



EVERETT

SOMERVILLE

CHARLESTOWN

28

CAMBRIDGE

WATERTOWN

DOWNTOWN

ALLSTON/
BRIGHTON

East Boston
Memorial
Park

90

20

Packard's
Corner

CHINATOWN

90

Brighton

Tufts Med

NEWTON

FENWAY/
KENMORE

SOUTH END

SOUTH BOSTON

BROOKLINE

Brigham
Circle

Ruggles

Mass
Ave

Roxbury
Crossing

Nubian Sq

Newmarket

Joe Moakley
Park

9

Jackson
Sq

ROXBURY

JFK/UMass

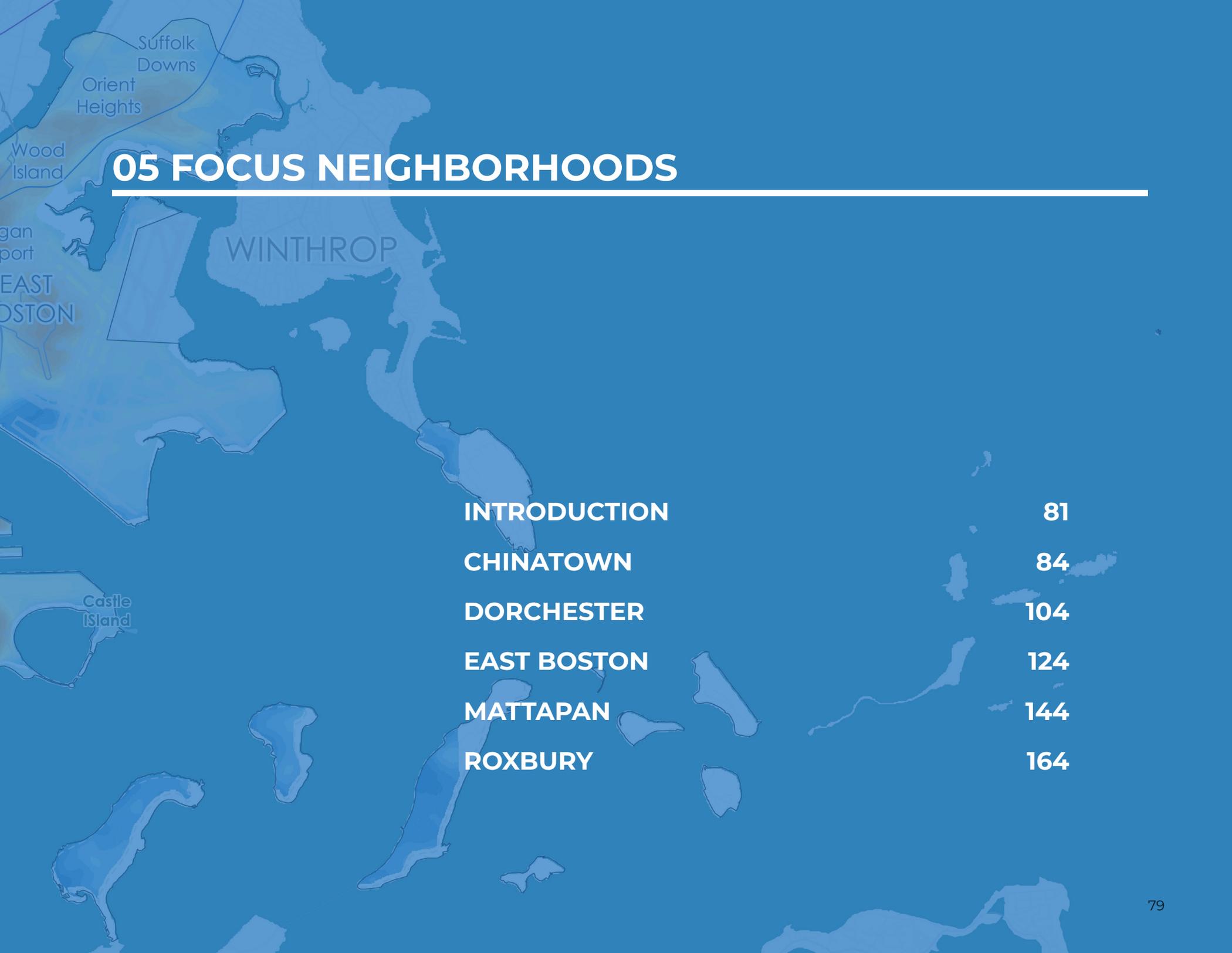
Jamaica
Pond

Uphams
Corner

Savin Hill

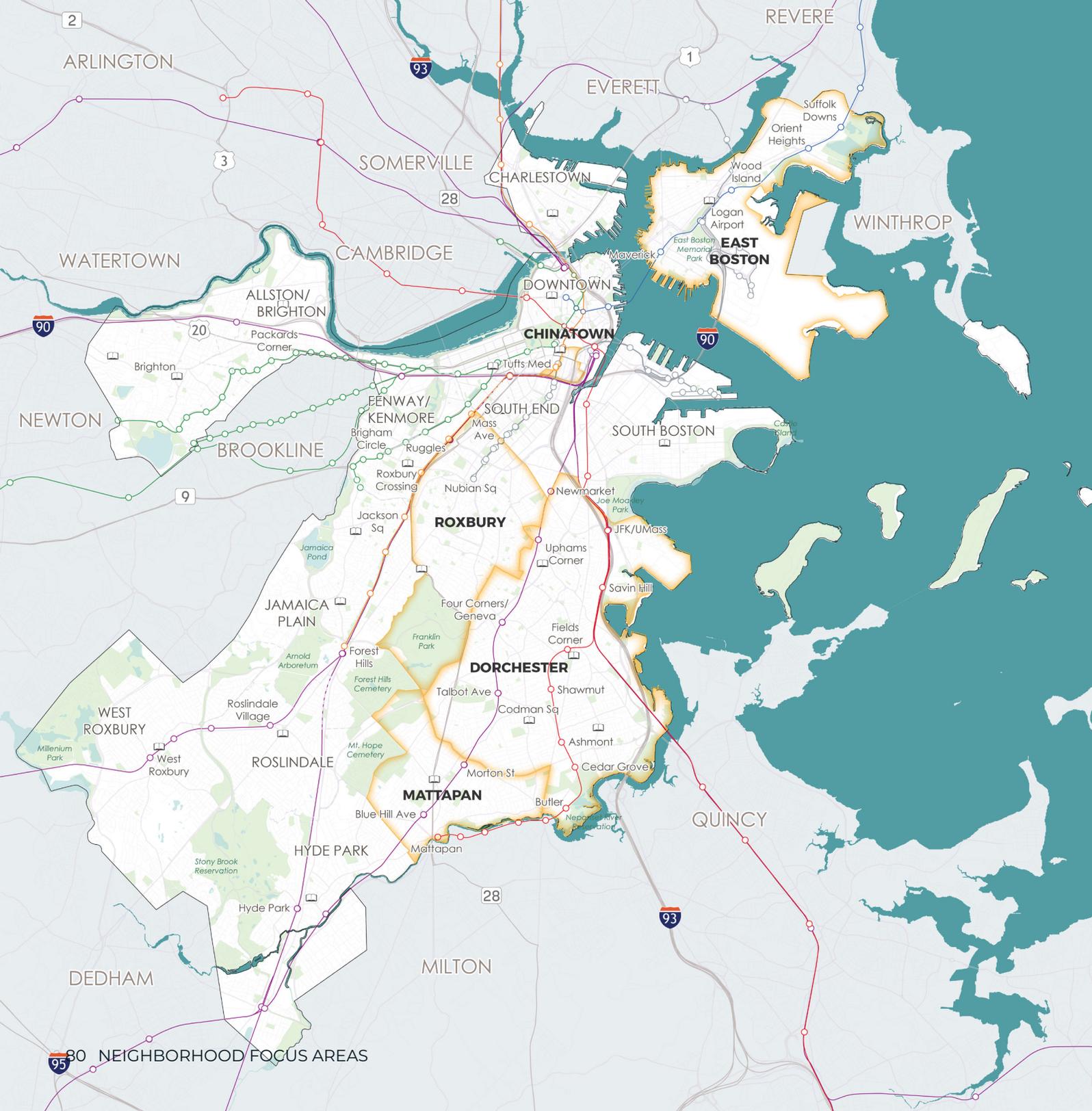
JAMAICA
PLAIN

Four Corners/
Geneva



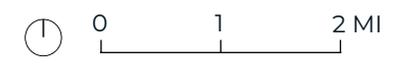
05 FOCUS NEIGHBORHOODS

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- LEGEND**
- Focus Areas
 - Parks
 - Roads
 - MBTA Red Line
 - MBTA Green Line
 - MBTA Orange Line
 - MBTA Blue Line
 - MBTA Silver Line
 - MBTA Commuter Rail

80 NEIGHBORHOOD FOCUS AREAS



INTRODUCTION

The planning process and strategy development for the Heat Plan included additional detailed study of solutions within five of the hottest environmental justice neighborhoods in Boston: Chinatown, Dorchester, East Boston, Mattapan, and Roxbury.

The intention of the *Heat Plan* is to define an equity-centered framework to reduce the risks and effects of extreme heat. While the whole city is hot, some communities and individuals can experience greater extreme heat exposure and risk, including communities of color, immigrant communities, communities where English is spoken as a second language, older adults, individuals with chronic health conditions, and youth.

The *Heat Plan* contains a wide range of strategies that are applicable to every neighborhood of the City of Boston. Additionally, the *Heat Plan* looks to ensure the needs of overburdened neighborhoods and vulnerable residents are met and prioritized through these strategies. The five neighborhoods on which the *Heat Plan* focused in greater detail include Chinatown, Dorchester, East Boston, Mattapan, and Roxbury. Heat and social vulnerability data from the 2016 *Climate Ready Boston Vulnerability Assessment* were used to identify critical hot spots across Boston that also coincide with environmental justice communities with minority, low- to no-income, and English-isolation characteristics.

A series of five listening sessions took place virtually to understand lived heat experiences in each focus area and identify strategies that residents expressed as critical needs in their communities. To reduce barriers to participation, these sessions used a combination of virtual chat, interpretation, breakout groups, surveys, and sketching. Translation was available for each meeting, based on common languages in each neighborhood.

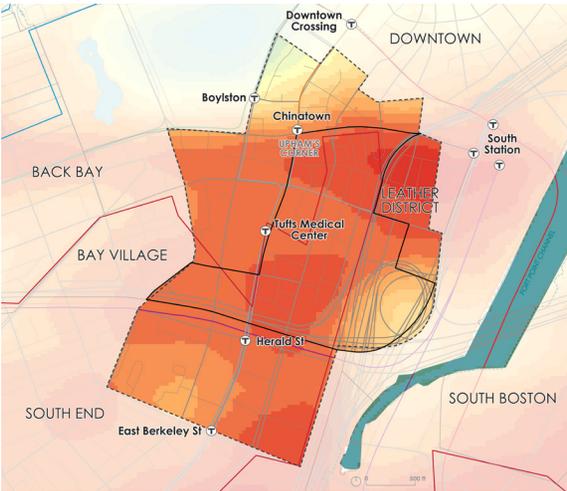
The following neighborhood sections dive into each neighborhood's heat story, lived experiences, vulnerabilities, and opportunities.

EACH NEIGHBORHOOD HAS A UNIQUE HEAT STORY

CHINATOWN

Extreme heat day and night

Due to denser buildings (many brick and with dark roofs) and limited trees and green space, Chinatown heats up significantly during the day. At night, that heat is released into a dense neighborhood with limited air flow, keeping temperatures hotter throughout the night. The area around the Chinatown Gate experiences especially elevated temperatures.

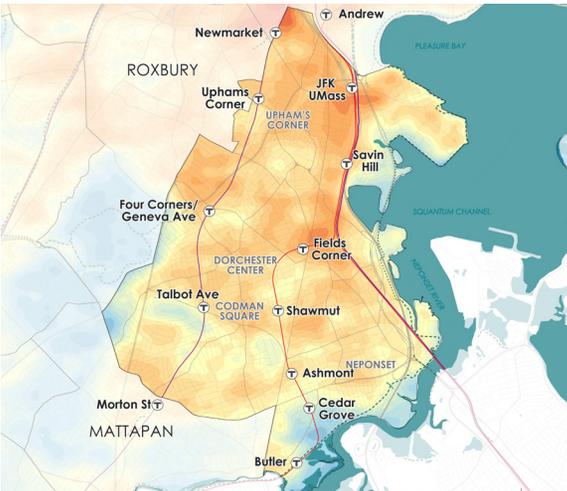


Chinatown Daytime Air Temperatures

DORCHESTER

Pockets of heat

As a large neighborhood, Dorchester has some areas that are hotter (Fields Corner, JFK/UMass MBTA station, and Newmarket and South Bay areas) and some areas that are cooler (around parks or adjacent to the waterfront). Contributing factors to hotter areas are unshaded pavement, parking lots, and dark roofs.

