Roxbury

71,600
CURRENT RESIDENTS

10,000
BUILDINGS

24,800
JOBS

$4.2 Billion
ANNUAL ECONOMIC OUTPUT

ROXBURY TODAY

Roxbury, at the geographic center of Boston, began as a farming town on the outskirts of Boston and then transitioned to industrial and residential uses in the early nineteenth century. In the early twentieth century, Roxbury experienced waves of immigration, and in the 1940s and 1950s, it became a center for African Americans migrating from the American South.

Today Roxbury is home to a diverse community. Roxbury is a center for families, with more households with children under five than any neighborhood in Boston. In addition, compared to other neighborhoods in the city, Roxbury has disproportionately high concentrations of people of color, low- to no-income residents, and people with disabilities.

Today, Roxbury has almost 28,000 housing units, about half of which are subsidized housing, and about 400 new units under construction or approved. Roxbury has active neighborhood groups who engage the community in both development and preservation efforts. Roxbury has over 24,000 jobs concentrated in the healthcare, local government, and education sectors. Roxbury Community College and Boston Public Schools are key neighborhood employers. However, many of Roxbury's lower-income residents work in service industry jobs and may depend on public transit to commute to jobs all over the city and region. Dudley Square has long been a commercial hub for the area and serves as a transit hub for a number of MBTA buses and the Silver Line.

While Roxbury includes several parks that offer residents substantial green space, including Franklin Park, its status as a dense, urban neighborhood with a lack of tree coverage in some areas contributes to urban heat island effect. Its inland location away from cooling coastal breezes also adds to higher summer temperatures. Heat island analysis reveals that Roxbury has some of the hottest daytime temperatures in the City of Boston during summer months.

22,000
OLDER ADULTS & CHILDREN*

29%
LOW-TO-NO INCOME RESIDENTS

950
BUILDINGS EXPOSED TO STORMWATER FLOODING**

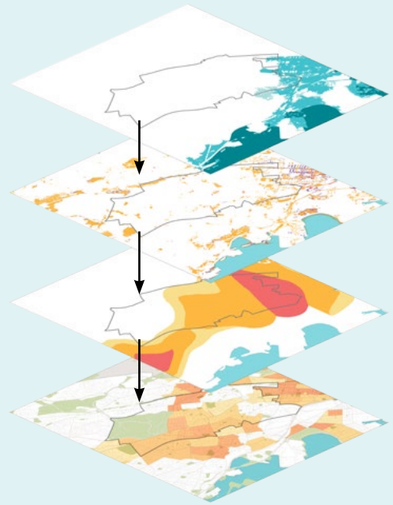
180 acres
LAND AREA FLOODED BY STORMWATER**

*HEAT VULNERABLE **LATE CENTURY SCENARIO

ROXBURY IMPACTS & RISK FACTORS

Image Source: Roxbury Historical Society

Roxbury, like many neighborhoods in Boston, is at the convergence of several future climate hazards and vulnerabilities.



CLIMATE HAZARDS

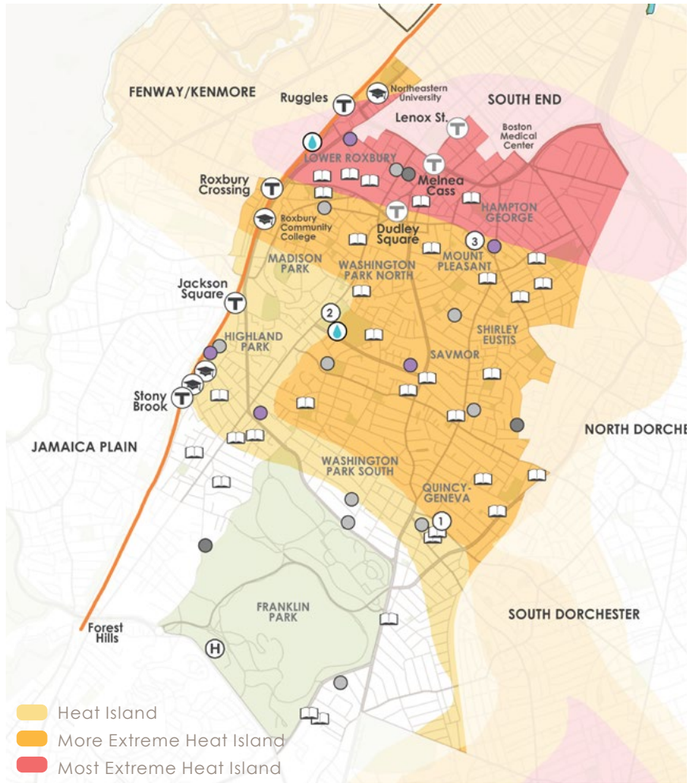
Roxbury faces multiple vulnerabilities and is exposed to coastal and stormwater flooding and extreme heat.

Roxbury has some of the highest poverty rates in all of Boston.

