as a Green Community over ten years ago to our commitment to supporting the transition to 100% renewable energy, we are already acting boldly to address climate change. *Resilient Watertown* takes these efforts a step further in ensuring our long-term sustainability and resilience. The Plan identifies opportunities for lasting improvements here in Watertown, by reducing climate change-causing greenhouse gas emissions and other pollutants and improving quality of life for all residents in the face of extreme events and prolonged stressors.

We would like to thank the Watertown community and all those who participated in the development of this plan for their dedication to climate action. We look forward to working together to implement our Climate & Energy Plan.

Sincerely,

Watertown City Council

ACKNOWLEDGEMENTS

Resilient Watertown was developed through a collaborative effort between municipal staff and the community with support from our consultant team.

Municipal Staff (Core Team)

Steve Magoon	Assistant City Manager; Director, Community Development & Planning
Laurel Schwab	Senior Environmental Planner
Laura Weiner	Senior Transportation Planner
Ed Lewis	Energy / Project Manager; Interim Director, Department of Public Buildings
Greg St. Louis	Superintendent, Department of Public Works

Stakeholder Advisory Group

Buildings & Energy Working Group

Chair: Brian Hebeisen, WE3C

Members:

Dante Angelucci	Alexandria Real Estate Equities
Ed Lewis	Department of Public Buildings
Marcus de Castro	Boylston Properties
Michael Lara	Watertown Housing Authority
Pat Rathbone	Watertown Faces Climate Change
Rick Malmstrom	Alexandria Real Estate Equities
William C. (Bill) Clark	Resident and climate science expert

Transportation & Mobility Working Group

Chair: Laura Wiener, Senior Transportation Planner

Members:

Amy Plovnick	Bicycle & Pedestrian Committee
Andy Compagna	Bicycle & Pedestrian Committee
Bridger McGaw	AthenaHealth
Doug Orifice	Watertown Business Coalition
Eric Kemp-Benedict	Resident and climate science expert
Ernesta Krackiewicz	Watertown Faces Climate Change

Natural Resources Working Group

Chair: Ellen Menounos, WE3C

Members:

Bob DiRico	Department of Public Works
David Meshoulam	Teens for Trees
Dira Johanif	Charles River Watershed Association
Greg Mosman	Former Tree Warden
Janet Buck	Stormwater Advisory Committee/Planning Board
Leo Martin	Conservation Commission
Libby Shaw	Trees for Watertown
May Cort	Sunrise Watertown
Paul Kwiatkowski	Mt. Auburn Cemetery
Sarah Moylan	Arsenal Yards

Infrastructure & Waste Management Working Group

Chair: Vincent Coljee, Resident and climate science expert

Members:

Greg St. Louis	Superintendent, Department of Public Works
Julie Wormser	Mystic River Watershed Association
Tom Watkins	Department of Public Works

Public Health & Community Preparedness Working Group

Chair: Larry Ramdin, Department of Public Health

Members:

Anne-Marie Gagnon	Council on Aging
Dr. Kimberlee Henry	Director of Diversity, Equity & Inclusion, Watertown Public School
Jan Singer	Watertown Community Foundation
Kim Charlson	Perkins School for the Blind
Robert Quinn	Watertown Fire Department
Sabrina Lopez	Sunrise Watertown
Stephanie Venizelos	Department of Public Health

Consultant Team: Kim Lundgren Associates, Inc.



ACRONYMS

CPC:	Community Preservation Committee
CRWA:	Charles River Watershed Association
DCDP:	Watertown Department of Community Development and Planning
DCR:	Massachusetts Department of Conservation and Recreation
DEP:	Massachusetts Department of Environmental Protection
DPB:	Watertown Department of Public Buildings
DPH	Watertown Department of Public Health
DPW:	Watertown Department of Public Works
EVs:	electric vehicles
GHGs:	greenhouse gases/greenhouse gas emissions
HFCs:	hydrofluorocarbons
MBTA:	Massachusetts Bay Transportation Authority
SWAC:	Stormwater Advisory Committee
WE3C:	Watertown Environment and Energy Efficiency Committee
WEC:	Watertown Electricity Choice
WHA	Watertown Housing Authority
WTMA:	Watertown Transportation Management Association



Watertown Free Public Library improves the quality of life in the community, providing valuable services and resources to all residents. Credit: City of Watertown



Watertown is committed to taking action on climate change while preserving and strengthening our unique neighborhoods, natural resources, and diverse communities. *Resilient Watertown*, our Climate & Energy Plan, outlines 61 priority actions to ensure Watertown is on a path to a net zero, climate resilient future.

PLAN AT A GLANCE

Cross-Cutting Strategies

Goal 1: Achieve synergies across multiple Plan Element goals and enable implementation of all strategies and actions

- » Strategy CC1: Add staff capacity and resources to the Energy Manager’s Office, the DPW Forestry Division, and the Department of Community Development and Planning
- » Strategy CC2: Create an overarching *Resilient Watertown* Outreach & Education Campaign
- » Strategy CC3: Develop assistance mechanisms and resources for renters and landlords (regarding energy efficiency, EV charging, etc.)
- » Strategy CC4: Collaborate regionally with other communities and entities
- » Strategy CC5: Explore establishing a Transportation Infrastructure Fund with funding from developers and the City to implement recommendations of this Plan
- » Strategy CC6: Encourage and require sustainable, climate-resilient development patterns



Image Credit: City of Watertown



Buildings & Energy

Goal 1: By 2050, 100% of electricity is sourced from renewables

» Strategy BE1: Accelerate the transition to renewable energy city-wide

- ◆ Action BE1.1: Expand and strengthen the existing solar ordinance
- ◆ Action BE1.2: Investigate implementing commercial PACE and other innovative financing programs
- ◆ Action BE1.3: Develop and implement a targeted outreach campaign focused on recruiting for Watertown Electricity Choice program and installing rooftop solar on homes and businesses



Goal 2: By 2050, Watertown's buildings are efficient, resilient, and carbon neutral

» Strategy BE2: Require the highest standards for efficiency and carbon neutrality for new construction and major renovations

- ◆ Action BE2.1: Adopt the State's Net Zero Stretch Code as soon as permissible
- ◆ Action BE2.2: Enact fees for residential gas hookups to promote electrification
- ◆ Action BE2.3: Promote workforce development and training programs for net zero construction
- ◆ Action BE2.4: Work with municipalities in the region to eliminate fossil fuels (e.g., identifying mechanisms like home rule petition)
- ◆ Action BE2.5: Include the use of Whole Building Life Cycle Assessment as a condition for granting permits for applicable developments and work towards setting progressively tighter standards

» Strategy BE3: Electrify existing buildings running on fossil fuels

- ◆ Action BE3.1: Investigate and support development of geo-microgrid pilot programs
- ◆ Action BE3.2: Develop and implement a targeted outreach campaign focused on promoting heat pumps for residential homes on oil heat and natural gas (e.g., zero-interest loans for heat pumps)
- ◆ Action BE3.3: Incentivize the transition to heat pumps through HEAT Smart or other programs

» Strategy BE4: Enhance and actively promote deep retrofit and aggressive conservation programs

- ◆ Action BE4.1: Enact a Building Energy Use Disclosure Ordinance
- ◆ Action BE4.2: Provide technical assistance for clean energy, energy efficiency, and financing activities (e.g., home energy guidance, collaborating on retrofits of Watertown Housing Authority properties)
- ◆ Action BE4.3: Upgrade major existing municipal facilities to achieve net zero energy performance
- ◆ Action BE4.4: Develop a bulk procurement and purchasing program to support smaller commercial properties with deep energy retrofits
- ◆ Action BE4.5: Incentivize large grocery stores and buildings with significant refrigeration to get certified in EPA GreenChill program to reduce HFCs

Image Credit: City of Watertown



Transportation & Mobility

Goal 1: By 2050, non-vehicular transportation options are accessible, affordable, and connected throughout Watertown, and personal vehicular travel miles are reduced by 50%

- » Strategy TM1: Enhance and actively promote zero-carbon mobility options for travel
 - ◆ Action TM1.1: Install well-shaded bike and pedestrian-only infrastructure for protected and off-street connections in densely developed areas and areas of high traffic volume
 - ◆ Action TM1.2: Collaborate regionally to increase and improve safe, interconnected pathways for bicyclists and pedestrians
 - ◆ Action TM1.3: Increase use of transit, bike, and pedestrian travel through outreach, incentives, and policy changes (e.g., decreasing zoning requirements for parking, traffic calming, safe routes to schools)
 - ◆ Action TM1.4: Work with MBTA to improve accessibility of routes, stops, and CharlieCard purchasing stations within Watertown, and electrification of the bus fleet
 - ◆ Action TM1.5: Implement bus prioritization projects such as dedicated lanes and signal priority
 - ◆ Action TM1.6: Develop an integrated, publicly accessible electric transit system that connects to MBTA and other points of interest not accessible by MBTA, including on-demand transportation options



Goal 2: By 2050, 100% of all vehicles in Watertown are electric

- » Strategy TM2: Accelerate the shift to electric vehicles (EVs)
 - ◆ Action TM2.1: Develop and implement an EV Roadmap for Watertown
 - ◆ Action TM2.2: Transition City-owned, leased, and contracted vehicles to electric, including, but not limited to, school bus, garbage truck, and maintenance fleets
 - ◆ Action TM2.3: Support the development of Multi-Use Parking Arrangements to develop EV charging at places of worship and other organizations with large parking lots in residential neighborhoods
 - ◆ Action TM2.4: Develop an outreach and incentive campaign to those with a vehicle over 10 years old to promote and incentivize EV purchase
 - ◆ Action TM2.5: Increase the availability of charging stations on municipal property
 - ◆ Action TM2.6: Incentivize homeowners and landlords to install EV chargers

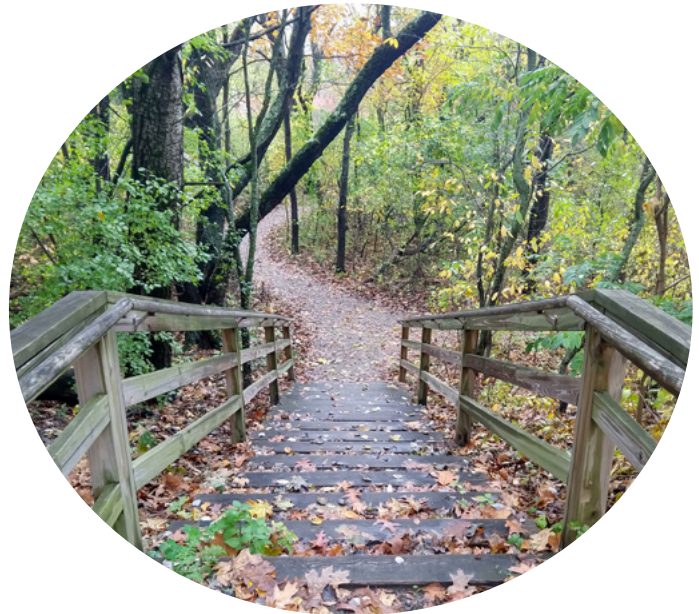


Natural Resources

Goal 1: By 2050, Watertown's natural assets and green space are enhanced, equitably distributed, and delivering full ecosystem benefits

» Strategy NR1: Protect and enhance forest and open space parcels

- ◆ Action NR1.1: Incorporate pocket parks into all neighborhoods lacking green space
- ◆ Action NR1.2: Promote biodiversity improvements to existing and new parks and open space by codifying existing DPW planting and maintenance practices and strengthening requirements for private development
- ◆ Action NR1.3: Acquire more open space, where possible, and create more open space on private property
- ◆ Action NR1.4: Establish equitable and accessible natural-habitat corridors along water bodies, trails, and utility easement areas, and protect existing ones



» Strategy NR2: Protect, enhance, and diversify the tree canopy

- ◆ Action NR2.1: Establish an enforceable tree ordinance focused on preservation, diversification, and equitable distribution of tree canopy on public and private property
- ◆ Action NR2.2: Establish a community outreach program to increase awareness and appreciation of the importance of the urban forest in mitigating climate change impacts
- ◆ Action NR2.3: Substantially increase annual street and municipal tree plantings and prioritize tree plantings in neighborhoods at high risk for urban heat impacts

» Strategy NR3: Promote regenerative landscaping and maintenance practices

- ◆ Action NR3.1: Develop a regenerative landscaping education and outreach plan with expanded opportunities for resident involvement (e.g., "Leave the Leaves" campaign)
- ◆ Action NR3.2: Utilize school gardens and community gardens as nature-based landscaping demonstration sites
- ◆ Action NR3.3: Update current development regulations to require the use of appropriate native plants for new- and re-development and de-emphasize non-native lawn spaces

» Strategy NR4: Minimize quantity and improve quality of stormwater runoff

- ◆ Action NR4.1: Expand and accelerate existing Green Stormwater Infrastructure (GSI) policies and management programs for public projects
- ◆ Action NR4.2: Promote and/or incentivize the incorporation of green stormwater infrastructure into existing large impervious areas
- ◆ Action NR4.3: Enhance incentives and ongoing education related to individual actions such as rain barrels, planting strips, and depaving private residential properties

Image Credit: City of Watertown



Infrastructure & Waste Management

Goal 1: By 2050, Watertown has achieved a net zero waste community status

» Strategy IW1: Transition community attitudes and actions around consumption and disposal practices

- ◆ Action IW1.1: Create a bulk purchasing network for compostable and environmentally friendly goods among the commercial and industrial sectors
- ◆ Action IW1.2: Design and implement an education and outreach campaign focused on reducing waste sent to the incinerator and the climate impacts of our current consumption patterns, including topics such as single use plastics and meat consumption
- ◆ Action IW1.3: Create a convenient and free or affordable organics recycling program, setting annual goals for enrollment and engaging residents in education and outreach on the topic
- ◆ Action IW1.4: Establish an Environmentally Preferable Purchasing policy (EPP) that focuses on reducing consumption, particularly of single use items within municipal government
- ◆ Action IW1.5: Investigate opportunities to pursue a circular economy in Watertown or within the Metro Boston region (e.g., plastic item bans, grey water recycling, pay-per-bag program, additions to recyclable items)



Goal 2: By 2050, Watertown's infrastructure is well maintained and resilient to the impacts of climate change

» Strategy IW2: Systematically integrate climate change projections into the design of all new and upgraded infrastructure projects

- ◆ Action IW2.1: Require that all major new infrastructure and upgrades incorporate resilient design guidelines, such as Envision™, that take climate impacts into account over the lifespan of the infrastructure
- ◆ Action IW2.2: Review and enhance current infrastructure maintenance systems and protocols to align with the needs of a changing climate
- ◆ Action IW2.3: Advocate with partners for the safe removal of the Watertown Dam
- ◆ Action IW2.4: Investigate local back-up power, microgrid, and battery options in coordination with utilities

Image Credit: City of Watertown



Public Health & Community Preparedness

Goal 1: By 2030, Watertown is a model for community resilience to climate change

» Strategy PH1: Promote climate literacy through education and training

- ◆ Action PH1.1: Launch a climate preparedness educational campaign
- ◆ Action PH1.2: Actively recruit volunteers to participate in the Community Emergency Response Team (CERT) program

» Strategy PH2: Acknowledge climate change's impact on and provide resources to enhance overall community health and well-being

- ◆ Action PH2.1: Complete a Climate Change and Health Vulnerability Assessment and develop Adaptation Guidelines (including issues like vector borne disease, pests, mental health)
- ◆ Action PH2.2: Mitigate existing and prevent new urban heat islands in Watertown
- ◆ Action PH2.3: Continue to enhance access to local food by expanding resources and support for food pantries and community fridge programs, community gardens, and the Farmers' Market for those who are food insecure

» Strategy PH3: Provide equitable access to emergency preparedness and response resources

- ◆ Action PH3.1: Identify and reduce structural barriers (e.g., internet access, language and cultural barriers, cognitive and/or physical disabilities, social isolation, access to services and emergency information) that prevent individuals and neighborhoods from taking care of themselves during and after extreme weather
- ◆ Action PH3.2: Require all commercial building owners to rebroadcast and post Watertown Alert announcements to building occupants in English and Spanish
- ◆ Action PH3.3: Launch a "Sign Up" campaign to ensure equitable access to communication resources
- ◆ Action PH3.4: Enhance emergency preparedness information on City website

» Strategy PH4: Promote overall community connectivity

- ◆ Action PH4.1: Establish a network of resilience hubs that provide resources (e.g., cooling, phone-charging, pantry) that are easily accessible throughout the community
- ◆ Action PH4.2: Enhance the existing Live Well Watertown coalition and its programs to incorporate neighborhood connections to nature and to each other



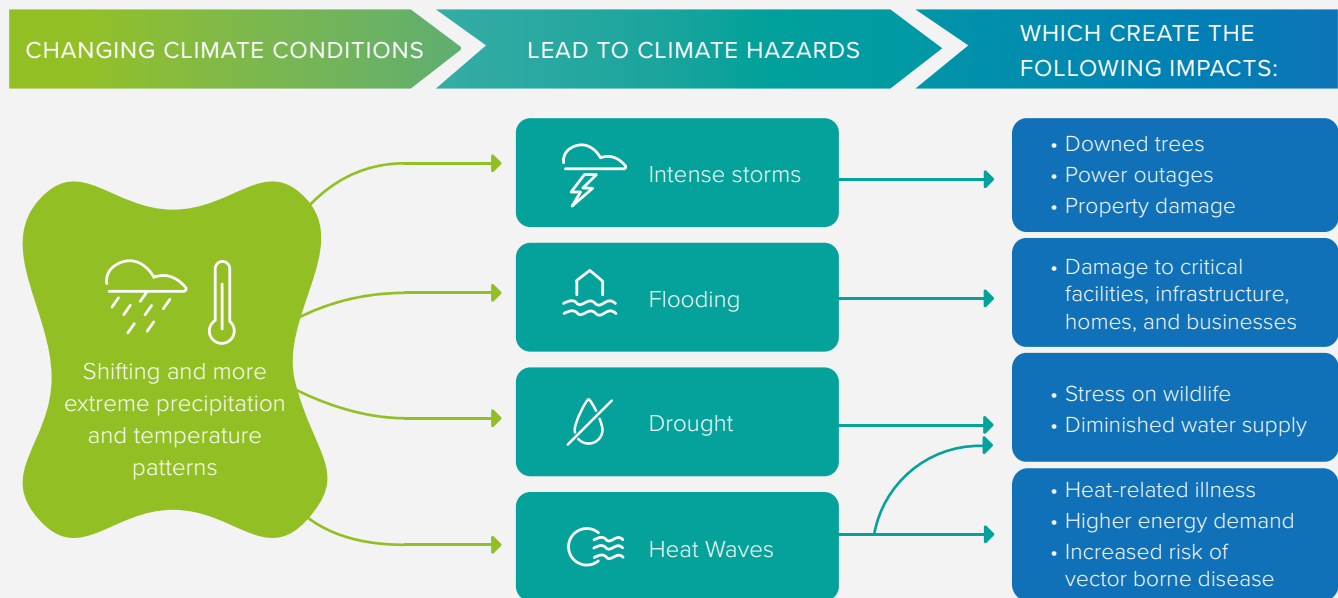
WHAT MOTIVATES US?

There are **two primary ways to address climate change: minimizing our contribution to climate change by reducing our greenhouse gas (GHG) emissions and increasing our resilience to climate impacts through adaptation measures.** The *Resilient Watertown* Climate & Energy Plan identifies opportunities to do both. We recognize the responsibility to do our part to lessen climate impacts while responding to the realities of our changing climate here in Watertown.

Understanding how climate change trends and projections will play out in Watertown allows us to identify the greatest opportunities for climate resilience actions.

Changing conditions, like increasing temperature and precipitation, are and will continue to exacerbate existing climate hazards in Watertown, with impacts to community health, local natural resources, and infrastructure. As in many other municipalities throughout the region, in Watertown, changes to climate are taking shape through four primary hazards: intense storms, flooding, drought, and heat waves.

CLIMATE HAZARDS



CLIMATE CHANGE IN WATERTOWN



INTENSE STORMS

The frequency and severity of intense storms—like nor’easters, ice storms, blizzards, hurricanes, windstorms, and heavy precipitation events—are increasing.

Trends

27% increase in heavy downpours in Massachusetts between 1950 and 2014, ranking as the 11th state with the largest increase¹

Projections

Up to 2.4 additional inches of precipitation by 2050 and **up to 3.9 inches** by 2100 projected in Massachusetts²

Impacts

In Watertown, one of the greatest concerns with intense storms is the threat of falling trees and poles, which have been known to lead to power outages.



Arsenal Street experienced downed power lines during a storm in 2018.

Credit: Watertown Police Department.



Flooding in Watertown can cause serious damage and disruption, for example, blocking local roadways. Credit: iStock



FLOODING

The frequency of high-intensity rainfall events is projected to increase, which will in turn increase the risk of flooding.

Trends

22 flood-related disasters between 1954 and 2018 in Massachusetts, causing **\$35.2 million worth of damage** Middlesex County in March of 2010 alone³

Projections

Up to 10 more days per year with precipitation of more than 1 inch by 2050⁴

Impacts

Flooding has increasingly affected local roadways, in particular Howard and Pleasant Streets, as well as buildings in Watertown. As storms and precipitation

become more severe, Watertown’s stormwater and sewer systems will be at risk of overcapacity.



DROUGHT

Although more annual precipitation is expected overall, it is anticipated to fall in fewer, more intense events, rather than sporadically throughout the year. This pattern will lead to longer periods without rainfall and increase the potential for drought.

Trends

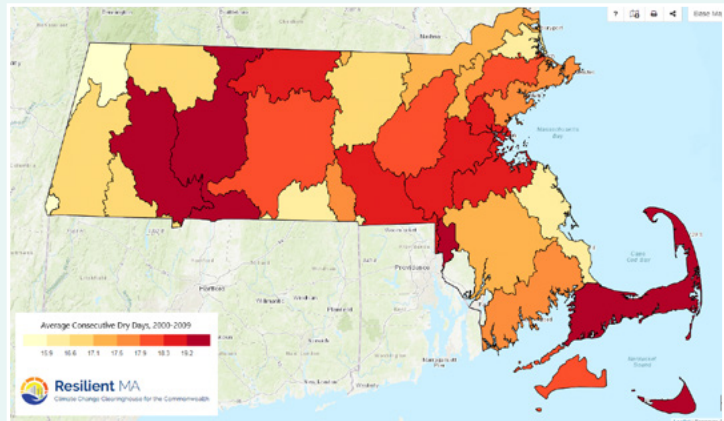
48 weeks of “severe drought” and **21 weeks of “extreme drought”** between 2001-2017 in Watertown⁵

Projections

Increase in frequency of short-term droughts⁶

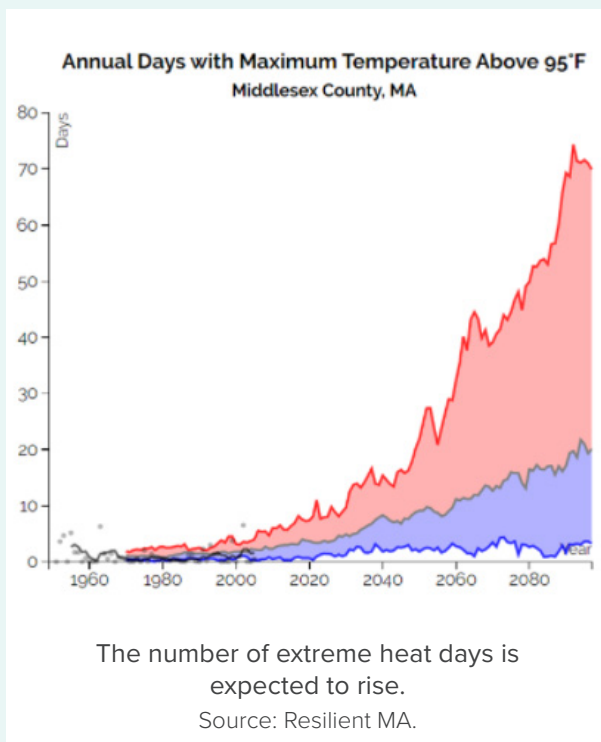
Impacts

Though Watertown’s water supply, which is supplied by the Massachusetts Water Resources Authority, is not typically affected by drought, water scarcity can have an impact on the city’s tree canopy, plants, and landscapes.



Longer periods without rainfall, especially in summer or fall, are expected.

Source: Resilient MA.



The number of extreme heat days is expected to rise.

Source: Resilient MA.



HEAT WAVES

Increasing temperatures and heat waves—periods of three or more days over 90°F—are on the rise in Watertown.