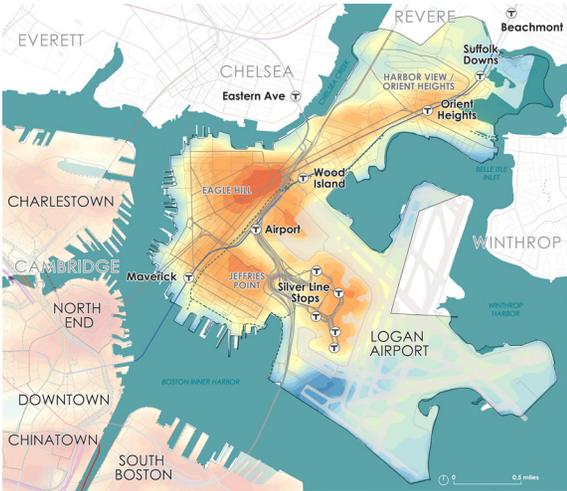


Dorchester Daytime Air Temperatures

EAST BOSTON

Cool waterfronts and hot inland neighborhoods

Although waterfront areas benefit from the cooling influence from Boston Harbor as well as waterfront green spaces like Piers Park and Belle Isle Marsh, the inland neighborhood areas experience much hotter temperatures, due to building density and less green space and tree canopy. Significant neighborhood temperature hot spots include the area around the Logan Rental Car Center and the Day Square and northwest Eagle Hill areas.

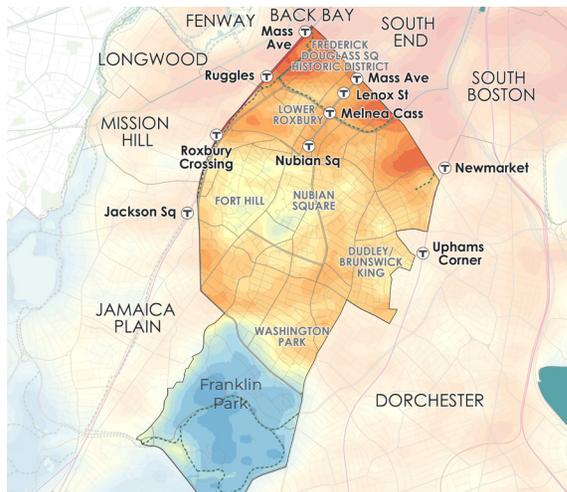


East Boston Daytime Air Temperatures

ROXBURY

Cooler Franklin Park area but hotter elsewhere

Franklin Park provides a cooling effect on nearby blocks, but other areas in the neighborhood experience hotter air temperatures. The Frederick Douglass Historic District, Boston Medical Center, and areas near Newmarket are all especially hot due to a combination of brick buildings, dark roofs, limited green space, unshaded pavement, and dense massing.

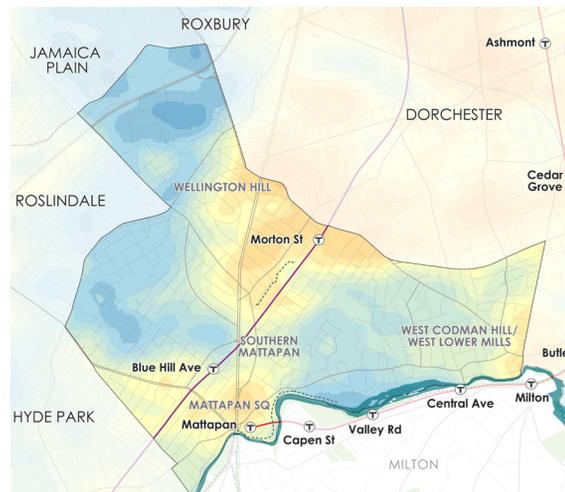


Roxbury Daytime Air Temperatures

MATTAPAN

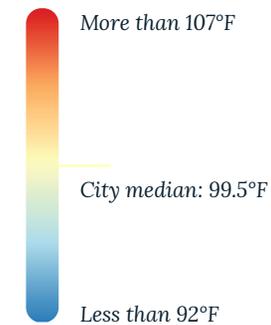
Proximity to green spaces supports nighttime cooling

Mattapan benefits from cooling effects from nearby green spaces, the Neponset River, and tree canopy in some areas of the neighborhood. However, areas around Milton Station, Mattapan Station, and Lower Mills are all hotter, due to patterns of dark roofs and large unshaded parking and pavement. Many wide streets with limited trees further contribute to elevated air temperatures.



Mattapan Daytime Air Temperatures

DAYTIME (3PM) AIR TEMPERATURE

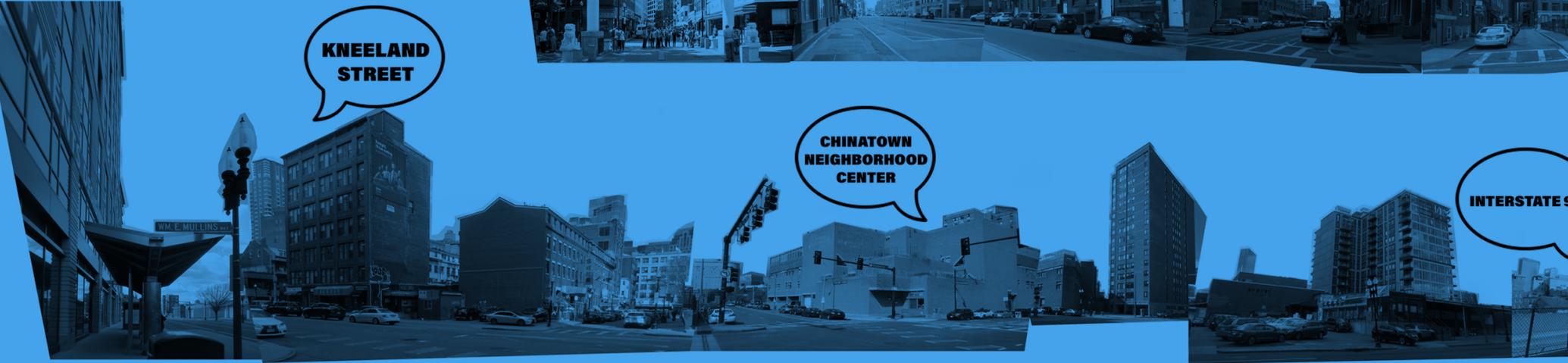


CHINATOWN

**CHINATOWN
GATE**



**KNEELAND
STREET**



**CHINATOWN
NEIGHBORHOOD
CENTER**

INTERSTATE 95



NEIGHBORHOOD CONTEXT 86

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HEAT RESILIENCE OPPORTUNITIES 100



NEIGHBORHOOD CONTEXT

Chinatown experiences some of the hottest daytime and nighttime temperatures in Boston, and its heat story is shaped by its physical characteristics and neighborhood history.

Chinatown is a thriving neighborhood in the heart of Boston that has been home to many immigrant communities throughout its history. Today, Chinatown residents represent many nationalities: Chinese, Taiwanese, Vietnamese, Filipino, Thai, Japanese, and more.¹ Chinatown is a hub for many Asian and other immigrant communities in the Boston region. The neighborhood provides a sense of home that centers culture and identity from China as well as other Asian countries, providing access to culturally relevant goods and supportive services.²

Chinatown has a history of resident advocacy and community-led planning. Residents and community organizations have come together when urban renewal, interstate expansion, and other projects have affected the neighborhood. Every 10 years since 1990, the community has spearheaded its own neighborhood plan. Over the past several decades, Chinatown organizations and residents have

spearheaded and advocated for the development, renovation, and preservation of affordable housing.

The neighborhood’s history has shaped its urban fabric and heat experiences over time. Prejudice, discrimination, and racism against Chinese and other Asian immigrants, including the Chinese Exclusion Act of 1882, the Immigration Act of 1924, and other national efforts, affected Asian immigrants to the United States. This history informed both the creation of enclaves like Boston’s Chinatown to support new and longtime residents, and the lack of inclusion in public planning decisions that affected the neighborhood. The neighborhood was a hub of industry and transportation, including the elevated (El) railway and the widening of Harrison Avenue. These uses increased air pollution in the neighborhood.³ From the 1930s to 1960s, many parts of the neighborhood were classified as “D: Hazardous” on HOLC maps.⁴ The construction of Interstates 93 and 90 through Chinatown displaced residents and businesses.⁵

The cumulative effects of these events over time have resulted in a neighborhood that has fewer trees and parks, wider roads, more vehicular traffic, and increased air pollution. Residents have raised air pollution as a significant concern.⁶ Chinatown is in the top 95th to 100th percentile for diesel particulate

matter, 70th to 80th percentile for air toxics cancer risk, 80th to 90th percentile for respiratory hazard index, and 99th percentile for traffic proximity and volume, compared to all block groups in the United States.⁷ As a result of the neighborhood’s environment, it experiences hotter temperatures and residents have a greater risk of developing respiratory conditions that increase residents’ sensitivity to extreme temperatures.

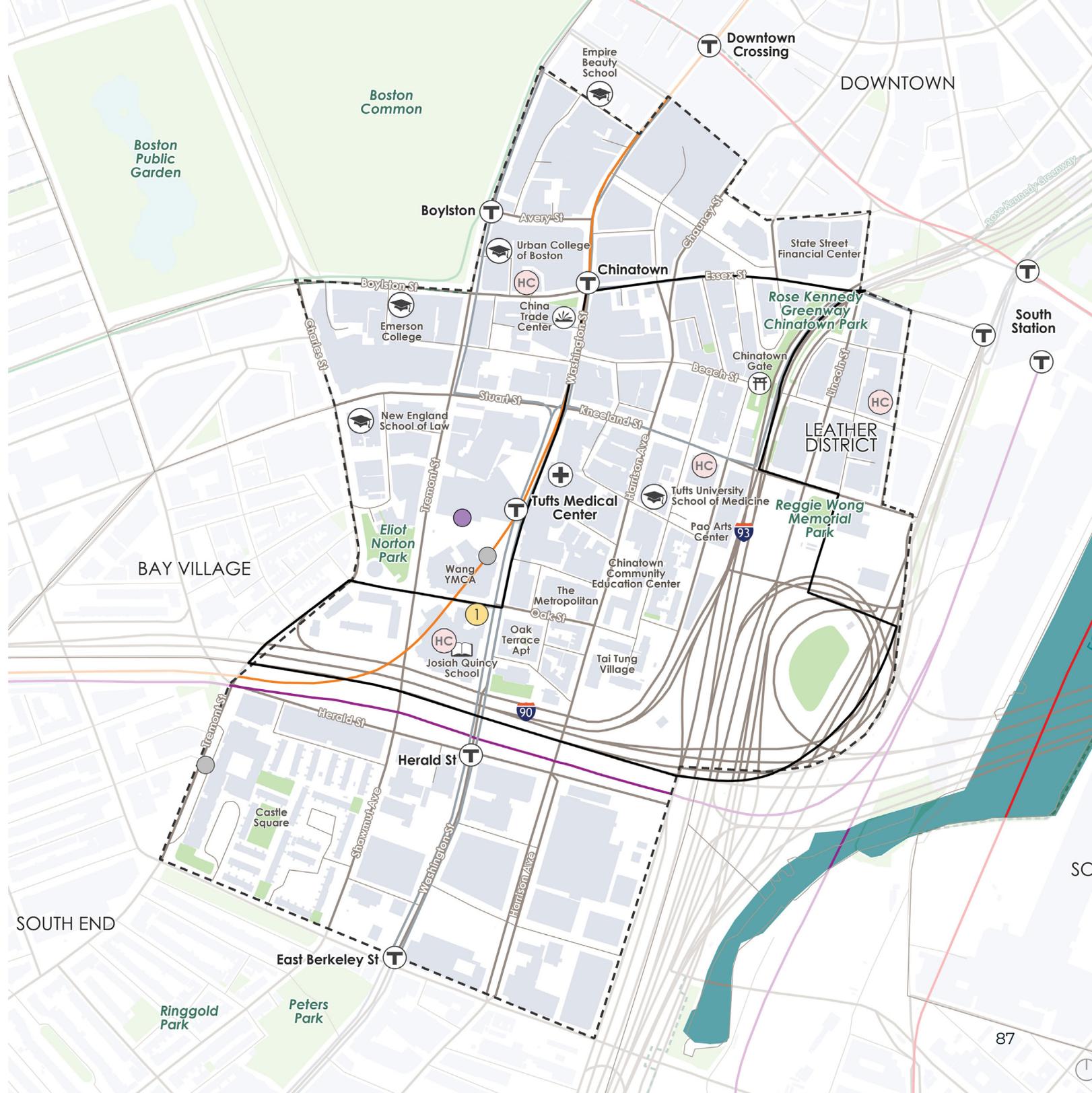
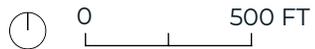
RECENT AND ONGOING PLANNING EFFORTS

