

RESILIENT HOTELS



The Colonnade Hotel Back Bay Boston



USGBC
MASSACHUSETTS

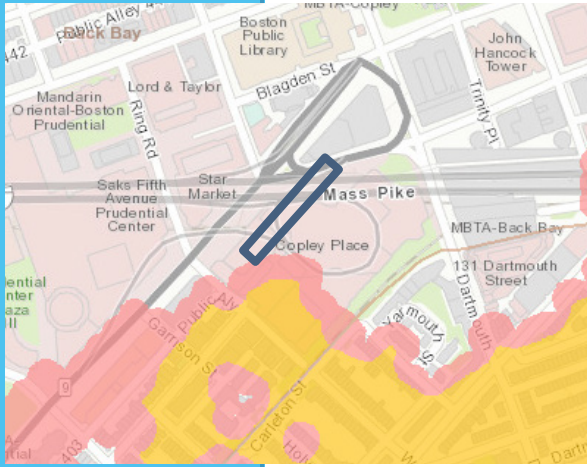
A guide for Boston hotels planning for climate resilience

YOUR OPPORTUNITY

According to the Urban Land Institute, resilience is defined as “the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.” With the release of the City of Boston’s Climate Ready Boston report, along with research from A Better City, the Resilient Design Institute, Boston Green Ribbon, and others, businesses and residences alike have the tools and resources to mitigate against and adapt to climate change. The hospitality industry must develop actionable resilience strategies that will ensure the safety and comfort of both guests and the larger community. Boston Harbor Now found that Superstorm Sandy could have flooded 6% of Boston in 2012 had it occurred at high tide. That projection increases five fold with rising sea levels and warmer temperatures. In advance of Greenbuild 2017, USGBC MA encourages you to understand your organization’s role in planning for and responding to events like those seen so recently in Houston and Tampa, and to join other climate leaders on the road to becoming *Climate Ready*.

YOUR NEIGHBORHOOD

The iconic Back Bay neighborhood was built on fill during the 19th century. A primarily residential area, Back Bay is particularly susceptible to sea level rise and flooding due to its low lying geography, which is four feet below today’s high tide. Mitigating the challenges of climate change while preserving the history of this region will require coordination, foresight, and planning. Acute stresses on this region will be most drastically felt towards the end of the 21st century, offering time for long-term planning that can allow for the practice and implementation of building and community resilient solutions. Consider one scenario from ULI’s “The Urban Implications of Living with Water” describing Storrow Drive as a canal for travel.



2070 100 Year Storm Water Depth

[Climate Smart Boston](#)
[GIS mapper](#)

Sea Level Rise

Boston is expected to see between **4”- 8”** sea level rise by **2030** and **7”- 1’6”** sea level rise by **2050**. ([Retrofitting Boston Buildings](#))

business as usual green house gas emissions could cause seas to rise by as much as **7ft** by **2100**.

Extreme Precipitation

Between 1958 and 2010, precipitation on the heaviest rainy days increased by **70%**.

Warming temperatures allows air to hold more moisture, creating heavier rain events. Such effects are already being seen in Louisiana and Texas.

Coastal Storms

Nor’easters and hurricanes will intensify with climate change, bringing large storm surges and more precipitation.

Vulnerability from Coastal Storms will be caused by precipitation and flooding from the Charles River and the Fort point channel.

Extreme Heat

Average temperature for Boston from 1981 to 2010 was **69°F**. By 2100 it could be **84°F**.

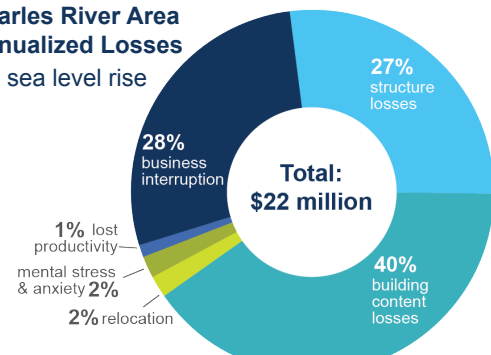
11 days per year were over 90°F between 1971 and 2000. By 2070, there could be **90 days** over 90°F.

Energy Demand

Access to local energy during acute stresses to the traditional power grid will help improve the reliability of your building’s critical infrastructure and needs, such as emergency lighting and cooling, as well as occupant safety and comfort. Adding renewable and/or alternative energy sources such as solar PV, combined heat and power (CHP), and energy storage, complimented by investments in energy conservation and efficiency, will make your building more resilient during severe weather events and power outages. As described in the Boston Community Energy Study (BPDA, 2016), Boston will target on-site power generation for 15% of the City’s energy use and 10 MW of solar PV.