Trends

11.5 days above 90°F between 2010 and 2014 in Massachusetts, the highest number since 1950⁷

Projections

10 to 35 days more extreme heat days and **17 to 39 fewer cold days** (under 32°F) by 2050⁸

Impacts

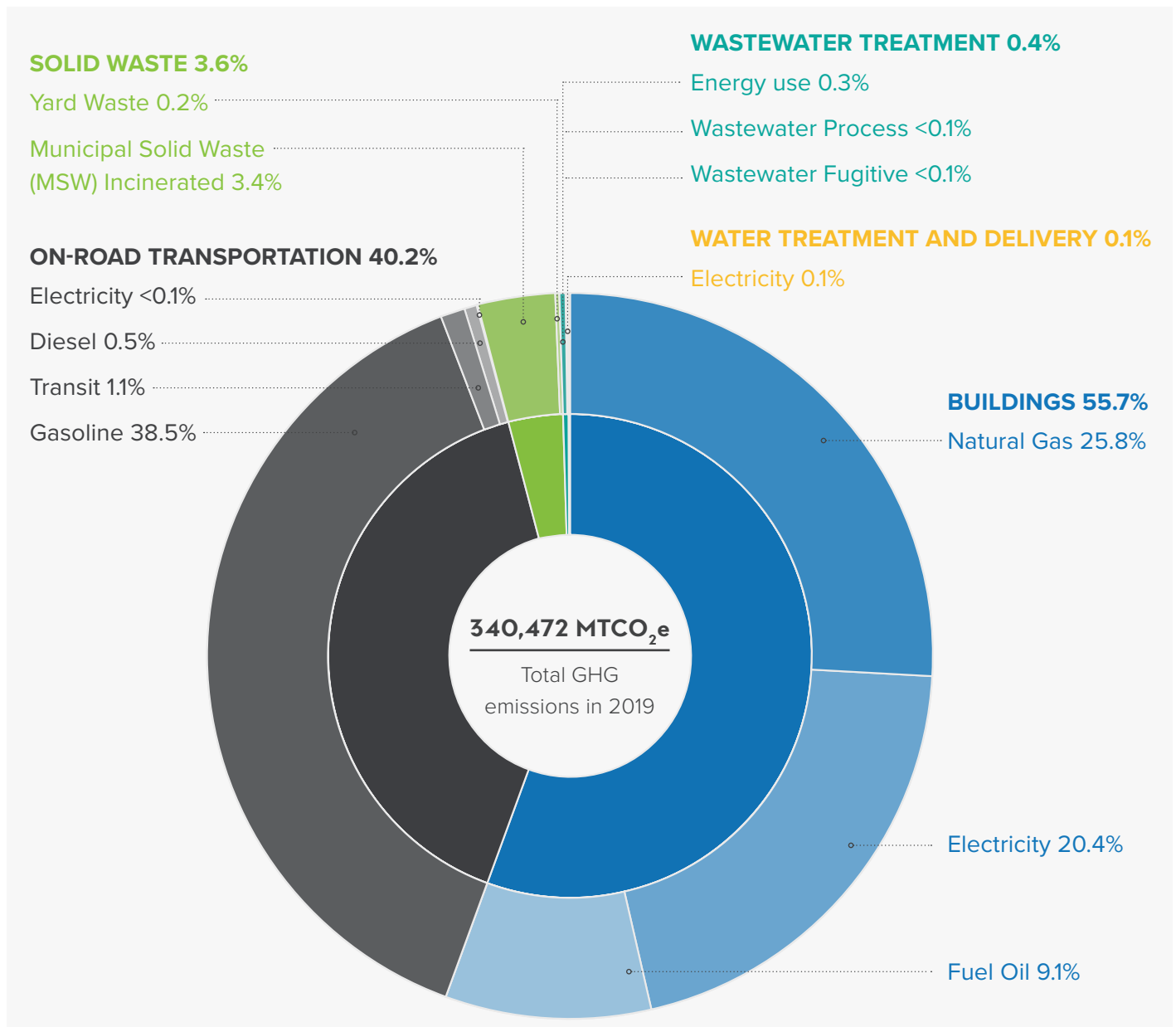
Access to cooling has been identified as a top concern related to extreme heat in Watertown, particularly for sensitive populations including seniors and outdoor workers.

WATERTOWN'S GREENHOUSE GAS EMISSIONS

It's important to understand where GHG emissions in Watertown are coming from so we can identify the greatest areas of opportunity to reduce our emissions in pursuit of our climate goals. As part of this planning process, Watertown conducted a GHG inventory to calculate 2019 community-wide and municipal emissions.⁹

Building energy use makes up more than half of Watertown's community emissions, and it is largely from the use of natural gas. Transportation makes up the second largest share and mostly come from use of gasoline in vehicles. In these two sectors, we'll need to focus our efforts on reducing building energy usage and miles traveled in private vehicles, while transitioning to renewable energy sources and non-vehicular transportation options. Solid waste makes up the next largest share of emissions and can be addressed through strategies to reduce waste generated and increase the percentage of waste that is recycled or composted.

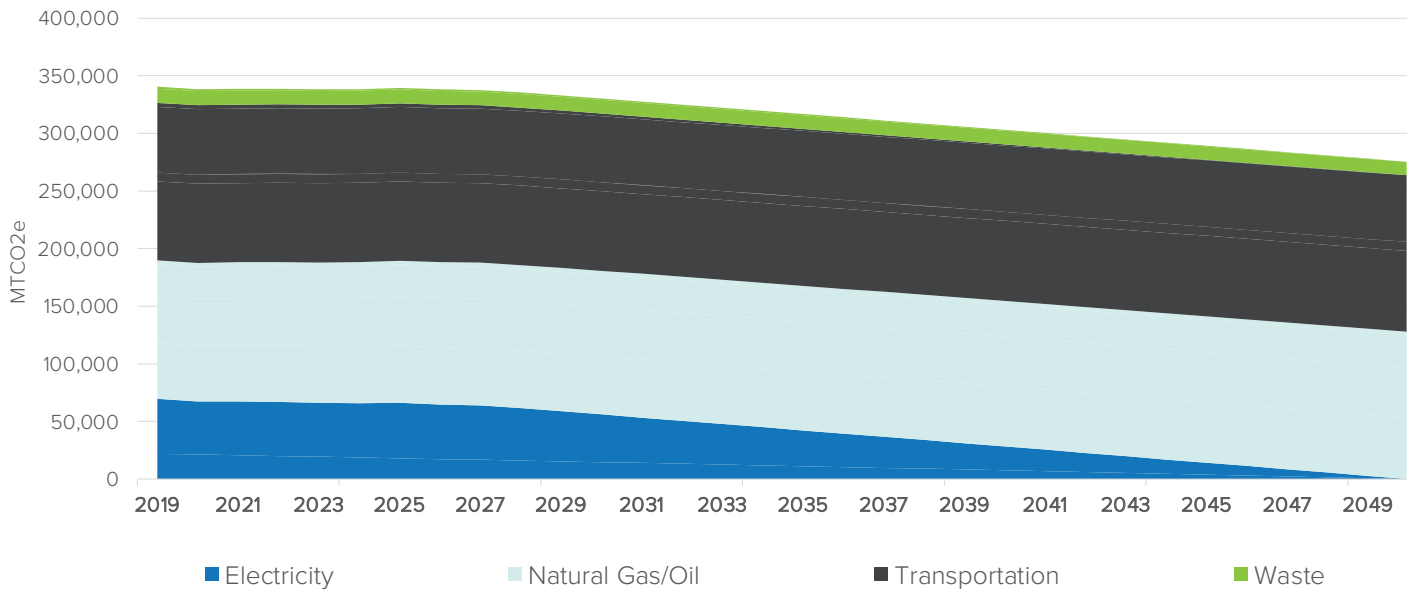
To estimate emissions and track progress, emissions of various GHGs are combined into a single weighted value for emissions, commonly references as **metric tons of carbon dioxide equivalent (MTCO₂e)**.



BUSINESS-AS-USUAL

The following chart forecasts what our emissions will look like if we take no intentional action. While we expect some emissions reductions over time due to the State’s Renewable Portfolio Standard (requirements for the percentage of the state’s electricity to come from renewable energy) and improved federal fuel economy standards, these actions alone will not put us on a path to achieve our goals.

Business-As-Usual Scenario, 2019-2050



HFC Leaks

Hydrofluorocarbons (HFCs) are used in all types of refrigeration and cooling equipment. These chemicals have very high global warming potential values and are over 1,000 times as powerful at trapping heat as CO₂. Even small amounts of leakage can have a big impact. Detailed leakage data is not available, but typical leakage rates applied to

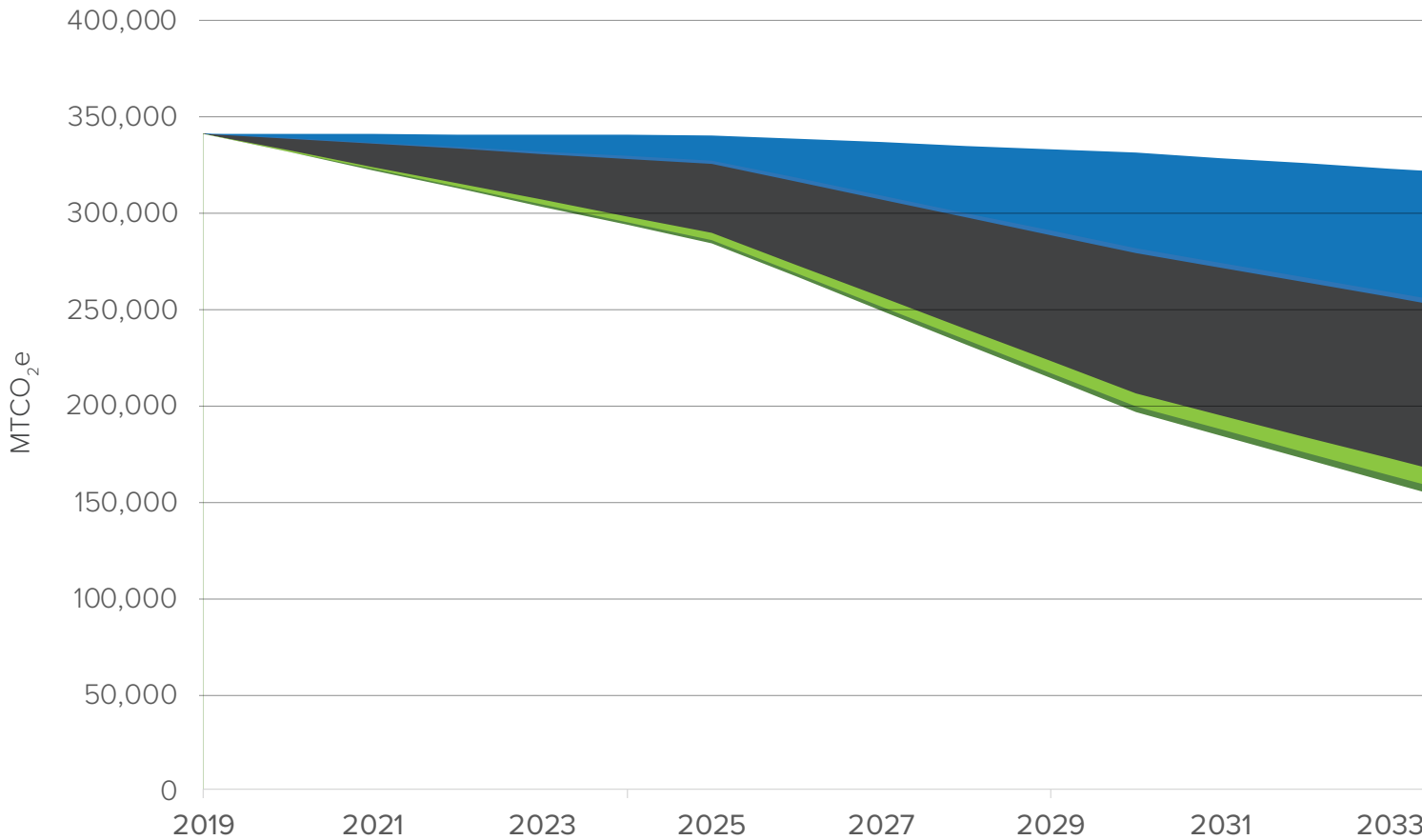
Watertown supermarkets and all the cars and buildings with air conditioning would likely raise our emissions profile by over 10,000 MTCO₂e. The good news is that these chemicals are being phased out, but there are a lot of leaks that we can stop right away.



WHERE DO WE GO FROM HERE?

REDUCING OUR CONTRIBUTION TO CLIMATE CHANGE

The strategies outlined in this Climate & Energy Plan are designed to help us reach our climate goals. The chart below models the opportunity for GHG reductions in our community through 2050. The different bands in the graph correspond to the Plan's high impact strategies that will help us get to zero emissions.



Transportation & Mobility

Potential to reduce up to 2,749,000 MTCO₂e

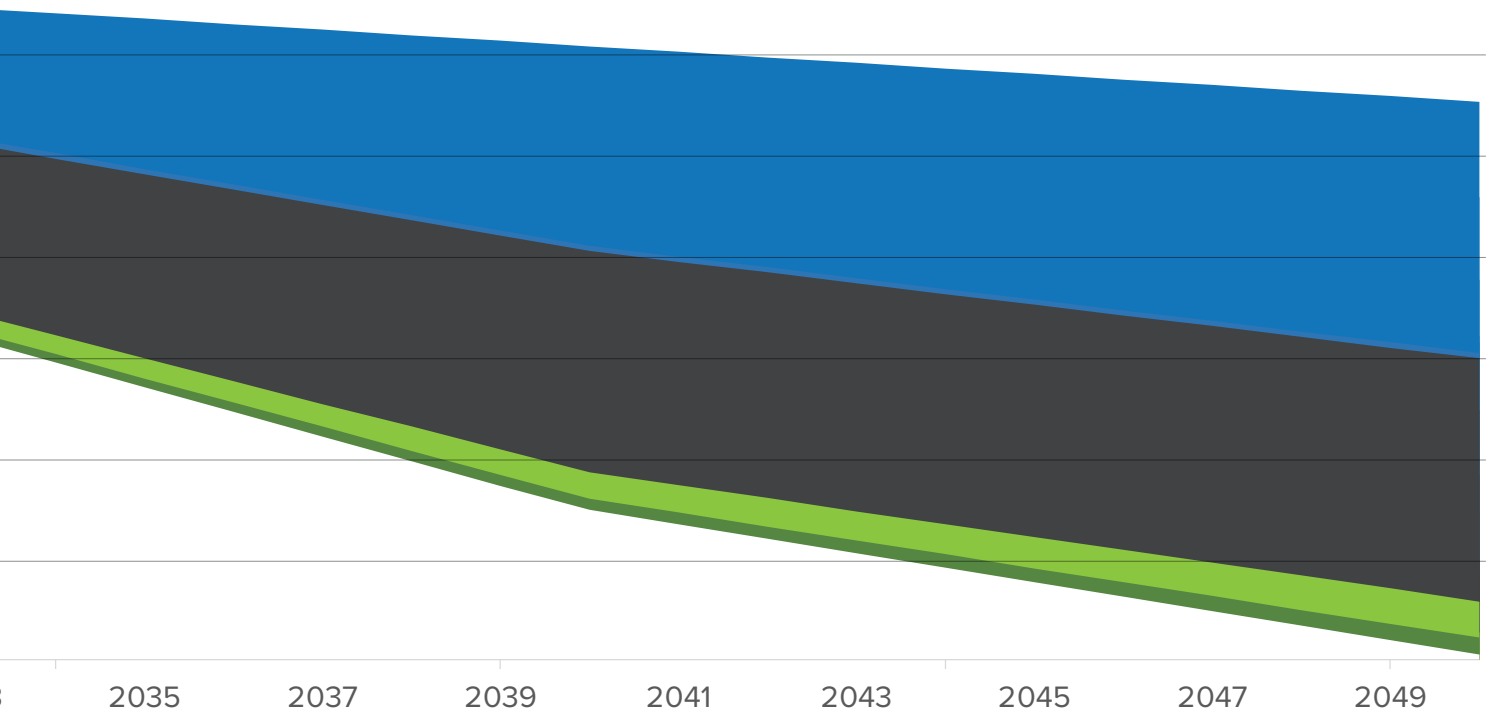
- Strategy TM1: Enhance and actively promote zero-carbon mobility options for travel
- Strategy TM2: Accelerate the shift to electric vehicles (EVs)

Buildings & Energy

Potential to reduce up to 2,917,000 MTCO₂e



- Strategy BE1: Accelerate the transition to renewable energy city-wide
- Strategy BE2: Require the highest standards for efficiency and carbon neutrality for new construction and major renovations
- Strategy BE3: Electrify existing buildings running on fossil fuels
- Strategy BE4: Enhance and actively promote deep retrofit and aggressive conservation programs



Infrastructure & Waste Management

Potential to reduce up to 182,000 MTCO₂e



- Strategy IW1: Transition community attitudes and actions around consumption and disposal practices

Natural Resources






























Potential to reduce up to 5,000 MTCO₂e



- Strategy NR1: Protect and enhance forest and open space parcels
- Strategy NR2: Protect, enhance, and diversify the tree canopy

ENHANCING OUR RESILIENCE TO CLIMATE IMPACTS

As climate hazards continue to threaten Watertown’s infrastructure, resources, and people, there are actions we can take to reduce their impact. The strategies outlined below provide an opportunity to minimize climate change’s worst impacts and enhance our resilience.

Plan Element	Strategy	Climate Change Hazards Addressed
Buildings & Energy	Strategy BE3: Electrify existing buildings running on fossil fuels	
Transportation & Mobility	Strategy TM2: Accelerate the shift to electric vehicles (EVs)	
Natural Resources	Strategy NR1: Protect and enhance forest and open space parcels	 
	Strategy NR2: Protect, enhance, and diversify the tree canopy	 
	Strategy NR3: Promote regenerative landscaping and maintenance practices	  
	Strategy NR4: Minimize quantity and improve quality of stormwater runoff	   
Infrastructure & Waste Management	Strategy IW2: Systematically integrate climate change projections into the design of all new and upgraded infrastructure projects	 
Public Health & Community Preparedness	Strategy PH1: Promote climate literacy through education and training	   
	Strategy PH2: Acknowledge climate change’s impact on and provide resources to enhance overall community health and well being	   
	Strategy PH3: Provide equitable access to emergency preparedness and response resources	  
	Strategy PH4: Promote overall community connectivity	  



Intense Storms



Flooding



Heat Waves



Drought

Climate Change Impacts Minimized

Lessens damage to infrastructure, homes, and businesses	Prevents power outages	Provides back-up power	Reduces energy demand	Minimizes local flooding	Protects water quality	Helps maintain water supply	Reduces stress on wildlife	Prevents heat related illness	Provides resources to residents & businesses in need
	✓	✓							
		✓	✓						
			✓	✓	✓		✓	✓	
			✓	✓				✓	
					✓	✓			
✓				✓	✓		✓		
✓	✓	✓	✓						
								✓	✓
								✓	✓
								✓	✓
								✓	✓

CLIMATE ACTION IN WATERTOWN

Watertown is already taking important steps to mitigate and adapt to climate change. *Resilient Watertown* builds on these existing initiatives and past milestones.

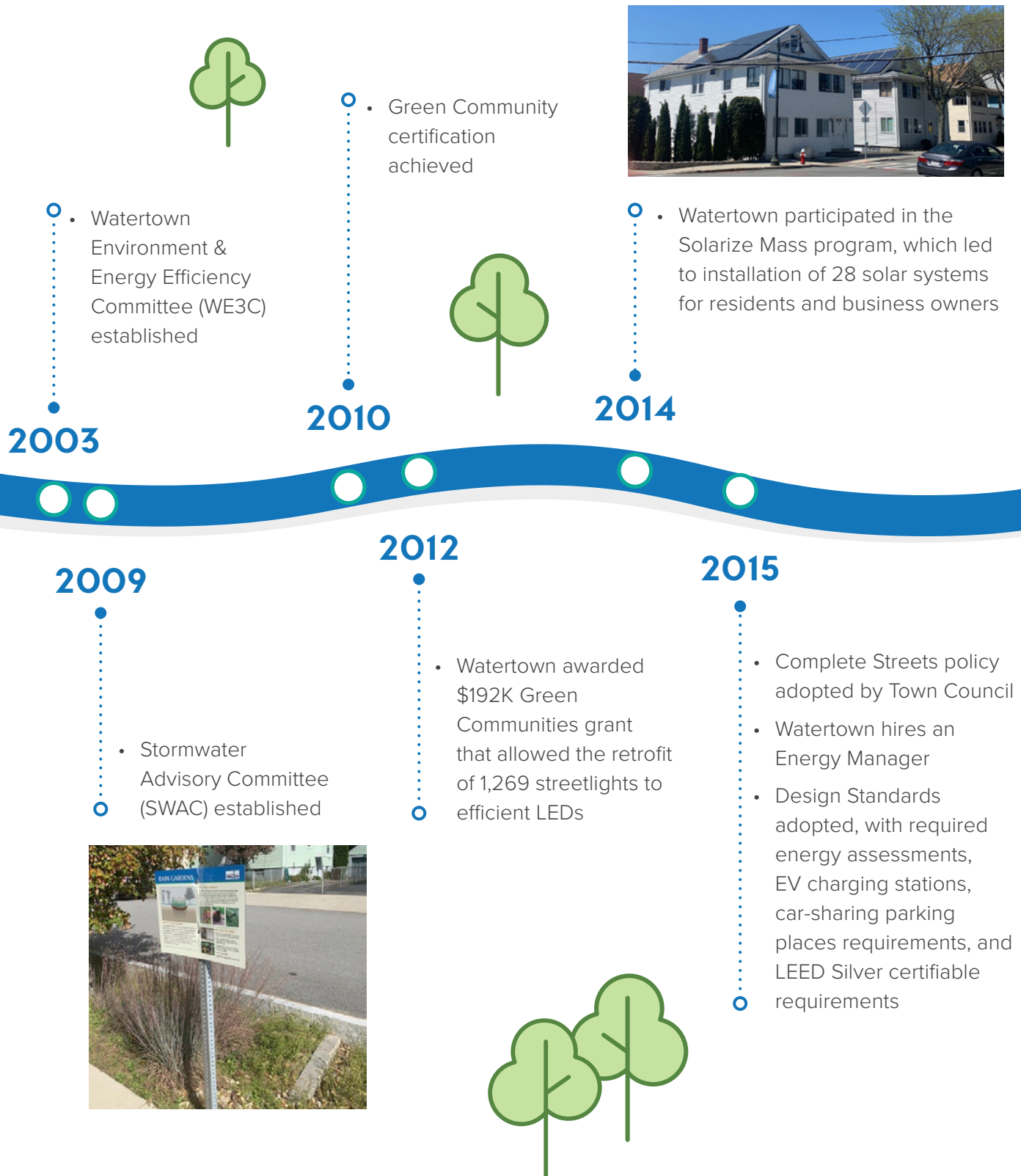
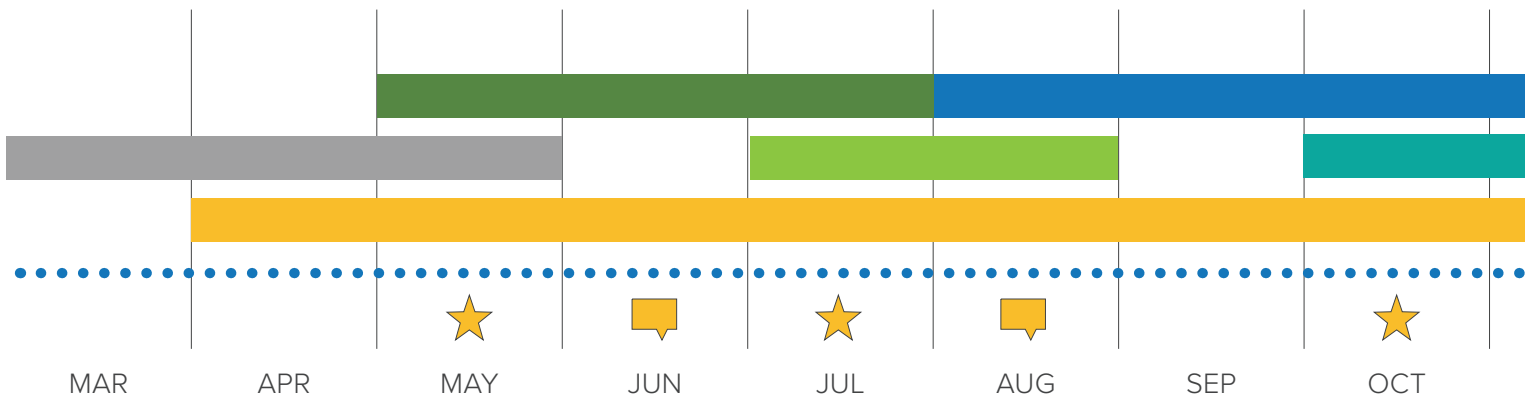


