



CLIMATE *READY* BOSTON

OUTLINE OF ACTIONS

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DECEMBER 2016



Boston must rise to the challenge of **climate adaptation**, applying the ingenuity and collective spirit that power its active civic life, innovative businesses, and world-renowned institutions.

BOSTON'S CHALLENGE

For almost 400 years, Boston has grown around its harbor and its rivers.

Bostonians built a vibrant, thriving city in what seemed a stable environment. However, we now know that, due to accelerating global climate change, temperatures are increasing, the sea level is rising, and storm and precipitation patterns are shifting.

In the coming century, many natural hazards that Boston already faces – including coastal and riverine flooding, stormwater flooding, and extreme heat – will be exacerbated by climate change. As soon as the 2070s, almost 90,000 residents and buildings worth over \$80 billion will face a one-percent chance of coastal and riverine flooding in any given year, stormwater flooding will pose a significant hazard to a tenth of the city, and the temperature may reach 90 degrees Fahrenheit almost every day of the summer.

If these climate hazards are not addressed, they **will threaten** Boston's livability and economic viability, and they will disproportionately impact those who lack sufficient resources to prepare for changing conditions or recover from emergencies.



Climate Ready Boston

The City's original Climate Action Plan (2007) and subsequent updates (2011, 2014) have given increasing attention to climate adaptation. Climate Ready Boston brings that planning to a new level of comprehensiveness and detail.

Building on updated projections of likely climate change, Climate Ready Boston proposes 39 initiatives, organized into 11 strategies, to reduce Boston's vulnerability now and over the next few decades:



Climate Ready Boston / Boston Harbor Now Workshop

STRATEGY 1.

Maintain up-to-date projections of future climate conditions to inform adaptation.

WHY Knowledge is the foundation for action. As global energy use and greenhouse gas emissions become clearer and as more data on the response of the Earth becomes available, climate projections will change. Bostonians need to remain informed to plan for the future.

WHAT The City should establish a Greater Boston Panel on Climate to update climate projections every five years. These projections should inform plans, policies, and regulations and be translated into readily accessible reports and maps.

STRATEGY 2.

Expand education and engagement of Bostonians on climate hazards and action.

WHY Climate adaptation cannot occur without an informed, engaged, and active public. Community members can provide deeper insight into how climate change is affecting their neighborhoods and businesses and create innovative and sensitive responses.

WHAT The City should work with partners from all sectors to inform and engage the Boston community on the risks from climate change and actions to reduce those risks. Different campaigns—targeting the general public, building owners, community facilities, businesses, and vulnerable populations who are more susceptible to the impacts of climate change—should promote short-term actions to reduce current risks while building support for larger-scale and longer-term measures.

STRATEGY 3.

Leverage climate adaptation as a tool for economic development.

WHY Over the coming decades, climate adaptation will require significant investments in the city's infrastructure, buildings, and other areas. The community can leverage this activity to promote equitable economic development, leaving Bostonians better prepared to thrive and face climate and other challenges.

WHAT The City should help train workers for jobs that will arise from climate adaptation projects and ensure that these projects follow the City's guidelines for local hiring, living wages, and employment of minority- and women-owned businesses

STRATEGY 4.

Develop local climate resilience plans to coordinate adaptation efforts.

WHY Some effects of climate change, such as increased temperatures, are spread across the city. Other, particularly coastal and riverine flooding, are more localized. Everywhere, these risks will interact with each other and with the social and economic needs of the neighborhood in particular ways. Coordinated adaptation actions can advance multiple community priorities simultaneously and use resources more effectively.

WHAT The City should develop local plans to address climate adaptation along with other community priorities. Through in-depth community engagement, the plans should include district-scale flood protection, infrastructure adaptation, and land-use planning, all in coordination with Imagine Boston 2030, 100 Resilient Cities, GoBoston 2030, and other planning efforts.

STRATEGY 5.

Create a coastal protection system to address flood risk.