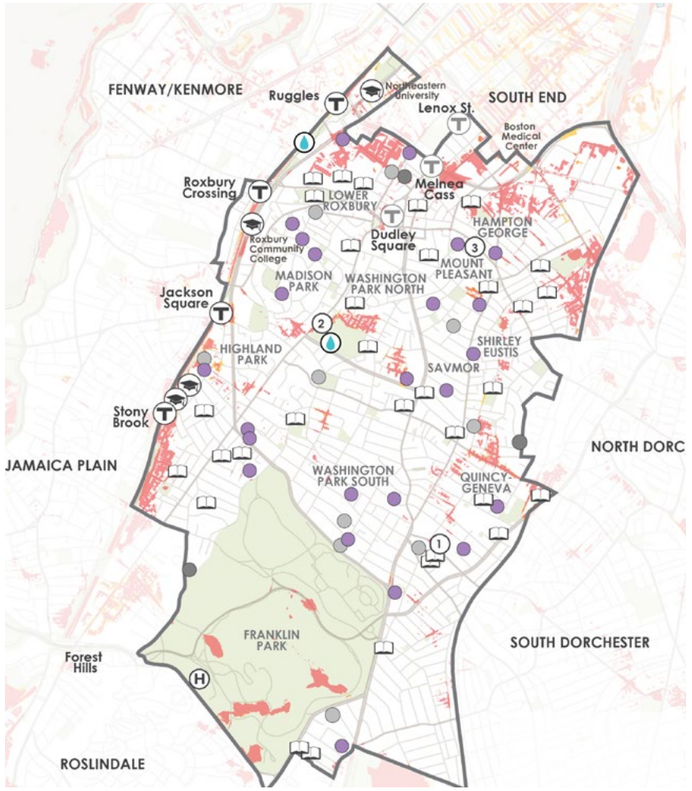
Roxbury's road infrastructure faces significant risk for disruption by stormwater flooding in a 10 year, 24 hour storm in the future.

180 acres of land (6% of total land area) are at risk for flooding in the long-term.

URBAN HEAT ISLAND - 2015



SOCIAL VULNERABILITY OVERLAP



LEGEND

- MBTA Silver Line Station
- MBTA Station
- Roads
- Major Roads
- Evacuation Routes
- Parks
- Roxbury Boundary
- School
- College or University
- Hospital
- Health Clinic
- Grove Hall Community Center
- Shelburne Community Center
- Vine Street Community Center
- BHA Public Housing
- Senior Housing
- DCR Spray Deck or Pool

Roxbury faces risk from several climate hazards. **Today and in the future, stormwater flooding can cause damages and nuisances that create localized challenges for neighborhood mobility and function, and extreme heat endangers residents with vulnerable health.** With 36 inches of sea level rise, coastal storm flooding could reach areas north of Melnea Cass Boulevard

As average temperatures and frequency of heat waves rise in the future, people across Boston will need to seek relief from dangerous extremes more often. Roxbury is one of the **neighborhoods that experience some of the hottest temperatures in the city during summer months.** Lack of tree canopy, a high percentage of impervious surface, and lack of coastal breezes contribute to heat island effect in the neighborhood. Within the heat island areas live many concentrations of populations that are vulnerable to heat including older residents and children.

Roxbury is at risk for stormwater flooding; even today the drainage system can be overwhelmed by heavy rains. More frequent intense storms will cause this type of flooding to increase. The Lower Roxbury and Hampton George areas are expected to experience significant flooding in low-lying areas. Key areas of potential impact include the northern edge of Malcom X Park in Washington Park North as well as the area north of King Towers Public Housing on MLK Boulevard.

Areas on both sides of Melnea Cass Boulevard and surrounding Boston Medical Center are also anticipated to experience stormwater flooding in a 10 year, 24 hour storm. However, this flooding analysis evaluates capacity of the existing drainage system; BWSC is upgrading pipes and expanding system capacity, which will reduce the expected flooding.

EXPOSURE & CONSEQUENCES
PEOPLE

Roxbury's population faces multiple vulnerabilities

Roxbury has a richly diverse population; 83% of residents are people of color, the second highest concentration of people of color in the entire city and much higher than Boston as a whole. The vast majority of the population of this neighborhood falls into at least one vulnerable category and most fall into several categories described below.

Roxbury is a stressed neighborhood in many ways. Lack of high quality transportation and fewer redundancies in transportation options in many areas of the neighborhood can strain Roxbury's households in getting to and from employment and in accessing healthcare resources. The Orange Line runs along the neighborhood's western border and the Silver Line provides high quality service to Dudley Square; however, heavy rail or rapid bus service does not penetrate into the southern portions of the neighborhood. Much of Roxbury is also designated as a food desert by the USDA[1] which creates challenges in accessing healthy food and supplies on a daily basis and for sheltering in place in a climate event.

Roxbury has high concentrations of vulnerable populations, but also many community organizations and non-profits that serve residents. Several Boston Centers for Youth and Families (BCYF) connect residents to resources and information and act as cooling centers. Community development corporations advocate for the neighborhood and develop affordable housing. These organizations help supplement the resource network for residents who have special needs and vulnerabilities and enhance resilience in the community in hazard events

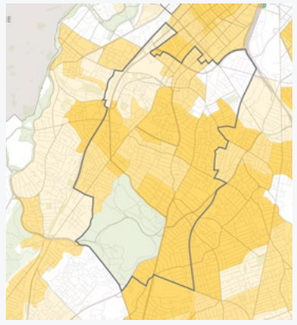
ROXBURY STATISTICS			
TOTAL POP	71,600	% ROXBURY	% BOSTON
OLDER ADULTS	5,800	8%	10%
CHILDREN	16,690	23%	17%
PEOPLE OF COLOR	59,160	83%	52%
LIMITED ENGLISH	11,400	16%	15%
LOW-TO-NO INCOME	27,690	39%	28%
MEDICAL ILLNESS	24,010	34%	37%
DISABILITY	10,420	15%	11%

[1]Source: USDA Economic Research Service-Food Access Research Atlas

VULNERABLE POPULATIONS

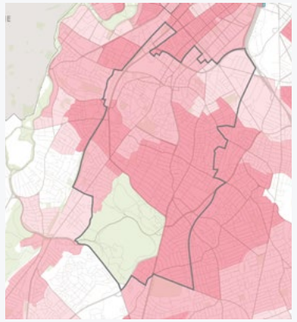
OLDER ADULTS

Roxbury has a lower percentage (8%) of older adults than the city at large (10%), but has ten senior housing developments and three nursing homes within the neighborhood. Care should be taken to educate seniors who live in these developments about the risks of hot weather to their health and to ensure all developments have adequate air conditioning. Shady outdoor locations like public parks can also provide respite during hot days.