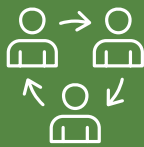
Image Credit: City of Watertown



DEVELOPING THE PLAN



Stakeholder Advisory Group

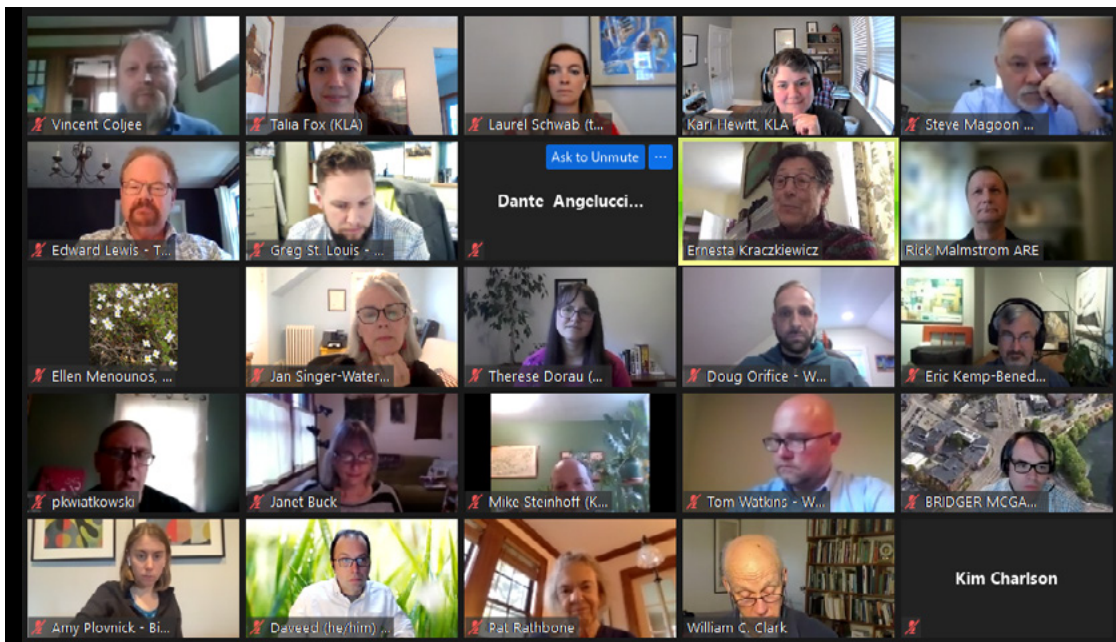
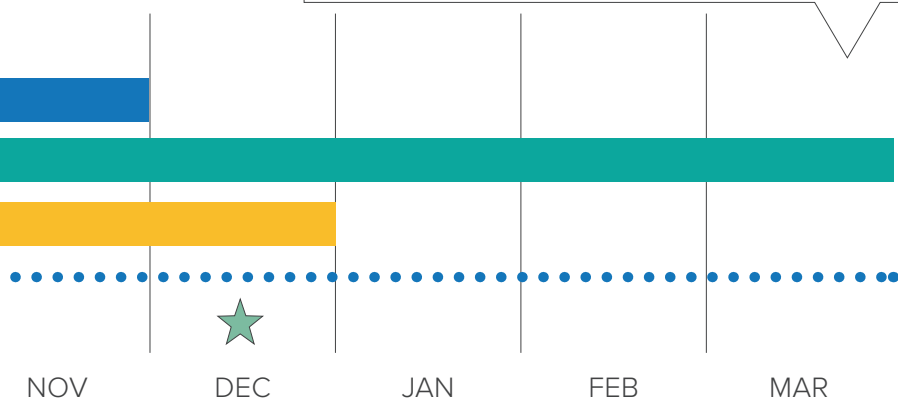
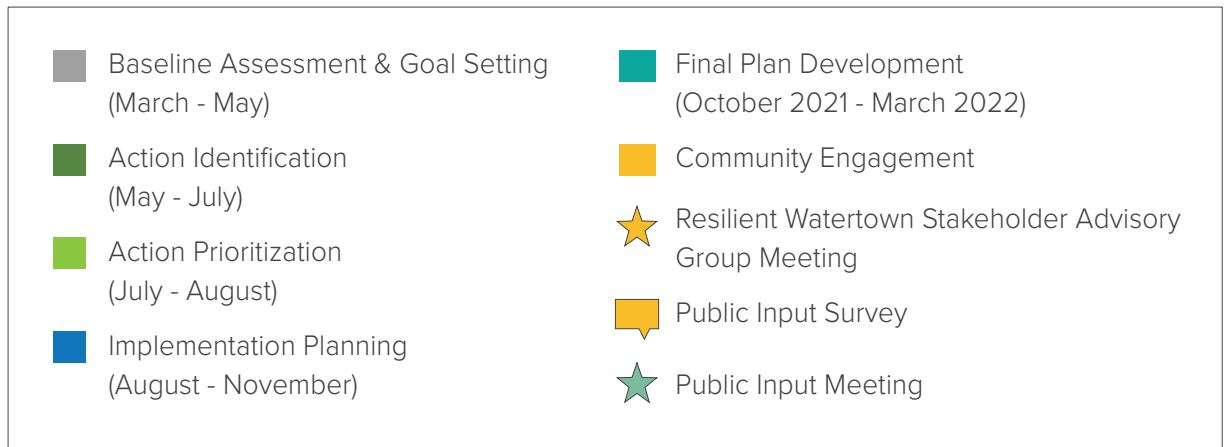


The **Resilient Watertown Stakeholder Advisory Group (RWSAG)** supported the planning process and directly informed the vision, goals, priority actions, and implementation steps throughout the plan’s development. The 35-member Advisory Group consisted of municipal representatives and key stakeholders from universities, non-profits, businesses, and local environmental groups.

Working Groups



In addition to convening as a group, the RWSAG was divided into **Working Groups** for each of the five plan elements based on expertise and interest. Working Groups met independently to collaboratively confirm goals, refine actions, and develop implementation blueprints for priority actions, as well as to support community engagement. The Advisory Group was integral to bringing community-based knowledge to shape the plan in addition to serving as ambassadors for climate action and *Resilient Watertown*.



The *Resilient Watertown* process launched Spring of 2021, building on the MVP planning efforts in 2020. The planning process consisted of five distinct phases that allowed the City to first assess existing conditions and projected climate impacts, and then develop goals, actions, and metrics based on that data and input from community members and stakeholders.

ENGAGING OUR COMMUNITY



645 Survey Responses

931 Comments

3,800 Residents engaged



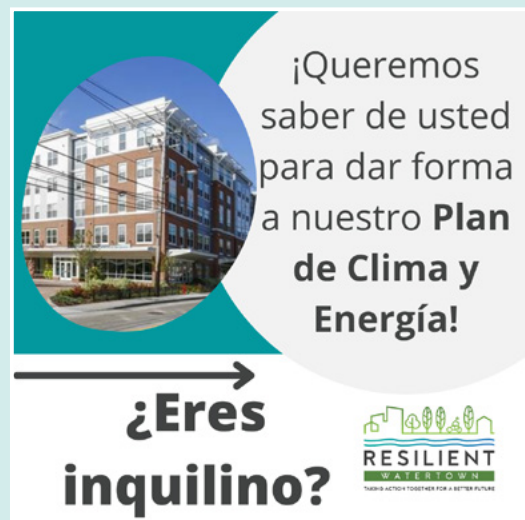
The City connected with a total of about 3,800 residents during the year-long planning process. Impacts from a global pandemic compelled the City to shift to a primarily virtual approach using online engagement tools, in addition to a handful of outdoor events.

Resilient Watertown engagement was intended to build capacity for community members to understand climate issues and foster ongoing climate conversations, with a focus on residents most vulnerable to climate impacts. Across nine months of engagement, the City and community organizations gathered 645 online survey responses across four surveys with nearly 1,000 comments from community members. City staff distributed education materials, had personal conversations at five public events, and provided public access to the three Advisory Group meetings and multiple opportunities to offer feedback during the process.

Equitable Engagement

Spanish Language – Over 9% of City residents identify as Hispanic and *Resilient Watertown* aimed to engage this audience in the planning process. Survey One was offered and advertised in Spanish to collect feedback from, and engage with, Spanish-speaking residents. Multilingual engagement efforts demonstrate that the City can work to build connections to Spanish-speaking community members.

Visual Accessibility – Watertown has significant cultural and institutional resources for community members with visual impairments, being the home of Perkins School for the Blind. To ensure that all community members could offer feedback, *Resilient Watertown* offered surveys in a platform that is more visually accessible. Future City planning processes can use best practices for accessibility during public outreach and stakeholder engagement and continue to reach out to include community members with visual impairments.



3 Goals for Engagement



- Gather input through an equitable process
- Build capacity of community members to understand climate issues
- Spark ongoing climate conversation



Planning for Resilient Housing

Nearly half of Watertown residents rent their home—and there are unique challenges to making rental properties more sustainable. Through targeted outreach to renters and owners of rental properties in the form of virtual surveys and focus groups, we gathered data and stories from renters and landlords that was incorporated into the plan. Building capacity among renters and landlords to improve the sustainability of rental housing is a priority for the City, so we developed a public online **Resource Center** that houses valuable tools, how-to-guides, and funding opportunities. Engaging renters and landlords is crucial to understand the barriers and opportunities for action so that Watertown can promote the character of our unique neighborhoods and support affordable, safe, and resilient rental housing for all.

Resilient Housing Resource Center

Almost 50% of Watertown residents rent their home and the Town is committed to ensuring that all residents live in safe, comfortable, and efficient homes. Whether you rent, own, or manage rental housing in Watertown, these resources can help you lower utility bills and operation costs, identify funding for building upgrades, and support a resilient rental housing market that is fit for the future. Many of these resources are valuable for homeowners, too!

Use the filters on the right to access exactly what you are looking for or, if you are unsure where to start, just scroll through and see what interests you.

Resource Type

- Databases
- Documents & Studies
- Financial Assistance
- How-To-Guides
- Online Tool
- Programs

Audience

- Renters
- Landlords & Property Managers

Topic

- Buildings
- Climate Impacts
- Cost Savings

WHAT WE HEARD

Residents voiced strong support for the City’s climate goals, especially for protecting and enhancing natural resources and supporting connected, convenient, and accessible transportation systems. Survey respondents were keenly aware that Watertown is a desirable location for new development and want to ensure that the city is an affordable, vibrant, and well-connected community to live, work, and play, for decades to come.

STRENGTHS

70%

Of Survey 1 respondents strongly support green infrastructure practices

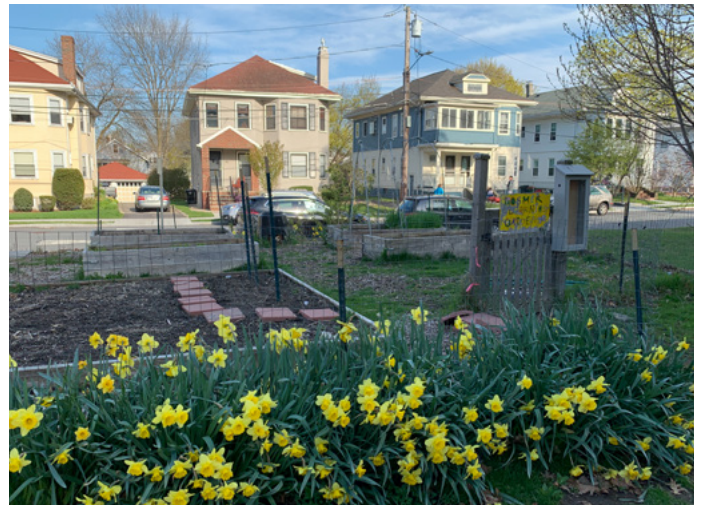
“

Watertown has a lot of open space, trails, and parks compared to most places I’ve lived. It makes the town a great place to live.



“

Walkability is one of the reasons I live in Watertown.



“

I opted up to 100% renewable energy on my electric bill as per the Watertown program. It costs a bit more, but worth it in the long run!



63%

Of Survey 1 respondents agree or strongly agree they have strong social ties in Watertown

Image Credit: City of Watertown

Renters and landlords expressed enthusiasm for creating more sustainable rental housing in Watertown and asked for City support for learning about funding, and implementing changes to make buildings healthier, safer, and better able to withstand impacts from climate change.



OPPORTUNITIES

65%

Of Survey 2 respondents support increasing tree planting on public property and prioritizing tree planting in vulnerable neighborhoods first.

37%

Of Survey 2 respondents reported heat, or related poor air quality, could be a health risk for their families.

Take our survey!

The Town of Watertown is creating a Climate and Energy Plan and wants your input.



THE RESILIENT WATERTOWN PLAN WILL FOCUS ON FIVE ELEMENTS



Are you a renter?
Take our survey just for you!

Watertown stands united to preserve and strengthen our unique neighborhoods and natural resources. With Resilient Watertown, our Climate & Energy plan, we are committed to equity, communication, and innovation while reducing our greenhouse gas emissions and enabling all residents to thrive in the face of climate change.



“

I would like to see education, and possibly financial incentives, for new and existing homeowners and landlords to transition their green spaces to be sustainable.

“

In Watertown I'd like to see less new construction destroying existing trees and plants.



“

I chose to sacrifice other things such as amenities, and some of my budget, in order to ensure I live right on the bus route. Not everyone is able to do that. Those inequities need to be addressed. Peoples' access is limited by their socioeconomics, disabilities, age, health, etc. Any changes made need to keep these factors in mind.

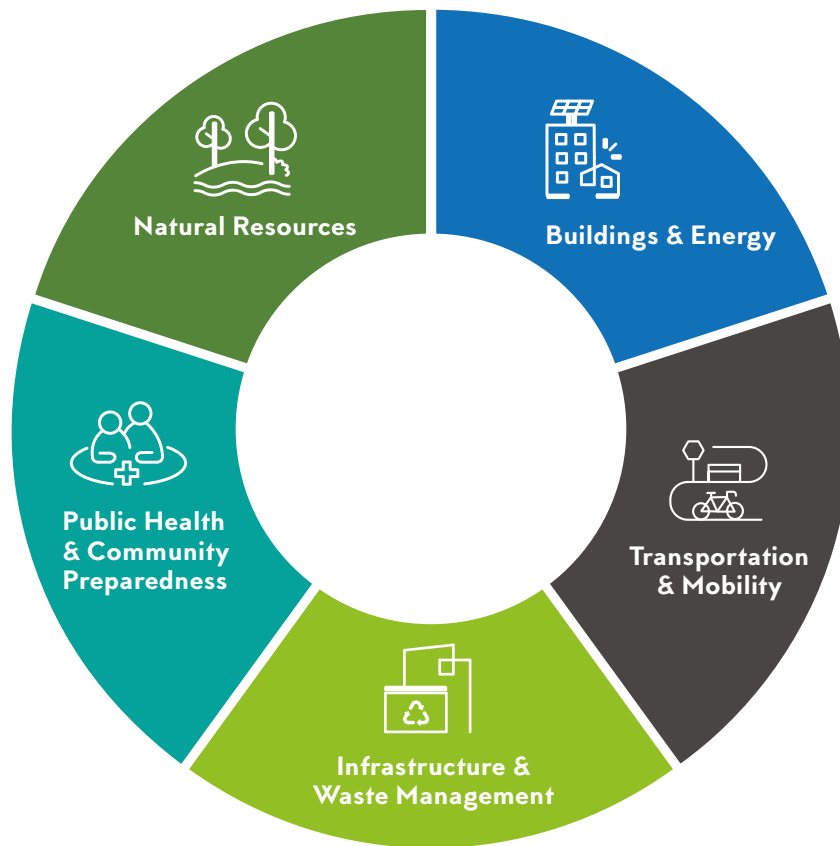
Image Credit: City of Watertown

OUR PLAN

Watertown’s path forward for acting on climate change includes reducing our greenhouse gas emissions and adapting to unavoidable climate impacts. *Resilient Watertown* identifies opportunities to reduce our GHG emissions, while enhancing our resilience to the climate hazards we are already experiencing in Watertown.

The goals, actions, and metrics by which we will measure success will be substantially re-evaluated every five years to update and adjust actions and targets to adapt to emerging trends and technologies. The plan will undergo review by City staff and the Watertown Environment and Energy Efficiency Committee (WE3C) annually. While the goals and metrics in the plan are aligned to reach a 2050 target date, we hope to achieve much, if not all, of the goals before that date, and will update our timeframe if progress allows.

Resilient Watertown goals and actions are organized into **5 PLAN ELEMENTS:**



6 GUIDING PRINCIPLES aligned with Watertown’s priorities are the foundation for achieving our goals and actions:

Greenhouse Gas Emission Reduction	Resilience	Preservation of Natural Resources
Regional Collaboration	Economic Vitality	Equity and Justice

HOW TO READ THIS PLAN

Details for each of the plan elements are outlined in the sections ahead and follow the following format:



Goals:

What Watertown intends to accomplish

[Plan Element] & Our Climate:

The relationship between the Plan Element and its contribution to climate change

Community Priorities:

Priorities and opportunities expressed by community members through engagement efforts

Leading by Example:

Initiatives currently underway

Strategies & Actions to Achieve our Goals:

Key strategies and actions prioritized through engagement and collaboration

	Action	Timeframe	Cost	Implementation Champion	Cumulative 2050 GHG Reduction	Resilience Benefits
Goal						
Strategy						

Strategy: General approach the City will take to accomplish our goals

Action: Brief summary of the specific activity that will be undertaken

Timeframe: Approximately how long it will take to accomplish the action. Options include:

- Short = <1 year
- Medium = 1-3 years
- Long = 3-5 years

Cost: Estimated cost to implement the action. Options include:

- \$ = <10K
- \$\$ = <100K
- \$\$\$ = >100K

Implementation Champion: Entity responsible for leading implementation of the action

Estimated GHG Reduction: How much the strategy will help reduce our contribution to climate change, measured in metric tons of carbon dioxide equivalent (MTCO₂e)

Resilience Benefits: How the strategies address the impacts of four primary climate hazards



Measuring Success:

The indicators of success to effectively measure our goals, strategies, and actions.

Metric (unit)	Baseline Data	2030 Target	2050 Target

Implementation Blueprints:

A roadmap that details steps, implementation champions, key partners, and timeframe. Blueprints were created for priority actions that were deemed to need more implementation details.



CROSS-CUTTING STRATEGIES

Resilient Watertown's five Plan Elements do not, and should not, exist in silos. Many of the issues within them overlap, indicating opportunity for synergies that help us achieve multiple goals at once. Furthermore, it's important that we pursue measures that enable our successful implementation of all strategies and actions, including by enhancing coordination and capacity, and building up our resources for implementation. Cross-cutting strategies help us reduce our contribution to climate change and protect us from its impacts by strengthening success across all strategies and actions. The City will pursue several additional strategies, which speak to these interconnections.

STRATEGIES TO ACHIEVE OUR GOAL

Strategy CC1: Add staff capacity and resources to the Energy Manager's Office, the DPW Forestry Division, and the Department of Community Development and Planning

- Pursuing the many actions in this Plan will require staff capacity. Creating new positions or expanding resources available to existing staff will be critical to the successful and timely implementation of the *Resilient Watertown* Climate & Energy Plan.

Strategy CC2: Create an overarching Resilient Watertown Outreach & Education Campaign

- Community-wide education is essential to spreading the word about *Resilient Watertown* and how residents support implementation of actions. This might include toolkits targeted to residents about what they can do to reduce impervious surfaces, plant more trees, conserve energy, change their commuting habits, work together with neighbors, and more. This may also include creation of education materials for use as a "presentation in a box" for volunteers to use while presenting to interested groups.

Strategy CC3: Develop assistance mechanisms and resources for renters and landlords (regarding energy efficiency, EV charging, etc.)

- When it comes to building improvements that support climate action, many landlords and renters want to help, but they may lack the funds, time, or information. The City can provide support to residents to help them access rebates or work with contractors to make changes to their homes.

Strategy CC4: Collaborate regionally with other communities and entities

- Many neighboring municipalities and partner organizations (such as the Resilient Mystic Collaborative, Charles River Climate Compact, and Metropolitan Area Planning Council) share our vision for a net zero, resilient future. We can strengthen existing partnerships and build new ones, both to pursue collaborative projects and advocate for collective goals at the state level.

Strategy CC5: Explore establishing a Transportation Infrastructure Fund with funding from developers and the City to implement recommendations of this Plan

- While still rare in the greater Boston area, a Transportation Infrastructure Fund could be a sustaining funding mechanism and a way of proactively demonstrating to the business community and community at large a strong public-private partnership between developers and City leaders to enable collective achievement of this plan's transportation goals.



GOAL

Achieve synergies across multiple Plan Element goals and enable successful implementation of all strategies and actions.

Strategy CC6: Encourage and require sustainable, climate-resilient development patterns

- Promoting more sustainable, climate-resilient development in Watertown will require both working closely with the development community and updating requirements, such as the upcoming Comprehensive Plan update and other relevant planning and regulatory processes. This might include working with prospective developers to address barriers to expanding reuse or redevelopment of historic and other existing properties. On the regulatory side, this could include enhancing requirements for developers to connect their properties to existing off-street paths to enhance multi-modal connectivity, in addition to strengthening our commitment to mixed-use development to facilitate the creation of “15-minute neighborhoods” where all one’s needs are a short distance from home.



Watertown’s downtown, located along Main Street, includes a variety of shops and restaurants, the Watertown Free Public Library, and more. Credit: City of Watertown



BUILDINGS & ENERGY

The Buildings and Energy plan element is focused on investing in smart infrastructure and programs that reduce energy consumption and increase renewable energy supply, preserving valuable historic neighborhood character and providing diverse affordable housing.



The ~2,700 rooftop solar panels installed at Arsenal Yards represent the largest solar energy project in Watertown, to-date. As of 2018, Watertown's zoning ordinance requires solar panels on new and substantially renovated buildings over 10,000 sq. ft. and parking garages. Credit: Dan Watkins for Arsenal Yards

BUILDINGS, ENERGY, & OUR CLIMATE

We spend most of our daily lives—sleeping, working, eating—in buildings. Our homes, offices, grocery stores, and places of worship require a significant amount of energy to ventilate the air, manage temperatures, power our devices, and provide many of the other basic comforts we are accustomed to. These activities come at a cost. The fossil fuels used in buildings and those used to generate the electricity we consume emit a significant amount of GHGs into the atmosphere. As of 2019, buildings represent 56% of our community's total GHG emissions.¹⁰ However, buildings also present the biggest opportunity for us to reduce our emissions, improve the daily lives of all of our community members, and design smart and efficient neighborhood systems that are resilient to climate change.



GOALS

Goal 1: By 2050, 100% of electricity is sourced from renewables


Goal 2: By 2050, Watertown's buildings are efficient, resilient, and carbon neutral

COMMUNITY PRIORITIES:

- ✓ Electrification and efficiency requirements for new construction in Watertown (Survey 1)
- ✓ Keeping energy affordable (Renter Survey)
- ✓ Rebates and grants to support reduction of fossil fuel uses in homes and businesses (Survey 2)

TRANSITIONING TO RENEWABLE ENERGY

Realizing a 100% clean energy future requires eliminating direct use of fossil fuels and shifting our electricity supply to renewables. While we expect continued changes in the regional electricity grid and will leverage Watertown Electricity Choice to accelerate the transition to renewables, we will also need to maximize installed solar capacity within the community.

3,209 rooftops 

Solar Capacity in Watertown
 2019: **3,209 rooftops**¹¹
 2050 Target: **6,700 rooftops**

LEADING BY EXAMPLE:

Net Zero Schools

Several Massachusetts schools have been leading the way in getting to net-zero energy. Net-zero schools have lower energy consumption and can provide ample educational opportunities for students. The Cunniff School in Watertown is one of the first net-zero energy certified school buildings in the state.



BUILDING NEW CONSTRUCTION EFFICIENTLY

To meet its GHG reduction targets, Watertown must eliminate fossil fuel use in both new and existing buildings. With new construction, we have an opportunity not only to reduce our community’s emissions, but also to build highly efficient, dynamic, and healthier buildings. Electric systems are more efficient, and the more energy efficient a building is, the less power (and money) it will need to operate over time. Plus, eliminating fossil fuel powered appliances improves air quality and can enhance comfort.

Watertown will start by requiring all new construction to be powered with electricity by 2025 for most building types. Buildings with more unique energy needs, such as hospitals or labs, can be built in a way that facilitates the transition to electricity as technology allows.

ELECTRIFYING OUR EXISTING BUILDINGS

Most of our residential buildings use natural gas and oil for heat. Accordingly, this is where most building emissions come from. With over 9,000 residential units to convert, the bulk of the work to electrify Watertown is in this sector. There are far fewer commercial buildings to convert, but their size presents opportunities for big wins with the right types of retrofits. To get this work done, the City will take advantage of State, Federal, and other financial support. As more and more communities continue to electrify, coordination with electrical providers will also be critical.

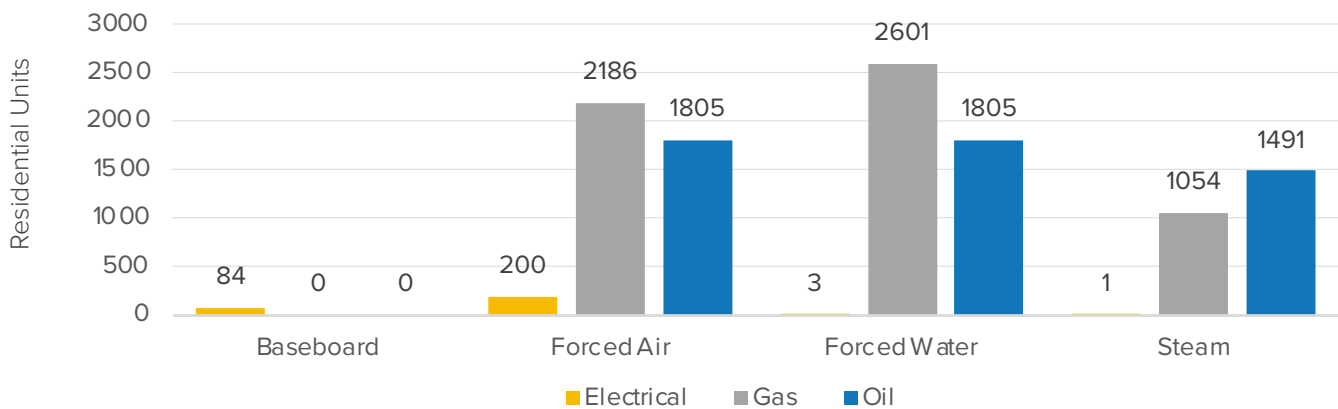
Year	2025	2030	2050
Electrification Target for Existing Buildings	10%	40%	100%

Watertown will prioritize and pursue these actions strategically. For example, over 2,500 residential units have forced air distribution systems.¹² These are the easiest to retrofit with today’s heat pump technologies and should be targeted first. Other easy retrofits include domestic hot water heaters and those homes that are installing central AC. Our actions will also consider how types of housing may play into barriers to retrofitting more heating systems. Condominiums and other multifamily properties may need additional coordination among owners, but there is opportunity to update multiple units at once.