WHY Coastal and riverine flooding poses a major and increasing threat to communities along Boston's waterfront and to the vitality of the city itself.

WHAT The City and its regional partners should investigate major "gray" and "green" infrastructure investments to address flood risk. The City should ensure that development in flood-prone areas does not prevent the future implementation of flood protection. The flood protection system should incorporate building-scale, district-scale, and harbor-wide measures.

STRATEGY 6.

Coordinate investments to adapt infrastructure to future climate conditions.

WHY Boston's infrastructure for power, water, transportation, communication, and more is a complex network with many public and private owners, operators, and regulatory authorities. As climate change presents new risks of failure, all stakeholders need to better understand the totality of vulnerabilities and to coordinate action to address them.

WHAT The City should establish an Infrastructure Coordination Committee with the region's major infrastructure organizations. The committee would develop planning and design standards aligned with up-to-date climate projections, identify cascading vulnerabilities, establish coordination mechanisms, and align adaptation efforts with other planning priorities.



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Image courtesy of Sasaki

STRATEGY 7.

Develop district-level energy solutions to increase decentralization and redundancy.

WHY Decentralized infrastructure of many kinds has the potential to combine climate adaptation with greenhouse gas reduction and economic development. Local sources that can keep operating during wider power failures could maintain the community's capacity to keep safe and cool as the frequency and intensity of heat waves rise.

WHAT The City should pursue community energy solutions, such as district energy systems or microgrids, that increase energy reliability and decrease greenhouse gas emissions. Priority sites should include areas with clusters of affordable housing or critical facilities.

STRATEGY 8.

Expand the use of green infrastructure and other natural systems to manage stormwater, mitigate heat, and provide additional benefits.

WHY Climate change will make it more difficult to manage stormwater and keep Bostonians cool, dry, and healthy. Green infrastructure, which relies on natural processes, can address these challenges and improve the safety and beauty of the public realm.

WHAT Building on past investments, the City should increase expand green infrastructure on public and private lands, in particular by developing sustainable funding sources and maintenance programs.

STRATEGY 9.

Update zoning and building regulations to support climate readiness.

WHY The current regulations that govern development in Boston do not have specific requirements for preparing for future climate conditions. In some cases, they may even pose obstacles to doing so.

WHAT Building on current requirements, the Boston Planning and Development Agency should propose land-use and other regulations that ensure that new development is ready for future climate conditions. The City should advocate for changes to the Massachusetts Building Code and explore measures that increase climate-ready retrofits in existing buildings.

STRATEGY 10.

Retrofit existing buildings against climate hazards.

WHY Most of the buildings in Boston that need to be prepared for climate change this century are already standing. The adaptation of existing buildings can be technically, operationally, and financially difficult. Property owners, particularly those with smaller or less valuable properties, may require technical or financial assistance.

WHAT The City should create programs to prepare existing buildings for climate change. Priorities should include buildings facing near-term flood risk and those with a public purpose or vulnerable populations. Programs could include resilience audits, investments in municipal facilities, support for backup power at facilities for vulnerable populations, and a toolkit of financing strategies.

STRATEGY 11.

Insure buildings against flood damage.

WHY Whatever actions the community takes, natural disasters may still occur. Flood insurance is an indispensable tool for supporting recovery after a flood. Affordable access to appropriate levels of flood insurance coverage is critical to protecting property owners' investments and neighborhoods' stability.

WHAT The City should promote appropriate flood insurance for property owners. This should include joining the National Flood Insurance Community Rating System to obtain flood insurance discounts through advanced floodplain management and advocating for reforms to better align premiums with actual risk.

MOVING TO IMPLEMENTATION

Climate Ready Boston's proposals are diverse in scope and scale. They are short-term and long-term, city-wide and neighborhood-specific, regulatory and financial. Some actions can be undertaken simultaneously; others must proceed in a certain order. They cannot all be done at once, because they would overwhelm government and community capacity. Furthermore, they do not need to be done all at once. Because climate change will accumulate over time, Boston's response can proceed over time too.