- » PLAN: Downtown (Mayor’s Office of Planning/BPDA)
- » Chinatown Master Plan 2020 (Chinatown and MAPC)
- » Parcel R-1 Chinatown Disposition Planning (Mayor’s Office of Planning/BPDA)

- Parks
- Greenways
- Roads
- Major Roads
- MBTA Red Line
- MBTA Orange Line
- MBTA Green Line
- MBTA Silver Line
- MBTA Commuter Rail
- T MBTA Station
- 2020 Chinatown Master Plan

COMMUNITY ASSETS

- 🎓 College/University
- 📖 School
- 📖 Library
- 🚓 Police Station
- 🚒 Fire Station
- + Hospital
- HC Community Health Center
- 1 Quincy Community Center/BCNC
- BHA Public Housing: Elderly/Disabled
- BHA Public Housing: Family



HEAT ANALYSIS

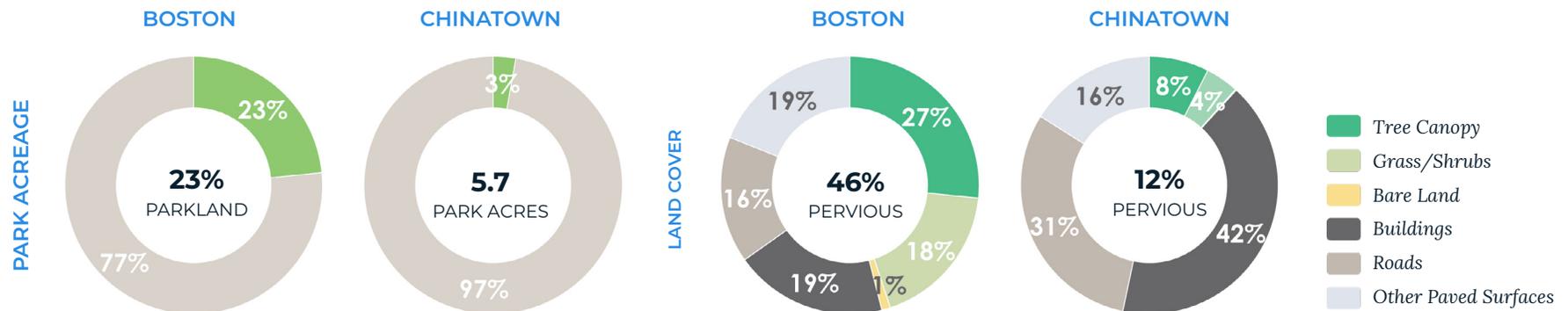
Hot Days, Hot Nights: Chinatown is the hottest of the five neighborhood focus areas during the day and night. The citywide heat analysis showed Chinatown’s daytime and nighttime median temperature at 105.5°F and 87.9°F, respectively. Chinatown’s daytime and nighttime temperatures were measured at 6°F hotter than the city’s median (daytime is 99.5°F and nighttime is 81.9°F). For comparison, Franklin Park, one of the coolest places in Boston in the heat analysis, measured daytime temperatures around 90°F with nighttime lows in the low 80s. The hottest part of the neighborhood is around Chinatown Gate, where daytime temperatures measured 106°F, and nighttime temperatures measured 91°F. Many parts of the neighborhood were measured above 90°F at night. With such extreme

overnight temperatures, mitigation of heat exposure in homes is particularly important in Chinatown. High nighttime temperatures are especially harmful to health because they do not allow residents to cool down from daytime heat.⁸

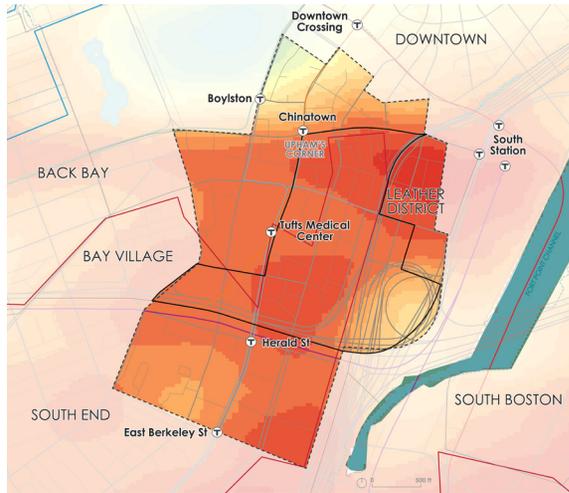
Chinatown’s hotter microclimate is a result of multiple factors, including less green space, wide streets with limited street trees, building characteristics, and density. In comparison to many other parts of the city, there are fewer trees and less green space in Chinatown. Trees and parks have cooling effects on their surroundings due to shading and evaporative cooling, which reduce air and surface temperatures. Chinatown has the highest percentage of impervious surfaces at 88%,

compared to 54% citywide. Of the land cover, 8% is tree canopy, and 3% of the neighborhood is dedicated to parks (compared to 27% tree canopy and 23% park space citywide). Major arteries like Kneeland Street, Harrison Avenue, and Surface Road have fewer street trees, so the pavement gets hotter during the day. The neighborhood’s brick buildings and many dark roofs further absorb heat, contributing to hot indoor and outdoor settings.

Dense development also factors into extreme heat conditions. Air that heats up in the daytime sun can remain restricted in the neighborhood overnight, which prevents cool night air from displacing hot daytime air. However, space between buildings can allow surface-level winds to blow out hot air.

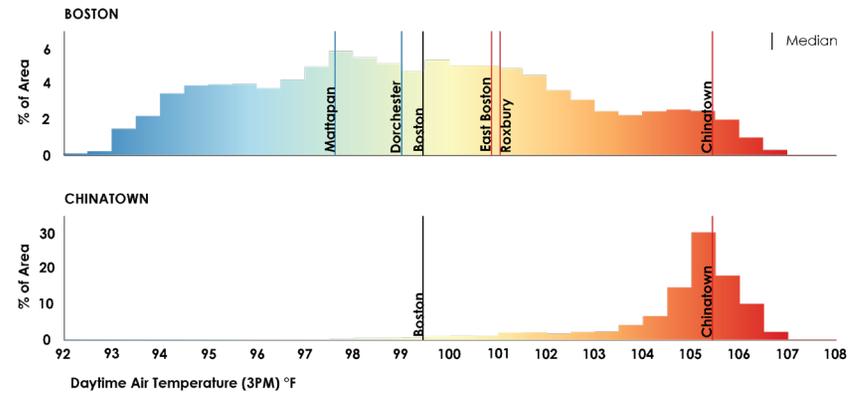
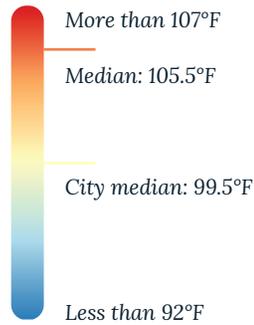


Data Source: Tree Canopy Assessment 2019, BPRD

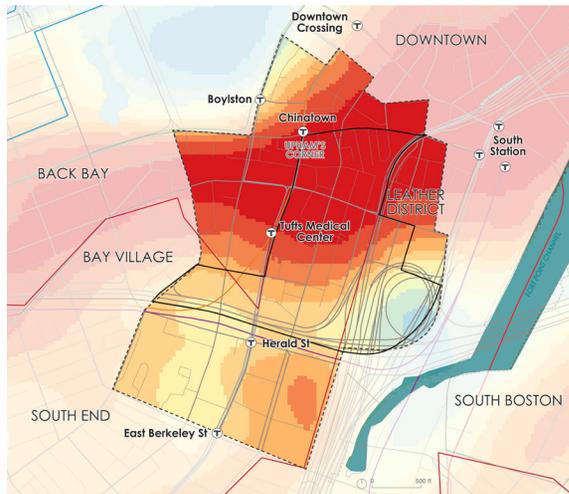


DAYTIME AIR TEMPERATURES

3PM:
AIR TEMPERATURE

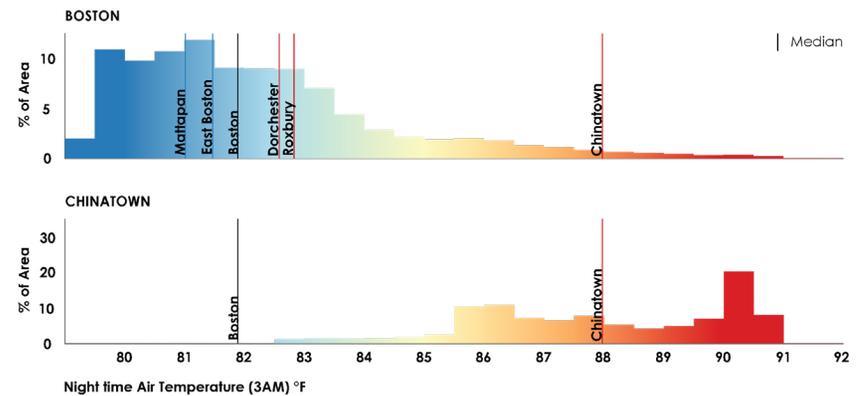
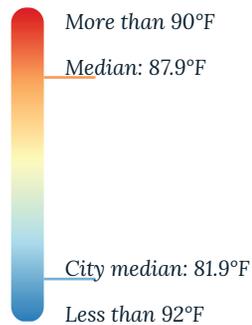


Daytime Air Temperature (3 p.m.): Air temperatures reflect an average day during a heat wave week in July 2019



NIGHTTIME AIR TEMPERATURES

3AM:
AIR TEMPERATURE



Nighttime Air Temperature (3 a.m.): Air temperatures reflect an average night during a heat wave week in July 2019



SAMPLE OF HEAT FINDINGS

These three areas illustrate examples of how Chinatown's land use affects daytime and nighttime temperatures, based on the citywide heat analysis.



1. LARGE FOOTPRINT BUILDINGS WITH DARK ROOFS

The dense area around Beech Street and the Chinatown Gate includes many buildings that are brick or have dark roofs, which absorb heat in the day. At night, the dense building form leaves less space for nighttime winds, so the stored heat cannot easily dissipate. Nearby interstates, like I-93, also absorb heat during the day. With limited green spaces and tree canopy, this area benefits less from shade and evapotranspiration that would help mitigate rising air temperatures.



2. LARGE RESIDENTIAL CAMPUSES

The heat analysis showed that residential campuses like the Castle Court Apartments can reach 104°F during the day, only a few degrees less than the northern areas of Chinatown. Although typologies like these may have significant amounts of pavement, there may also be a higher percentage of tree canopy that can help provide shade and cool the air. For some campuses with lower building density, heat absorbed during the day can escape more easily at night.