Did You Know? The Benefits of Geo-Micro Grids

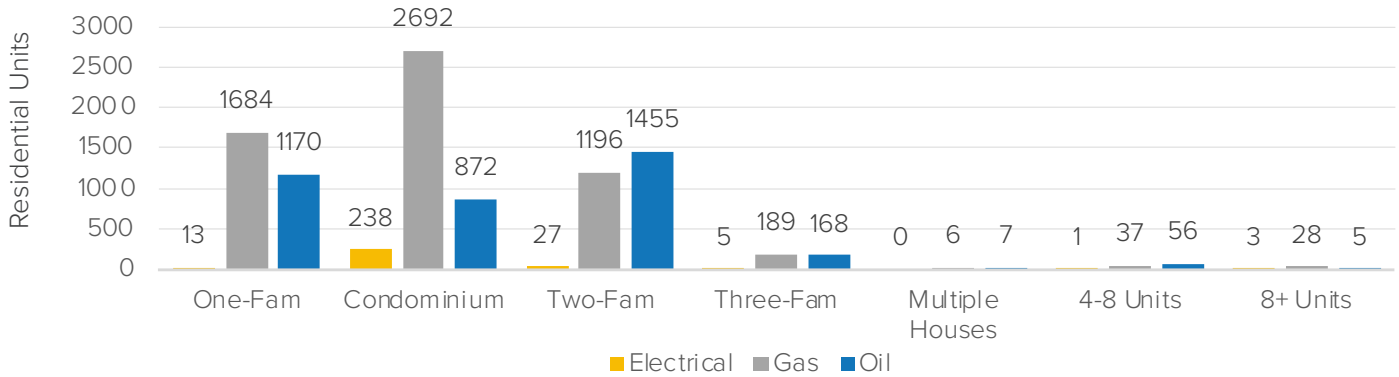
Scaling up electrification for larger commercial and institutional structures could benefit from the use of geo-micro grids, a decentralized solution that uses thermal energy transferred through heat pumps and a shared water loop. Larger, more energy intensive buildings could benefit from this technology as it could serve multiple buildings while providing other resilience benefits, such as enhanced power reliability.

Residential Units by Heating Source (2021)



Source: Watertown Assessor's Database

Residential Units by Unit Type (2021)



Source: Watertown Assessor's Database

CONSERVING OUR ENERGY

As we electrify our buildings and power them with 100% clean energy, it may be tempting to discount conservation efforts to reduce GHGs. The fact is that it will be extremely difficult to produce or purchase all the clean energy we need if we do not find ways to make our buildings more efficient. Electrification in buildings alone will increase electricity use by 47% and electric vehicles will add even more. Combining deep energy retrofits as we electrify our buildings will stabilize the increase in electricity demand and make it easier to get to and maintain carbon-free electricity. Existing programs that help residents and businesses conserve energy include MassSave rebates, incentives, and no-cost energy assessments and the Massachusetts Clean Energy Center's Clean Heating and Cooling programs that offer financial assistance for heat pumps and other technologies.

Residential Targets	2025	2030	2040	2050
Percent Retrofitted	10%	40%	80%	100%
Target Units to Retrofit	962	3,850	7,699	9,624
Units to Retrofit / Year	241	577	385	192

Commercial Targets	2025	2030	2040	2050
Percent Retrofitted	10%	40%	80%	100%
Total Buildings to Retrofit by year	52	207	414	517
Target Buildings to Retrofit / Year	52	31	21	10

Did You Know? Retrofits Support Equity

Households in Watertown below 30% of area median income (AMI) spend on average 16% of income on energy, compared to 2% for those earning higher than AMI.¹³ Retrofits are therefore an important way to help low-income residents save money. Furthermore, technical and financial assistance proposed in this Plan will work to address these disparities as we transition our building systems.

STRATEGIES & ACTIONS TO ACHIEVE OUR GOALS

The strategies and actions identified for Buildings and Energy focus on expanding opportunities for solar and other renewables, as well as creating standards and technical and financial support for new construction to be net zero, and for existing buildings to be all-electric and as efficient as possible.

	Action ID	Action
GOAL 1: By 2050, 100% of electricity is sourced from renewables		
Strategy 1: Accelerate the transition to renewable energy city-wide	BE 1.1	Expand and strengthen the existing solar ordinance
	BE 1.2	Investigate implementing commercial PACE and other innovative financing programs
	BE 1.3	Develop and implement a targeted outreach campaign focused on recruiting for Watertown Electricity Choice program and installing rooftop solar on homes and businesses
GOAL 2: By 2050, Watertown's buildings are efficient, resilient, and carbon neutral		
Strategy 2: Require the highest standards for efficiency and carbon neutrality for new construction and major renovations	BE 2.1	Adopt the State's Net Zero Stretch Code as soon as permissible
	BE 2.2	Enact fees for residential gas hookups to promote electrification
	BE 2.3	Promote workforce development and training programs for net zero construction
	BE 2.4	Work with municipalities in the region to eliminate fossil fuels (e.g., identifying mechanisms like home rule petition)
	BE 2.5	Include the use of Whole Building Life Cycle Assessment as a condition for granting permits for applicable developments and work towards setting progressively tighter standards
Strategy 3: Electrify existing buildings running on fossil fuels	BE 3.1	Investigate and support development of geo-microgrid pilot programs
	BE 3.2	Develop and implement a targeted outreach campaign focused on promoting heat pumps for residential homes on oil heat and natural gas (e.g., zero-interest loans for heat pumps)
	BE 3.3	Incentivize the transition to heat pumps through HEAT Smart or other programs
Strategy 4: Enhance and actively promote deep retrofit and aggressive conservation programs	BE 4.1	Enact a Building Energy Use Disclosure Ordinance
	BE 4.2	Provide technical assistance for clean energy, energy efficiency, and financing activities (e.g., home energy guidance, collaborating on retrofits of Watertown Housing Authority properties)
	BE 4.3	Upgrade major existing municipal facilities to achieve net zero energy performance
	BE 4.4	Develop a bulk procurement and purchasing program to support smaller commercial properties with deep energy retrofits
	BE 4.5	Incentivize large grocery stores and buildings with significant refrigeration to get certified in EPA GreenChill program to reduce HFCs



Intense Storms



Flooding



Heat Waves



Drought

Timeframe Short (<1 year) Medium (1-3 years) Long (3-5 years)	Cost \$ (<\$10K) \$\$ (<\$100K) \$\$\$ (> \$100K)	Implementation Champion	Cumulative 2050 GHG Reduction	Resilience Benefits
Medium	\$	DCDP	674,800 MTCO ₂ e	
Short	\$	Energy Manager	12% of total reductions	
Short	\$	DCDP		
Medium	\$	DCDP	154,200 MTCO ₂ e	
Medium	\$\$	DCDP	3% of total reductions	
Medium	\$\$	Energy Manager		
Long	\$	DCDP		
Medium	\$\$	DCDP		
Long	\$\$\$	Energy Manager	2,029,000 MTCO ₂ e	
Medium	\$\$	DCDP	35% of total reductions	
Short	\$\$	Energy Manager		
Medium	\$\$	DCDP	58,900 MTCO ₂ e	
Medium	\$\$\$	Energy Manager	1% of total reductions	
Long	\$\$\$	DPB		
Medium	\$\$	Energy Manager		
Short	\$\$	DCDP		



MEASURING SUCCESS

The following indicators will help Watertown monitor progress toward our goals for Buildings and Energy. Multiple actions may contribute to a single target. The City will revisit these targets every five years.

Metric (unit)	Baseline Data	Baseline Year	2030 Target	2050 Target	Source
Percent of income spent on energy for households within 0% to 30% of AMI	16% of income on energy (2% for those earning higher than AMI)	2018	8%	2%	US DOE Low Income Energy Affordability Database
Enrollment in Watertown Electricity Choice (%), enrollment in 100% renewable option (%)	>82% enrollment, 3% of users with 100% renewable option	2019	Increasing 100% Opt Up Participation		Watertown Electricity Choice
Potential solar capacity (# of rooftops)	3,209 rooftops	2019	4,256	6,700	Google Project Sunroof
Installed solar capacity (kW)	4,521	2021	33,600	112,000*	MassCEC Production Tracking System Reports
Estimated total solar electricity produced (MWh)	5,360	2021	38,400	128,000*	MassCEC Production Tracking System Reports
Commercial energy use intensity (EUI) For buildings >5,000 square feet (MMBtu/sq. ft.)	New Metric		To develop from disclosure reporting, with considerations for building use type.		
Number of gas/oil heated residential properties	9,625	2019	5,775	0	Watertown Assessor Database
Number of gas/oil heated commercial properties	521	2019	312	0	Watertown Assessor Database

*Maximum potential if all roof space utilized.



Almost 50% of residents in Watertown rent their home. The City is committed to ensuring a diversity of housing types that can support all residents. Credit: City of Watertown



TRANSPORTATION & MOBILITY

The Transportation and Mobility plan element is focused on promoting non-motorized, shared, and active transportation modes, ensuring a safe, accessible, and connected network for bicycles and pedestrians, and accelerating the transition to electric vehicles (EVs).



The Watertown Connector is operated by the Watertown Transportation Management Association. Credit: Kevin Bernier

TRANSPORTATION AND MOBILITY & OUR CLIMATE

Transportation in Watertown is the second largest contributor to the City's GHG emissions. Transportation is critical to our daily lives, and Watertown has the opportunity to aid its residents and visitors in the transition to cleaner modes of commuting that are also connected and accessible for all. Simply put, the more people who bike, walk, and take transit, the fewer miles driven. From enhancing electric vehicle (EV) infrastructure to offering more and safer ways to walk and bike, we can decrease Watertown's contributions to climate change while also promoting public health and wellness and a more connected, vibrant community.



GOALS

Goal 1: By 2050, non-vehicular transportation options are accessible, affordable, connected, and well-utilized throughout Watertown, and personal vehicular travel miles are reduced by 50%

Goal 2: By 2050, 100% of Watertown registered vehicles are electric

COMMUNITY PRIORITIES:

- ✓ Expanded local public transportation options to address resident needs (Survey 1)
- ✓ Convenient, active transportation and walkability. When asked to prioritize a list of nine options, “walkable to transit” and “walkable to amenities like restaurants, shopping, and parks” ranked number one and two as most important, respectively (Renter Survey)
- ✓ “I absolutely want my next car to be electric and would love to see greater infrastructure for them.” (Survey 1)

MAKING PUBLIC TRANSPORTATION CONNECTED AND ACCESSIBLE

Plan actions around transit will work to ensure all Watertown residents have accessible and connected transit options available, continuing efforts such as the introduction of bus rapid transit (BRT) lanes for MBTA bus routes. Bus and shuttle services will need to be supplemented with on-demand services, combining all services in an integrated mobility solution. In doing so, Watertown is supporting increased employment opportunities for its residents and local economic development.



16%

Only 16% of residents take public transit.¹⁴



The Route 71 bus is one of many MBTA bus routes that transports passengers throughout Watertown. Credit: Kari Hewitt

PROMOTING ACTIVE TRANSPORTATION MODES

Active mobility by walking or biking is an important aspect of transportation in and around Watertown. Because walking and biking have no associated GHG emissions, they are a cleaner way to travel and commute. Since Watertown is home to a stretch of the Charles River Greenway and the Watertown-Cambridge Greenway, along with bike lanes and sidewalks throughout town, pedestrians, cyclists, and multi-modal commuters have options when it comes to alternate modes of transportation. It has been shown that better, safer bicycle infrastructure leads to higher cycling modal share.¹⁵ With the Transportation and Mobility actions in this plan, Watertown aims to create a network of streets throughout the city that are safe and accessible for bicyclists and pedestrians of all ages and abilities.



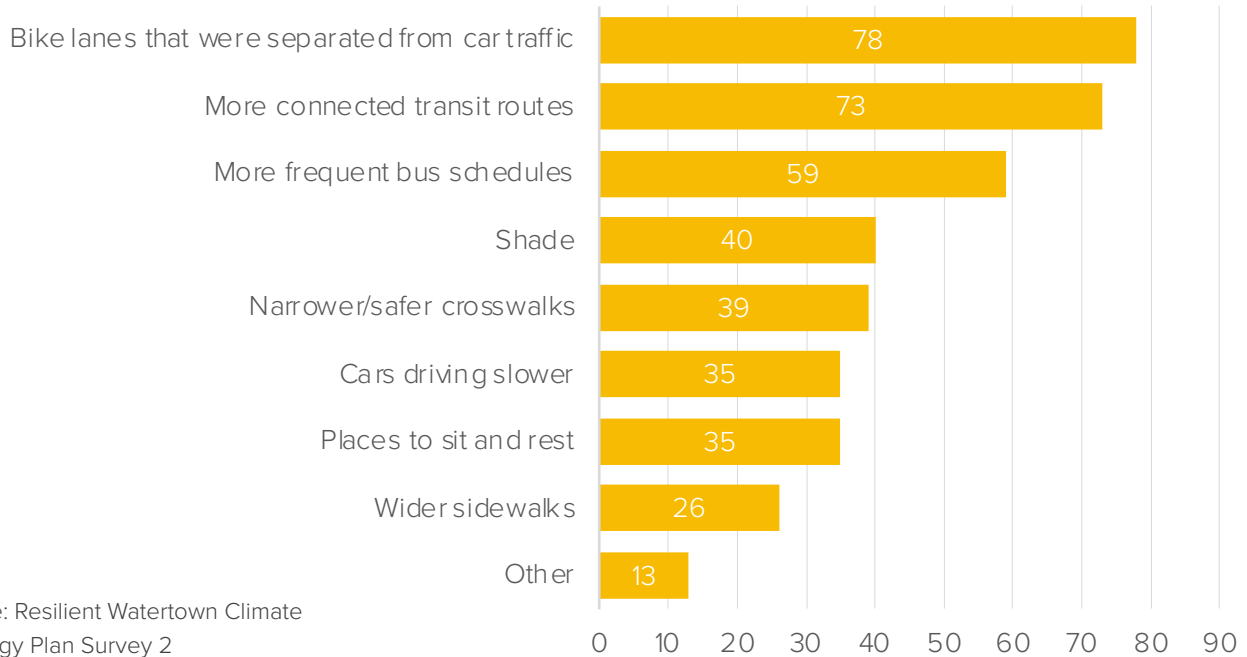
Bicycle infrastructure, like bicycle parking, is an important aspect of making biking easy and accessible. Credit: City of Watertown

Data from the Bluebikes regional bike share program show that the top two destinations to and from Watertown are Boston and Cambridge, respectively. These destinations are also the two top destinations where Watertown residents work, suggesting an opportunity for increased active forms of commuting.

INCREASING PEDESTRIAN AND CYCLIST SAFETY

Resident surveys highlighted that road safety for cyclists, safer crossings for pedestrians, and accessibility improvements would enable community members to feel more comfortable as they move around the city.

Residents would be more comfortable biking, walking or taking transit if there were:

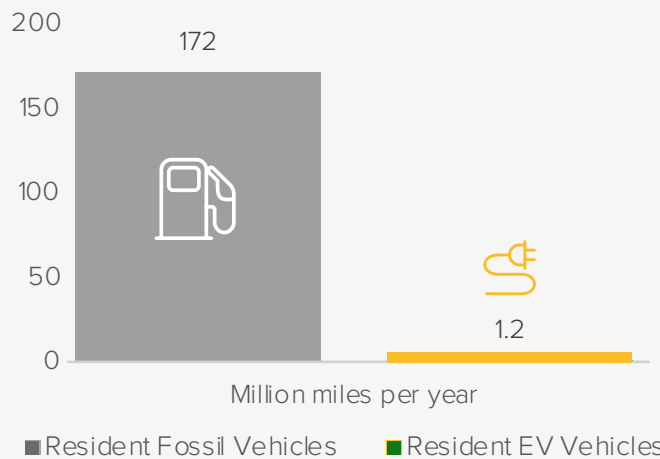


Source: Resilient Watertown Climate & Energy Plan Survey 2

TRANSITIONING TO ELECTRIC VEHICLES

In 2019, residents were responsible for 172 million miles of on-road vehicle miles traveled, just over half of all Watertown’s transportation miles, yet only 0.7% of the total vehicles registered to Watertown were EVs. The fossil-fuel powered vehicles we use to get around produce the majority of Watertown’s transportation-related emissions. We have an opportunity to reduce our emissions by transitioning to EVs, both within the community and our municipal fleet. As the grid transitions to renewable energy, the emissions associated with EV use will go down to zero. Relatedly, with the City’s waste disposal contract up for renewal in June 2022, Watertown has an opportunity to introduce a hybrid or electric waste truck fleet.

Watertown’s Transportation Miles and Emission Rates (2019)



Source: Kim Lundgren Associates, Inc. (2021).

HOW WE'LL GET THERE

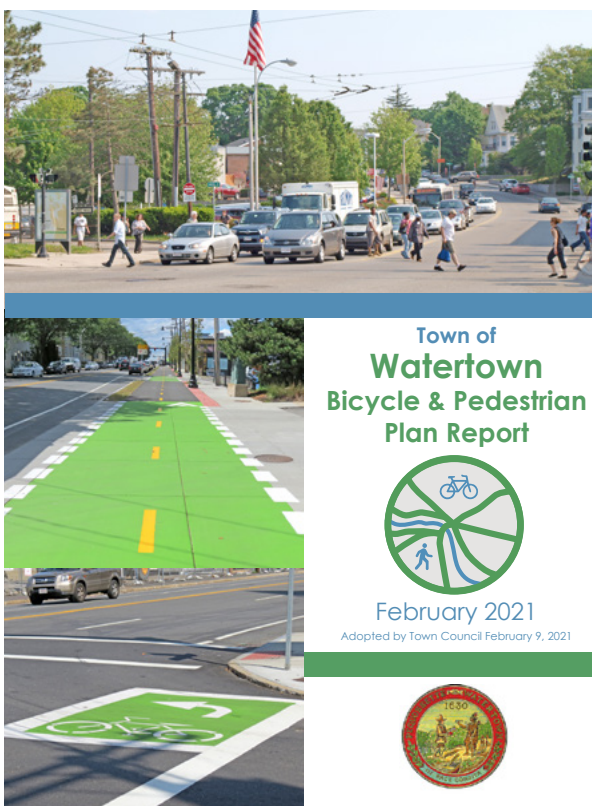
EV sales are booming across the U.S., priming cities like Watertown to accelerate the phase-out of fossil-fuel powered vehicles. The chart below illustrates how we will transition to EVs in order to achieve zero emissions by 2050. As of 2020, Watertown had approximately 172 EVs registered.

Indicators	2025	2030	2040	2050
Vehicles to Replace with EVs by Target Year	3,571	7,554	11,949	13,676
Vehicles to Replace with EVs Per Year	680	797	439	173

LEADING BY EXAMPLE:

Bike and Pedestrian Plan (2021)

Following on the heels of our Complete Streets Plan (2018) and Bluebikes funding (2020), the City recently turned its focus toward a dedicated and detailed Bicycle & Pedestrian Plan. The Plan's vision is to support a bicycle and pedestrian network that is safe and accessible, interconnected, and promotes a culture of walking and biking. By developing infrastructure, policies, and programs that encourage residents and visitors to participate in alternative and multi-modal forms of transportation, the City continues to support public health and wellness and vibrant public spaces. The recommendations in the *Resilient Watertown* Climate & Energy Plan have been aligned to support and strengthen the recommendations in the Bicycle & Pedestrian Plan.



Credit: McMahon and Associates



Cyclists, runners, and pedestrians enjoy a sunny day on the Charles River Greenway along Greenough Boulevard. Credit: Kari Hewitt

STRATEGIES & ACTIONS TO ACHIEVE OUR GOALS

The strategies and actions identified for Transportation and Mobility focus on ensuring accessible and connected transit for all residents, enhancing the safety and infrastructure for zero-carbon mobility options like walking and biking, and transitioning from fossil-fuel powered vehicles to EVs. In doing so, Watertown can work to safeguard the health and livelihoods of its residents while reducing its emissions contributions.

	Action ID	Action
GOAL 1: By 2050, non-vehicular transportation options are accessible, affordable, and connected throughout Watertown, a		
Strategy 1: Enhance and actively promote zero-carbon mobility options for travel	TM 1.1	Install well-shaded bike and pedestrian-only infrastructure for protected and off-street connections in densely developed areas and areas of high traffic volume
	TM 1.2	Collaborate regionally to increase and improve safe, interconnected pathways for bicyclists and pedestrians
	TM 1.3	Increase use of transit, bike, and pedestrian travel through outreach, incentives, and policy changes (e.g., decreasing zoning requirements for parking, traffic calming, safe routes to schools)
	TM 1.4	Work with MBTA to improve accessibility of routes, stops, and CharlieCard purchasing stations within Watertown, and electrification of the bus fleet
	TM 1.5	Implement bus prioritization projects such as dedicated lanes and signal priority
	TM 1.6	Develop an integrated, publicly accessible electric transit system that connects to MBTA and other points of interest not accessible by MBTA, including on-demand transportation options
GOAL 2: By 2050, 100% of all vehicles in Watertown are electric		
Strategy 2: Accelerate the shift to electric vehicles (EVs)	TM 2.1	Develop and implement an EV Roadmap for Watertown
	TM 2.2	Transition all City-owned, leased, and contracted vehicles to electric, including school bus, garbage truck, and maintenance fleets
	TM 2.3	Support the development of Multi-Use Parking Arrangements to develop EV charging at places of worship and other organizations with large parking lots in residential neighborhoods
	TM 2.4	Develop an outreach and incentive campaign to those with a vehicle over 10 years old to promote and incentivize EV purchase
	TM 2.5	Increase the availability of charging stations on municipal property
	TM 2.6	Incentivize homeowners and landlords to install EV chargers



Intense Storms



Flooding



Heat Waves



Drought

Timeframe Short (<1 year) Medium (1-3 years) Long (3-5 years)	Cost \$ (<\$10K) \$\$ (<\$100K) \$\$\$ (> \$100K)	Implementation Champion	Cumulative 2050 GHG Reduction	Resilience Benefits
and personal vehicular travel miles are reduced by 50%				
Medium	\$\$\$	DPW	449,400 MTCO ₂ e 8% of total reductions	
Medium	\$	DCDP		
Long	\$\$	DCDP		
Long	\$	DCDP		
Medium	\$\$\$	DPW		
Long	\$\$\$	DCDP		
Short	\$\$\$	DCDP	2,299,000 MTCO ₂ e 39% of total reductions	
Long	\$\$\$	DPW		
Medium	\$	DCDP		
Medium	\$\$	DCDP		
Medium	\$\$\$	DPW/DPB		
Long	\$\$\$	DCDP		



MEASURING SUCCESS

The following indicators will help Watertown monitor progress toward our goals for Transportation and Mobility. Multiple actions may contribute to a single target. The City will revisit these targets every five years.

Metric (unit)	Baseline Data	Baseline Year(s)	2030 Target	2050 Target	Source
Residents who use sustainable mode (bike, walk, transit) to travel to work (%)	1 in 4 residents / 20%	2013-2017 ACS	50%	60%	US Census American Community Survey
Roads rated at a 4 or 5 stress level (# of miles)	6.9 Miles	2018	3.5 Miles	0	Bicycle and Pedestrian Plan
Total electric vehicles (%)	0.7%	2020	54%	100%	Watertown Excise Tax Records
Population within a ½ mile radius of a public EV charging station (%)	23%	2021	100%	100%	DOE Alternative Fuel Data Center
Number of publicly accessible EV charging stations	17	2021	575	1,050	DOE Alternative Fuel Data Center



The Joseph Thompson Pedestrian Bridge allows pedestrians and cyclists using the Charles River Greenway to cross the Charles River safely. Credit: City of Watertown



NATURAL RESOURCES

The Natural Resources plan element is focused on preserving and enhancing our open spaces, tree cover, habitats, and water resources through smart management practices.



The Charles River and surrounding vegetation provide both climate resilience and mitigation benefits. Credit: City of Watertown

NATURAL RESOURCES & OUR CLIMATE

We rely on natural resources for some of our most essential needs—clean water and air, food, comfortable temperatures, and recreation opportunities. Healthy natural resources are therefore increasingly important to our well-being and ability to adapt as climate change impacts like extreme storms and heat intensify. Natural resources, particularly trees, natural landscapes, and other areas of green growth, can also sequester (remove) carbon from the atmosphere, reducing our contributions to climate change. We have an opportunity to work with—not against—our natural systems to protect habitats, infrastructure, and public health. It’s our responsibility to ensure that everyone in the Watertown community can access and enjoy these benefits.



GOAL

Goal 1: By 2050, Watertown’s natural assets and green space are enhanced, equitably distributed, and delivering full ecosystem benefits

ENHANCING AND PRESERVING OUR TREES

Trees do important work in Watertown, like sequester carbon and provide shade and cooling. Carbon sequestration is the process of capturing and storing carbon dioxide, the most common greenhouse gas, from the atmosphere by trees and other plants. Typical suburban tree canopy can sequester approximately 4.5 MTCO₂e per acre, every year.¹⁶ Over time, that’s a lot of carbon storage! Watertown’s trees are estimated to store **60,718 MTCO₂e** of carbon.