The Recommended Roadmap presents a timeline for undertaking these initiatives. The timeline has three divisions—within two years, within five years, and long-term. However, over half of the initiatives will be ongoing because, once started, they will need to continue or repeat indefinitely; for example, climate projections should be updated with new data that becomes available over time.

One question underlying almost all of the initiatives is how to pay for them. Some initiatives explicitly address the financial question, but even those that do not will be affected by it.

The placement of initiatives represents a rough prioritization based on many factors, including:

- Who and what is most at risk now?
- Are there existing efforts—climate-related or related to other initiatives—upon which the next phase of climate initiatives can build?
- Are resources—human, technical, fiscal—available to undertake this work?
- Is one initiative a necessary or desirable foundation for another?
- What is the risk or cost of delay, and who bears that risk or cost?
- Who has to take action?
- Is there already community or sectoral support?
- How difficult is implementation?

Some of the key initiatives that need begin in the next two years include:

- 2.1** Expand citywide climate readiness education and engagement campaign
- 4.1** Develop local climate resilience plans to support district-scale climate adaptation
- 5.2** Determine an evaluation framework for flood defense prioritization
- 6.1** Establish an Infrastructure Coordination Committee
- 8.2** Develop a sustainable operating model for green infrastructure on public land and right-of-way
- 9.2** Revise zoning code to support climate-ready buildings
- 10.2** Prepare municipal buildings for climate change