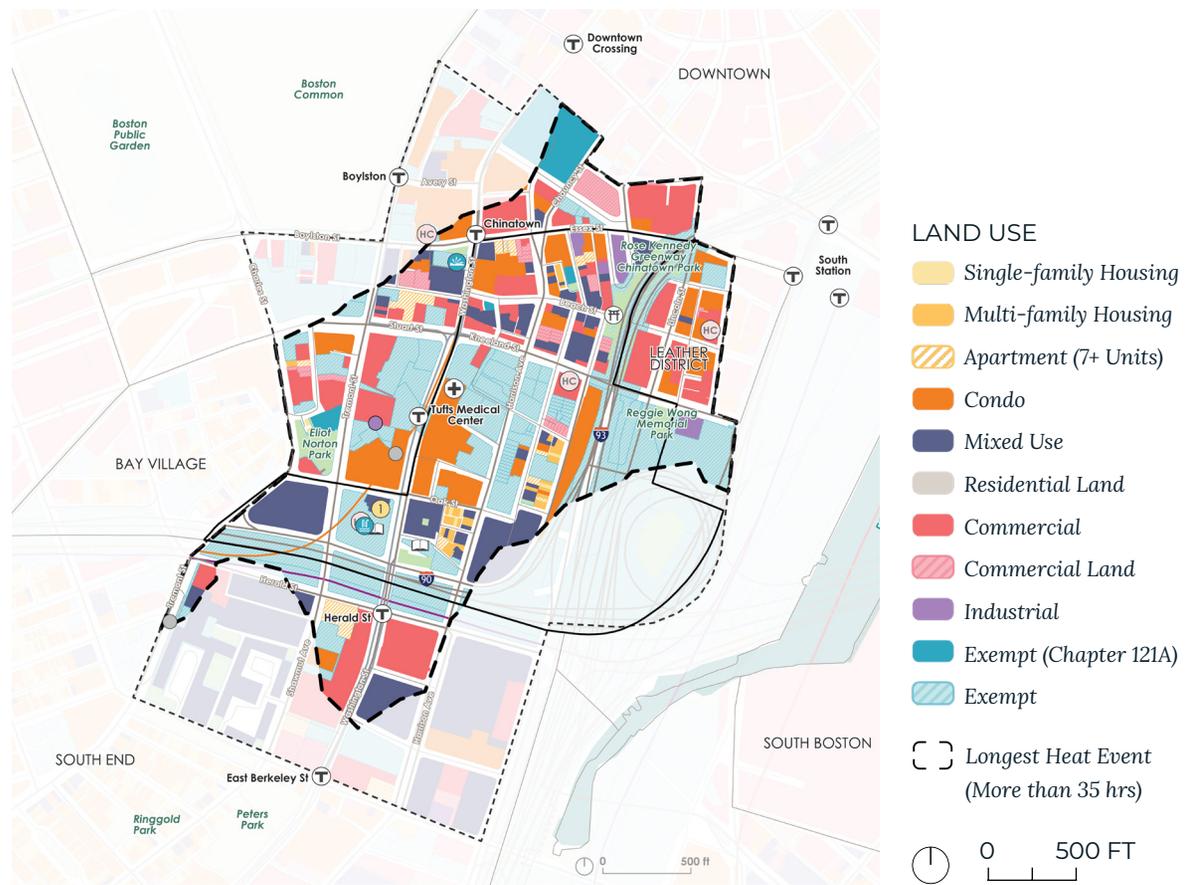
3. LARGE SURFACE ROADS

During the day, the portions of large surface roads like I-93 and I-90 and related on-ramps that lie on the southeastern edge of Chinatown can reach air temperatures of over 100°F. However, because of the open space and lack of building density, this area cools down more at night. The green space in the middle of the interstate loop contributes to cooling and is the coolest place in the neighborhood at night, measuring 83°F in the heat analysis.

LAND USE AND PEOPLE

The area of Chinatown that experiences the most intense and longest heat event duration includes areas north of Kneeland Street where there are condos and mixed-use type housing. However, temperature differences across Chinatown are relatively small compared to other neighborhoods. Even the cooler parts of the neighborhood during the day and night are still hotter than many other parts of Boston. The areas near Essex and Beach Streets to Tremont Street and around Tai Tung Village and Josiah Quincy School have higher population density. These areas also have temperatures that are at or above the neighborhood median temperature in the day (105.5°F). Contributing factors include building density, building materials, and lack of vegetation.

As described in Chapter 3, hot weather can create disproportionate health risks for some people, especially those who are younger or older, who have preexisting health conditions, or who are exposed to heat for longer periods of time. In Chinatown, young children (under 5 years) make up 2.5% of neighborhood residents (compared to 5% citywide), and older adults (over 65 years) make up 15% of neighborhood residents (compared to 12% citywide).⁹ Of Chinatown residents, 21% are low-income (compared to 16% citywide), and 84% of housing units are renter-occupied (compared to 64% citywide).¹⁰ Low-income residents and renters may face barriers to home retrofits or affording cooling options.



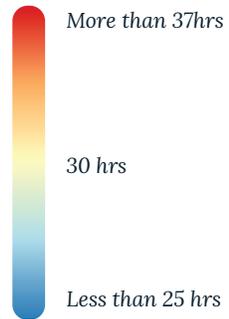
Data Source: Analyze Boston

POPULATION DENSITY AND HIGH-HEAT EVENT DURATION

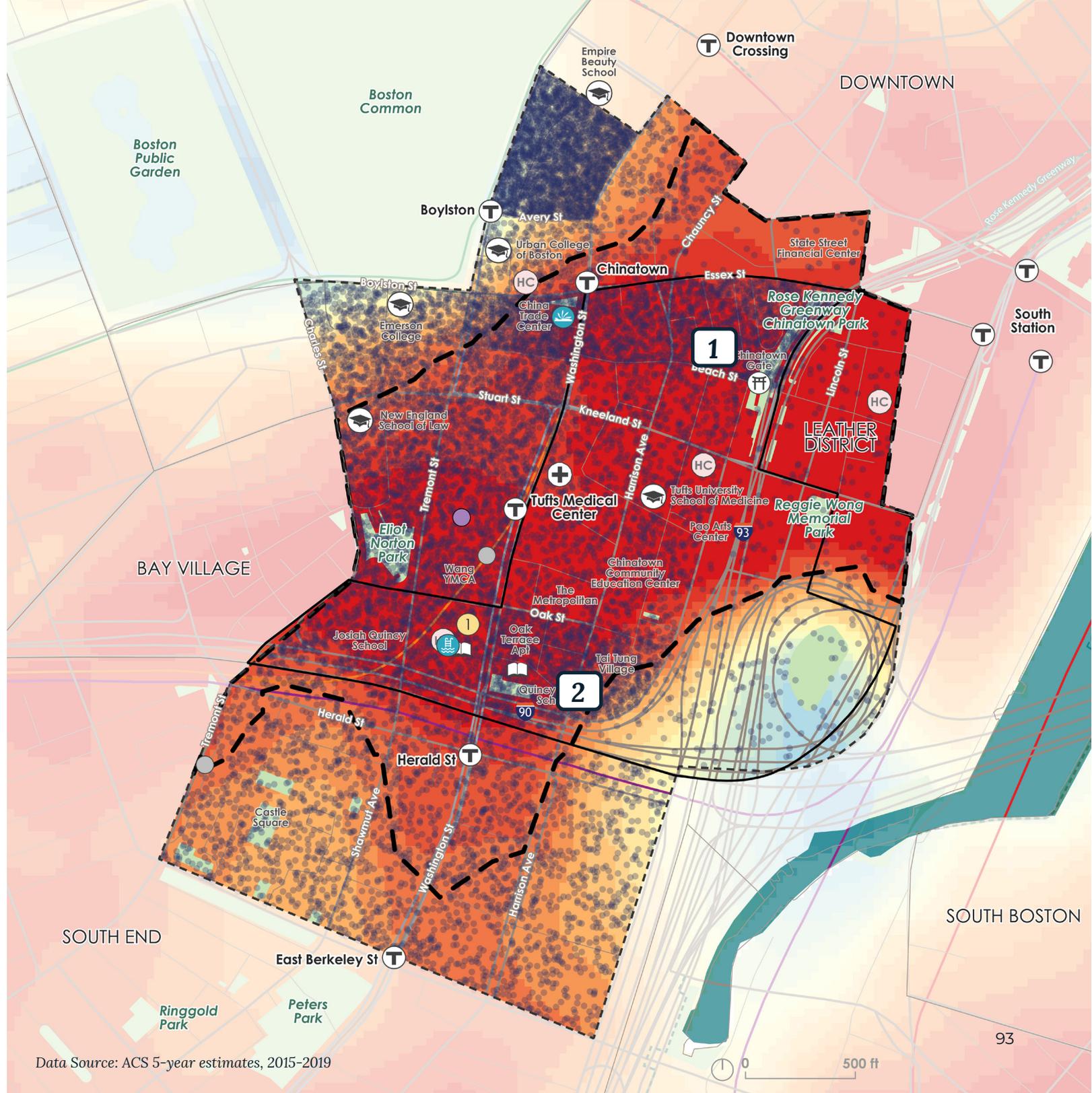
-  College/University
-  School
-  Library
-  Pools
-  Hospital
-  Community Health Center
-  Quincy Community Center/BCNC
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family

1 DOT = 1 PERSON

HEAT EVENT HOURS



 Longest Heat Event (More than 35 hrs)



Data Source: ACS 5-year estimates, 2015-2019

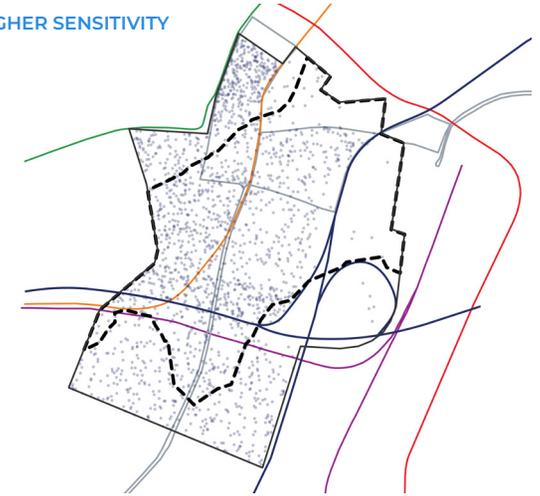
RESIDENT DEMOGRAPHICS AND HEAT DURATION

These maps compare the density of Chinatown residents to areas with the longest duration event in the heat analysis. Chinatown's residents are predominantly Asian and white (composing 43% and 42% of the neighborhood, respectively).¹¹ However, Asian residents comprise the majority of those who live in areas that experience longer and more intense heat. These same areas have a higher density of low-income and renter-occupied housing.

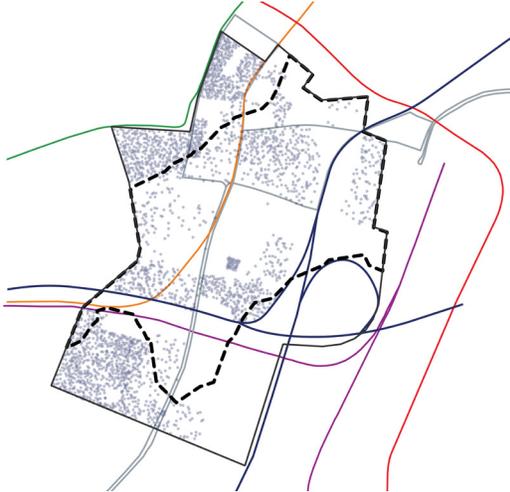
YOUNG CHILDREN (<5 YRS)
HIGHER SENSITIVITY