The diagram above shows different land uses in Watertown—like open space and residential or commercial impervious surfaces—that could accommodate an estimated 45 acres of additional tree cover (about a 10% increase). This additional tree cover could help remove a significant amount of carbon from the atmosphere in the coming 30 years, supporting our GHG reduction goals.



6,000 metric tons of CO₂e

Sequestration potential associated with this increase in tree cover in Watertown¹⁷

In addition to carbon storage, Watertown's trees provide critical flood protection, habitat, and cooling, making them important assets as we adapt to climate changes in the region. The right amount of tree cover, for example, can lower summertime temperatures by as much as 10 °F, making trees an important tool to reducing the urban heat island effect.¹⁸

PRIORITIZING GREEN INFRASTRUCTURE

Watertown has already taken steps to introduce green infrastructure throughout the community. This infrastructure replaces impervious surfaces with natural features that enhance water filtration and capture stormwater, reducing flooding and water pollution. As of 2016, 57% of the community's land area is covered by impervious surfaces.¹⁹



Impervious Surface:

A hard surface (like pavement) that prevents water—particularly stormwater—from filtering into the soil. By contrast, pervious surfaces filter and absorb stormwater to protect water quality and provide cooling benefits.

COMMUNITY PRIORITIES:

- ✓ Green infrastructure practices, like installing pervious pavers and rain gardens that provide habitat, flood protection, and cleaner air and water (scored 4.6 out of 5 on Survey 1)
★★★★☆
- ✓ More public funding for tree planting on public property, as well as in specific neighborhoods with fewer trees and residents with greater vulnerability to climate change impacts. Proper tree maintenance and support for maintenance (Survey 2)
- ✓ Incentives, rebates, and other financial support mechanisms for natural resources protection and maintenance (e.g., sustainable landscaping, replacement of impervious pavement, tree care) (Survey 2)

PROMOTING NATIVE PLANTING

Even a lawn captures more carbon in biomass and soil than it respire. Increasing green growth areas of any kind removes carbon from the atmosphere. Where cost-effective and appropriate, landscaping should favor native plants. Native plants can minimize inputs such as water and fertilizer, requiring less maintenance and protecting against certain invasive and non-native species that can harm ecosystems.



Regenerative Landscaping:

Regenerative landscapes are those that restore the environment and encourage long-term sustainability, increased biodiversity, and enhanced resilience by focusing on soil health and utilizing plant species that thrive locally and support local ecosystems.

LEADING BY EXAMPLE:

Pollinator Garden at Watertown DPW

In partnership with the Watertown Department of Public Works (DPW) and the Watertown Conservation Commission, volunteers from Friends of Bees installed a pollinator garden at DPW in spring 2021. The garden has native flowers to attract local pollinators like bees and butterflies, which support other local plant and animal species.²⁰



Credit: Pam Phillips

STRATEGIES & ACTIONS TO ACHIEVE OUR GOALS

The strategies and actions identified for Natural Resources focus on physical improvements to preserve, enhance, and equitably distribute natural resources, as well as leverage their natural ability to protect us from climate impacts like flooding and extreme heat. Community education and awareness actions support these improvements by promoting collective stewardship of these resources.

	Action ID	Action
GOAL 1: By 2050, Watertown’s natural assets and green space are enhanced, equitably distributed, and delivering full ecosystem services		
Strategy 1: Protect and enhance forest and open space parcels	NR 1.1	Incorporate pocket parks into all neighborhoods lacking green space
	NR 1.2	Promote biodiversity improvements to existing and new parks and open space by codifying existing DPW planting and maintenance practices and strengthening requirements for private development
	NR 1.3	Acquire more open space, where possible, and create more open space on private property
	NR 1.4	Establish equitable and accessible natural-habitat corridors along water bodies, trails, and utility easement areas, and protect existing ones
Strategy 2: Protect, enhance, and diversify the tree canopy	NR 2.1	Establish an enforceable tree ordinance focused on preservation, diversification, and equitable distribution of tree canopy on public and private property
	NR 2.2	Establish a community outreach program to increase awareness and appreciation of the importance of the urban forest in mitigating climate change impacts
	NR 2.3	Substantially increase annual street and municipal tree plantings and prioritize tree plantings in neighborhoods at high risk for urban heat impacts
Strategy 3: Promote regenerative landscaping and maintenance practices	NR 3.1	Develop a regenerative landscaping education and outreach plan, with expanded opportunities for resident involvement (e.g., “Leave the Leaves” campaign)
	NR 3.2	Utilize school gardens and community gardens as nature-based landscaping demonstration sites
	NR 3.3	Update current development regulations to require the use of appropriate native plants for new- and re-development and de-emphasize non-native lawn spaces
Strategy 4: Minimize quantity and improve quality of stormwater runoff	NR 4.1	Expand and accelerate existing Green Stormwater Infrastructure (GSI) policies and management programs for public projects
	NR 4.2	Promote and/or incentivize the incorporation of green stormwater infrastructure into existing large impervious areas
	NR 4.3	Enhance incentives and ongoing education related to individual actions such as rain barrels, planting strips, and de-paving private residential properties



Intense Storms



Flooding












Heat Waves



Drought

Timeframe	Cost	Implementation	Cumulative 2050	Resilience Benefits
Short (<1 year)	\$ (<\$10K)	Champion	GHG Reduction	
Medium (1-3 years)	\$\$ (<\$100K)			
Long (3-5 years)	\$\$\$ (> \$100K)			

System benefits

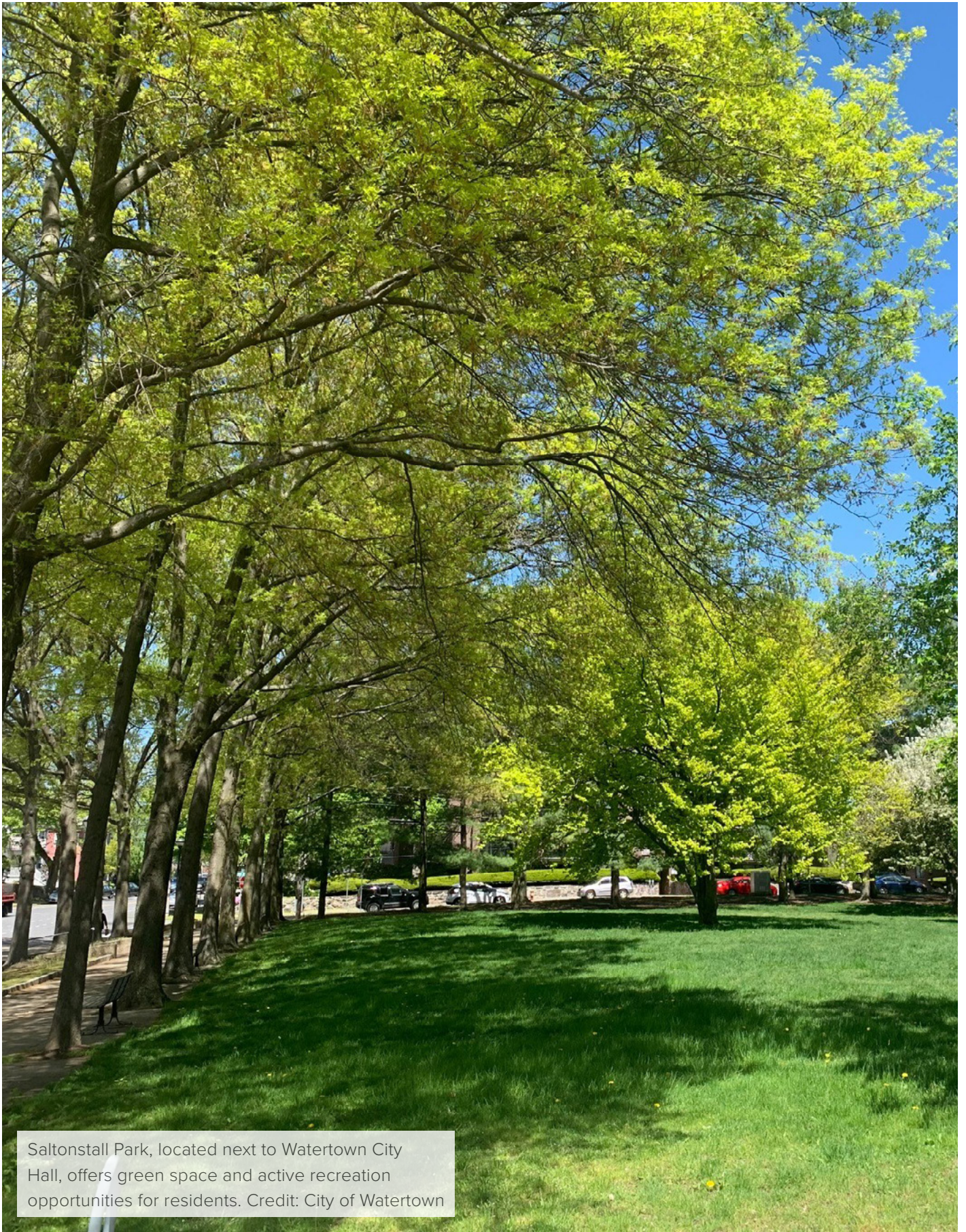
Long	\$\$	DCDP	4,500 MTCO ₂ e <1% of total reductions	 
Medium	\$	DCDP		
Long	\$\$\$	DCDP		
Medium	\$\$	DCDP		
Medium	\$	DCDP		
Short	\$	DCDP		
Medium	\$\$	DPW Forestry		
Medium	\$	DCDP	  	
Medium	\$	Watertown Public Schools/DCDP		
Short	\$	DCDP		
Medium	\$	DPW	   	
Long	\$\$	DCDP		
Medium	\$\$	DPW		



MEASURING SUCCESS

The following indicators will help Watertown monitor progress toward our goals for Natural Resources. Multiple actions may contribute to a single target. The City will revisit these targets every five years.

Metric (unit)	Baseline Data	Baseline Year	2030 Target	2050 Target	Source
Open space per person (acres/1,000 people)	3.25 acres per 1,000 people	2020	5	10	Community Preservation Act Plan
Tree Canopy Coverage (%)	20.89%	2016	23%	27%	MassGIS Land Use Land Cover data layer
Impervious Surfaces (%)	57%	2016	55%	50%	MassGIS Land Use Land Cover data layer
Public Trees in Good Health (%)	84%	2018	90%	100%	Trees for Watertown
Public Tree Sites Occupied (%)	49%	2018	75%	100%	Trees for Watertown
Area (sf) of school gardens and community gardens	20,350	2021	24,000	30,000	Field calculations



Saltonstall Park, located next to Watertown City Hall, offers green space and active recreation opportunities for residents. Credit: City of Watertown



INFRASTRUCTURE & WASTE MANAGEMENT

The Infrastructure and Waste Management plan element is focused on reducing consumption and waste generation, as well as ensuring that the infrastructure that supports resource distribution is helping to mitigate and enhance resilience to climate change.



The Watertown Dam spans the Charles River upstream from the Watertown Bridge. Several entities have recommended it be removed to allow safe passage of fish and wildlife. Credit: Laurel Schwab

INFRASTRUCTURE AND WASTE MANAGEMENT & OUR CLIMATE

The critical services and infrastructure that keep Watertown running, including water, wastewater, energy, and waste services, are essential to our community well-being. Climate change impacts are already disrupting these essential services and infrastructure. How we choose to develop and operate these services, and whether we do so efficiently and sustainably, is key to minimizing consumption and waste and reducing climate impacts. We have an opportunity to build on our history of innovation right here in Watertown, implementing solutions that put us on a path toward net-zero waste and increase the reliability, efficiency, and cost-effectiveness of our infrastructure.



GOALS

Goal 1: By 2050, Watertown has achieved a net zero waste community status

Goal 2: By 2050, Watertown's infrastructure is well maintained and resilient to the impacts of climate change

REDUCING OUR CONSUMPTION

The more we consume, the more waste we throw away. While minimizing our waste on a larger scale can be challenging, there are policies, incentives, and educational awareness campaigns that can be used to make the transition easier.

COMMUNITY PRIORITIES:

- ✓ Reducing consumption, by buying less, avoiding single use plastics, or reusing and repairing belongings scored 4.3 out of 5 for resident support (Survey 1)
★★★★★
- ✓ Support for an expanded ban or fee on single-use plastic items, increasing plastic types acceptable for recycling, and a waste minimization awareness campaign to reduce plastic consumption (Survey 2)
- ✓ Top concerns include damage to critical facilities, infrastructure, and buildings, as well as power outages, higher energy demand, and leaks and flooding (Landlord and Renter Focus Groups)



The Watertown Recycling Center offers services such as bulk item drop-off and textile recycling. Credit: Watertown DPW

REDUCE, REUSE, THEN RECYCLE

The waste we produce contributes both to local environmental pollution and climate change through increased GHG emissions. That shiny new product we want requires a lot of resources to get to the point of purchase—from the raw materials to make it, to its packaging and transportation, all of which have associated emissions. There’s also the waste and emissions associated with discarding an older version of the product. Reducing our consumption, and finding useful alternatives for existing waste streams, allows us to move toward a circular economy.

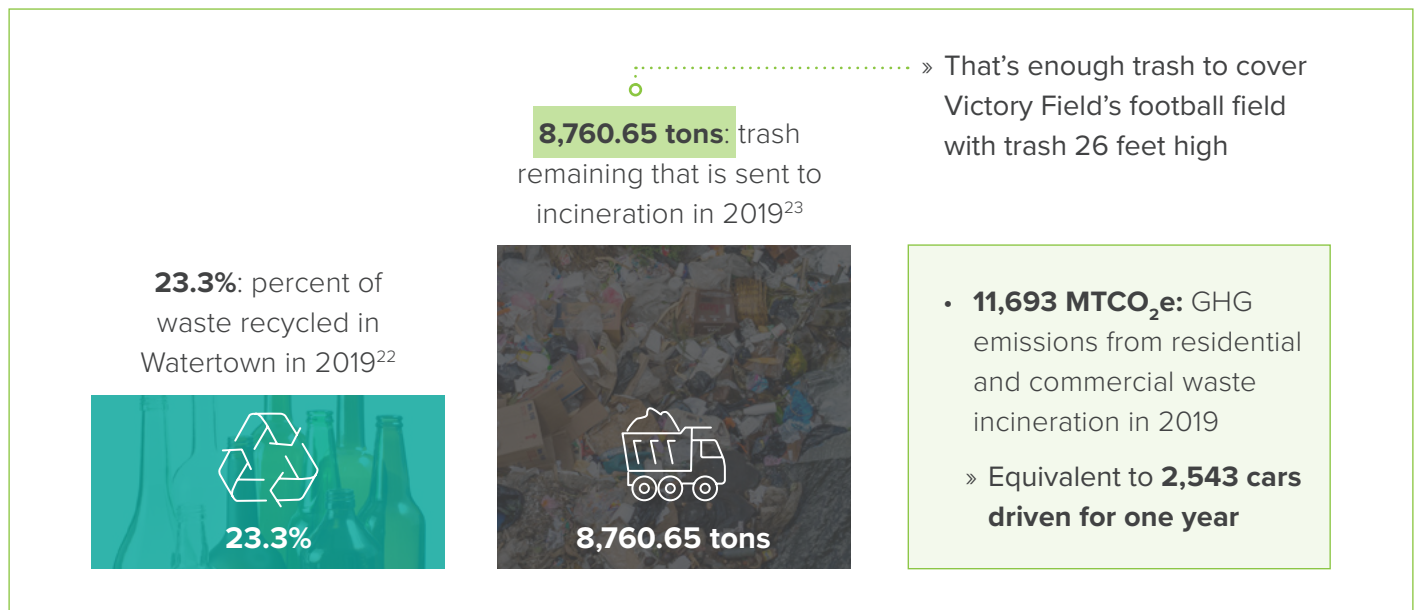
Circular Economy:



A model of material management that prevents waste and creates value through emphasis on reusing and regenerating, versus a linear model of using and discarding.

Identifying where waste comes from and how it is disposed of is important to understand the more and less wasteful components of our community. Approximately 23.3% of waste produced in Watertown is recycled. While we do not know how much of our waste stream is made up of food and yard waste, approximately 34% of waste produced in Massachusetts is made up of organics.²¹

Waste that is not recycled in Watertown is incinerated in a waste-to-energy facility. Most of the energy contained in solid waste that is incinerated is from plastic, effectively a fossil fuel, which leads to higher emissions.



In an acknowledgement of the importance of reforming our community’s waste and recycling practices, the City formed a Solid Waste and Recycling Advisory Committee in 2021. This body will be integral to the successful implementation of new and expanded programs around outreach and education, plastic item bans, organics recycling, and more.

INCREASING OUR INFRASTRUCTURE'S RESILIENCE

Climate change can bring serious effects to our city's infrastructure—from waste management to the electrical grid. With these disruptions to service and infrastructure come impacts to the local economy and community health and well-being. Watertown is taking steps to mitigate impacts to infrastructure from climate change and received its Municipal Vulnerability Preparedness Community certification in 2020, created a Hazard Mitigation Plan in 2019, and has been installing emergency generators at critical facilities like schools.



\$41.9 billion

total property damages due to flooding in Middlesex County²⁴ (Hazard Mitigation Plan)

11 major flood events

that impacted Watertown between 1950 and 2010²⁵

LEADING BY EXAMPLE:

Stormwater Management and Erosion Control

After it rains, much of the water that builds up in our streets, known as stormwater runoff, is carried into our storm drains and local waterways, without treatment. Stormwater runoff is often contaminated from construction sites that can collect pollutants, like sediment, oil, or grease, or from paved surfaces, like roads. In 2019, the City passed an ordinance that requires certain projects to obtain a permit from the Department of Public Works to demonstrate proper stormwater management, pollution prevention, and erosion control during and after construction.²⁶



STRATEGIES & ACTIONS TO ACHIEVE OUR GOALS

The strategies and actions identified for Infrastructure and Waste Management focus on increasing the sustainability and resiliency of Watertown’s critical assets and infrastructure by altering consumption and disposal practices, as well as integrating information about climate change into our infrastructure.

	Action ID	Action
GOAL 1: By 2050, Watertown has achieved a net zero waste community status		
Strategy 1: Transition community attitudes and actions around consumption and disposal practices	IW 1.1	Create a bulk purchasing network for compostable and environmentally friendly goods among the commercial and industrial sectors
	IW 1.2	Design and implement an education and outreach campaign focused on reducing waste sent to the incinerator and the climate impacts of our current consumption patterns, including topics such as single use plastics and meat consumption
	IW 1.3	Create a convenient and free or affordable organics recycling program, setting annual goals for enrollment and engaging residents in education and outreach on the topic
	IW 1.4	Establish an Environmentally Preferable Purchasing policy (EPP) that focuses on reducing consumption, particularly of single use items within municipal government
	IW 1.5	Investigate opportunities to pursue a circular economy in Watertown or within the Metro Boston region (e.g., plastic item bans, grey water recycling, pay-per-bag program, additions to recyclable items)
GOAL 2: By 2050, Watertown’s infrastructure is well maintained and resilient to the impacts of climate change		
Strategy 2: Systematically integrate climate change projections into the design of all new and upgraded infrastructure projects	IW 2.1	Require that all major new infrastructure and upgrades incorporate resilient design guidelines, such as Envision™, that take climate impacts into account over the lifespan of the infrastructure
	IW 2.2	Review and enhance current infrastructure maintenance systems and protocols to align with the needs of a changing climate
	IW 2.3	Advocate with partners for the safe removal of the Watertown Dam
	IW 2.4	Investigate local back-up power, microgrid, and battery options in coordination with utilities



Intense Storms



Flooding



Heat Waves



Drought

Timeframe Short (<1 year) Medium (1-3 years) Long (3-5 years)	Cost \$ (<\$10K) \$\$ (<\$100K) \$\$\$ (> \$100K)	Implementation Champion	Cumulative 2050 GHG Reduction	Resilience Benefits
Medium	\$	DCDP	182,400 MTCO ₂ e 3% of total reductions	
Medium	\$	DCDP		
Short	\$\$	DPW		
Short	\$	Purchasing		
Medium	\$	DPW		
Medium	\$	DPW		
Medium	\$	DPW		
Long	\$	DCDP		
Medium	\$\$\$	DPB		



MEASURING SUCCESS

The following indicators will help Watertown monitor progress toward our goals for Infrastructure and Waste Management. Multiple actions may contribute to a single target. The City will revisit these targets every five years.

Metric (unit)	Baseline Data	Baseline Year	2030 Target	2050 Target	Source
Tons of trash sent to incineration (tons)	2019	9,836	7,500	0	Mass DEP 2019 Municipal Solid Waste and Recycling Survey + Estimates
Household Waste Generation Rate (lbs / household / year)	2019	1,552	1,226	900	Mass DEP 2019 Municipal Solid Waste and Recycling Survey
Diversion rate (tons recycled/total tons waste generated)	2019	23.3% diversion	50%	100%	Mass DEP 2019 Municipal Solid Waste and Recycling Survey
Number of households signed up for food waste pick-up	2021	400 households (Black Earth compost)	2,500	10,000	Conversation with Greg St. Louis
Critical infrastructure in hazardous areas (e.g., flood plains)	2019	3 critical facilities in flood area			Watertown Hazard Mitigation Plan 2019 Update



Watertown’s schools are critical infrastructure that can be used to enhance residents’ capacity to adapt to climate emergencies.
Credit: Kari Hewitt



PUBLIC HEALTH & COMMUNITY PREPAREDNESS

The Public Health and Community Preparedness plan element is focused on ensuring the well-being, health, and safety of Watertown residents through improved climate change preparedness and response, enhanced communications, and accessible resources for physical, mental, and emotional health.



Watertown Farmers' Market offers local affordable and healthy food options to residents, supporting an estimated 300 food insecure residents. Credit: Eva Kelleher

PUBLIC HEALTH & OUR CLIMATE

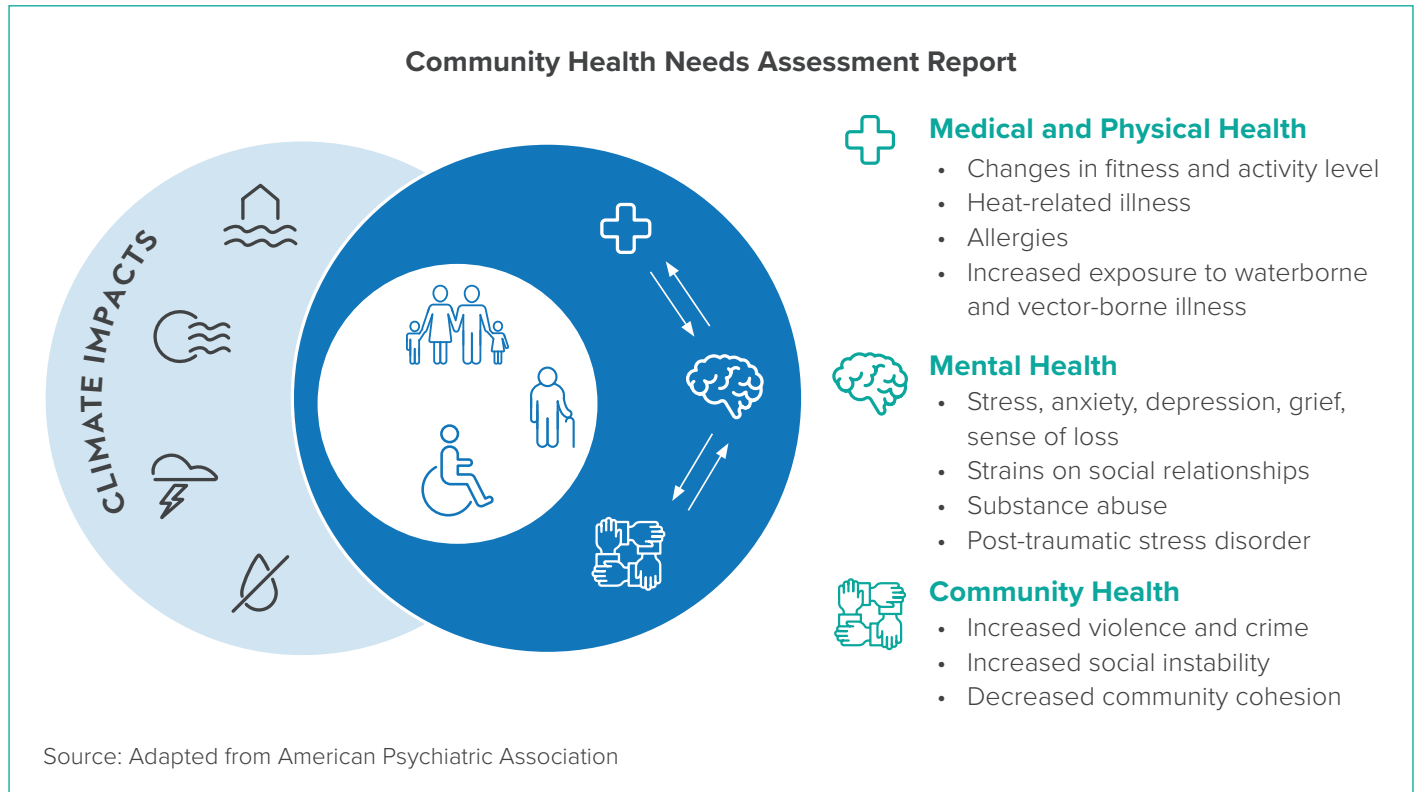
The COVID-19 pandemic has placed a spotlight on public health and our overall community resilience. The increased understanding and appreciation by many of our dependencies on our environment and on each other's actions can set us up for success as we add climate change impacts to the growing list of stressors that impact our physical and mental well-being. Research on climate change has shown that certain social demographics (e.g., health conditions, income, employment) can lead to worsened impacts, making it critical to ensure resources to increase resilience are equitable and accessible.