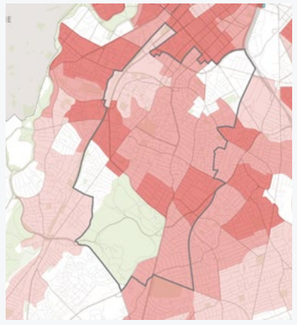
CHILDREN

Roxbury has a relatively high concentration of children; 23% percent of households have at least one child under 5 years old. Children are at risk to the stress of hot temperatures if they do not have adequate access to air conditioned spaces or green spaces to help stay cool. Children also suffer the mental stress of other flooding and other emergencies more than adults. Many children in Roxbury are already bearing the stress of living in an under resourced neighborhood.



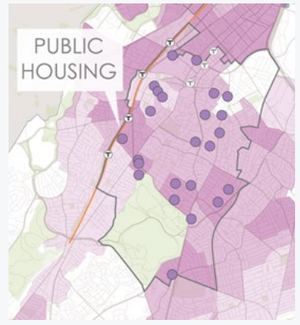
PEOPLE OF COLOR

Roxbury's population is 83% people of color. 35% of residents are black, and the neighborhood is also home to significant Hispanic (22%) and Asian (9%) populations. Roxbury is a rich confluence of many different cultures, but also faces a legacy of racial inequities.



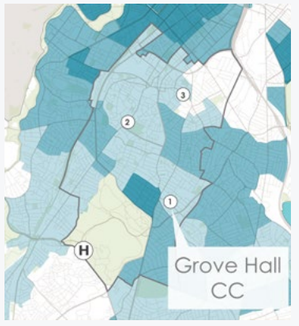
LIMITED ENGLISH

Over 11,000 residents (16% of Roxbury's population) have limited English proficiency and may need targeted information campaigns to increase awareness about climate risks. These residents are fairly spread out throughout the neighborhood. Among those with limited English proficiency, the most common languages spoken are Spanish or Spanish Creole (24%), Chinese (10%), African languages (4%) and Portuguese (3%).



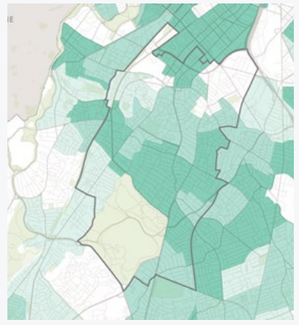
LOW-TO-NO INCOME

39% of Roxbury's population is low-to-no income, and Roxbury has five public housing developments, including the King Towers (100 units) which is projected to experience stormwater flooding from a 10 year, 24 hour storm as early as 2030. Low income residents dependent on public transportation in southern areas of the neighborhood are only served by buses. HUD housing projects as a policy do not include air conditioning in housing units, which increases health risks in a heat wave.



MEDICAL ILLNESS

Medically ill residents in Roxbury may have symptoms worsened by the physical stress of a heat wave. The Washington Park South area has a very high concentration of medically ill. For residents without air conditioning, the cooling center at Grove Hall Community Center is likely the most convenient center. The entire census tract that has the highest concentration of medically ill is within a 3/4 mile radius of the cooling center.



DISABILITIES

15% of Roxbury's population has a disability. That is over 10,000 people who may find it more difficult to evacuate or seek shelter in an extreme weather event (like the 2014 snow storms). Many of this population already face mobility challenges that could be worsened by stormwater flooding on sidewalks. Concentrations are fairly evenly distributed across Roxbury.

Source: USDA Economic Research Service-Food Access Research Atlas

EXPOSURE & CONSEQUENCES

DEFINITIONS

Near-term: Beginning 2030s, assumes 9 inches of sea level rise

Mid-term: Beginning 2050s, assumes 21 inches of sea level rise

Long-term: Beginning 2070s or later, assumes 36 inches of sea level rise
Exposure: Can refer to people, buildings, infrastructure, and other resources within areas likely to experience hazard impacts. Does not consider conditions that may prevent or limit impacts.

Vulnerability: Refers to how and why people or assets can be affected by a hazard. Requires site-specific information.

Consequence: illustrates to what extent people or assets can be expected to be affected by a hazard, as a result of vulnerability and exposure. Consequences can often be communicated in terms of economic losses .

Annualized losses: The sum of the probability-weighted losses for all four flood frequencies analyzed for each sea level rise scenario. Probability-weighted losses are the losses for a single event times the probability of that event occurring in a given year.

*For a full list of definitions, refer to the Glossary in the Appendix.