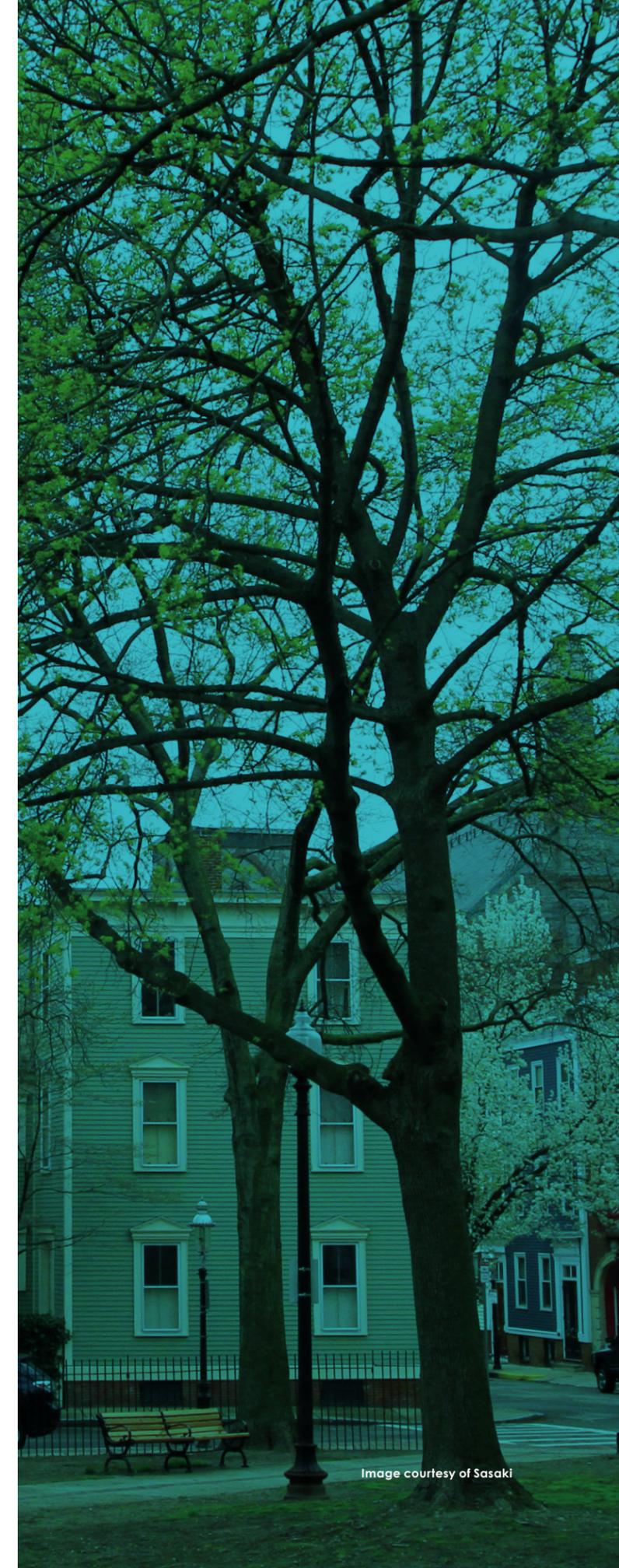


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CLIMATE READY BOSTON RECOMMENDED ROADMAP

INITIATIVE WITH DEADLINE  CONTINUOUS INITIATIVE 

	#	INITIATIVE	IMPLEMENTATION PERIOD		
			WITHIN 2 YEARS	WITHIN 5 YEARS	LONG-TERM
STRATEGY 1 Climate Projection Consensus Maintain up-to-date projections of future climate conditions to inform adaptation.	1.1	Launch the Greater Boston Panel on Climate Change and require periodic updating of Boston-specific climate projections.		Greater Boston Panel on Climate is launched.	Climate projections updated every 5 yrs.
	1.2	Create updated local flood maps to support planning, policy, and regulation.	City establishes policy on planning flood standards.	Future flood maps are incorporated into City policy and regulation.	Flood maps are periodically updated.
STRATEGY 2 Prepared and Connected Communities Expand education and engagement of Bostonians about climate hazards.	2.1	Expand Citywide Climate Readiness Education and Engagement campaign.	Citywide campaign is launched.		
	2.2	Launch a Climate Ready Buildings Education Program for property owners and users.	Climate Ready Buildings Education Program is launched.		
	2.3	Conduct an outreach campaign to facilities that serve vulnerable populations to support preparedness and adaptation.		Outreach campaign is launched.	
	2.4	Update the City's heat emergency action plan.	Heat emergency action plan is updated.		
	2.5	Expand Boston's Small Business Preparedness Program.	Small business preparedness resources developed.	Climate adaptation is incorporated into Main Streets program.	

	#	INITIATIVE	IMPLEMENTATION PERIOD			
			WITHIN 2 YEARS	WITHIN 5 YEARS	LONG-TERM	
STRATEGY 3 Prepared and Connected Communities Leverage climate adaptation as a tool for economic development.	3.1	Identify resilience focused workforce development pathways.		Pathways are developed and incorporated into existing workforce programs.		
	3.2	Pursue inclusive hiring and living wages for resilience projects.				
	3.3	Prioritize use of minority- and women-owned businesses for resilience projects.				
STRATEGY 4 Protected Shores Develop local climate resilience plans to coordinate adaptation efforts.	4.1	Develop local climate resilience plans in vulnerable areas to support district-scale climate adaptation.	Initial plans are launched.	Complete initial plans.	Plans are completed for all focus areas and periodically revised.	
	4.2	Establish local climate resilience committees to serve as long-term community partners for climate adaptation.	First committee is established.		Committees are established for all focus areas.	

Protected Shores
STRATEGY 5
Create a coastal protection system to address flood risk.

#	INITIATIVE	IMPLEMENTATION PERIOD		
		WITHIN 2 YEARS	WITHIN 5 YEARS	LONG-TERM
5.1	Establish Flood Protection Overlay Districts (FPOD) and require potential integration with flood protection.	Policies for FPOD are studied.	Policies for FPOD are enacted.	
5.2	Determine a consistent evaluation framework for flood defense prioritization.	Evaluation framework is studied.	Evaluation framework is established.	
5.3	Prioritize and study the feasibility of district-scale flood protection.	Evaluation of district-scale flood defenses is initiated.	Evaluation is completed for highest-priority sites.	Evaluation of additional sites and continued implementation.
5.4	Launch a harbor-wide flood protection system feasibility study.	Evaluation of harbor-wide flood protection is initiated.		Decision on harbor-wide strategy is reached and, as needed, implementation launched.