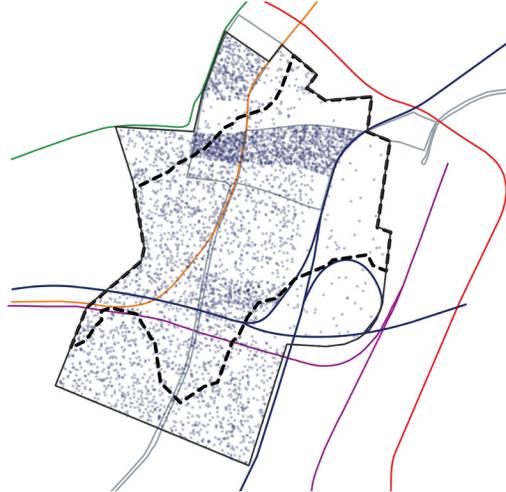
OLDER ADULTS (>65 YRS)
LOWER ADAPTIVE CAPACITY
HIGHER SENSITIVITY



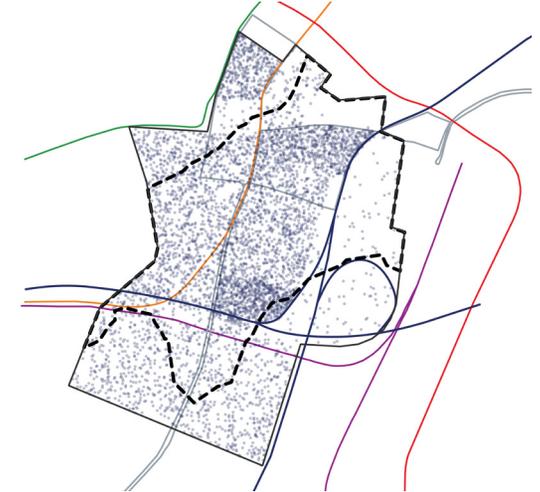
LOW-INCOME RESIDENTS
LOWER ADAPTIVE CAPACITY



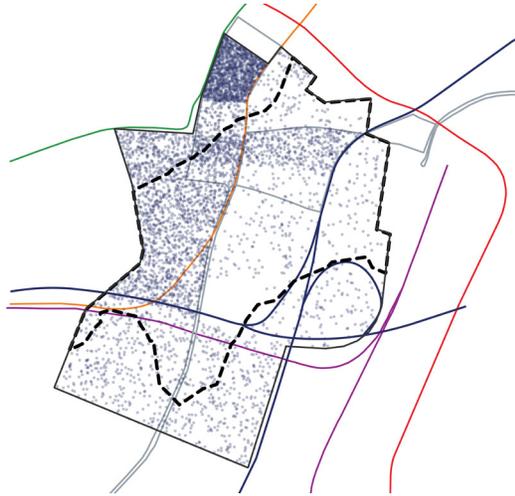
RENTER-OCCUPIED HOUSING
LOWER ADAPTIVE CAPACITY



ASIAN



WHITE



BLACK



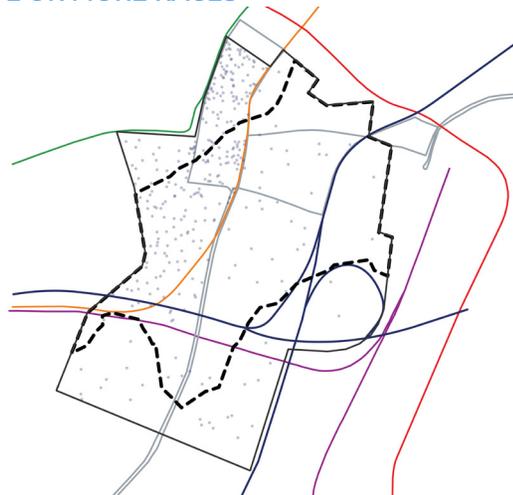
LATINX



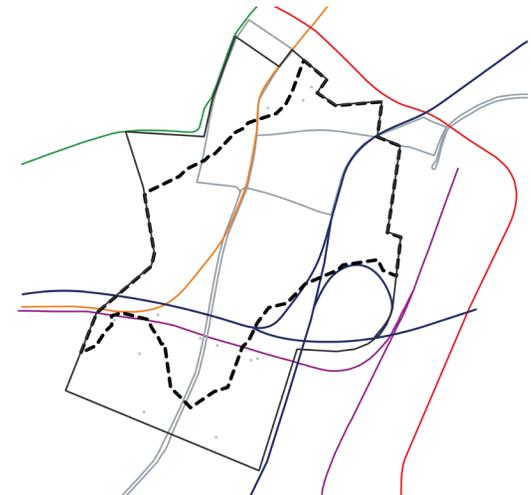
AMERICAN INDIAN/
ALASKA NATIVE



2 OR MORE RACES

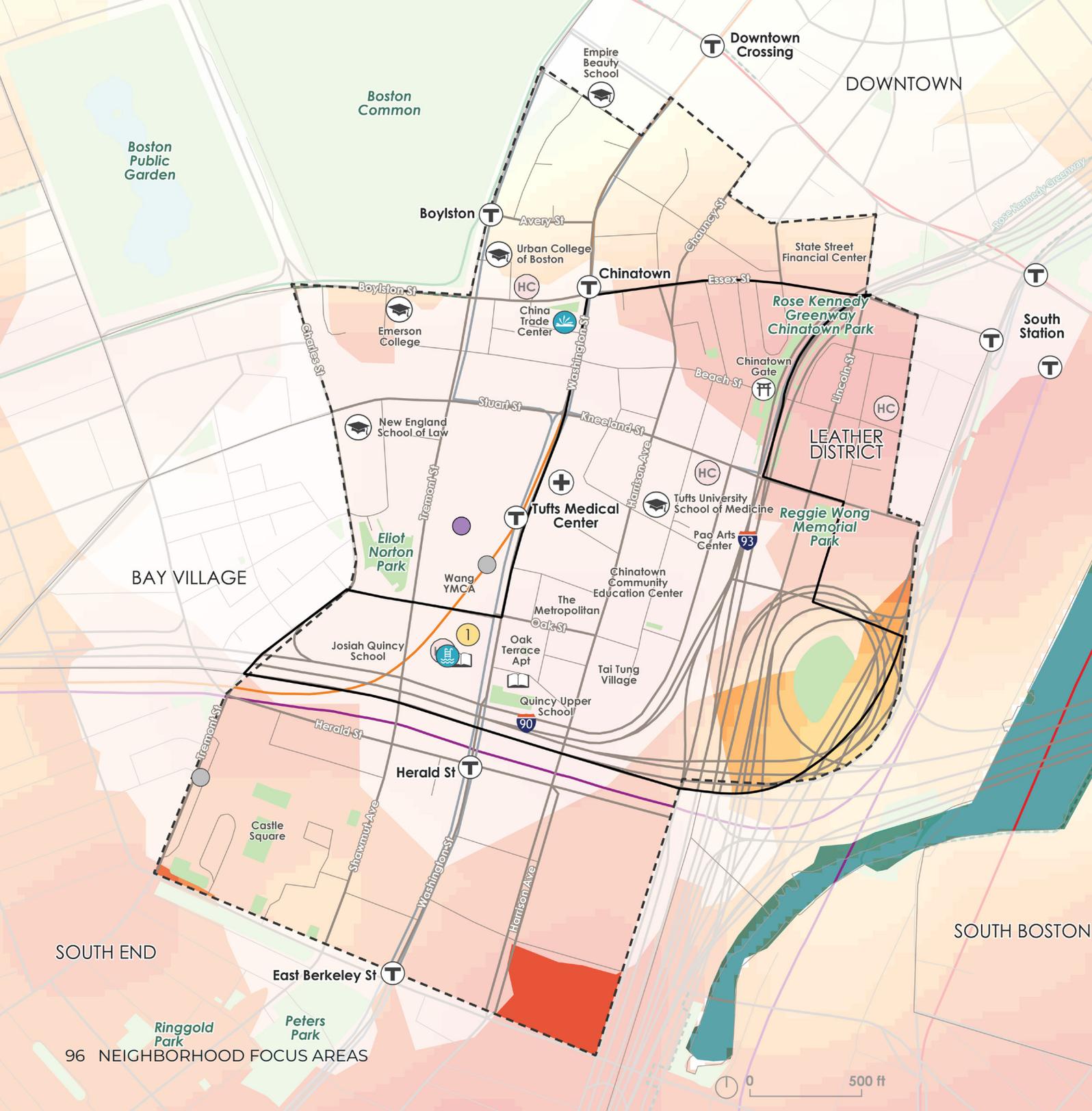


ANOTHER RACE



Data Source: ACS 5-year estimates, 2015-2019

 Longest Heat Event (More than 35 hrs) 1 DOT = 1 PERSON

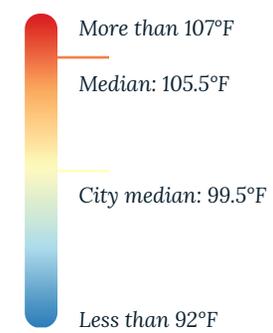


GAPS IN INDOOR COOLING NETWORK

- College/University
- School
- Library
- Pools
- Hospital
- Community Health Center
- Quincy Community Center/BCNC
- BHA Public Housing: Elderly/Disabled
- BHA Public Housing: Family

Areas masked in white are within a 10-minute walk of a BCYF center and the library. Areas in orange red experience extreme heat during heat waves, and are not within a 10-minute walk of a BCYF center or library.

3PM: AIR TEMPERATURE



COMMUNITY HEAT EXPERIENCES AND COOLING IDEAS

HEAT EXPERIENCES

Chinatown residents discussed their heat experiences and cooling ideas during the Neighborhood Ideas Workshop and through responses to the citywide survey. Areas of concern mentioned by participants included the effect of increasing density on air temperatures, air pollution from vehicles and trucks, dark surfaces, heat from electronic billboards, and hot homes. Participants were particularly concerned by the severity and duration of heat in their neighborhood. They appreciated that this process highlighted the challenges they faced and encouraged near-term action to improve conditions.

125 Lincoln proposed development will further increase height + density + number of cars in Chinatown, exacerbating the existing issues

COOLING IDEAS

Chinatown residents suggested strategies that create a cooler environment, add more green space, and improve indoor cooling options. Participants shared the following ideas to increase access to cooling in Chinatown:

- » Zoning and development review: Opportunities to improve zoning and development review to reduce adverse impacts of new development on the neighborhood's microclimate, which could include opportunities to improve airflow through the neighborhood to mitigate temperatures
- » Cool surfaces: Opportunities for cooler, light-colored materials, including pavement, as well as vertical greening on walls

Electronic billboards should be banned from Chinatown because they also emit a lot of heat and energy

- » Increased shade: Opportunities for more shade through both tree planting and other shade structures, which could provide cooling more immediately than the time it would take new trees to grow large enough to provide significant shade
- » New cool outdoor gathering spaces: Opportunities to add more green space through pavement conversion, including shade, water features, and trees, and opportunities for active cooling with water such as spray pads, running water bodies, and misting, which could be complemented with more options for public indoor cooling spaces
- » Cool Homes: Opportunities to retrofit existing buildings for improved energy efficiency and interior cooling, including incorporating passive cooling strategies

Hottest place in Chinatown: the corner of Beach Street and Harrison Ave

OPPORTUNITIES FOR A COOLER CHINATOWN

Would love to see Chinatown Gate *more climate ready and resilient*, because we want to make it so that when there is a large gathering we don't feel the heat. *It is a very important space for the community, we need to make the best use of it.*
 -Chinatown resident





Turn dark roofs into cool roofs

HUDSON STREET

Provide canopy and mist systems on narrow streets

Promote locally owned businesses as cooling locations through heat escape vouchers

TYLER STREET

TUFTS MEDICAL CENTER

Pop-up cooling relief activities for youth

INTERSTATE 90

More opportunities for water play and public art

AUNTIE KAY & UNCLE FRANK CHIN PARK

Paint roadways with reflective paints to reduce the urban heat island effect

HEAT RESILIENCE OPPORTUNITIES

This section describes key needs for heat reduction or increasing access to cooling resources and opportunities to integrate resilience, based on neighborhood-level heat analysis and community feedback.

While all the strategies may be relevant to each neighborhood, each section lists specific heat resilience strategies that respond to the particular needs that have been identified. More details on the strategies listed below can be found in Chapter 6: Citywide Heat Resilience Strategies.

SHADED, VEGETATED, COOL WALKS TO LOCAL DESTINATIONS AND MAIN STREETS

Participants shared that the lack of vegetation, shade, and other cooling strategies along the streets of Chinatown can make walking to nearby local destinations uncomfortable. A higher percentage of Chinatown residents walk to work in Chinatown (49%) compared to Boston as a whole (15%),¹² suggesting that cooler streets are a particularly high need in Chinatown. Priority locations for cooling improvements could include wider streets where surface temperatures are higher and pedestrian traffic is high, such as Kneeland Street, Washington Street, Harrison Avenue, and Beach Street.

Narrow streets in areas with a higher density of residents, such as Beach Street to Essex Street, and Tyler Street to Tai Tung Village, are extremely hot. More shade and green gathering spaces could help reduce temperatures. Chinatown residents that participated in the planning process highlighted Beach Street as a corridor that receives a lot of foot traffic from the Chinatown Gate to Harrison Avenue. Participants suggested this area could be a potential location for adding shading features, especially on the street's northern side that receives more sunlight.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 6.1: ENHANCED COOLING IN POCKET GREEN SPACES AND STREET-TO-GREEN CONVERSIONS

STRATEGY 7.1: COOL COMMUTES

STRATEGY 7.3: COOL MAIN STREETS

COMMERCIAL BUILDINGS WITH COOL ROOFTOPS AND ENERGY EFFICIENT STRATEGIES

Many surfaces—roofs and ground-level—along main streets and mixed-use areas are dark, contributing to heat exposure. Participants in this planning process expressed that financial incentives could encourage building owners to invest in energy efficiency or other cooling improvements. Working with local community organizations to provide guidance and other resources to building owners can increase adoption of cooling strategies.