GOAL

Goal 1: By 2030, Watertown is a model for community resilience to climate change.

In 2019, Watertown released the Community Health Needs Assessment Report. This report highlighted the major areas of concern based on engagement with community stakeholders. Mental health was one of the areas of greatest concern among all stakeholders. This is not surprising, given the current state of mental health in the nation. Two reasons cited for this high level of concern were lack of community connections and increased stress among residents. Accessibility, affordability, and awareness/advertising of services were also commonly cited concerns, specifically around equity of access for older residents, those without internet access, and non-native English speakers. Given these existing priorities, it is essential that actions to strengthen community preparedness focus on existing public health stressors that will be exacerbated by climate change.



REDUCING VULNERABILITY TO EXTREME HEAT

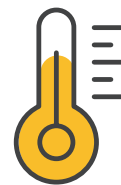
While Watertown is affected by a number of climate hazards, extreme heat poses the greatest risk to human life. In fact, extreme heat takes more lives than any other weather-related hazard in the U.S.²⁷



11.5: days over 90°F
on average between 2010-2014



24: days over 90°F
in 2021, as of August 2021²⁸



Up to 35: days over 90°F
projected by 2050

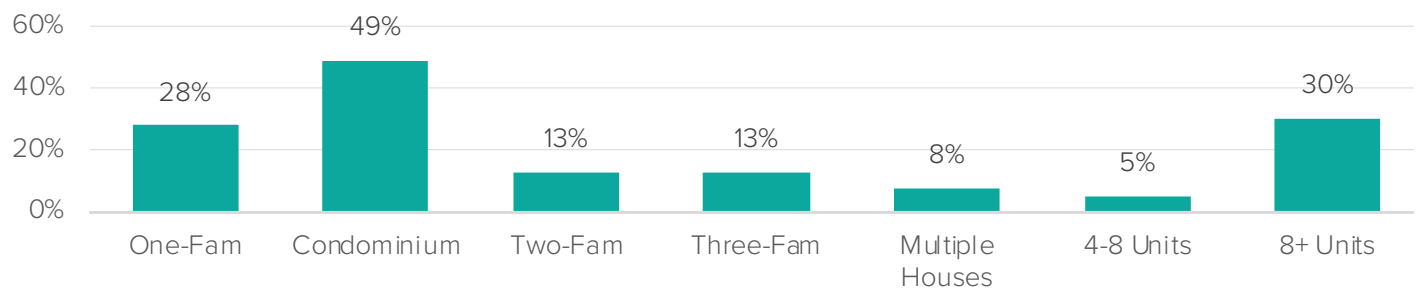
COMMUNITY PRIORITIES:

- ✓ Survey respondents in Watertown noted highest concern with heat-related health impacts, such as increasing health risks due to heat and poor air quality, and temperatures that make traveling outdoors or staying at home unsafe and uncomfortable (Survey 2).
- ✓ Respondents felt that resources to make their home or business better able to withstand climate change were most important (Survey 2)
- ✓ Social ties, feeling connected to neighbors, scored 3.7 out of 5 (Survey 1)



Only 31% of households have central air conditioning and most of them are in newer condo units. Trees are an important resource for reducing extreme heat indoors and outdoors, from cooling outdoor air temperatures to reducing heating and cooling costs by shading buildings. Tree canopy covers less than 21% of the community in Watertown, compared to 27% tree canopy coverage in Boston.


% of Units with Central AC (31% total)



Source: Watertown Assessor's Database

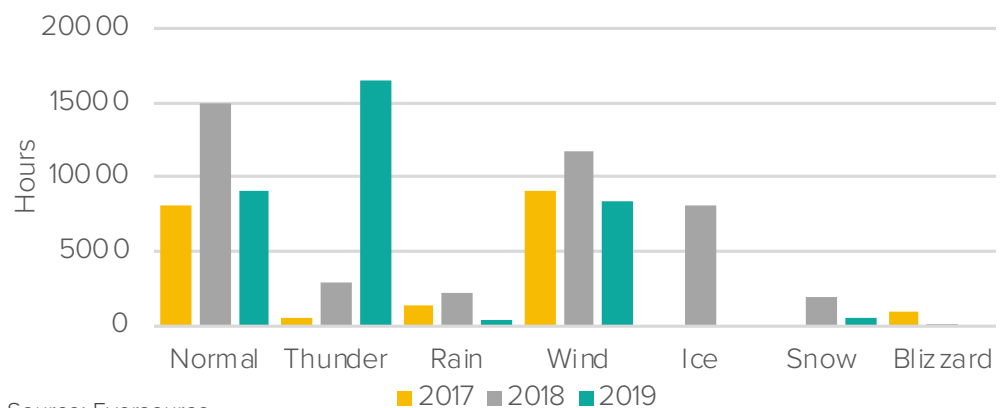
PREPARING FOR INTENSE STORMS

Intense storms are another area of significant concern for Watertown from power outages or property damage due to wind and thunderstorms to at-risk seniors living alone. Power outages due to extreme weather have fluctuated over the past few years but have increased significantly due to thunderstorms.



34%
of the 65+
population in
Watertown
lives alone

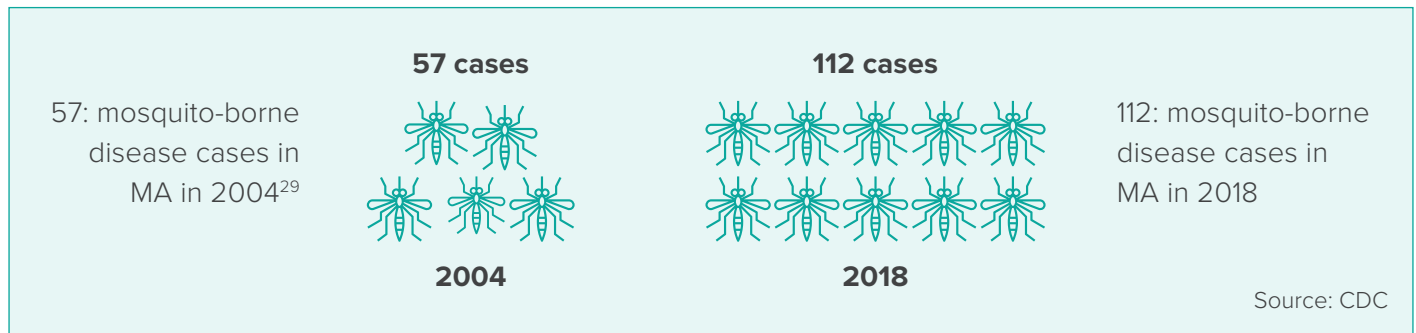
Electricity Customer-Outage Hours



Source: Eversource

PROTECTING AGAINST VECTOR-BORNE DISEASES

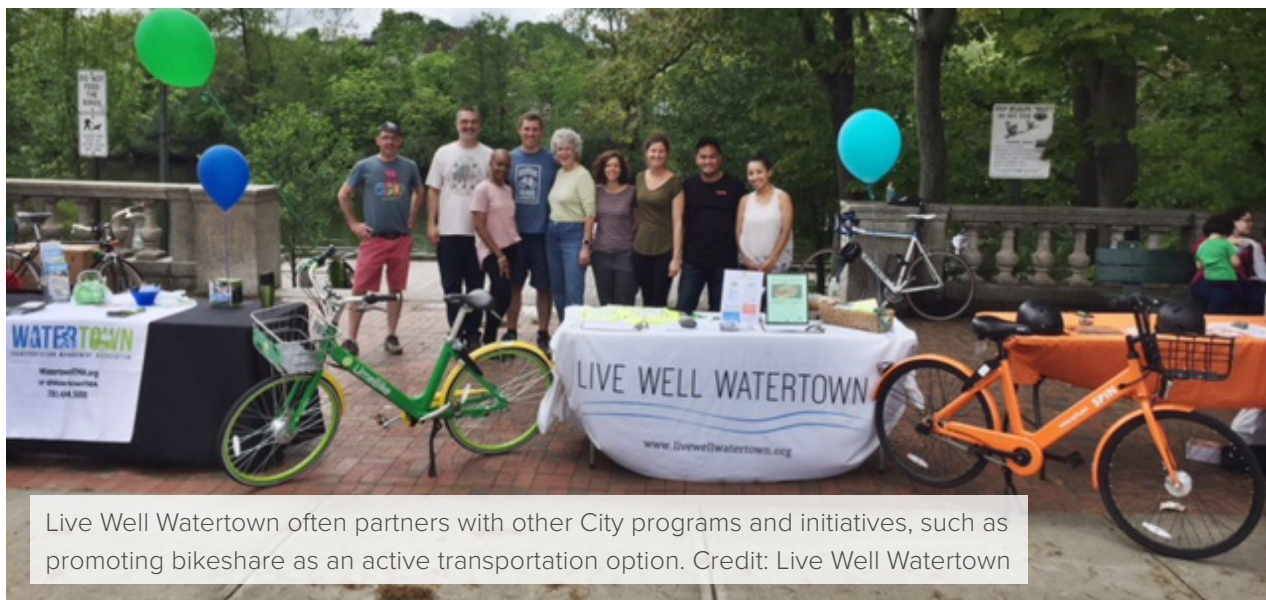
Viruses and diseases that occur in Massachusetts—like West Nile Virus, Eastern Equine Encephalitis (often known as “EEE” or “Triple E”), and Lyme Disease—are expected to present a higher risk with climate change. As temperatures increase, so does the primary source of vector-borne diseases: ticks and mosquitoes. Increasing precipitation and intense storms may also create new habitat for vectors. While the number of tick-borne disease cases in Massachusetts has fluctuated over time, mosquito-borne disease cases have been steadily increasing.



LEADING BY EXAMPLE:

Live Well Watertown

In 2013, Watertown launched Live Well Watertown³⁰, a collaborative initiative between Watertown’s Community Development and Department of Community Development and Planning and the Health Department, as well as a group of residents. The initiative aims to provide increased access to information, resources, and programs in order to promote healthy living and identify opportunities to build wellness.



STRATEGIES & ACTIONS TO ACHIEVE OUR GOALS

The strategies and actions identified for Public Health and Community Preparedness focus on addressing existing public health challenges and building a greater understanding among community members on how climate change affects each of us. Without making the personal connection and building knowledge and capacity, our residents and business owners will continue to be vulnerable to the changing climate.

	Action ID	Action
GOAL 1: By 2030, Watertown is a model for community resilience to climate change		
Strategy 1: Promote climate literacy through education and training	PH 1.1	Launch a climate preparedness educational campaign
	PH 1.2	Actively recruit volunteers to participate in the Community Emergency Response Team (CERT) program
Strategy 2: Acknowledge climate change's impact on and provide resources to enhance overall community health and well-being	PH 2.1	Complete a Climate Change and Health Vulnerability Assessment and develop Adaptation Guidelines (including issues like vector borne disease, pests, mental health)
	PH 2.2	Mitigate existing and prevent new urban heat islands in Watertown
	PH 2.3	Continue to enhance access to local food by expanding resources and support for food pantries and community fridge programs, community gardens, and the Farmers' Market for those who are food insecure
Strategy 3: Provide equitable access to emergency preparedness and response resources	PH 3.1	Identify and reduce structural barriers (e.g., internet access, language and cultural barriers, cognitive and/or physical disabilities, social isolation, access to services and emergency information) that prevent individuals and neighborhoods from taking care of themselves during and after extreme weather
	PH 3.2	Require all commercial building owners to rebroadcast and post Watertown Alert announcements to building occupants in English and Spanish
	PH 3.3	Launch a "Sign Up" campaign to ensure equitable access to communication resources
	PH 3.4	Enhance emergency preparedness information on City website
Strategy 4: Promote overall community connectivity	PH 4.1	Establish a network of resilience hubs that provide resources (e.g., cooling, phone-charging, pantry) that are easily accessible throughout the community
	PH 4.2	Enhance the existing Live Well Watertown coalition and its programs to incorporate neighborhood connections to nature and to each other



Intense Storms



Flooding



Heat Waves



Drought

Timeframe Short (<1 year) Medium (1-3 years) Long (3-5 years)	Cost \$ (<\$10K) \$\$ (<\$100K) \$\$\$ (> \$100K)	Implementation Champion	Resilience Benefits
Short	\$	DCDP	
Short	\$	Health	
Medium	\$\$	Health	
Medium	\$\$\$	DCDP	
Medium	\$\$	Health	
Medium	\$\$	Health	
Medium	\$\$	Health	
Medium	\$	DCDP	
Short	\$	IT	
Short	\$	IT	
Medium	\$\$	Health/Fire	
Medium	\$\$	Health	



MEASURING SUCCESS

The following indicators will help Watertown monitor progress toward our goals for Public Health & Community Preparedness. Multiple actions may contribute to a single target. The City will revisit these targets every five years.

Metric (unit)	Baseline Data	Baseline Year	2030 Target	2050 Target	Source
Number of census tracts with moderate or higher heat vulnerability score	2 of 6	2019	0	0	MAPC
Community members signed up for emergency alerts and communications (%)	34% (12,068)	2021	80%	100%	Watertown Police
Businesses signed up for emergency alerts and communications (# of businesses)	2,749 (need to ID total # of businesses)	2021	80%	100%	Watertown Police
Customer-hours of weather-related power outages	28,965	Average 2018-2020	14,000	0	Eversource Outage Accident Reports to DPU
Number of residents served by resilience hubs annually	New Metric				



Watertown's natural assets, like Mount Auburn Cemetery, help cool the environment and reduce the impacts of extreme heat. Credit: City of Watertown

GLOSSARY

Building Energy Use Disclosure Ordinance: An ordinance that requires building owners to track and report their annual energy usage.

Carbon Neutrality: A state of net-zero carbon dioxide emissions that can be achieved by eliminating carbon dioxide emissions or balancing emissions of carbon dioxide with its removal (through carbon sequestration).

Carbon Sequestration: A process of capturing and storing carbon dioxide from the atmosphere. Carbon dioxide is naturally captured through biological and physical processes and is stored in forests, vegetation, wetlands, soils, and oceans. Scientists are exploring technological processes of capturing carbon dioxide.

Circular Economy: A model of material management that prevents waste and creates value through emphasis on reusing and regenerating, versus a linear model of using and discarding.

Climate Change and Health Vulnerability Assessment: An assessment that allows health departments to understand the people most susceptible to health impacts associated with climate change.

Community Emergency Response Team (CERT): A federally-sponsored program that educates people about disaster preparedness for hazards and trains them in basic disaster response skills.

Envision™: A rating system developed by The Institute for Sustainable Infrastructure to identify sustainable approaches during planning, design, and construction of infrastructure projects to continue throughout the project's operations and maintenance and end-of-life phases.

Fugitive Gas Emissions: Leaks or irregular release of gas that result primarily from oil and gas activity.

GreenChill: A voluntary EPA partnership program that works collaboratively with the food retail industry to reduce refrigerant emissions and decrease their impact on the ozone layer and climate change.

HeatSmart Mass: A program administered by the Massachusetts Clean Energy Center to increase the adoption of small-scale clean heating and cooling systems through community-based outreach and education.

Impervious Surface: A hard surface (like pavement) that prevents water—particularly stormwater—from filtering into the soil. By contrast, pervious surfaces filter and absorb stormwater to protect water quality and provide cooling benefits.

Property Assessed Clean Energy (PACE): A mechanism for financing energy efficiency and renewable energy improvements on private property.

Regenerative Landscaping: Regenerative landscapes are those that restore the environment and encourage long-term sustainability, increased biodiversity, and enhanced resilience by focusing on soil health and utilizing plant species that thrive locally and support local ecosystems.

Sustainable Materials Management: A systemic approach to using and reducing materials more productively over their life cycles.

Whole Building Life-Cycle Assessment: A tool that allows building professionals to understand the energy use and environmental impacts associated with all phases of a building, from material procurement to construction and operation.

Zero-Carbon Mobility: A collection of transportation solutions that result in zero carbon dioxide emissions.

ACTION IMPLEMENTATION BLUEPRINTS

Action Implementation Blueprints are roadmaps that detail how to achieve priority actions and include implementation steps, implementation champion, key partners, and timeframe. The Blueprints on the following pages were created for actions that were deemed to need more implementation details.



Credit: City of Watertown



ACTION BE1.1

Expand and strengthen the existing solar ordinance



DESCRIPTION OF ACTION

Identify meaningful and achievable ways to build on Watertown's successful rooftop solar ordinance, which currently requires the equivalent of 50% roof coverage for new and substantially renovated buildings over 10,000 sq. ft. (or residential units of greater than 10 units) and 90% of parking garages.



CHAMPION

DCDP

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS	TIMEFRAME	KEY PARTNERS
<p>1 Analyze options for expanding ordinance. Consider feedback from existing ordinance and cost/benefit of proposed expansions. Consider phasing in changes. Potential changes include: expand to cover all new construction (or lower the square footage threshold for the requirement); include substantial rehab or retrofits; add a provision for solar canopies over parking; include existing parking garages.</p>	<p>3-4 MONTHS</p>	<ul style="list-style-type: none"> • WE3C • Watertown Faces Climate Change • Other Massachusetts municipalities
<p>2 Engage relevant property owners and developers in education, outreach, and strategic discussions.</p>	<p>ONGOING</p>	<ul style="list-style-type: none"> • WE3C • Watertown Faces Climate Change • Watertown Business Coalition • Real estate and developer community
<p>3 Develop a draft updated ordinance and timeline for further phases.</p>	<p>6 MONTHS</p>	<ul style="list-style-type: none"> • WE3C
<p>4 Submit the draft development code update to the City Council to undergo the standard review process, including City Council meetings and public review opportunities.</p>	<p>3-4 MONTHS</p>	<ul style="list-style-type: none"> • City Council
<p>5 Incorporate public and other stakeholder input into language and submit final ordinance for adoption and approval.</p>	<p>2 MONTHS</p>	<ul style="list-style-type: none"> • City Council
<p>6 Annually evaluate buildings that have been built or upgraded to net zero standards to confirm they are meeting the standard. Plan for small/medium/large maintenance to be done at roughly 1/3/10 years to maintain energy standard.</p>	<p>ONGOING</p>	<ul style="list-style-type: none"> • DCDP • City Council



TOOLS & RESOURCES

Technical Resources

- [Current Watertown Solar Ordinance](#)
- [MAPC Municipal Net Zero Playbook](#)



EQUITY CONSIDERATIONS

- ✓ Ensure the life-cycle benefits of solar are communicated equitably and to a diverse audience.
- ✓ Engage all community members when requesting input and comments.
- ✓ Work with regional partners (i.e., other cities) to generate a consistent message to developers, landlords, and tenants.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Publicize success and impact of existing ordinance to enhance support.
- ✓ Coordinate with other communities to ensure uniform adoption.



ACTION BE1.2

Investigate implementing commercial PACE and other innovative finance programs



DESCRIPTION OF ACTION

Investigate financial programs the City can adopt that increase participation in GHG reducing actions. These could include commercial PACE, CCA 2.0, alternative compliance payments from BEUDO, etc.



CHAMPION

Energy Manager's Office

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Investigate possible options for financial programs and consider which would be most effective for Watertown's unique needs.	6-12 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Watertown Faces Climate Change • Other Massachusetts communities • Relevant financial experts • Relevant user stakeholders
2	Draft proposals for the highest priority options.	4-6 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C
3	Incorporate public and other stakeholder input into language.	2 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C
4	Submit the programs to City Council to undergo the standard review process for program and/or budget approval, including City Council meetings and public review opportunities.	3-4 MONTHS	<ul style="list-style-type: none"> • DCDP • City Council
5	Incorporate revisions and submit final language for adoption.	3 MONTHS	<ul style="list-style-type: none"> • DCDP • City Council



TOOLS & RESOURCES

Financial Tools

- [Massachusetts Clean Energy Center Grant Programs](#)
- [Green Communities Grant Program](#)

Technical Resources

- [Commercial PACE information](#)
- [Local CCAs](#)
- [MAPC Municipal Net Zero Playbook](#)



EQUITY CONSIDERATIONS

- ✓ Engage all community members when requesting input and comments.
- ✓ Target outreach to low-income, minority residents, seniors, renters, and small businesses (depending on the program). Develop compelling message for residential and commercial landlords as conduits for renters.
- ✓ Ensure benefits of the programs are prioritized to those traditionally excluded and those most at need. Build this into program rules.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Work with community partners to design and implement the programs and perform outreach.
- ✓ Work with regional partners to minimize overhead costs.



ACTION BE1.3/BE3.2

Conduct outreach campaigns for solar, heat pumps, WEC, and energy efficiency



DESCRIPTION OF ACTION

Create a multipronged publicity effort to radically increase adoption rates by residential and small commercial entities of solar installations, heat pump space and hot water heaters, City-provided bulk purchase high renewable electricity option (WEC), and deep energy efficiency retrofits and conservation actions.



CHAMPION

Energy Manager's Office

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Allocate financial resources for consultant services and seek City Council approval if required.	3 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Watertown Faces Climate Change • City Council
2	Identify best practices based on past outreach experience in Watertown and similar campaigns in other MA municipalities.	3 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Watertown Faces Climate Change • MAPC
3	Develop a multi-phase, multi-year publicity plan with the assistance of expert consultants.	6 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Watertown Faces Climate Change
4	Launch initial phases. Include in-person demonstrations or tours to familiarize residents and businesses with relevant technologies or interventions.	6 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Watertown Faces Climate Change • Other interested partner organizations
5	Continue ongoing rollout with annual evaluation of progress and adjustments made.	ONGOING	<ul style="list-style-type: none"> • DCDP • WE3C • Watertown Faces Climate Change • Other interested partner organizations



TOOLS & RESOURCES

Financial Tools

- [MAPC Accelerating Climate Resiliency Grant Program](#)

Technical Resources

- [WEC materials](#)
- [HeatSmart programs \(e.g., Belmont\)](#)
- [Solarize Mass](#)
- [MassSave](#)



EQUITY CONSIDERATIONS

- ✓ Target outreach to low-income, minority residents, seniors, and renters. Develop compelling message for landlords as conduits for renters.
- ✓ Engage all community members when requesting input and comments.
- ✓ Work with regional partners (i.e., other cities) to generate a consistent message to developers, landlords, and tenants.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Coordinate with other communities and regional organizations for lessons learned (e.g., Newton) and to gain economies of scale.
- ✓ Use multiple forms of media and repetition to increase power of message.
- ✓ Partner with trusted community members and local organizations (e.g., church leaders, local businesses) to spread the message and leverage existing communication networks.



ACTION BE2.1

Adopt the State's Net Zero Stretch Code as soon as permissible



DESCRIPTION OF ACTION

Watertown will actively advocate for and participate in the development of a net zero stretch code by the Commonwealth of Massachusetts and adopt it immediately. This action will also allow Watertown to align with and contribute to the State of Massachusetts' net zero energy standard.



CHAMPION

Energy Manager's Office

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Designate a representative of the City of Watertown to engage in the state code development process. Attend regular meetings of the Board of Building Regulations and Standards and relevant energy working groups. Work with Key Partners to advocate for rapid development of a standard that aligns with Watertown's priorities for a net zero standard.	8-12 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Watertown Faces Climate Change • Other Massachusetts communities • Northeast Energy Efficiency Partnerships • Net zero developer and architectural community
2	Develop a draft stretch code adoption ordinance, tightening feasible standards as soon as possible for each building type. Include alternate compliance mechanisms to the net zero standard, if appropriate for furthering other resilience goals.	2-3 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C
3	Submit the draft development code update to City Council to undergo the standard review process, including City Council meetings and public review opportunities.	3-4 MONTHS	<ul style="list-style-type: none"> • City Council
4	Incorporate public and other stakeholder input into language.	1 MONTH	<ul style="list-style-type: none"> • City Council
5	Submit final net zero standard language for City Council approval and adoption.	1 MONTH	<ul style="list-style-type: none"> • City Council



TOOLS & RESOURCES

Technical Resources

- [Boston Planning & Development Agency: Boston Net Zero Carbon Building Zoning Initiative](#)
- [Northeast Energy Efficiency Partnership: Massachusetts Energy Zero Code \(MA E-Z Code\)](#)
- [City of Cambridge: Green Building Requirements and Net Zero Narrative](#)
- [Passive House Institute US: The Passive House Standard](#)
- [Northeast Sustainable Energy Association: Building Energy Case Study Database](#)
- [Built Environment Plus \(former USGBC-MA\)](#)
- [ASHRAE: Advanced Energy Design Guide- Achieving Zero Energy series](#)



EQUITY CONSIDERATIONS

- ✓ Work with existing developers to help them understand the available resources to comply with new standards.
- ✓ Ensure the life-cycle benefits of net zero construction are communicated equitably and to a diverse audience.
- ✓ Engage all community members when requesting input and comments.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Incorporate reporting and enforcement of new standards into existing responsibilities.
- ✓ Connect the development community with appropriate training resources and qualified partners who can meet the standard.
- ✓ Coordinate closely with the State of Massachusetts and develop adoption language concurrent with standard development so that adoption process can begin immediately.
- ✓ Coordinate with other communities to ensure uniform adoption.