Resilient Infrastructure
STRATEGY 6
Coordinate investments to adapt infrastructure to future climate conditions.

6.1	Establish an Infrastructure Coordination Committee (ICC).	ICC is launched.		
6.2	Continue to collect important asset and hazard data for planning purposes.	Data-sharing protocol is established.		
6.3	Provide guidance on priority evacuation and service road infrastructure to the ICC.	Priority evacuation and service roads are identified.		

Resilient Infrastructure
STRATEGY 7
Develop district-level energy solutions to increase decentralization and redundancy.

#	INITIATIVE	IMPLEMENTATION PERIOD		
		WITHIN 2 YEARS	WITHIN 5 YEARS	LONG-TERM
7.1	Conduct feasibility studies for community energy solutions.	Launch feasibility studies for community energy solutions at high-priority sites.	Implement community energy solutions at high-priority sites.	

Resilient Infrastructure
STRATEGY 8
Expand the use of green infrastructure and other natural systems to manage stormwater, mitigate heat, and provide additional benefits.

8.1	Develop a green infrastructure location plan for public land and rights-of-way.	Green infrastructure location plan is launched.		
8.2	Develop a sustainable operating model for green infrastructure on public land and rights-of-way.	New operating model is adopted by City.		
8.3	Evaluate incentives and other tools to support green infrastructure.	Evaluation of incentives is complete.		
8.4	Develop design guidelines for green infrastructure on private property to support co-benefits.		Design guidelines are set as regulation.	
8.5	Develop an action plan to expand Boston's urban tree canopy.	Canopy inventory is launched.	Canopy inventory is completed.	
8.6	Prepare outdoor facilities for climate change.		Adaptations are evaluated and prioritized across portfolio.	
8.7	Conduct a comprehensive wetlands inventory and develop a wetlands protection action plan.		Wetlands inventory is completed.	

Adapted Buildings

STRATEGY 9

Update building regulations to support climate readiness.

#	INITIATIVE	IMPLEMENTATION PERIOD		
		WITHIN 2 YEARS	WITHIN 5 YEARS	LONG-TERM
9.1	Establish a planning flood elevation to support zoning regulations in the future floodplain.	Analysis process initiated	Planning flood elevation is established for all development.	
9.2	Revise zoning code to support climate-ready buildings.	Review of zoning code launched.	Zoning changes are implemented.	
9.3	Promote climate readiness for projects in the development pipeline.	Notifications are sent to all permitted developments.		
9.4	Pursue state building code amendments to promote climate readiness.	Begin working with Commonwealth regarding building code amendments.		
9.5	Incorporate future climate conditions into area plans.	Standards are enacted as City policy for future plans.		

IMPLEMENTATION PERIOD

#	INITIATIVE	IMPLEMENTATION PERIOD		
		WITHIN 2 YEARS	WITHIN 5 YEARS	LONG-TERM
10.1	Establish a Resilience Audit Program for property owners.		Resilience audit program is launched.	
10.2	Prepare municipal facilities for climate change.	Priority buildings are identified.	Priority retrofits are begun.	Retrofits continue.
10.3	Expand back-up power at private buildings that serve vulnerable populations.		First tranche of back-up power installation completed.	Back-up power installation continues.
10.4	Develop toolkit of building retrofit financing strategies.		Toolkit of financing strategies is released.	
11.1	Evaluate the current flood insurance landscape in Boston.		Evaluation is completed.	
11.2	Join the NFIP Community Rating System.		City becomes active participant in CRS.	
11.3	Advocate for reform in the National Flood Insurance Program.		City begins advocacy for reforms that align with Boston's flood risks.	

Adapted Buildings

STRATEGY 10

Retrofit existing buildings against climate hazards.

Adapted Buildings

STRATEGY 11

Insure buildings against flood damage.