RELATED HEAT RESILIENCE STRATEGIES **STRATEGY 5.2: COOL ROOFS PROGRAM**

COOL, SHADED PAVEMENT AND SURFACE PARKING

A number of surface parking lots and wide roads with no vegetation contribute to the amount of hot, non-vegetated surfaces in Chinatown. The heat absorbed by these dark surfaces is not easily dispersed at night, making the neighborhood hot in the day and night. Opportunities include the use of light-colored paint for surfaces or installing shade structures to reflect sunlight.

RELATED HEAT RESILIENCE STRATEGIES **STRATEGY 7.3: COOL MAIN STREETS** **STRATEGY 9.3: HEAT RESILIENCE BEST PRACTICE GUIDELINES**

COOL HOMES

Many of the buildings in Chinatown have dark flat roofs and are made out of brick, which absorbs more heat than other materials. Opportunities exist for information sharing about existing resources and programs with building owners and renters, and identifying other opportunities for cool homes and access to affordable energy.

RELATED HEAT RESILIENCE STRATEGIES **STRATEGY 5.1: HOME COOLING RESOURCES DISTRIBUTION** **STRATEGY 5.3: HOME ENERGY RETROFITS** **STRATEGY 5.4: AFFORDABLE HOUSING RESOURCES AND RETROFITS**

MORE SHADED GATHERING SPACES WITH NATURAL PLAY SPACE

Urban parks like Uncle Frank and Auntie Kay Chin Park (Chin Park) have light tree and bamboo cover; however, the land cover there is predominantly hardscape. The heat analysis measured the park's temperature at about 6°F hotter than the Boston Common. Chin Park is located near the Chinatown Gate where many residents gather daily and for events. Hot urban parks like Chin Park that serve as important community gathering areas are opportunities to prioritize cooling strategies.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.1: POP-UP HEAT RELIEF

STRATEGY 6.1: ENHANCED COOLING IN POCKET PARKS AND STREET-TO-PARK CONVERSIONS

STRATEGY 6.4: PLANNING FOR FUTURE PARKS

Residents shared that there is a need throughout Chinatown for additional outdoor gathering spaces and parks, with vegetation, trees, shade, and cooling. As described above, the analysis shows Chinatown has less green space, parks, and tree canopy than Boston as a whole. Opportunities could include adding greenery and shade to existing pocket parks that are largely hardscape, such as at Harrison and Essex, and then identifying other suitable locations for new cool, gathering spaces.

COOL SCHOOLS

Many schools in Boston have dark roofs and hardscape outdoor spaces. During capital improvements, these schools have opportunities to integrate cool roofs, trees, shade, and vegetation that can help reduce temperatures. In Chinatown, for example, the Josiah Quincy Elementary School has tiered roofs with some hardscape play surfaces. Schools like Josiah Quincy offer opportunities to consider cooling strategies like green spaces, shade structures, cool pavement, and cool roofs.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 5.5: COOL SCHOOLS

INDOOR COOLING NETWORK

One concern voiced by Chinatown residents during the planning process was that a lack of larger, free, indoor cool places. Chinatown has one BCYF center (BCYF Quincy) and a temporary library in the China Trade Center. BCYF Quincy was not a designated city cooling center in 2021. The limited choices and space can create gaps in accessing indoor cooling options. Indoor cooling options, including options for evening respite, are especially important given the neighborhood's hot microclimate throughout the day and night. Expansions to the indoor cooling network can include a mix of public and community cooling options, such as enhancing or expanding City-run cooling centers or working with community organizations to identify additional options.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.2: ENHANCED AND EXPANDED CITY-RUN COOLING CENTERS

STRATEGY 2.3: CITYWIDE COOLING NETWORK

RESILIENT DESIGN FOR NEW DEVELOPMENT

Like many Boston neighborhoods, Chinatown has been experiencing increasing development pressures in many parts of the neighborhood. Chapter 6 of this document includes three strategies related to development review, zoning, and heat resilience design guidelines. Development review could provide opportunities to consider how building massing affects the local microclimate and airflow. Continuing to support and expand affordable housing options is a priority throughout the City.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 8.1: UPDATED CLIMATE RESILIENCY CHECKLIST

STRATEGY 8.2: HEAT RESILIENCE BEST PRACTICE GUIDELINES

STRATEGY 8.3: ZONING REVISIONS TO SUPPORT COOLER NEIGHBORHOODS

DORCHESTER

**UPHAM'S
CORNER**



**CODMAN
SQUARE**



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NEIGHBORHOOD CONTEXT

Dorchester's neighborhoods, squares, and corridors have diverse heat experiences, including pockets of high heat.

With more than 126,000 residents and over six square miles, Dorchester is the largest neighborhood in Boston.¹³ It is often described as a neighborhood of smaller neighborhoods, each with their own distinct characters. Commercial districts like Upham's Corner, Fields Corner, and Codman Square are knit together by residential neighborhoods characterized by the triple-decker buildings for which the neighborhood and city is known.

One of the most diverse neighborhoods, 34% of residents are foreign-born.¹⁴ Dorchester is home to Caribbean, Cape Verdean, Irish, Polish, and Vietnamese communities. Public transportation and highway access has significantly shaped development patterns in Dorchester. In the 1950s, the Old Colony Line railway was replaced by the Southeast Expressway.¹⁵ During this period, these investments displaced the residents of the adjacent areas and reduced transit access for Dorchester residents. Redlining and blockbusting activities contributed to population decline, and Dorchester's population shrank from 162,000 people in 1950 to 101,000 people

in 1980.¹⁶ Residents raised their voices to secure recent investments in the Fairmount Indigo Rail Line and associated Station Area planning efforts that aim to reconnect Dorchester with Downtown Boston and guide sustainable development to support current residents and business owners.¹⁷

Dorchester is also dealing with escalating flood risk.. Up to 20% of the land area in Dorchester has a 1% annual risk of flooding in a future where Boston experiences 36 inches of sea level rise.¹⁸ Coastal and riverine flood risks affect residential, commercial, and industrial land, including community assets like libraries, schools, and other facilities that can be places where people seek help or shelter during heat and other climate-related emergencies.¹⁹

Housing costs have increased rapidly, with median housing costs increasing 38% between 2010 and 2015.²⁰ Over that same period, median household income only rose 3%.²¹ Local community groups have created a narrative around displacement that weaves together the economic displacement that they are currently experiencing with the future possibility of climate displacement and are trying to identify strategies that address both challenges.

RECENT AND ONGOING PLANNING EFFORTS

- » PLAN: Newmarket, the 21st Century Economy Initiative
- » Dorchester Avenue Project
- » Upham's Corner Implementation
- » Fairmount Indigo Planning Initiative
- » PLAN: Glover's Corner, Dorchester
- » Columbia Point Master Plan

- Parks
- Greenways
- Roads
- Major Roads
- MBTA Red Line
- MBTA Commuter Rail
- T MBTA Station

COMMUNITY ASSETS

- 📖 School
- 📖 Libraries
- P Police Station
- 🚒 Fire Station
- + Hospital
- HC Community Health Center
- 1 Grove Hall Senior Center
- 2 Holland Community Center
- 3 Marshall Community Center
- 4 Perkins Community Center
- 5 Leahy/Holloran Community Center
- BHA Public Housing: Elderly/Disabled
- BHA Public Housing: Family

Dorchester is rich with community and regional amenities and landmarks. It is home to several distinct neighborhoods, each with their own character, and UMass Boston, the JFK Library, and the Edward M. Kennedy Institute.



HEAT ANALYSIS

Areas of Dorchester experience temperatures that exceed Boston's median temperatures.

Dorchester's daytime and nighttime median temperatures measured 100.9°F and 82.6°F, respectively, in the heat analysis. These temperatures are about 1°F hotter than the city's median (99.5°F and 81.9°F, respectively). However, some parts of the neighborhood, including residential areas and commercial centers, experience much hotter days and nights. For example, areas around Newmarket and South Bay Center showed the highest daytime and nighttime temperatures in the neighborhood: 105°F in the day, cooling to 84°F overnight.

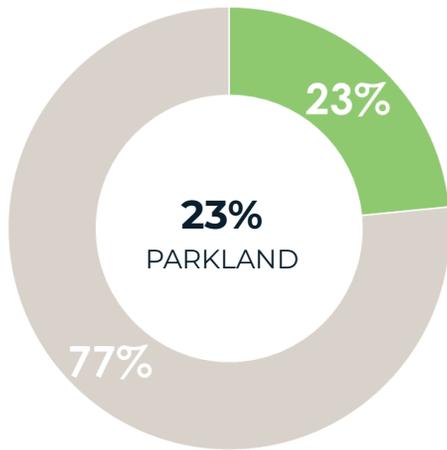
Dorchester's hotter microclimates are a result of several factors, including less green space, building characteristics, and impermeable surfaces.

The areas with a relative lack of green space and trees have less natural air cooling than many other parts of Dorchester and Boston. In addition, large commercial buildings with many dark roofs further absorb heat, contributing to hot indoor and outdoor air temperatures. Impervious surfaces make up 58% of Dorchester's land area. The locations of pervious surfaces and tree canopy coverage closely align with the cooler areas in the neighborhood. Areas with more impervious surface, especially unshaded pavement and large parking lots, align with the hotter areas of the neighborhood, like Newmarket and South Bay Center. Major infrastructure, such as I-93, several arterial roads, and rail lines, also contribute to heat in Dorchester.

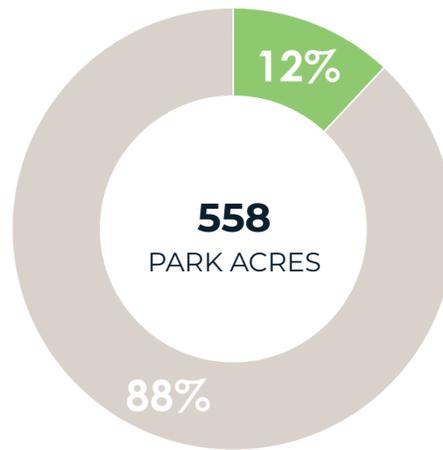
PARK ACREAGE AND LAND COVER COMPARISON

PARK ACREAGE

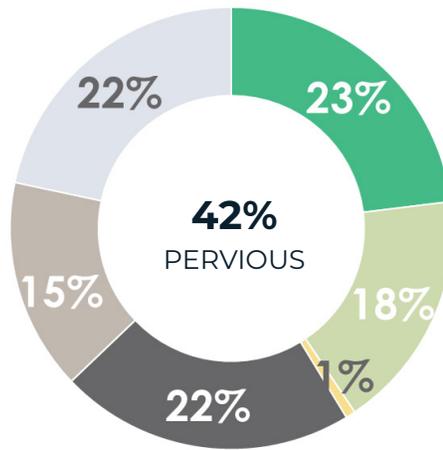
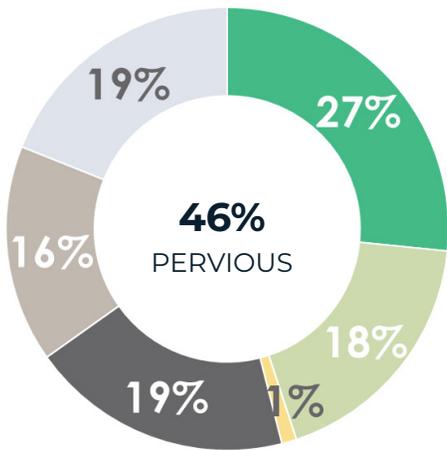
BOSTON