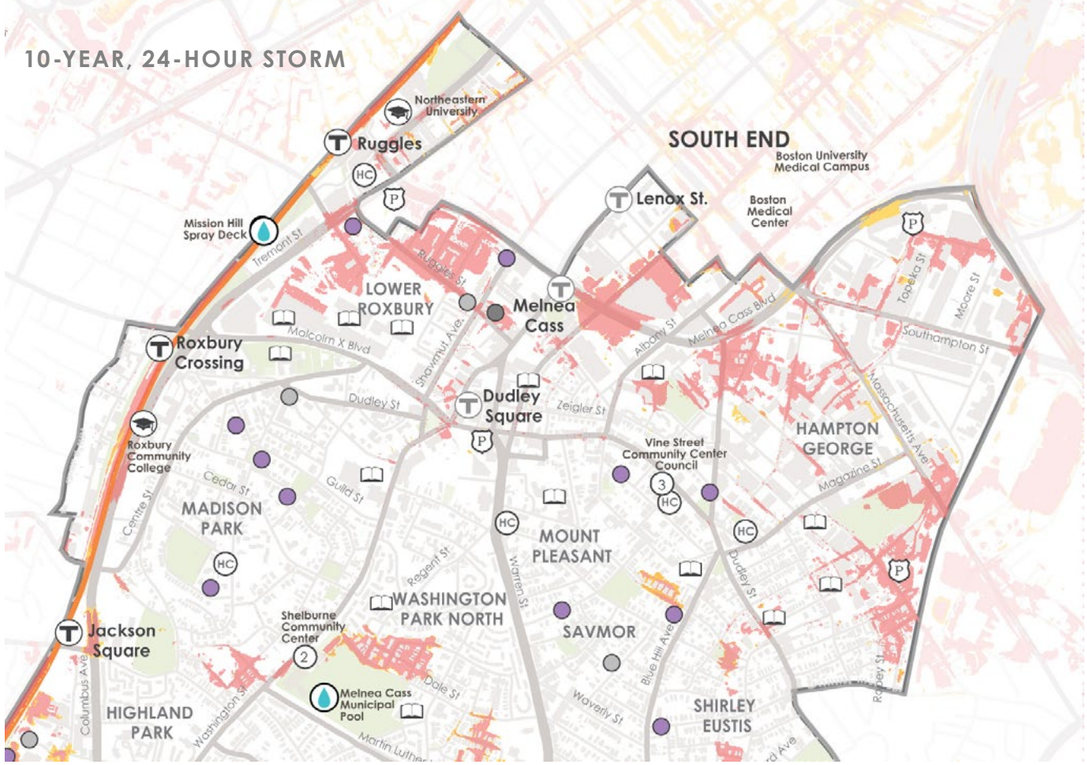
Road disruption by stormwater flooding threatens neighborhood mobility; residential structures face the greatest exposure to flooding

Road flooding can be caused by even a few inches of rain in a short period and can block access to services, force businesses to close, and leave cars and transit riders stranded. Furthermore, flooded roads can be a safety risk when cars attempt to cross flooded areas and become stranded. **Melnea Cass Boulevard is already impacted today in heavy rains and is projected to experience significant flooding at the intersection with Harrison Ave and onto South Bay Harbor Trail.** South of Melnea Cass Boulevard, Hampden and Gerard Streets are also at risk. Melnea Cass flooding will also impact the BWSC headquarters and fueling center.

Projected road flooding impacts several bus routes on Massachusetts Avenue and Melnea Cass Boulevard. Dale Street adjacent to Malcom X Park serves as the access road for the Sojourner House food pantry and could be blocked in a flooding event.

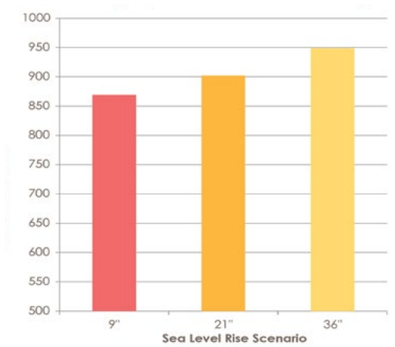
The Amtrak/MBTA rail lines between Tremont and Columbus Avenue are exposed to flooding. The rail lines serve the Amtrak Shore Line and the Orange Line. **Suspended service or lack of access to transit could have serious consequences for Roxbury residents who may not be able to get to work or access healthcare; it also hurts businesses in the area.**

The majority of stormwater impacts to buildings. occur in residential buildings. Stormwater flooding could have strong impacts on indoor air quality from mold, with potential to exacerbate asthma and other health risks. Stormwater flooding is also projected in areas where new development is proposed, including a Northeastern University property slated for new student housing and commercial buildings between Tremont and Columbus Avenue southwest of Douglass Park.

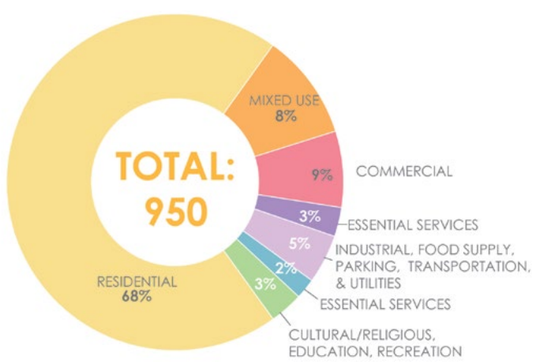


Flood progression into Roxbury takes place through the South End and is described within the vulnerability assessment for that focus area.

