

PROACTIVE POLICY & PLANNING

Boston's Response to Climate Change

The BRA works in partnership with City agencies to prepare for climate change:

- **Public Engagement**
 - Boston Living with Water
- **Planning for Climate Change**
 - Imagine Boston 2030
 - Strategic Planning Areas
 - Municipal Harbor Plans
- **Design and Zoning**
 - Article 25: Flood Hazard District
 - Article 37: Green Buildings *and* Climate Change Preparedness and Resiliency Checklist
 - Article 80: Development Review and Approval



Spaulding Rehabilitation Center, Charlestown Navy Yard

PUBLIC ENGAGEMENT

BOSTON LIVING WITH WATER

INTERNATIONAL DESIGN COMPETITION

- Board Professional and Stakeholder Participation
 - Leading national / international practitioners
 - Cross sector experts
 - Public forums and exhibits
- Envisioning a future Boston
Thriving in the Face of Climate Change
 - 5' of sea level rise
 - Exploring solutions at three scales



Projected MHHW + 5' of sea level rise – Boston Redevelopment Authority

PLANNING FOR CLIMATE CHANGE



Emerging Ideas:



*preserve wisely,
enhance equitably, and
grow inclusively.*

Strategic Planning Areas



Carbon-Free / Climate-Ready

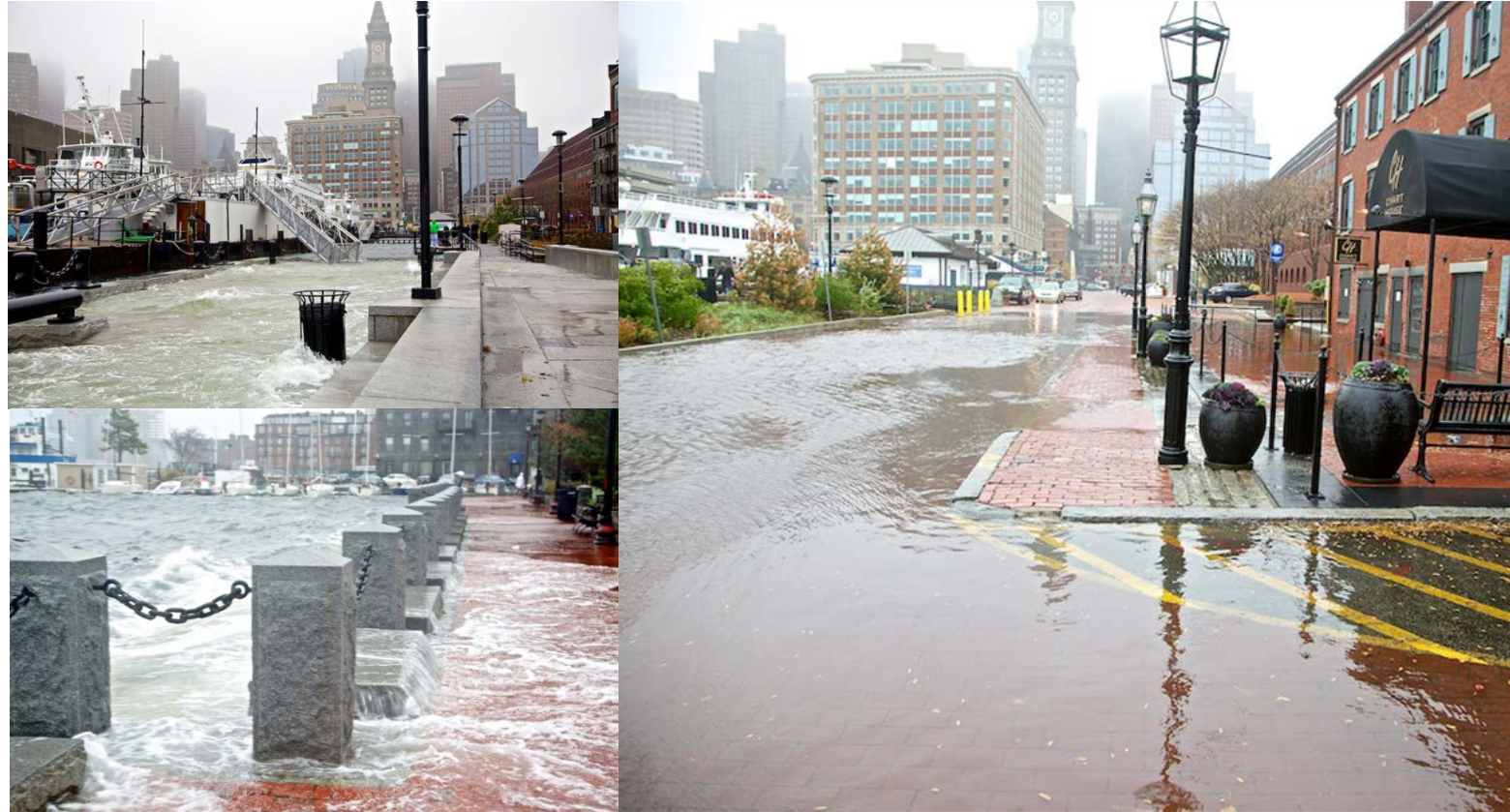
- Neighborhood & District Strategies – Compact Connected Communities
- Elevate public realm and buildings above flooding + sea level rise thru 2100
- LEED & Net Zero Carbon / Energy Buildings
- Social Resilience = Affordable Housing + Job / Business Opportunities