DORCHESTER

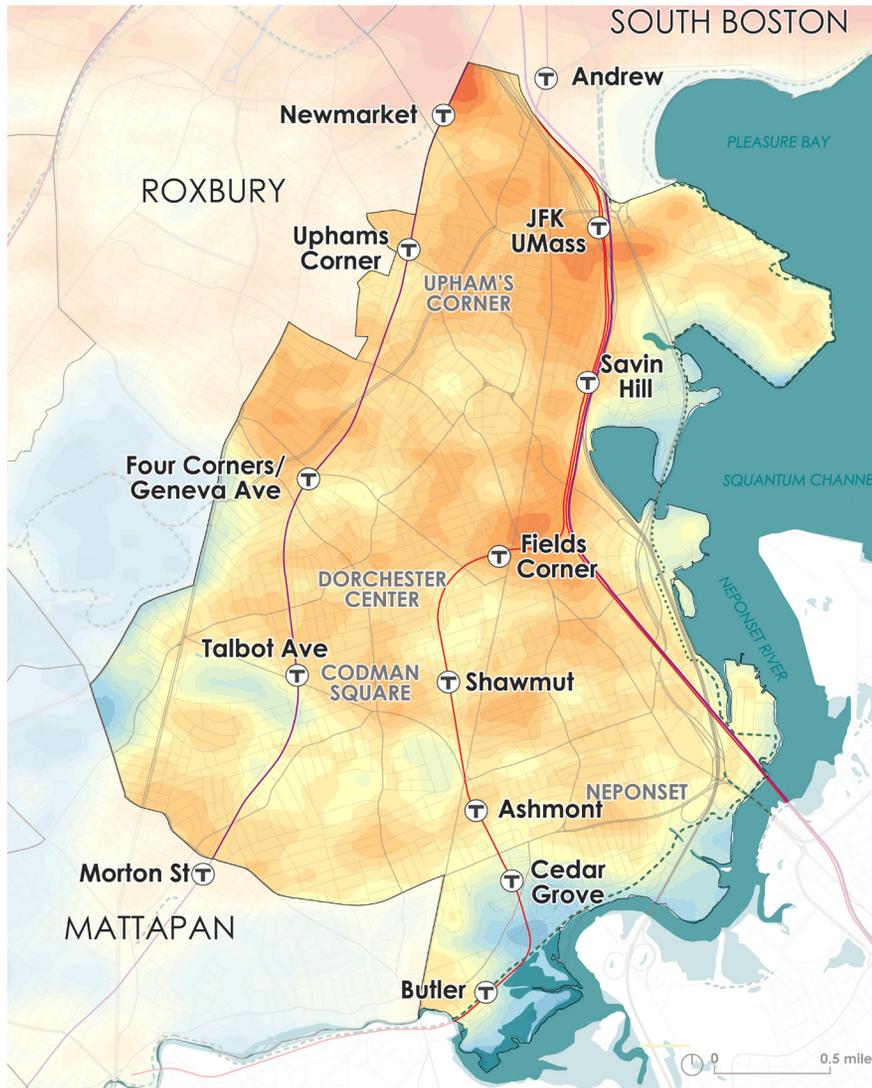


LAND COVER



- Tree Canopy
- Grass/Shrubs
- Bare Land
- Buildings
- Roads
- Other Paved Surfaces

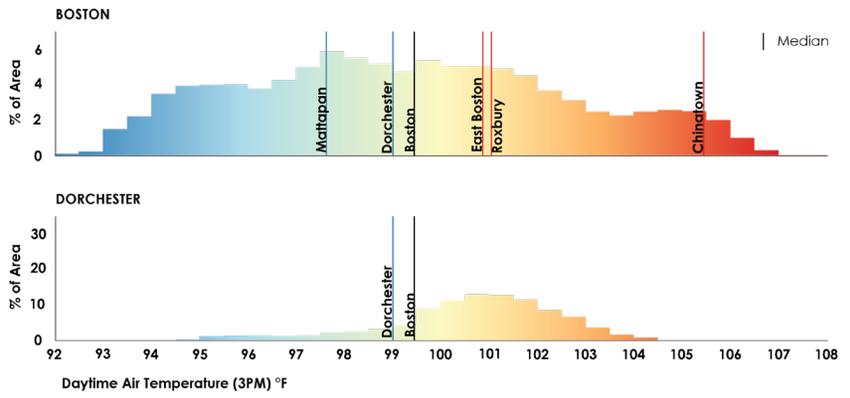
Data Source: Tree Canopy Assessment 2019, BPRD

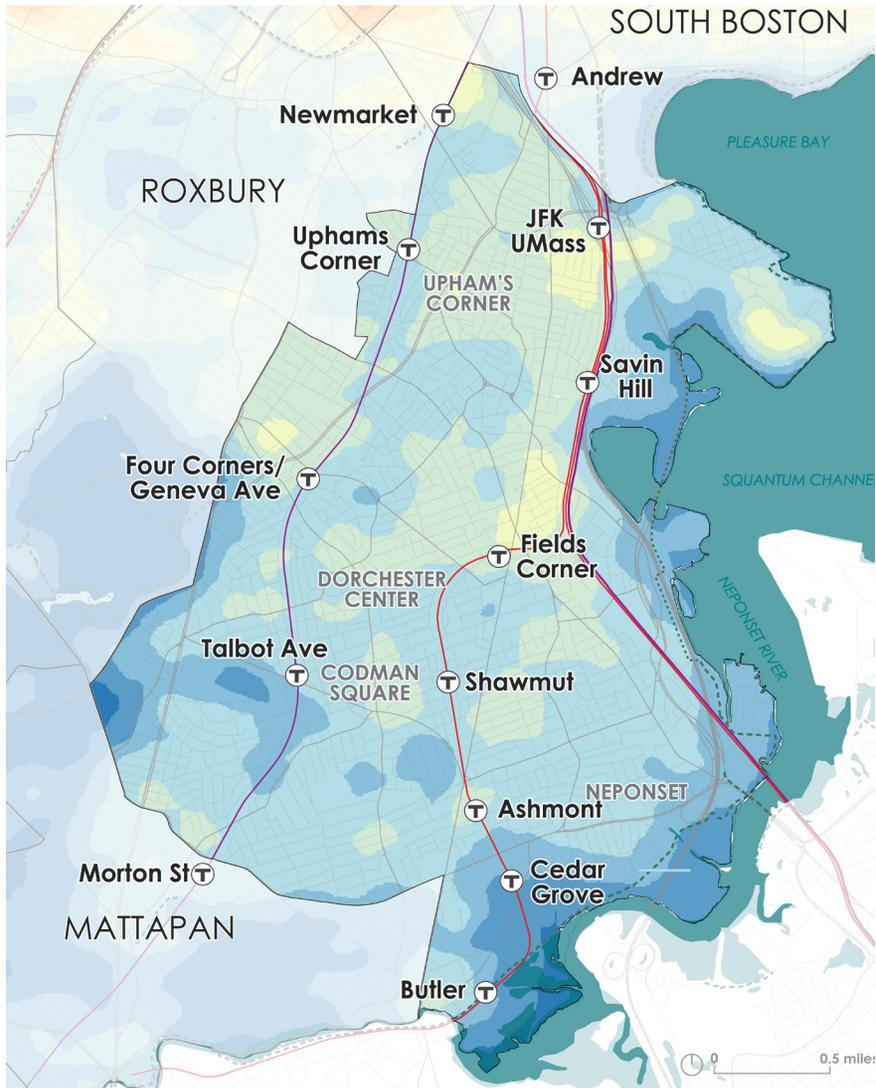


DAYTIME TEMPERATURES

Daytime Air Temperature (3 p.m.): Median neighborhood air temperature at 3 p.m. is about 1°F hotter than the Boston median.

3PM:
AIR TEMPERATURE

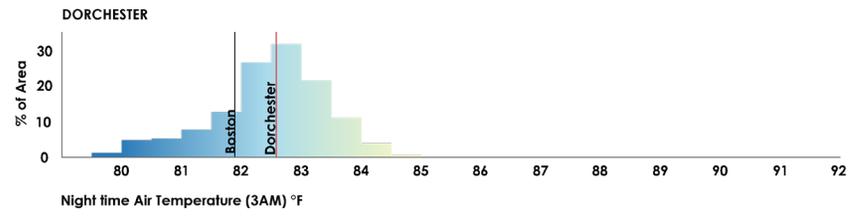




NIGHTTIME TEMPERATURES

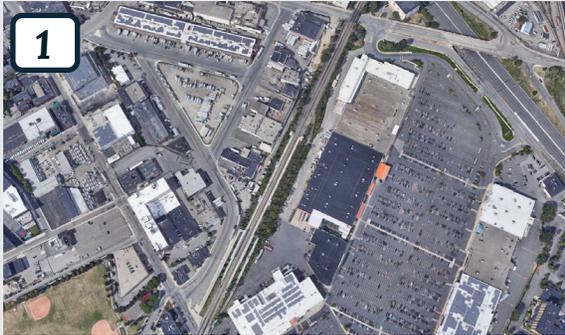
Nighttime Air Temperature (3 a.m.): Median neighborhood air temperature at 3 a.m. is less than 1°F hotter than the Boston median.

3AM:
AIR TEMPERATURE



SAMPLE OF HEAT FINDINGS

These three areas illustrate examples of how Dorchester's land use affects daytime and nighttime temperatures, based on the citywide heat analysis.



1. LARGE COMMERCIAL AND INDUSTRIAL BUILDINGS

Large commercial buildings with black roofs and black asphalt surfaces, like those found in Newmarket, heat up during the day, but the relatively low density building forms allow heat to radiate and dissipate at night. Nearby interstates, like I-93, also absorb a lot of heat during the day and contribute to heating the surrounding neighborhood. The limited green spaces and tree canopy in this area means that there is not as much shade and evapotranspiration to help mitigate rising air temperatures.



2. MIXED-USE COMMERCIAL DISTRICTS

Clusters of large mixed-use buildings with dark roofs, as found in Four Corners, absorb heat during the day. This and other similar zero-setback commercial areas can have limited tree canopy coverage shading sidewalks, so the asphalt streets heat up during the day and create hotter conditions for pedestrians. The density patterns and some vegetation help Four Corners cool off at night.



3. MULTI-WAY INTERSECTIONS

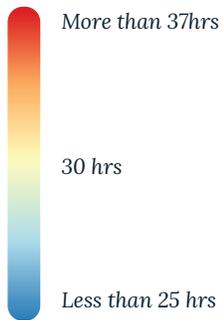
Multi-way intersections, as found in Codman Square and other neighborhood destinations, have a lot of pavement due to several major roadways and intersections. These areas often also have larger buildings with black roofs. Like in other kinds of mixed-use commercial districts, tree canopy coverage is mostly limited to backyards, leaving streets exposed to the sun during the day. The lower density and building heights help the area cool off at night.

AREAS EXPERIENCING LONGER HIGH-HEAT EVENTS

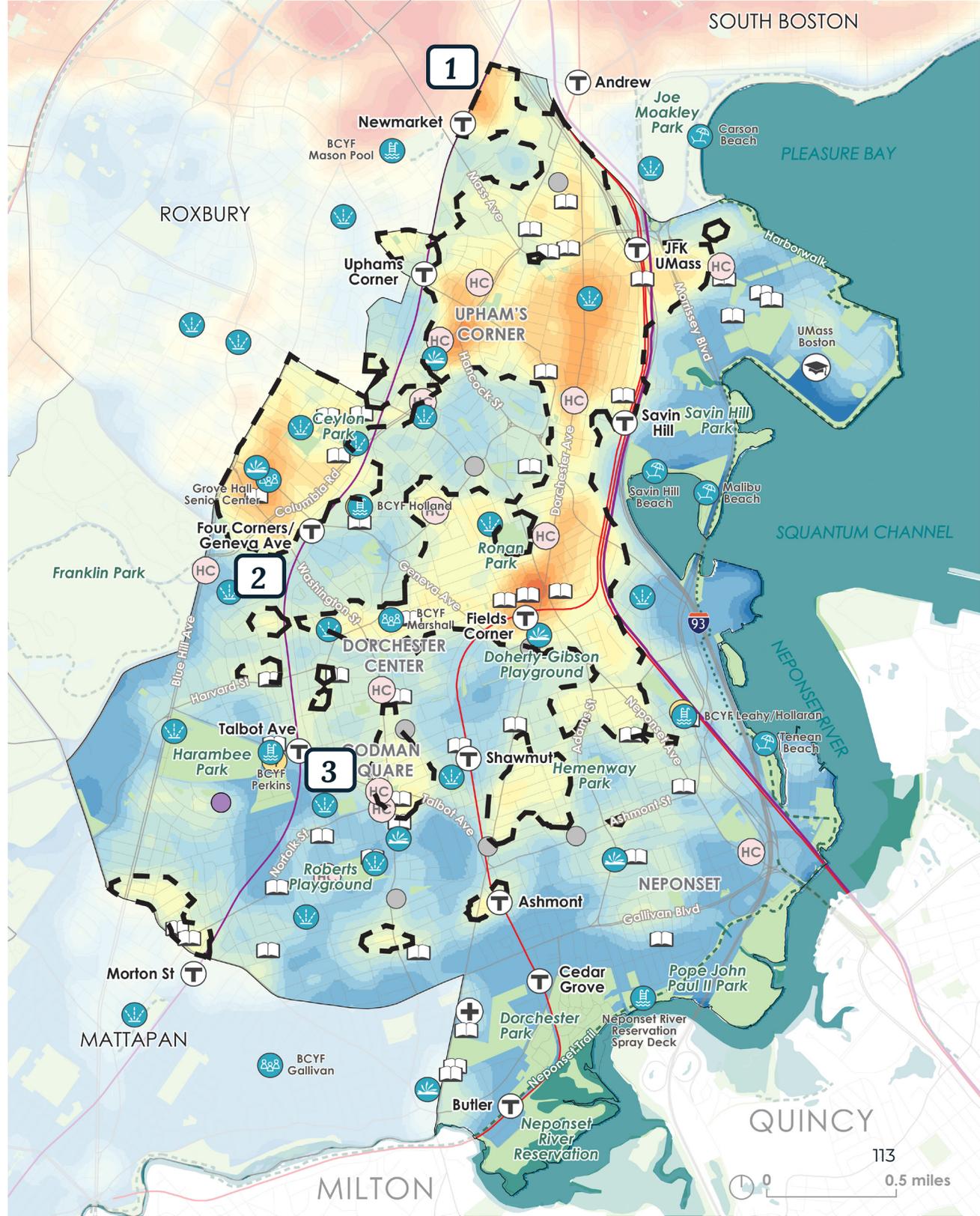
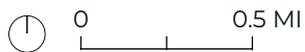
-  School
-  Hospital
-  Community Health Center
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family
-  Community Centers
-  Pools (BCYF and DCR)
-  Tot Sprays
-  Beaches
-  Libraries

Heat Event Duration is the sum of all the hours during the analysis week (a heat wave week in July 2019) that the local modeled heat index is above 95°F, for days that the nighttime temperature does not drop below 75°F.