BUILDINGS EXPOSED TO STORMWATER FLOODING



ROXBURY BUILDING EXPOSURE TO STORMWATER FLOODING BY TYPE

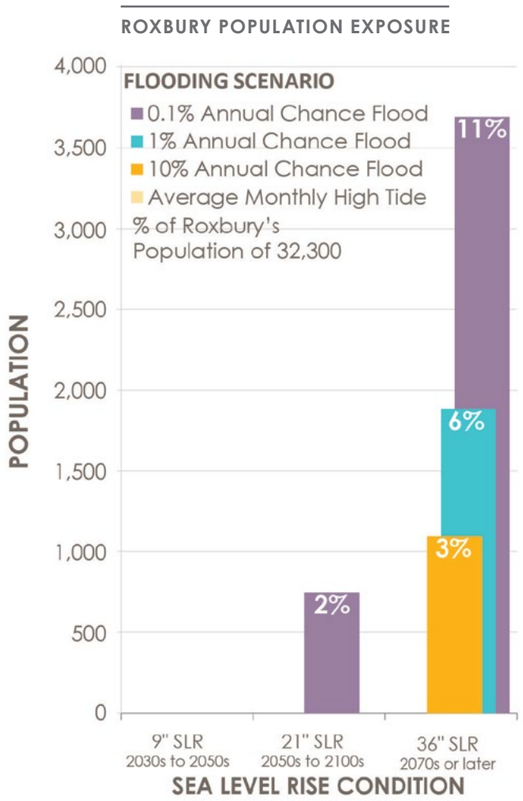


EXPOSURE
POPULATION & INFRASTRUCTURE

POPULATION AND SOCIAL VULNERABILITIES

Roxbury's population is not expected to be exposed to coastal flooding until a very low probability event (0.1 percent annual chance) mid-century. Nevertheless, exposure increases significantly later in the century, and rises to over 1,800 persons currently living in areas exposed to the 1 percent annual chance event. Roxbury's current shelter capacity is 1,300 persons across eight shelters.

Roxbury's population remains largely unexposed to coastal flood impacts until later in the century. The focus area is consistently among the least exposed in terms of land area, population, and buildings when compared to other neighborhoods.



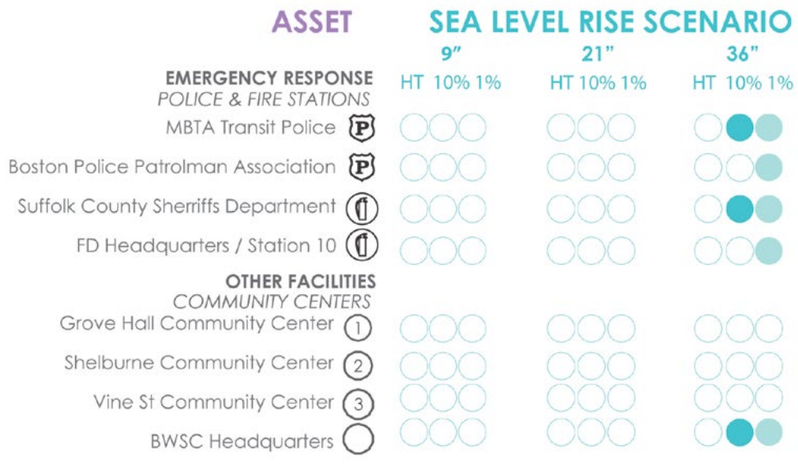
INFRASTRUCTURE

Damage to exposed roads and the MBTA Red Line could isolate Columbia Point from the rest of Dorchester, and impact transportation connections to North Quincy.

The Boston Water and Sewer Commission (BWSC) Headquarters, located in the northern portion of Roxbury, will be exposed to high-probability flooding later in the century (10 percent annual chance event). As a critical facility, BWSC Headquarters employs system redundancies. Notwithstanding backup power supply, loss of power to the structure would disable all computerized systems , including work order management, and major building functions such as vehicle fueling. Such functionality disruptions at the Headquarters building may result in delayed repair of BWSC assets throughout Greater Boston.

Facilities which support Roxbury's police and fire services are exposed to sea level rise and coastal storms.

In northern Roxbury, the Suffolk County Sheriff, MBTA Transit Police Headquarters, and two of three fire stations are exposed to the high-probability storms expected by later in the century (10 percent annual chance event).



EXPOSURE AND CONSEQUENCES
BUILDINGS AND ECONOMY

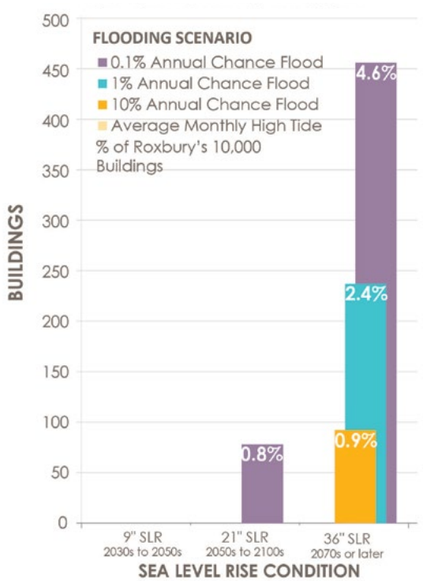
RISK TO BUILDINGS

Almost 80 structures in Roxbury are expected to be exposed to mid-century coastal flooding for the 0.1 percent annual chance event. This number increases to 450 buildings exposed to high-probability flooding later in the century (1 percent annual chance event). Of the buildings exposed later in the century, 40 percent of them are residential or mixed-use in nature, followed by commercial buildings (20 percent). Though these buildings are only a fraction of Roxbury's total building stock, the neighborhood can still expect over $30 million in annualized damage to buildings and other related costs with 36 inches of sea level rise.

