



The Hilton DoubleTree Downtown



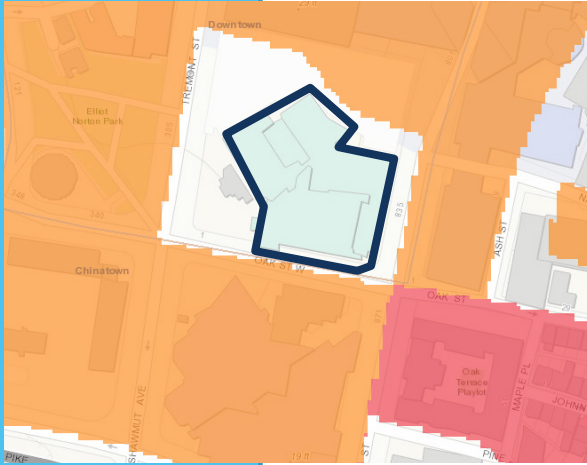
A guide for Boston hotels planning for climate resilience

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

Downtown Boston is a commercial and business hub within the City, with relatively fewer residential dwellings. New development, however, is diversifying the area with more mixed use and residential buildings. A large percentage of vulnerable populations— primarily, low income and linguistically isolated households— live within or near this neighborhood. According to Boston Harbor Now’s report, “Preparing for the Rising Tide,” 2.2 million square feet of existing area in Downtown Boston is susceptible to flooding during today’s 100-year storm event. Because of this, your organization has a role in creating a resilient network within the community that can help aid recovery for the most at-risk populations during and after a disaster.



- hotel site
- moderate priority
- moderate to high priority
- high priority

Vulnerable Communities

This area has a large percentage of vulnerable populations

[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](#))

1/3 of citywide annualized losses in the near term are expected to occur in the Downtown district

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.

36% of buildings in downtown Boston are at risk of flooding from a **10%** annual flood event with **36”** of sea level rise.

Extreme Heat

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

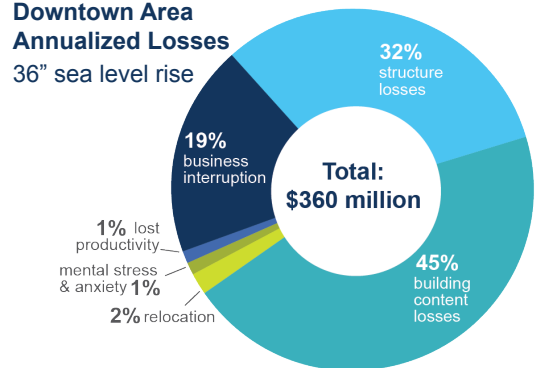
11 days per year were over 90°F between 1971 and 2000. By 2070, there could be **90 days** over 90°F.

Energy Demand

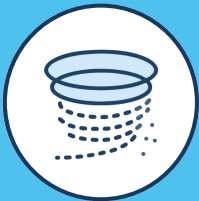
Access to local energy during acute stresses to the traditional power grid will help improve the reliability of your building’s critical infrastructure and needs, such as emergency lighting and cooling, as well as occupant safety and comfort. Adding renewable and/or alternative energy sources such as 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.

Downtown Area Annualized Losses

36” sea level rise



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



RESILIENT SOLUTIONS

The Downtown district’s vulnerability to flooding make it necessary to begin the development and implementation of a resilience plan that can both address infrastructural and social needs. 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 Downtown district 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 DoubleTree Hotel is currently not located in a “cool” priority zone; however, actions taken to mitigate urban heat island effect can have a larger impact on the greater region. If possible, opportunities to add vegetation like street trees, bioswales, and green roofs should be taken. Not only can they reduce ambient air temperatures, but they can also add scenic value and relaxation for guests.

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

- 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.

- Building Resilience in Boston (Best Practices):** [Link](#)
- ULI Living with Water:** [Link](#)
- Funding:** MassSave [Link](#)
- Commercial Tax Deduction** [Link](#)

ABSORB

Flood mitigation can be achieved through implementing various absorption and collection strategies. Rain catchment can be implemented to store and recycle water falling on-site. Pervious surfaces (e.g., permeable pavers, rain gardens, green roofs, permeable concrete) can allow for water to be infiltrated into the soil before it can be channeled into a potential stressed drainage system.

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.

- 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.

- 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/>

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. Dry floodproofing will be effective for this area because the site will not be regularly exposed to the effects of sea level rise until much later in the century or beyond.

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

- Flood Shields** (temporary watertight barriers): \$180-250 per ft of width.
- Elevating Mechanical Equipment:** \$1m-\$20m depending on structural reinforcement

CONNECT

The Doubletree’s location in the Downtown district make it centrally located to many attractions. 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.

- Case Study:** 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*