ACTION BE4.1

Enact a Building Energy Use Disclosure Ordinance



DESCRIPTION OF ACTION

Adopt an ordinance to require property managers of buildings of designated sizes and types to track and report energy use to the City of Watertown. This will allow Watertown to set equitable building energy use reduction targets that tighten over time to drive reductions in greenhouse gases. Consider setting reduction targets initially rather than phasing it in over time.



CHAMPION

DCDP

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Complete a review of existing ordinances from similar jurisdictions to determine best practices in both ordinance language and process of developing ordinances. Consider ordinances in jurisdictions that can be appropriately compared to Watertown, including those with similar building types and sizes, GHG emissions, energy sources, and climate.	2-3 MONTHS	<ul style="list-style-type: none"> • Energy Manager's Office • WE3C • Watertown Faces Climate Change • Massachusetts Climate Action Network • Boston/Cambridge/other municipalities identified • Large property owners and commercial developers • Watertown Business Coalition
2	Identify data gaps in current assessment of energy use, especially around non-utility energy such as fuel oil, range of existing building performance levels, and other data to design reporting requirements to obtain a complete accounting of energy related GHGs, enabling development of performance standards.	3-4 MONTHS	<ul style="list-style-type: none"> • Energy Manager's Office • DPB • WE3C
3	Write draft Ordinance language. Ensure language specifically requires information on building energy sources and fuel mix.	3-6 MONTHS	<ul style="list-style-type: none"> • Energy Manager's Office • WE3C
4	Review reporting process design, data requirements, and other details with impacted parties to ensure feasibility and adjust as needed.	3-4 MONTH	<ul style="list-style-type: none"> • Building and property managers • Eversource, National Grid
5	Submit the draft ordinance to City Council for subcommittee review and public input process.	3-4 MONTHS	<ul style="list-style-type: none"> • City Council
6	Incorporate revisions and submit final Ordinance language for adoption.	2-3 MONTHS	<ul style="list-style-type: none"> • City Council



TOOLS & RESOURCES

Technical Resources

- [Institute for Market Transformation: Putting Data to Work](#)
- [Institute for Market Transformation: Analyzing Benchmarking Data](#)
- [Institute for Market Transformation: Sample Specifications for a Building Performance Reporting Software Platform](#)



EQUITY CONSIDERATIONS

- ✓ Review existing reporting requirements for building managers/owners and determine if the intent of this action can be made through other means.
- ✓ Ensure the benefits of energy use reporting are communicated equitably and to a diverse audience.
- ✓ Consider a threshold (e.g., building size, building type) that would limit the buildings that need to comply with the ordinance.
- ✓ Identify systems that could automatically collect and report information (e.g., ENERGY STAR® Portfolio Manager®).
- ✓ Engage all community members when requesting input and comments.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Reach out to those who have implemented similar ordinances (e.g., in Massachusetts or the Northeast) for guidance.
- ✓ Develop a data review process and instructions for enforcement, establishing both incentives and penalties.
- ✓ Develop clear expectations, process, and schedule for phasing in public data disclosure, considering building types and landlord-tenant relationships.
- ✓ Phase in reporting at regular intervals to allow for managing data and supporting impacted property owners as the program matures to minimize reporting burden.
- ✓ Consider alternative compliance payments that could be redirected toward meeting other goals or be reinvested locally.
- ✓ Select initial thresholds for covered buildings that balance the need for obtaining a meaningful representative sample against the reporting burden for small entities. Phase additional building types and/or lower thresholds over time.
- ✓ Demonstrate the value of the data for understanding progress and highlighting tangible achievements and exceptional performance within the city.
- ✓ Explicitly link observed energy and GHG performance data obtained from the program into the periodic review and update of the Resilient Watertown Climate and Energy Plan.
- ✓ Utilize data on on-site fuel use to target local stationary combustion sources, which impact public health and local air quality.
- ✓ Provide regular training and technical assistance to help less-resourced building owners.
- ✓ Commit the City to retaining Renewable Energy Credits (RECs) for all municipal solar arrays.



ACTION BE4.3

Upgrade major existing municipal facilities to achieve net zero energy performance



DESCRIPTION OF ACTION

Analyze all existing municipal and school buildings and perform deep energy retrofits to achieve as close to net zero performance as possible. Analyze buildings designed for net zero performance to verify they meet the standard and make adjustments or improvements as needed.



CHAMPION

DPB

OVERALL TIMEFRAME

Long (3-5 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Analyze all existing municipal buildings for existing conditions and opportunities for deep energy retrofits, utilizing energy performance consultant services if deemed necessary.	12 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Eversource and National Grid • Library Trustees and Director • WHA
2	Create a priority list of facilities for upgrades based on urgency, cost, previously planned upgrades or renovations, barriers, and other factors identified.	2 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C
3	Submit the budget items associated with the upgrades to the City Council for review during the normal budget process.	4 MONTHS	<ul style="list-style-type: none"> • DCDP • City Council
4	Integrate net zero upgrades into planned renovations already in capital plans.	3-4 MONTHS	<ul style="list-style-type: none"> • DCDP • City Council
5	Install high quality energy monitoring equipment in all municipal buildings during construction.	ONGOING	<ul style="list-style-type: none"> • DCDP • City Council
6	Evaluate (annually) buildings that have been built or upgraded to net zero standards to confirm they are meeting the standard. Plan for small/medium/large maintenance to be done at roughly 1/3/10 years to maintain energy standard.	ONGOING	<ul style="list-style-type: none"> • DCDP • City Council



TOOLS & RESOURCES

Financial Tools

- [Green Communities Grant Program](#)

Technical Resources

- [Boston Net Zero Carbon Building Zoning Initiative](#)
- [Massachusetts Energy Zero Code \(MA E-Z Code\), Northeast Energy Efficiency Partnership](#)
- [Green Building Requirements and Net Zero Narrative, City of Cambridge](#)
- [Building Energy Case Study Database, Northeast Sustainable Energy Association \(NESEA\)](#)
- [ASHRAE Advanced Energy Design Guide-Achieving Zero Energy series](#)



EQUITY CONSIDERATIONS

- ✓ Consider equity impacts of upgrades when creating priority list of upgrades.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Incorporate ongoing monitoring of building energy performance against net zero standard into existing responsibilities.
- ✓ Establish a budget item for maintenance relative to energy performance to streamline process.



ACTION TM1.2

Collaborate regionally to increase and improve safe, interconnected pathways for bicyclists and pedestrians



DESCRIPTION OF ACTION

Continue to build out a robust bicycle and pedestrian network that reaches destinations beyond our municipal boundaries.



CHAMPION

DCDP

OVERALL TIMEFRAME

Medium (1-3 years)/Ongoing

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Include sidewalks and curbs wherever new road construction is planned.	ONGOING	• DPW
2	Work with DPW and Complete Streets Committee to ensure that at least one project on each year's road plan improves bike safety. Protected bike lanes are preferred where feasible.	ONGOING	• DPW
3	Coordinate with Planning and Public Works Department in adjacent towns when road projects are close to borders.	ONGOING	• Cambridge, Boston, Newton, Waltham, Belmont
4	Increase bike parking in business districts and transit nodes (Watertown Yard, Watertown Square and Coolidge Square).	ONGOING	• DPW • Local business community • Real estate and developers
5	Maintain and grow the number of Bluebikes stations to improve first and last mile travel options.	ONGOING	• DPW • Local business community • Real estate and developers



TOOLS & RESOURCES

Financial Tools

- [Massachusetts Chapter 90 Funding](#)
- [American Rescue Plan Act Funding](#)
- [Capital Improvement Plan](#)

Technical Resources

- [Watertown Bicycle and Pedestrian Plan](#)
- [MAPC Net Zero Playbook: Zero Emission Mobility](#)



EQUITY CONSIDERATIONS

- ✓ Prioritize investments in areas with Environmental Justice populations and climate-vulnerable communities.
- ✓ Consider how investments will connect to local and regional transit.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Consider long-term economic development of Watertown and the region to anticipate future mobility routes.
- ✓ Conduct frequent outreach to the public on the accessibility of pedestrian and bicycle movement in Watertown.



ACTION TM1.3

Increase use of transit, bike, and pedestrian travel through outreach, incentives, and policy changes



DESCRIPTION OF ACTION

Systematically expand use of non-vehicular travel by instituting and advertising changes such as decreased zoning requirements for parking, traffic calming, and safe routes to schools.



CHAMPION

DCDP

OVERALL TIMEFRAME

Long (3-5 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Conduct an inventory of transportation assets and programs to generate a baseline.	2 MONTHS	<ul style="list-style-type: none"> • DPW • Bike/Ped Committee
2	Develop incentives to reduce parking needs, including expanding the shuttle program, sharing parking between businesses, and improving bike infrastructure in municipal parking lots.	6 MONTHS	<ul style="list-style-type: none"> • DPW
3	Consider policy changes such as reducing parking requirements or instituting parking maximums in the zoning code and better integrating traffic calming measures into road planning.	1 YEAR	<ul style="list-style-type: none"> • DPW • City Council
4	Expand and/or formalize programs aimed at specific locations in Watertown, such as “safe routes to school” and promoting walkability of the central business district.	ONGOING	<ul style="list-style-type: none"> • DPW • Local business community • Watertown Public Schools • neighborhood organizations
5	Plan and promote events and other creative ways to communicate about existing and new programs and technologies.	ONGOING	<ul style="list-style-type: none"> • DPW • Local business community • Bike/Ped Committee



TOOLS & RESOURCES

Financial Tools

- [MAPC Accelerating Climate Resiliency Grant Program](#)
- [MassDOT Shared Streets and Spaces funds](#)

Technical Resources

- [MAPC Net Zero Playbook: Zero Emission Mobility](#)
- [MAPC Maximum Parking Allowances](#)



EQUITY CONSIDERATIONS

- ✓ Prioritize policy changes and incentive programs that will benefit low-income residents, renters, and other climate vulnerable populations.
- ✓ Conduct meaningful public engagement when discussing and adopting policy changes.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Engage property owners and businesses early on and lead with successful examples from other communities.
- ✓ Tie efforts to long-term economic and community development goals.



ACTION TM1.6

Develop an integrated, publicly accessible electric transit system that connects to MBTA and other points of interest not accessible by MBTA, including on-demand transportation options



DESCRIPTION OF ACTION

Increase the connectedness of mobility choices and destinations in and around Watertown using clean and affordable options.



CHAMPION

DCDP

OVERALL TIMEFRAME

Long (3-5 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Assess current ridership demographics and local and regional transit origin/destination needs.	3 MONTHS	<ul style="list-style-type: none"> • MBTA • WTMA • Surrounding communities (e.g., Belmont, Newton, Waltham) • Watertown businesses and employers • E-bikeshare providers
2	Create a transit advisory group that reflects the demographics of the city to prioritize ridership, routes, and destinations to focus on and determine which are best serviced by shuttles, on-demand, or other modes.	2 MONTHS	<ul style="list-style-type: none"> • MBTA • WTMA • WE3C • Council on Aging
3	Collaborate with transit partners to assess and develop an electrification plan for bus and shuttle fleet.	6 MONTHS	<ul style="list-style-type: none"> • Participating service providers • WTMA
4	Collaborate with existing service providers in and around Watertown to discuss partnership opportunities for public use. Develop and implement Integrated Mobility Solutions so that services enhance rather than compete with each other.	6-12 MONTHS	<ul style="list-style-type: none"> • MBTA • WTMA • NewMO • Council on Aging
5	Expand the TDM Ordinance to apply to existing businesses. Collaborate with local businesses and anchor institutions on transportation demand management options. Amend or revise the TDM Ordinance to expand its reach.	6 MONTHS	<ul style="list-style-type: none"> • Large employers in Watertown (e.g., Athenahealth, Riverworks, VHB) • WTMA • City Council • Watertown Public Schools • Perkins School for the Blind



<p>6</p>	<p>Implement new bus routes, shuttle routes, priority bus lanes and signal priorities, and e-bikeshare stations as deemed relevant by the assessment in steps 1 and 2.</p>	<p>1-2 YEARS (ONGOING)</p>	<ul style="list-style-type: none"> • Participating service providers • MBTA • WTMA • Private property owners • Traffic Commission • DPW
<p>7</p>	<p>Review ridership fee structures for equity, in collaboration with chosen partners.</p>	<p>2 MONTHS</p>	<ul style="list-style-type: none"> • Participating service provider partners
<p>8</p>	<p>Rollout new services. Develop ridership guidebook that encompasses all publicly available routes, connections, service providers, and fees. Develop and release public outreach to advertise new transit options and connections.</p>	<p>3 MONTHS</p>	<ul style="list-style-type: none"> • Participating service provider partners



TOOLS & RESOURCES

Financial Tools

- [Mascot: Community Transit Grant Program](#)
- [National Center for Mobility Management: Grants and Opportunities](#)

Technical Resources

- [City of Newton: New-Mo](#)
- [Salem Skipper](#)
- [Uber Transit \(Partner of the MBTA\)](#)
- [Community Compact Cabinet: Best Practices Program, Transportation / Public Works](#)
- [Community Transportation of America](#)
- [Transit Planning 4 All](#)
- [National Center for Applied Transit Technology](#)
- [Operating a Successful Community Shuttle Program: A Guidebook](#)



EQUITY CONSIDERATIONS

- ✓ Ensure accessibility for people with disabilities and seniors including both accessibility of stops and consideration of distance between stops.
- ✓ Consider affordability of ridership fee schedule and strategies to facilitate reduced fares.
- ✓ Identify neighborhoods that have specific transit needs (e.g., “transit deserts” or a larger percentage of 2nd and 3rd shift workers not served by current transit timetables).



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Ensure that new routes and ridership services cover a wide range of resident demographics to provide connectedness opportunities for all.
- ✓ Consider long-term economic development of Watertown to anticipate future routes and service needs.
- ✓ Collaborate early and often with the MBTA on forthcoming improvements to their routes and services to ensure synergy and reduce duplication of services.
- ✓ Engage the Watertown community through multiple strategies and at multiple touchpoints to gather the most accurate ridership needs data.
- ✓ Work with neighboring communities to fund and maintain regional transit and connection options.



ACTION TM2.1

Develop and implement an EV Roadmap for Watertown



DESCRIPTION OF ACTION

Create a detailed and actionable roadmap to install localized electric vehicle (EV) infrastructure and develop programs to increase EV adoption in Watertown.



CHAMPION

DCDP

OVERALL TIMEFRAME

Short (<1 year)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Conduct a baseline assessment of current Watertown EV infrastructure (public and private), including existing number and adoption rate of EVs.	3 MONTHS	<ul style="list-style-type: none"> • Director of Public Buildings/Energy Manager • Watertown Registry of Motor Vehicles
2	Identify and engage with all critical and relevant parties, including the audience that will be directly or indirectly impacted by the Roadmap, and populations who have been underserved.	1 MONTH	<ul style="list-style-type: none"> • Energy Manager • WE3C • DPB • DPW • Watertown Business Coalition • Large developers and property owners
3	Research best practices national and from surrounding communities, including ways to increase charging stations on both public and private property, unique charging infrastructure scenarios, and EV purchase incentives; understand upcoming developments in the industry.	3 MONTHS	<ul style="list-style-type: none"> • Surrounding communities • National Grid and Eversource • ChargePoint • Clean Cities Coalition
4	Define scope of EV Roadmap and set City goals for the Roadmap utilizing data collected from steps 1-3.	2 MONTHS	<ul style="list-style-type: none"> • Traffic Commission • Energy Manager • WE3C • DPB • DPW • Watertown Business Coalition • Large developers and property owners
5	Identify barriers to EV adoption at all scales and engage the community for feedback.	3 MONTHS	<ul style="list-style-type: none"> • Renters and landlords • Low-moderate income residents • Watertown visitors and commuters • Car dealerships • Businesses • Developers



<p>6</p>	<p>Analyze data and community and stakeholder feedback, identify key themes, and compile and prioritize immediate, medium, and long-term actions.</p>	<p>6 MONTHS</p>	<p>• Consultant</p>
<p>7</p>	<p>Launch Roadmap in conjunction with a public outreach campaign and begin implementation.</p>	<p>2 MONTHS</p>	<p>• WE3C • Energy Manager • City Council</p>



TOOLS & RESOURCES

Financial Tools

- [US Department of Transportation – Low or No Emission Vehicle Program](#)
- [US Department of Energy – Federal Tax Credits](#)
- [MassDOER – MOR-EV Rebate Program](#)
- [MassDOER – MOR-EV Trucks Program](#)

Technical Resources

- [USDN - Electric Vehicle Charging Access for Renters: A Guide to Questions, Strategies, and Possible Next Steps](#)
- [MJ B&A - Regional EV Charging Infrastructure Location Identification Toolkit \(ILIT\)](#)
- [US Department of Energy – Electric Vehicle Infrastructure Projection Tool \(EVI-Pro\) Lite](#)
- [City of Boston – Recharge Boston](#)
- [Tucson Electric Power - Electric Vehicle 5-Year Strategic Roadmap](#)
- [Partnership between City of Melrose and National Grid to place EV chargers on utility poles](#)



EQUITY CONSIDERATIONS

- ✓ Provide opportunities for renters to access and utilize EV infrastructure.
- ✓ Identify creative solutions for Watertown’s building stock of older multifamily homes.
- ✓ Ensure EV charging is physically, logistically, and financially accessible to all residents of Watertown.
- ✓ Include actions that increase low-income access to electric vehicles.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Seek feedback proactively and have conversations with developers and landlords on any new policies and regulations, both while the Roadmap is in development and after launch.
- ✓ Ensure City implements a long-term maintenance plan for new EV infrastructure.
- ✓ Conduct early and frequent outreach to the public on the accessibility of new EV infrastructure.
- ✓ Consider future local and regional economic development plans to ensure EV infrastructure readily connects to other infrastructure.
- ✓ Ensure new infrastructure is guided by core principles, such as ability to enhance workforce development by way of expanded transit options.
- ✓ Provide technical assistance to property owners interested in hosting EV infrastructure.
- ✓ Evaluate pros and cons of private vs. public infrastructure ownership.
- ✓ Seek funding to offer financial incentives for gaps the Roadmap identifies in state and federal funding.



ACTION NR1.1

Incorporate pocket parks into all neighborhoods lacking green space



DESCRIPTION OF ACTION

Watertown will identify and implement pocket parks on public and private property, with a priority focus on neighborhoods lacking open space. This process will take place in coordination with private development activity wherein privately-owned public open space may be created.



CHAMPION

DCDP

OVERALL TIMEFRAME

Long (3-5 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Identify sections of Watertown that meet the definition of "lacking green space" based on number of residents within a ten-minute walk to open space.	1-2 MONTHS	• GIS consultants
2	Create a set of criteria that would make: a) public property suitable for conversion to open space (minimum square footage, potential for other priority uses, abutting land uses, etc.) b) private property appropriate for purchase by the City for use as open space (square footage range, current use, abutting land uses, etc.)	1-2 MONTHS	• DPW • Assessor's Office
3	Conduct a mapping exercise to identify existing public properties that could accommodate open space and to identify small parcels the City can purchase.	1-2 MONTHS	• GIS consultants
4	Develop a list of priority properties for acquisition (if applicable) and conversion.	1-2 MONTHS	• DPW • City Council
5	Incorporate priority public parcels for conversion into upcoming capital plans and aim for development of one pocket park per year via a combination of capital funds and applicable grant programs.	2 MONTHS	• DPW



TOOLS & RESOURCES

Financial Tools

- [Massachusetts Parkland Acquisitions and Renovations for Communities \(PARC\) Grant Program](#)
- [MassDevelopment: Commonwealth Places](#)
- [Municipal Vulnerability Preparedness \(MVP\) Action Grant](#)
- [Metropolitan Area Planning Council: Accelerating Climate Resiliency Grant Program](#)
- [MA DCR: Urban and Community Forestry Challenge Grants](#)
- [Community Preservation Act Grant Program](#)

Technical Resources

- [National Recreation and Park Association: Issue Brief on Pocket Parks](#)
- [Trust for Public Land Pocket Park Toolkit](#)



EQUITY CONSIDERATIONS

- ✓ Balance need for open space with other priority needs such as affordable housing.
- ✓ Identify local leadership for each site as it is developed to steer the process and generate buy-in for the future park.
- ✓ Prioritize green space enhancements in environmental justice communities and neighborhoods with low tree canopy coverage.
- ✓ Ensure programs and activities are sensitive to variety of cultures in Watertown, including types of activities as well as days activities are held.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Connect with existing volunteer groups (e.g., Friends of Bees, Watertown Community Gardens) for training, outreach, and support.
- ✓ Identify opportunities to use green space enhancements for climate resiliency objectives (e.g., trees for shading, rain gardens for stormwater management).
- ✓ Plan for any additional maintenance requirements for enhancements early on in the projects.



ACTION NR1.4

Establish equitable and accessible natural-habitat corridors along water bodies, trails, and utility easement areas, and protect existing ones



DESCRIPTION OF ACTION

Enhance our existing natural habitat corridors, improve the ecology along the Charles River, and identify opportunities to establish or formalize new habitat corridors.



CHAMPION

DCDP

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Conduct a mapping exercise and field study to identify areas where natural habitat corridors could exist or could be bolstered; keep regional connections in mind.	3 MONTHS	<ul style="list-style-type: none"> • DPW • WE3C • Conservation Commission • Mass Audubon • DCR • Mount Auburn Cemetery • Friends of Bees
2	Develop a priority list of specific properties, rights of way, and other parcels that should be naturalized and/or preserved in service of habitat corridor creation.	3 MONTHS	<ul style="list-style-type: none"> • DPW • WE3C • Conservation Commission
3	Add identified projects to capital plans as appropriate, seeking opportunities to add onto already planned work if feasible.	1-2 MONTHS	<ul style="list-style-type: none"> • DPW • City Council
4	Work with DCR and partner groups to support the maintenance and improved health of habitat corridors on their properties.	1-2 MONTHS	<ul style="list-style-type: none"> • DCR • Partner groups and stewardship volunteer organizations
5	Connect new habitat corridor efforts to outreach and education around natural resources and climate change.	ONGOING	<ul style="list-style-type: none"> • DCR • WE3C • Conservation Commission



TOOLS & RESOURCES

Financial Tools

- [Municipal Vulnerability Preparedness \(MVP\) Action Grant](#)
- [Metropolitan Area Planning Council: Accelerating Climate Resiliency Grant Program](#)
- [MA DCR: Urban and Community Forestry Challenge Grants](#)
- [Community Preservation Act Grant Program](#)

Technical Resources

- [Smart Cities Dive: Corridor Ecology and Planning](#)



EQUITY CONSIDERATIONS

- ✓ Prioritize green space enhancements in environmental justice communities and neighborhoods with low tree canopy coverage.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Coordinate with regional organizations and neighboring municipalities to enhance habitat across city boundaries.
- ✓ Integrate this effort with the City's emerging pollinator program and multi-use path developments.



ACTION NR2.3

Substantially increase annual street and municipal tree plantings and prioritize tree plantings in neighborhoods at high risk for urban heat impacts



DESCRIPTION OF ACTION

Watertown will conduct an aggressive tree-planting campaign and ensure proper data collection, in order to prioritize areas with low canopy coverage and track progress towards a healthier and more robust urban tree canopy.



CHAMPION

Forestry Division

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Develop historical data on tree canopy change in Watertown including current conditions.	3-4 MONTHS	• GIS consultants
2	Set a goal of planting a minimum number of trees per year or expanding the baseline tree canopy by a minimum percentage per year in Watertown.	2 MONTHS	• DCDP • DPW • WE3C
3	Develop a strategy and budget allocation that will enable Watertown to meet or exceed its planting goals on an annual basis, outlining staff and equipment needs, cost estimates, volunteer/partnership opportunities, and other considerations deemed necessary.	6 MONTHS	• WE3C • Trees for Watertown • Teens for Trees • Conservation Commission • Watertown Public Schools
4	Establish a program of neighborhood-based bare-root tree planting events with special emphasis on greening tree-barren neighborhoods and those with greater urban heat island effects.	6 MONTHS	• Trees for Watertown • Teens for Trees • Conservation Commission • Watertown Public Schools • Watertown Housing Authority
5	Invest in a detailed, GIS-based tree inventory database software package that can be graphically merged as an overlay with other city databases to give a detailed picture of Watertown's street infrastructure for planning purposes. software should have the following: <ul style="list-style-type: none"> • Data able to be updated via cell phone • Database input parameters able to be customized • Feature a user-friendly interactive map for public use 	3 MONTHS	• GIS consultants
6	Rewrite Watertown's tree planting contract to require high quality planting stock from regional New England nurseries, optimal planting practices, and regular and adequate watering for the first two growing seasons.	1 MONTH	• DPW
	Support newly planted trees with an educational campaign encouraging resident watering support.	ONGOING	• WE3C • Trees for Watertown



TOOLS & RESOURCES

Financial Tools

- [Massachusetts Executive Office of Energy & Environmental Affairs: Municipal Vulnerability Preparedness Action Grant](#)
- [Metropolitan Area Planning Council: Accelerating Climate Resiliency Grant Program](#)
- [MA DCR: Urban and Community Forestry Challenge Grants](#)

Technical Resources

- [City of Cambridge: Miyawaki Forest demonstration project](#)
- [City of Cambridge Urban Forest Master Plan](#)



EQUITY CONSIDERATIONS

- ✓ Prioritize plantings in neighborhoods with higher percent impervious surface, lower income residents, and historically limited investment.
- ✓ Meaningfully engage abutting residents during projects proposing significant tree investments



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Leverage existing volunteer groups (e.g., Friends of Bees, Watertown Community Gardens, Master Naturalist, Master Gardener, Scouts) to support City staff.
- ✓ Work with student and teacher groups to integrate tree planting and care into school curricula and professional development programs. Support teachers with training to ensure they can develop and teach the curriculum.