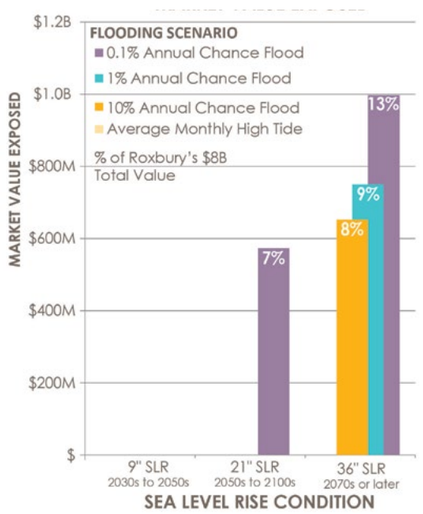
RISK TO THE ECONOMY

Dorchester provides Boston with close to 35,000 jobs and over $7 billion in annual output. Top employers in the community include public education, hospitals, and grocers, though no one industry seems to dominate. The economy is heavily service-oriented. As with other service-oriented neighborhood economies, restaurants are expected to be most heavily impacted in a flood event, particularly considering expected loss of employment. This is expected to be the case throughout the century. By late-century, coastal flood impacts to Dorchester are expected to result in 110 annualized jobs lost and about $15 million in annualized output loss to the current Boston economy. Restaurants are expected to comprise roughly 40 percent of job loss and 20 percent of output loss. Restaurants tend to employ low- to moderate-income personnel, and business interruption to such assets can exacerbate impacts to already vulnerable populations.

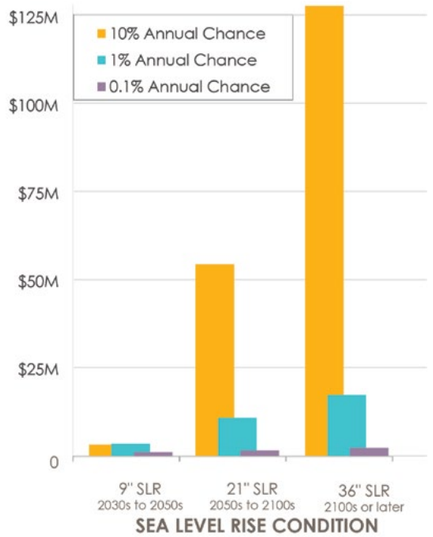
ROXBURY BUIILDINGS EXPOSURE



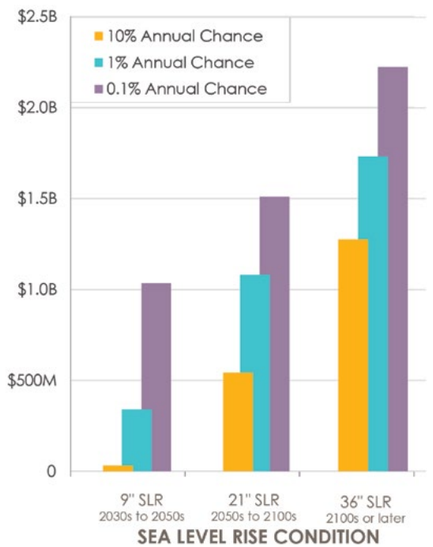
ROXBURY REAL ESTATE MARKET VALUE EXPOSURE



ROXBURY ANNUALIZED LOSSES



ROXBURY ECONOMIC LOSSES

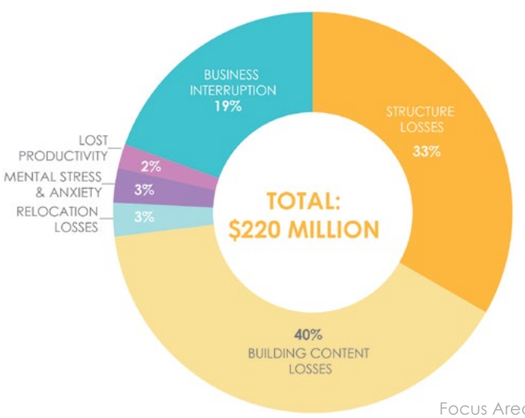


ECONOMIC RISK ASSUMPTIONS

Job and output loss includes direct, indirect, and induced consequences of flood impacts. Direct results are impacts felt within a neighborhood, while indirect and induced results are those expected to be felt throughout Suffolk County as a result of changes in spending patterns. Results for both job and output losses are the sum of annualized values for the four flood frequencies analyzed for each sea level rise scenario. This represents a lower-bound estimate for several reasons. First, not all probabilistic events are considered. Second, the analysis assumes that all impacted businesses eventually reopen, though FEMA estimates that almost 40 percent of small businesses—and up to 25 percent of all businesses—never reopen after experiencing flood impacts. Third, only building areas directly impacted by floodwater are assumed to experience business interruption. This does not consider interruptions of businesses due to loss of power or utility functions. Finally, the analysis only considers existing populations, businesses, and buildings and does not include projections for future growth. Refer to the Appendix for a more detailed explanation of the exposure and consequence analysis.