Charles River Area Annualized Losses

36” sea level rise



Annualized losses and climate data from [Climate Ready Boston](#)

RESILIENT SOLUTIONS

The Back Bay has opportunities to create effective and holistic resilience planning and development strategies as climatic stresses are not expected to intensify until later in the century. According to the Climate Smart™ Boston tool developed by the Trust for Public Land, the Back Bay will benefit most from implementing its ‘cool, absorb, protect, and connect’ criteria. These solutions, described in more detail below, address the risks that threaten your organization most. These resiliency strategies will also provide critical mutual support and co-benefits for Boston and the iconic Back Bay neighborhood as a whole. Click [here](#) to visit the Trust for Public Land portal.

Every \$1 spent on resilient mitigation returns over \$4 of benefits.
Multi-hazard Mitigation Council (2006).

OVERVIEW

LEED

COSTS|CASE STUDIES

RESOURCES

COOL

The Colonnade Hotel is a long hotel spanning almost a block of Massachusetts Ave. Because of its impervious surface footprint- i.e., concrete, roofing, asphalt- strategies such as white roofing or green roofing, cool paving from light colors, and increased ground level vegetation can help to reduce the effects of heat island and extreme temperatures.

Pursuing materials that have high solar reflectance values can provide LEED credits in the urban heat island category for LEED BD+C: Hospitality.

ABSORB

The hotel’s large footprint increases its need to added pervious surfaces. Pervious pavers, bioswales & rain gardens, and green roofs can manage heavy rainfall and flooding when combined sewer systems are under stress. These systems can also be designed to harvest rain water, offsetting potable water usage for non potable uses- e.g., washing machines, toilets, irrigation.

Permeable pavers and bioinfiltration can help achieve LEED points in rainwater management. They can also be paired with other categories (e.g., open space, heat island, outdoor water use) for greater effect.

PROTECT

Where possible, protect valuable mechanical equipment from potential flooding events by elevating systems above the first floor. If relocating equipment is not feasible, seek opportunities to dry floodproof rooms and/ or critical equipment with temporary or permanent barricades. Though not currently located in a floodable zone, climate change has created climatic uncertainty, and having a strategy in place will protect from unforeseen events.

Innovation credits and new resilience pilot credits for floodproofing measures can be attained through LEED’s Integrative Design section, as described [here](#).

CONNECT

The best method for decreasing the risks of climate change is by preemptively lowering its effect through green house gas reduction strategies. Linking visitors with public transportation, offering discounts for ride- and bicycle-sharing, and by offering rental bicycles can help reduce visitors green house gas production. Provide shower facilities for hotel staff and short- and long-term storage for guests and staff.

Focusing on multi-modal transportation networks can earn points towards Regional Priorities for the Boston area, green vehicles, reduced parking footprint, and bicycle facilities.

Extensive Green Roof:
\$5-25 per sqft.

Intensive Green Roof:
\$25-40 per sqft.

Green Roof Maintenance:
\$0.75-\$1.5yr

Low Slope Cool Roofing:
Membrane \$1.50-\$3 per sqft.

Permeable Concrete Pavers: \$2.5-\$10per sqft.

Pervious Concrete: \$2- \$6.50 sqft.

Porous Asphalt: \$0.50-\$2.5 sqft. ~10-15% more expensive than conventional asphalt

Bioretention: \$2.22-\$30 sqft.

Flood Shields (temporary watertight barriers): \$180-250 per ft of width.

Elevating Mechanical Equipment: \$1m-\$20m depending on structural reinforcement.

Case Studies:

- Fontainebleau Hotel [Link](#)
- Atlantic Warf [Link](#)
- Cuisinart Center for Culinary Excellence [Link](#)
- Spaulding Rehabilitation Hospital [Link](#)

Cost estimates from *A Better City’s Building Resilience Toolkit*

Building Resilience in Boston (Best Practices):
[Link](#)

ULI Living with Water:
[Link](#)

Funding: MassSave
[Link](#)

Commercial Tax Deduction
[Link](#)

ORGANIZATIONS

- USGBC MA Chapter:** www.usgbcma.org
- Urban Land Institute Boston:** www.boston.uli.org/
- Boston Green Tourism:** www.bostongreentourism.org
- Greenovate Boston:** www.greenovateboston.org/
- Boston Green Ribbon:** www.greenribboncommission.org/
- LinneanSolutions:** <https://www.linneansolutions.org>
- Resilient Design Institute:** <https://www.resilientdesign.org>
- A Better City:** <http://www.abettercity.org/>