PLANNING FOR CLIMATE CHANGE

Downtown Waterfront

Draft Downtown Waterfront Municipal Harbor Plan includes four provisions to foster flood resilience:

1. Incrementally elevates open space
2. Improves resilience of interior public space
3. Allows additional building height for existing structures to incentivize flood-proof retrofits
4. Mandates evaluation of and information sharing on climate preparedness best practices



Photos: The Boston Harbor Association/Boston Harbor Now

PLANNING FOR CLIMATE CHANGE

Using Open Space to Enhance Resiliency

Emerging public realm and infrastructure strategies:

- Can aggregating open space along waterfront provide greater benefits as both a space to play and as a flood defense?
- How can public and private sectors partner given co-benefits?

*“Resilient Linkages: the Parks”
by NBBJ, Ground Inc., Haley & Aldrich, Inc.,
& Charles River Watershed Association*

*Boston Living with Water Design Competition
Honorable Mention*



ZONING FOR CLIMATE CHANGE

Article 37 Green Buildings *and* Climate Change Checklist

- Massachusetts ranks 5th Nationally for LEED Buildings
 - Market Driven Transformation / Regulatory Floor
 - All buildings over 50K SF must be LEED certifiable
- Consider present **AND** future climate conditions in assessing projects' environmental impacts
 - Elevate site & ground floor above flood levels
 - Plan for future site & building adaptations



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DESIGNING FOR CLIMATE CHANGE

Green Buildings *and* Climate Change Preparedness

General Electric Headquarters

- Mitigation: sustainable / efficient / green building
 - LEED Gold
 - Solar Veil = 10% of building's energy
- Adaptation: Present **AND** future climate conditions
 - Entire site elevated above flood plain
 - First floors raised for future sea level rise
 - Planned future adoptions



Credit: General Electric

DESIGNING FOR CLIMATE CHANGE

Elevating new developments

New developments are designing for expected sea level rise

- Stavis Seafood's proposed seafood processing and marine warehousing and industrial facility at the Massport Marine Terminal in the Raymond L. Flynn Marine Park
- Design flood elevation at approximately twelve feet above today's high tide
- Based upon expected 500-year-flood elevation in 2070 plus three feet



Photo: Landslides Aerial Photography

DESIGNING FOR CLIMATE CHANGE

Future Planning & Design

- Update and Amend Zoning
 - Establish building flood-proof elevation allowing added height for future adaption at ground floor
 - Allow building addition to incentivize Resiliency Retrofits
- Support PACE Financing
- Explore Resiliency Districts & policy for sharing of resiliency benefits and costs

Triple Decker
SMA Zone: AE
BFE: 1' from grade
Floodboard: 2'
DRE: 3' from grade

Existing Conditions: residential building w/ the basement

FEMA
Retrofitting strategies that are required or encouraged by FEMA and the VFP

Retro+
Retrofitting strategies that incorporate additional design recommendations

Abandon lower floor and use the space for storage and as a lobby. Use floodproof the first floor and use flood damage-resistance materials in that space. Install the basement and elevate mechanical systems to a floor above the BFE or to the roof.

Use the first floor space for secondary programming, including pop-up retail, indoor markets, an exhibition and performance, and community facilities and meetings. Add landscaping along the street level and on the roof. Add a lift to the roof to replace some of the square footage lost by abandoning the first floor.

Strategies eligible for MIP flood insurance reduction: upgrading basement, abandoning lower street floor, and floodproofing using flood openings.

Dry floodproof the first floor, up to the level of the DRE, and install sump pumps. Dry floodproof the mechanical room. Elevate the mechanical systems that are the easiest to move as a precaution. Install the easements. Work with an engineer to re-force structural systems in a situation of hydrostatic pressure.

Add landscaping along the street level. Install backup generators to power sump pumps during a blackout. Consider installing "backup measures," i.e. emergency lighting in residential hallways and stairwells, solar panels, and operable windows.

Infill the basement and move mechanical systems to the roof, or to a floor above the BFE.

Upgrade mechanical equipment to more resilient components. Relocate. Add landscaping to increase permeability and reduce runoff. Install "backup measures," which could include operable windows and toilets and faucets that don't require power to operate.

Strategies eligible for MIP flood insurance reduction: upgrading basement.

Strategies eligible for MIP flood insurance reduction: upgrading basement.

Credit: Adria Boynton, Harvard Graduate School of Design, BRA Community Serve Fellow