ACTION NR3.1

Develop a regenerative landscaping education and outreach plan with expanded opportunities for residential involvement



DESCRIPTION OF ACTION

Create educational materials and incentives to facilitate resident engagement in landscaping practices that minimize pesticide use, support native species, and use green infrastructure and low-impact development.



CHAMPION

DPW

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Review existing nature-based landscaping education and incentive programs in partnership with community members and City staff to understand opportunities to expand existing offerings and design new programs.	3-4 MONTHS	<ul style="list-style-type: none"> • Watertown Community Gardens • Friends of Bees • CRWA • Trees for Watertown • Teens for Trees • Watertown Free Public Library • Mount Auburn Cemetery • Recreation • Conservation Commission • Watertown Public Schools • Watertown Housing Authority • Watertown Community Education
2	Establish a City-approved pollinator plant and tree species list to distribute to developers and homeowners.	3-4 MONTHS	<ul style="list-style-type: none"> • Above listed partners
3	Develop an annual calendar for outreach and education that builds off both existing and new educational programs and is based on seasonal, consistent themes.	1 MONTH	<ul style="list-style-type: none"> • Above listed partners
4	Develop and launch a multimedia campaign in English and Spanish consistently promoting seasonal educational opportunities and programs and distribute materials to local landscaping companies.	3 MONTHS	<ul style="list-style-type: none"> • Above listed partners
5	Develop a sustainable landscaping workshop series for residents and/or commercial entities, in partnership with local experts.	6 MONTHS	<ul style="list-style-type: none"> • Massachusetts Master Gardener Association • Mass Audubon • CRWA • DCR • Middlesex Conservation District • Watertown Community Education • Watertown Free Public Library
6	Connect education campaign to Watertown Public Schools curriculum and professional development, in coordination with action NR3.2.	1 YEAR	<ul style="list-style-type: none"> • Watertown Public Schools



TOOLS & RESOURCES

Financial Tools

- [Massachusetts Executive Office of Energy & Environmental Affairs: Municipal Vulnerability Preparedness Action Grant](#)
- [Metropolitan Area Planning Council: Accelerating Climate Resiliency Grant Program](#)
- [Toxics Use Reduction Institute: Community Grants](#)

Technical Resources

- [City of Cambridge: Miyawaki Forest demonstration project](#)
- [Town of Concord: Sustainable Concord Landscape Handbook](#)
- [Ecological Landscape Alliance](#)
- [Massachusetts Horticultural Society](#)
- [Grow Native Massachusetts](#)
- [X-Cel Education program](#)
- [Boston Water & Sewer Commission and Boston Public Schools: Stormwater & Green Infrastructure Curriculum for Boston Public Schools](#)
- [USDA Conservation Districts](#)



EQUITY CONSIDERATIONS

- ✓ Celebrate and actively incorporate non-western methods of sustainable landscaping (see Cambridge Miyawaki Forest example).
- ✓ Consider technology access, as well as physical, geographic, cultural, and/or linguistic barriers to participation when designing programs.
- ✓ Incorporate green infrastructure maintenance training into demonstration projects (modeled after and potentially via partnership with X-Cel Education Program).
- ✓ Prioritize support for projects in neighborhoods with higher percent impervious surface, lower income residents, and historically limited investment.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Identify existing programs to expand, such as the adopt-an-island program, and new programs to establish, such as distribution of free or discounted native pollinator seeds and guidance on how to maintain native plants.
- ✓ Leverage existing volunteer groups (e.g., Friends of Bees, Watertown Community Gardens, Master Naturalist, Master Gardener, Scouts) to support City staff.
- ✓ Work with student and teacher groups to integrate sustainable landscaping into school curricula and professional development programs. Support teachers with training to ensure they can develop and teach the curriculum.



ACTION NR4.2

Promote and/or incentivize the incorporation of green stormwater infrastructure into existing large impervious areas



DESCRIPTION OF ACTION

Create a green stormwater infrastructure promotion structure that incorporates ordinance updates, public outreach, incentives, and technical assistance. Include bioswales, rain gardens, trees, pervious pavement, and other green infrastructure techniques that help to filter pollutants out of stormwater and control flooding.



CHAMPION

DPW

OVERALL TIMEFRAME

Long (3-5 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Convene an ad-hoc group to design incentives for both commercial and residential properties.	6-8 MONTHS	<ul style="list-style-type: none"> • SWAC • DCDP • Conservation Commission • Schools • Large property owners • Developers • Charles River Watershed Association • Mystic River Watershed Association
2	Assess the types and locations of impervious surfaces, locations of frequent surface flooding, stormwater basins, and areas where infrastructure is due for replacement across Watertown to identify high-priority replacement opportunities.	3-4 MONTHS	<ul style="list-style-type: none"> • SWAC • DCDP • GIS consultants
3	Modify the Stormwater Management and Erosion Control Ordinance to lower the trigger size for including green infrastructure.	6-12 MONTHS	<ul style="list-style-type: none"> • SWAC • City Council
4	Work with partners to promote the incentives, alongside expanded technical assistance and education opportunities.	4-6 MONTHS	<ul style="list-style-type: none"> • SWAC • Conservation Commission • Schools • Large developers
5	Develop demonstration projects for the various sectors represented focusing on sectors with limited existing information and educational resources.	1-2 YEARS	<ul style="list-style-type: none"> • SWAC • Conservation Commission • Schools • Large developers



TOOLS & RESOURCES

Financial Tools

- [Massachusetts Executive Office of Energy & Environmental Affairs: Municipal Vulnerability Preparedness Action Grant](#)
- [Metropolitan Area Planning Council: Accelerating Climate Resiliency Grant Program](#)
- [Massachusetts Department of Environmental Protection: Section 319 Nonpoint Source Grants Program](#)
- [National Fish & Wildlife Foundation: Resilient Communities Program](#)
- [US EPA: Green Infrastructure Funding Opportunities](#)

Technical Resources

- [Devens Enterprise Commission: Green Infrastructure Guidelines for Devens Projects](#)
- [The Nature Conservancy: Eco-Urban Assessment](#)
- [Metropolitan Area Planning Council: Designing Parks and Playgrounds as Green Infrastructure for Stormwater and Climate Resilience](#)



EQUITY CONSIDERATIONS

- ✓ Maximize public benefits of green infrastructure alternatives to impervious surfaces, particularly in neighborhoods experiencing more severe impacts (e.g., flooding, heat island).
- ✓ Incorporate the results of Mystic River Watershed Association's forthcoming heat island analysis (Wicked Hot Mystic) into the projects/locations that are incentivized.
- ✓ Provide job training opportunities for green infrastructure (potentially via partnership with X-Cel Education Program).
- ✓ Provide support for renters to have conversations with their landlords about the benefits of replacing impervious surface.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Offer a range of incentive options, tailored to different sectors and property types, to encourage replacement of existing impervious surfaces.
- ✓ Ensure that programs and incentives account for the realities of sector-specific constraints. For example, incentivizing existing commercial entities to convert their impervious surfaces may be cost-prohibitive, so capitalizing on existing pavement replacement or repair projects may be most effective.
- ✓ Seek creative opportunities to introduce green infrastructure (e.g., as part of projects to convert underutilized areas to parks or community green spaces).
- ✓ Direct local landscapers and contractors to green infrastructure training opportunities and resources (or provide these resources via the City, if possible).
- ✓ Pair City support with increased regulation regarding trigger size for green infrastructure.
- ✓ Plan for green infrastructure maintenance with necessary partners very early in projects.
- ✓ Use well-maintained demonstration projects to build buy-in with neighbors.



ACTION IW1.5

Investigate opportunities to pursue a circular economy in Watertown or within the Metro Boston region



DESCRIPTION OF ACTION

Investigate opportunities to pursue a circular economy in Watertown and throughout the region, such as plastic item bans, grey water recycling, pay-per-bag trash collection system, and other actions.



CHAMPION

DPW

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Conduct research into examples of circular economy efforts in other municipalities for opportunities to replicate locally and/or join into and expand existing programs.	3-4 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Recycling Committee
2	Evaluate options for expansion of services at recycling center to include hazardous waste, yard waste, and used clothing swap opportunities. Include these needs in any future upgrade or renovation plans for recycling center.	3-4 MONTHS	<ul style="list-style-type: none"> • DCDP • WE3C • Recycling Committee
3	Conduct a feasibility study on solid waste reduction programs such as “pay-as-you-throw” in partnership with solid waste contractor, built into new contract that is due to be renegotiated in June 2022.	6 MONTHS	<ul style="list-style-type: none"> • Republic Waste Services (contractor) • Recycling Committee
4	Implement programs that are deemed feasible and incorporate education about new programs into overarching Resilient Watertown outreach efforts.	1-2 YEARS	<ul style="list-style-type: none"> • Recycling Committee • WE3C • Watertown Faces Climate Change



TOOLS & RESOURCES

Financial Tools

- [MassDEP: Sustainable Materials Recovery Program \(SMRP\) Municipal Grant](#)

Technical Resources

- [MassDEP: Sustainable Materials Recovery Program \(SMRP\) Municipal Technical Assistance](#)
- [Natick Pay as You Throw Strategy](#)



EQUITY CONSIDERATIONS

- ✓ Minimize the impact of programs such as pay-as-you-throw on low-income residents.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Integrate circular economy concepts into broader Resilient Watertown education and outreach efforts.
- ✓ Begin education and outreach efforts at start of effort.



ACTION IW2.4

Investigate local back-up power, microgrid, and battery options in coordination with utilities



DESCRIPTION OF ACTION

Identify opportunities for sustainable back-up power sources, microgrids, and battery energy storage for installation at City facilities or anchor institutions within the community with the goal to reduce disruptions during normal operations and during disasters.



CHAMPION

DPB

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Develop and convene a joint working group with utilities and critical facilities/ large energy users to assess gaps and opportunities and set guiding principles.	4 MONTHS	<ul style="list-style-type: none"> • Eversource • WE3C • DCDP • DPW • Critical facilities (e.g., schools, emergency response facilities) • Fire Department • WHA • Community organizations • Residents and businesses
2	Conduct a needs assessment of current infrastructure and resident and business energy use to identify where back-up power is needed and most critical. Evaluate opportunities to convert fossil fuel-based back-up power to renewable or microgrid technologies.	8 MONTHS	<ul style="list-style-type: none"> • Joint working group • External consultants
3	Develop an evaluation framework to use for project prioritization to maximize community resilience and reduce greenhouse gas emissions.	2 MONTHS	<ul style="list-style-type: none"> • Joint working group
4	Prioritize projects based on evaluation framework, urgency, cost, barriers, and other factors identified.	3 MONTHS	<ul style="list-style-type: none"> • Joint working group
5	Establish an implementation plan and identify potential funding sources.	4 MONTHS	<ul style="list-style-type: none"> • Joint working group



TOOLS & RESOURCES

Financial Tools

- [Massachusetts Executive Office of Energy and Environmental Affairs: Municipal Vulnerability Preparedness Action Grant](#)
- [Massachusetts Department of Energy Resources \(DOER\): Community Clean Energy Resiliency Initiative](#)
- [Federal Emergency Management Agency \(FEMA\): Building Resilient Infrastructure and Communities \(BRIC\) Grant Program](#)

Technical Resources

- [US Department of Energy: Energy Storage](#)
- [DOER & Massachusetts Clean Energy Center \(MassCEC\): State of Charge: A Comprehensive Study of Energy Storage in Massachusetts](#)
- [MassCEC: Microgrids Background and Studies](#)
- [MassCEC: Clean Energy and Resiliency Case Studies](#)
- [Rocky Mountain Institute: Solar Plus Storage Case Studies](#)
- [National Renewable Energy Laboratory: Renewable Energy Integration & Optimization Tool \(REopt\)](#)
- [U.S. Department of Energy: Solar-plus-storage economics: What works where, and why?](#)



EQUITY CONSIDERATIONS

- ✓ Consider environmental justice communities and historically under-resourced neighborhoods in assessment and prioritization of investments.
- ✓ Collaborate with a diverse range of residents, businesses, agencies, and institutions during the assessment and prioritization phases.
- ✓ Consider where back-up power may benefit emergency response (e.g., evacuation centers, cooling centers).
- ✓ Identify opportunities for workforce development, local hiring, and vocational training opportunities during development of implementation plan.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Engage with a broad set of stakeholders, particularly utilities, early in the process to ensure project buy-in.
- ✓ Identify diversity of funding sources to cover upfront cost of investments and alleviate objections or concerns stakeholders may have about cost.
- ✓ Evaluate utility rates and demand response programs for potential funding.



ACTION PH2.2

Mitigate existing and prevent new urban heat islands in Watertown



DESCRIPTION OF ACTION

Reduce the impact of existing and future urban heat islands on Watertown neighborhoods by taking action to enhance green space, shading, water features, and reflective surfaces.



CHAMPION

DCDP

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Map existing impervious surfaces, surface temperatures, and environmental justice communities to understand the geographic and demographic distribution of urban heat islands.	1 MONTH	<ul style="list-style-type: none"> • Tree Warden • DPW • DPH • GIS consultants
2	Identify approaches for heat mitigation for residential and commercial properties, considering options including, but not limited to, a “cool roofs” program, an artificial turf ban, and incentives for de-paving private property.	3 MONTHS	<ul style="list-style-type: none"> • DPW • DPB • WE3C • Watertown Faces Climate Change • Large property owners
3	Develop educational materials on the dangers of the urban heat island effect and the benefits of green space and tree canopy.	2 MONTHS	<ul style="list-style-type: none"> • Education/outreach consultants
4	Conduct outreach to residents and businesses to understand the best approaches for heat mitigation. Use this step as an opportunity to continue education around heat impacts and strategies.	3 MONTHS	<ul style="list-style-type: none"> • Watertown Free Public Library • Watertown Public Schools • Businesses • WE3C • Watertown Housing Authority
5	Establish targets to mitigate a percentage of existing urban heat islands each year.	1 MONTH	<ul style="list-style-type: none"> • DPW
6	Make appropriate zoning or other regulatory amendments to minimize urban heat island effects in the built environment.	6 MONTHS	<ul style="list-style-type: none"> • Planning Board • City Council
7	Implement new programs and/or regulations as identified to be feasible and impactful approaches for Watertown.	ONGOING	<ul style="list-style-type: none"> • DPW • WE3C • DPH • Large property owners



TOOLS & RESOURCES

Financial Tools

- [MassDevelopment: Community Health Center Grant Program](#)
- [MassDevelopment: Commonwealth Places](#)
- [MA DCR: Urban and Community Forestry Challenge Grant](#)
- [EPA New England: Healthy Communities Grant Program](#)

Technical Resources

- [Metropolitan Area Planning Council: Extreme Heat Resources](#)
- [Metropolitan Area Planning Council: Climate Vulnerability in Greater Boston](#)
- [US EPA: Keeping Your Cool](#)
- [City of Philadelphia: Beat the Heat Toolkit](#)



EQUITY CONSIDERATIONS

- ✓ Ensure that initiatives target neighborhoods and populations that are most vulnerable to extreme heat (e.g., communities of color, low-income communities, elderly population, individuals experiencing homelessness).
- ✓ Incorporate practices into public housing projects or any publicly funded projects.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Promote the benefits of heat mitigation strategies, including green space, shading, water features, and reflective surfaces, to overcome the cost benefits of increasing pervious surfaces, like parking lots.
- ✓ Continue to seek feedback and conversations with property owners and residents on impacts of any new policies or zoning changes.
- ✓ Create a plan for monitoring progress, including review of heat maps and other heat-related indicators on a recurring basis.
- ✓ Conduct ongoing public outreach and education about urban heat islands and mitigation strategies.



ACTION PH4.1

Establish a network of resilience hubs that provide resources (e.g., cooling, phone-charging, pantry) that are easily accessible throughout the community



DESCRIPTION OF ACTION

Create a network of spaces that will serve residents during a climate-related emergency or other disruption, providing power, food and water, and other basic services.



CHAMPION

DCDP

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Create a list of criteria necessary for a resilience hub to have and quantify the number of hubs needed to serve Watertown. Consider locations that have other assets nearby like grocery stores for essential items.	2 MONTHS	<ul style="list-style-type: none"> • Fire Department • Police Department • DPB • DPH
2	Engage residents to identify whether specific services are needed in different parts of Watertown.	3 MONTHS	<ul style="list-style-type: none"> • DPH • Live Well Watertown
3	Conduct a mapping exercise to identify existing locations that are or can be used as a hub.	2 MONTHS	<ul style="list-style-type: none"> • Fire Department • Police Department • DPB • DPH
4	Engage property owners, if applicable, to design and execute partnership agreements.	6 MONTHS	<ul style="list-style-type: none"> • Fire Department • Police Department • DPH
5	Develop final list of resilience hubs and develop protocol to follow during operation as a resilience hub, including coordination with City emergency preparedness communications.	2 MONTHS	<ul style="list-style-type: none"> • Fire Department • Police Department • DPH • Live Well Watertown
6	Publicize new network of resilience hubs to residents.	ONGOING	<ul style="list-style-type: none"> • Police Department • DPH • Live Well Watertown



TOOLS & RESOURCES

Financial Tools

- [Municipal Vulnerability Preparedness \(MVP\) Action Grant](#)

Technical Resources

- [Resilient Medford: Resilience Hubs Report](#)
- [Cambridge Community Center Resilience Hub Plan](#)
- [Pew Charitable Trusts: Health Impact](#)



EQUITY CONSIDERATIONS

- ✓ Engage climate-vulnerable populations to ensure their needs will be met during emergencies.
- ✓ Consider multi-modal accessibility to resilience hubs when identifying potential locations.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Coordinate implementation with existing Watertown Hazard Mitigation Plan.
- ✓ Integrate resilience hub upgrades into capital plan for public facilities, if applicable.



ACTION PH4.2

Enhance the existing Live Well Watertown coalition and its programs to incorporate neighborhood connections to nature and to each other



DESCRIPTION OF ACTION

Acknowledging the health and climate benefits associated with experiences in nature and connected communities, the Live Well Watertown coalition will enhance the existing “Walk with a Doc/ Just Walk” program, which includes themed talks, building social connections, and movement for health, to include new partnerships and the incorporation of nature and environmental themed programs. This expanded initiative aims to eventually culminate into the creation of localized neighborhood walking networks that can also be utilized to distribute information and aid in an emergency.



CHAMPION

Live Well Watertown

OVERALL TIMEFRAME

Medium (1-3 years)

PLANNING CONSIDERATIONS

IMPLEMENTATION STEPS		TIMEFRAME	KEY PARTNERS
1	Conduct community outreach to assess the interest and feasibility of partnering with local organizations on new, expanded Walk with a Doc/Just Walk programming.	3 MONTHS	<ul style="list-style-type: none"> • Watertown Free Public Library • Watertown Public Schools • Watertown Boys & Girls Club • Watertown Recreation • Watertown Community Gardens • Friends of Bees • Trees for Watertown • Watertown Faces Climate Change • Riverside Neighborhood Group
2	Conduct education and outreach through new partnerships to strengthen the connection between health and nature in residents’ minds.	6 MONTHS	<ul style="list-style-type: none"> • Partners
3	Expand group of existing walk leaders by identifying a leader for each new walking group (and affiliated neighborhood).	3 MONTHS	<ul style="list-style-type: none"> • Partners who are ready to participate in 2022
4	Launch new walking programs, staggering based on timing needs/constraints of each organization.	3 MONTHS	<ul style="list-style-type: none"> • Partners who are ready to participate in 2022
5	Establish localized networks of neighborhood walking groups that can also serve as information conduits and emergency preparedness safeguards.	ONGOING	<ul style="list-style-type: none"> • Partners



TOOLS & RESOURCES

Financial Tools

- [America Walks: Community Change Grants](#)
- [Environmental Protection Agency: Healthy Communities Grant Program](#)
- [Massachusetts DCR: MassTrails Grants](#)

Technical Resources

- [America Walks: Resource Center](#)
- [MassDOT: Municipal Resource Guide for Walkability](#)



EQUITY CONSIDERATIONS

- ✓ Ensure outreach, education, and newly created walking programs are reaching Environmental Justice areas and climate-vulnerable communities, as well as elderly, special needs populations, minorities, and those with limited mobility.



OPPORTUNITIES TO OVERCOME POTENTIAL IMPLEMENTATION BARRIERS

- ✓ Work with coalition members and collaborators and leverage their established networks to add capacity for outreach, engagement, and participation.
- ✓ Consider looking at walking programs in nearby municipalities, such as WalkBoston, WalkUP Roslindale, or West Rox Walks.

REFERENCES

1. Climate Central. (2015). When it Rains it Pours: Heaviest Downpours are on the Rise. Retrieved from: http://assets.climatecentral.org/pdfs/WhenItRainsItPours_methods.pdf.
2. Northeast Climate Adaptation Science Center. (2018). Massachusetts Climate Change Projections – Statewide and for Major Drainage Basins.
3. Northeast Climate Adaptation Science Center. (2018).
4. Resilient MA. N.d. Changes in Precipitation. Retrieved from <https://resilientma.org/changes/changes-in-precipitation>
5. National Drought Mitigation Center. N.d. United States Drought Monitor.
6. Massachusetts Executive Office of Energy and Environmental Affairs. (2018). Massachusetts Integrated State Hazard Mitigation Plan and Climate Adaptation Plan.
7. Runkle et al. (2017). Massachusetts State Climate Summary. NOAA Technical Report NESDIS 149-MA. Retrieved from: <https://statesummaries.ncics.org/chapter/ma/>.
8. Northeast Climate Adaptation Science Center. (2018).
9. Kim Lundgren Associates. (2021). Watertown Community and Municipal 2019 Greenhouse Gas Emissions Inventory Summary Report.
10. Kim Lundgren Associates, Inc. (2021).
11. Massachusetts Clean Energy Center, Production Tracking System. Retrieved from <https://www.masscec.com/data-and-reports>
12. City of Watertown. (2021). Assessor’s Database.
13. DOE. (2018). Low Income Energy Affordability Database. Retrieved from <https://www.energy.gov/eere/slsc/maps/lead-tool>
14. Kim Lundgren Associates, Inc. (2021).
15. Elizabeth Karpinski (2021). Estimate the effect of protected bike lanes on bike-share ridership in Boston: A case study on Commonwealth Avenue. *Case Studies on Transport Policy*, 9, 3, pgs 1313-1323.
16. Nowak, D.J., Greenfield, E.J., Hoehn, R.E., & Lapoint, E. (2013). Carbon storage and sequestration by trees in urban and community areas of the United States. *Environmental Pollution*, 178, 229-236. <https://doi.org/10.1016/j.envpol.2013.03.019>
17. Northeast Climate Adaptation Science Center. (2018).

- 18.** Ziter, C.D., Pedersen, E.J., Kucharik, C.J., Turner, M.G. (2019). Scale-dependent interactions between tree canopy cover and impervious surfaces reduce daytime urban heat during summer. *PNAS*, 116, 7575-7580. <https://doi.org/10.1073/pnas.1817561116>
- 19.** MassGIS (2016). MassGIS Data: 2016 Land Cover/Land Use. Retrieved from: <https://www.mass.gov/info-details/massgis-data-2016-land-coverland-use>
- 20.** Watertown Citizens for Peace, Justice, and Environment. (2021). New Pollinator Garden at Watertown DPW. Retrieved from: <https://watertowncitizens.org/new-pollinator-garden-at-watertown-dpw/>
- 21.** Massachusetts Department of Environmental Protection. (2021). Massachusetts 2030 Solid Waste Master Plan: Working Together Toward Zero Waste. Retrieved from <https://www.mass.gov/doc/2030-solid-waste-master-plan-working-together-toward-zero-waste/download>
- 22.** Massachusetts Department of Environmental Protection. (2019). Municipal Solid Waste and Recycling Survey. Retrieved from <https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns>)
- 23.** Massachusetts Department of Environmental Protection. (2019). Municipal Solid Waste and Recycling Survey. Retrieved from <https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns>)
- 24.** City of Watertown. (2019). Hazard Mitigation Plan 2019 Updates.
- 25.** City of Watertown. (2019).
- 26.** City of Watertown. (2020). Stormwater Management & Erosion Control Permit. Retrieved from <https://www.watertowndpw.org/207/Stormwater-Management-Erosion-Control-Pe>
- 27.** Jonathan Erdman. (2021). America’s No. 1 Weather Killer is Not Tornadoes, Flooding, Lightning or Hurricanes. Retrieved from <https://weather.com/safety/heat/news/2021-06-03-heat-america-fatalities>
- 28.** Martin Finucane. (2021). Boston has seen 24 days with temps 90 or above this year – and there’s still time for more. Retrieved from <https://www.bostonglobe.com/2021/08/27/metro/boston-has-seen-23-days-with-temps-90-or-above-this-year-theres-still-time-more/>
- 29.** Centers for Disease Control and Prevention. (2018). Massachusetts: Vector-borne Diseases Profile (2004–2018). Retrieved from <https://www.cdc.gov/ncezid/dvbd/vital-signs/massachusetts.html>.
- 30.** Live Well Watertown. About Us. Retrieved from <https://livewellwatertown.org/about>



RESILIENT

W A T E R T O W N

TAKING ACTION TOGETHER FOR A BETTER FUTURE