INDUSTRY	ANNUALIZED LOSS OF ECONOMIC OUTPUT
Restaurants	$442,000
Healthcare and medical services	$188,000
Real estate	$98,000
Other industries	$672,000
Total	**$1,400,000**

EAST BOSTON ANNUALIZED LOSSES
36 INCH SEA LEVEL RISE CONDITION



ROXBURY
APPLICATION OF RESILIENCE INITIATIVES

PROTECTED SHORES

PRIORITIZE AND STUDY THE FEASIBILITY OF DISTRICT-SCALE FLOOD PROTECTION

To reduce the risk of coastal flooding at major inundation points, the City should study the feasibility of constructing district-scale flood protection at the primary flood entry points for Roxbury (see Potential Flood Protection Locations below for a preliminary identification of locations and potential benefits). As described below, flood protection systems that would benefit Roxbury would likely be located outside of Roxbury, in South Boston, Dorchester, and by the New Charles River Dam.

These feasibility studies should feature engagement with local community stakeholders, coordination with infrastructure adaptation, and considerations of how flood protection would impact or be impacted by neighborhood character and growth. Examples of prioritization criteria include the timing of flood risk, consequences for people and economy, social equity, financial feasibility, and potential for additional benefits beyond flood risk reduction.

POTENTIAL DISTRICT-SCALE FLOOD PROTECTION LOCATIONS[2]

See the District-Scale Flood Protection Systems Overview section (p.330) for a citywide perspective on district-scale flood protection. District-scale flood protection is only one piece of a multilayered solution that includes prepared and connected communities, resilient infrastructure, and adapted buildings.

[2]These preliminary coastal flood protection concepts are based on a high-level analysis of existing topography, rights-of-way, and urban and environmental conditions. Important additional factors, including existing drainage systems, underground transportation and utility structures, soil conditions, zoning, as well as any potential external impacts as a result of the project have not been studied in detail. As described in Initiatives 5-2 and 5-3 (see pp. 106,110), detailed feasibility studies and appropriate public and stakeholder engagement are required in order to better understand the costs and benefits of flood protection in each location.

In the near term, coastal flood risk in Roxbury is minimal and likely does not require district-scale flood protection.

As soon as the 2050s, the northern edge of Roxbury will be exposed to flooding from Fort Point Channel and other inland flood pathways, so combined flood protection at multiple locations will be critical:

- At the **South Boston Waterfront,** addressing inland flood pathways originating from Fort Point Channel, Boston Harbor, and the Reserve Channel
- At **Dorchester Bay,** addressing inland flood pathways originating from the Old Harbor and Savin Hill Cove
- At the **New Charles River Dam,** addressing potential overtopping or flanking of the dam

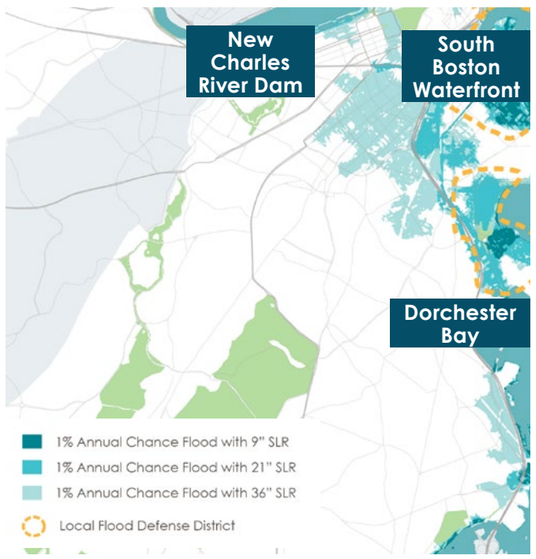
SLR SCENARIO	DISTRICT SCALE FLOOD PROTECTION FOR 1% ANNUAL CHANCE FLOOD[3]
9" SLR (2030s–2050s)	None
21" SLR (2050s–2100s)	The South Boston Waterfront and Dorchester Bay locations combined
36" SLR (2070s or later)	The New Charles River Dam, South Boston Waterfront, and Dorchester Bay locations combined

LOCATIONS

- **The South Boston Waterfront location,** described in the South Boston focus area (see p. 282), addresses flood entry points along the edge of the district.
- **The Dorchester Bay location,** described in the Dorchester focus area (see p.194), addresses flood pathways from the Old Harbor and Savin Hill Cove.
- **The New Charles River Dam location,** described in the Charles River and Downtown focus areas (see pp. 174, 216), addresses potential overtopping or flanking of the dam.

DETAILED CONSIDERATIONS

- Flood protection at multiple locations likely required to accommodate later-century flood event scenarios: Late century, flood protection solutions at the South Boston Waterfront and Dorchester Bay may not be independently effective for the 1 percent annual chance event and events with lower probability of occurrence and may require an intervention at the New Charles River Dam to impede flooding from the Charles River. While investments at all three locations may be significant, losses avoided are expected to be substantial because an integrated system could protect Downtown, South Boston, Dorchester, the South End, Roxbury, and neighborhoods along the Charles River.



[3]Additional flood protection may be required for flood events more severe than the 1 percent annual chance flood. See Appendix for more detailed information on expected effectiveness of flood protection systems, including analysis of additional flood protection locations and flood frequencies.

PREPARED & CONNECTED COMMUNITIES

CONDUCT AN OUTREACH CAMPAIGN TO PRIVATE FACILITIES THAT SERVE VULNERABLE POPULATIONS TO ENSURE THAT THEY ENGAGE IN EMERGENCY PREPAREDNESS AND ADAPTATION PLANNING

The City should conduct outreach to managers of facilities in Roxbury that serve significant concentrations of vulnerable populations and are not required to have operational preparedness and evacuation plans under current regulations. The City will inform these facilities about the need to prepare for climate change impacts, especially stormwater flooding and extreme heat in the near term. Targeted facilities will include affordable housing complexes, substance abuse treatment centers, daycare facilities, food pantries, small nonprofit offices, and others. Illustrative examples of the types of Roxbury facilities to which the City might conduct outreach include the American Red Cross/Boston Pantry, the Sojourner House Food Pantry, and Tartt's Day Care Center.[4]

EXPAND BOSTON'S SMALL BUSINESS PREPAREDNESS PROGRAM

The City should reach out to small businesses in Roxbury that are exposed to stormwater flooding in the near term to help them develop business continuity plans, evaluate insurance coverage needs, and identify low-cost physical adaptations. In particular, the City will reach out to businesses along Melnea Cass Boulevard, which experiences stormwater flooding impacts today.

UPDATE THE CITY'S HEAT EMERGENCY ACTION PLAN

The City should pilot components of its heat emergency plan in Roxbury, given the high concentration of socially vulnerable populations there. The City can partner with Renew Boston and the Boston Home Center's repair program to provide energy-efficient air conditioners for physically homebound people who cannot leave their homes without assistance. The City also can partner with Roxbury nonprofits to establish a network of neighborhood-level volunteers to check in on neighbors during heat events. In addition, the City can partner with community nonprofits and healthcare providers to register disabled residents who lack cooling capacity in their homes register for THE RIDE, if interested, in advance of heat events.

[4]The City did not review the extent of existing preparedness planning as part of this study.

RESILIENT INFRASTRUCTURE

ESTABLISH INFRASTRUCTURE COORDINATION COMMITTEE

In the near term, the City will support the MBTA in conducting a full asset-level vulnerability assessment of its system, including the Orange Line. Stormwater flooding is projected to impact bus routes on Massachusetts Avenue and Melnea Cass Boulevard and Orange Line rail lines between Tremont and Columbus Avenue.

PROVIDE GUIDANCE ON PRIORITY EVACUATION AND SERVICE ROAD INFRASTRUCTURE TO THE ICC

The Office of Emergency Management will work with the Boston Transportation Department, Department of Public Works, and Roxbury's private utilities to develop a list of critical roads to prioritize for adaptation, given that Roxbury's road infrastructure faces significant risk from stormwater flooding in all future conditions. Melnea Cass Boulevard is already impacted today under heavy rains.

CONDUCT FEASIBILITY STUDIES FOR COMMUNITY ENERGY SOLUTIONS

The 2016 Boston Community Energy Study identified several locations in Roxbury as potential locations for energy justice microgrids. This summer, the DOE Combined Heat and Power (CHP) Technical Assistance Partnerships analyzed municipal facilities and affordable housing in Roxbury, concluding that CHP is economically feasible. The City will work with the community to explore options for microgrids in this neighborhood. The Community Energy Study also found that Roxbury has high solar power generation potential relative to other Boston neighborhoods.

ADAPTED BUILDINGS

PROMOTE CLIMATE READINESS FOR PROJECTS IN THE DEVELOPMENT PIPELINE

Upon amending the zoning code to support climate readiness (see Initiative 9-2, p.135), the Boston Planning and Development Agency (BPDA) should immediately notify all developers with projects in the development pipeline in the future floodplain that they may alter their plans in a manner consistent with the zoning amendments (e.g., elevating their first-floor ceilings without violating building height limits), without needing to restart the BPDA permitting process. Currently, 31 residential buildings are under construction or permitted in Roxbury, representing 434 additional housing units. To the extent that these buildings are at risk for coastal flooding, the City will reach out to property owners so that they can make necessary adjustments without re-permitting.

INCORPORATE FUTURE CLIMATE CONDITIONS INTO AREA PLANS AND ZONING AMENDMENTS

The Boston Planning and Development Agency should incorporate future climate considerations (long-term projections for extreme heat, stormwater flooding, and coastal and riverine flooding) into major planning efforts in Roxbury.

ESTABLISH A CLIMATE READY BUILDINGS EDUCATION PROGRAM FOR PROPERTY OWNERS, SUPPORTED BY A RESILIENCE AUDIT PROGRAM

The City should develop and run a Climate Ready Buildings Education Program and a resilience audit program to inform property owners about their current and future climate risks and actions they can undertake to address these risks. A resilience audit should help property owners identify cost-effective, building-specific improvements to reduce flood risk, such as backflow preventers, elevation of critical equipment, and deployable flood barriers; promote interventions that address stormwater runoff or the urban heat island effect, such as green roofs or “cool roofs” that reflect heat; and encourage owners to develop operational preparedness plans and secure appropriate insurance coverage. The resilience audit program should include a combination of mandatory and voluntary, market-based and subsidized elements.

PREPARE MUNICIPAL FACILITIES FOR CLIMATE CHANGE

The City should develop and run a Climate Ready Buildings Education Program and a resilience audit program to inform property owners about their current and future climate risks and actions they can undertake to address these risks. A resilience audit should help property owners identify cost-effective, building-specific improvements to reduce flood risk, such as backflow preventers, elevation of critical equipment, and deployable flood barriers; promote interventions that address stormwater runoff or the urban heat island effect, such as green roofs or “cool roofs” that reflect heat; and encourage owners to develop operational preparedness plans and secure appropriate insurance coverage. The resilience audit program should include a combination of mandatory and voluntary, market-based and subsidized elements.