HEAT EVENT HOURS



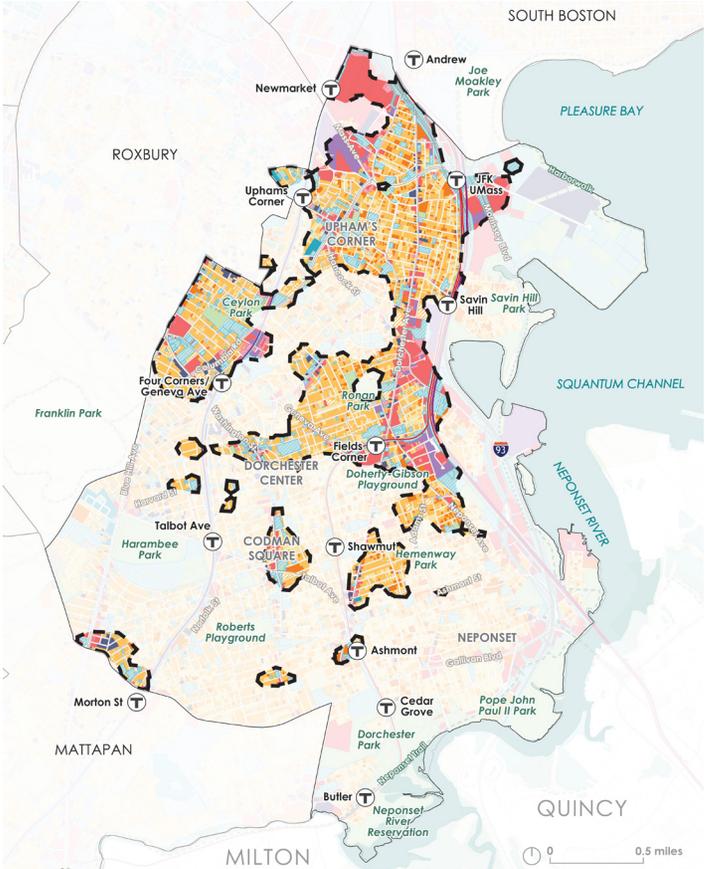
 Longest Heat Event (More than 30 hrs)



LAND USE AND PEOPLE

Residential and commercial corridors (like Dorchester Avenue) are the most common land uses in the areas of Dorchester that experience the most intense and longest heat events. This means that extreme heat affects a range of residents, transit riders, business patrons, and workers. There is higher population density in areas with longer heat exposure at high intensity, such as Upham’s Corner, Fields Corner, Four Corners, and Shawmut.

As described in Chapter 3, hot weather can create disproportionate health risks for some people, especially for those who are younger or older, who have preexisting health conditions, or who are exposed to heat for longer periods of time. In Dorchester, young children (under 5 years) make up 6% of neighborhood residents (compared to 5% citywide), and older adults (over 65 years) make up 12% of neighborhood residents (same as the citywide percentage).²⁴ Of Dorchester residents, 24% are low-income (compared to 16% citywide), and 64% of housing units are renter-occupied (same as the citywide percentage).²⁵ Low-income residents and renters may face barriers to home retrofits or affording cooling options.



Data Source: Analyze Boston

Land Use Map: The hottest and most intense areas of Dorchester are mainly residential, with main commercial corridors, like Dorchester Avenue

LAND USE

- Single-family Housing
- Multi-family Housing
- Apartment (7+ Units)
- Condo
- Mixed Use
- Residential Land
- Commercial
- Commercial Land
- Industrial
- Exempt (Chapter 121A)
- Exempt

Longest Heat Event (More than 30 hrs)

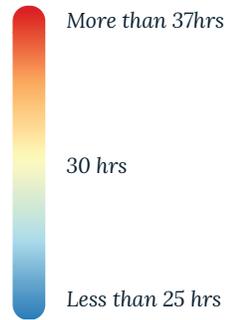
0 0.5 MI

POPULATION DENSITY AND
HIGH-HEAT EVENT DURATION

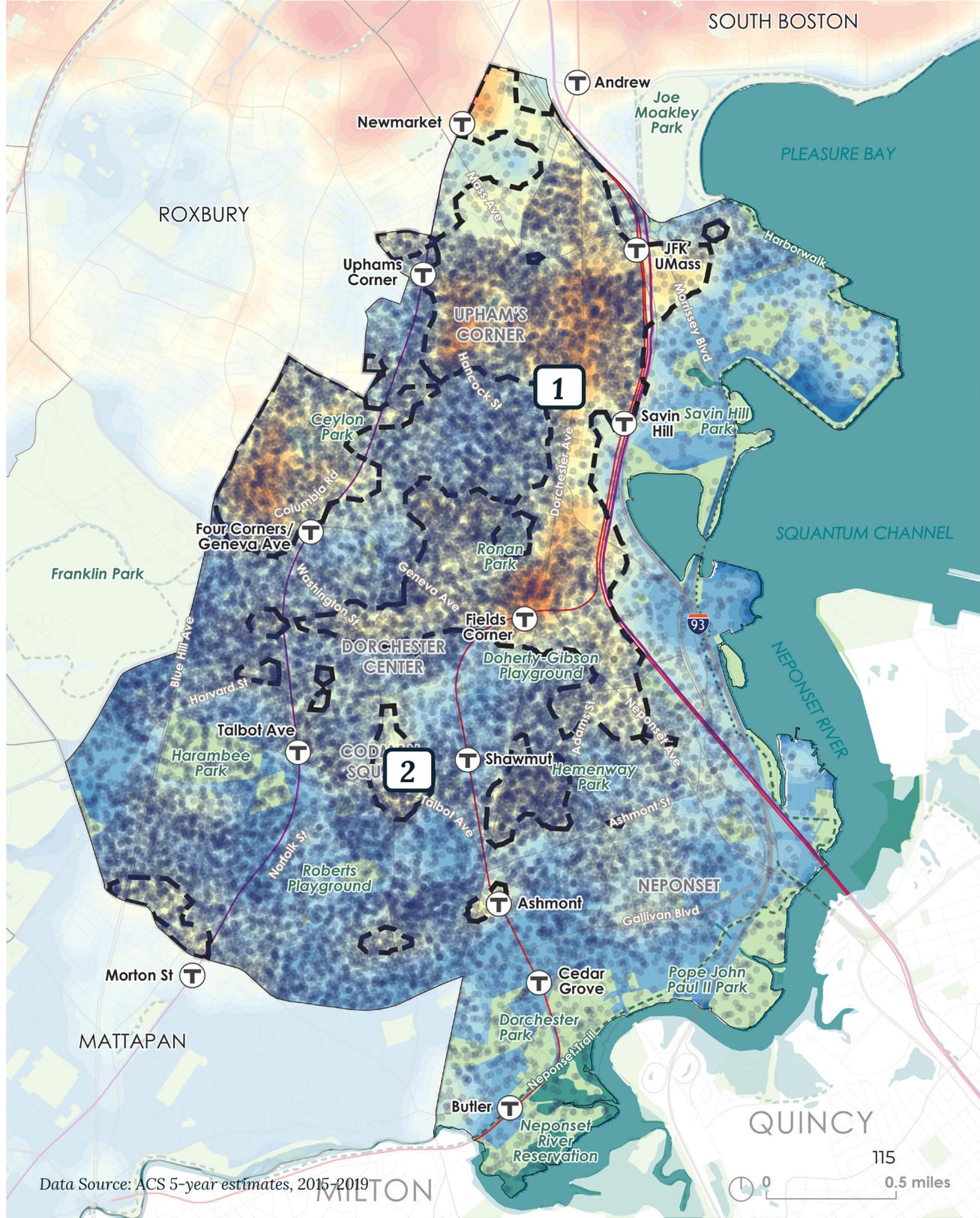
Higher density in areas with longer heat exposure and intensity including Upham's Corner, Fields Corner, Four Corners, and Shawmut

1 DOT = 5 PEOPLE

HEAT EVENT HOURS



 Longest Heat Event
(More than 30 hrs)



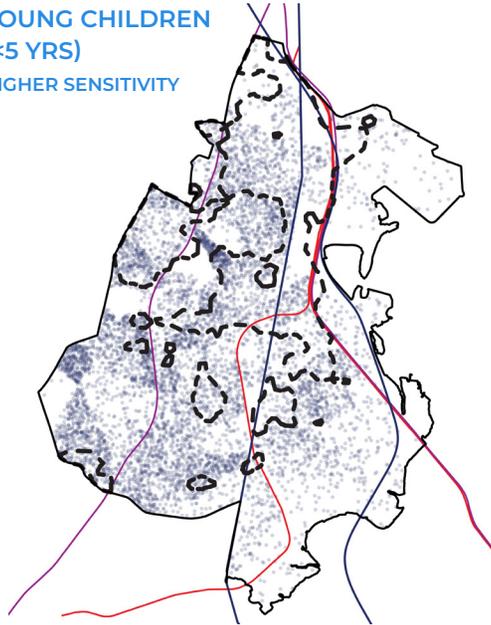
Data Source: ACS 5-year estimates, 2015-2019



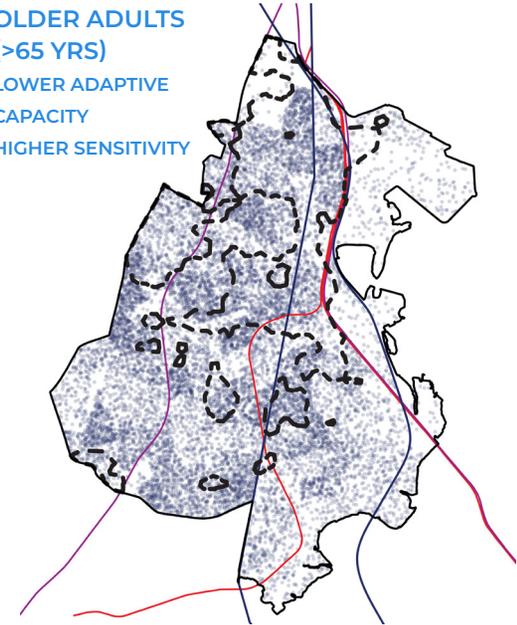
RESIDENT DEMOGRAPHICS AND HEAT DURATION

The following maps compare the density of Dorchester residents to areas with the longest duration event in the heat analysis. Due to longer heat event duration and higher heat intensity, heat risk may be higher for residents in certain areas. For example, Fields Corner experiences long heat events (33 hours) 4 hours above the neighborhood median (29 hours), and is 6°F hotter than Franklin Park. Other areas that experience long heat event duration and high heat intensity include Four Corners (29 hours, 4.2°F), Upham's Corner (30 hours, 5.2°F), Newmarket (31 hours, 5.5°F), and along the Dorchester Avenue corridor (34 hours, 6°F).

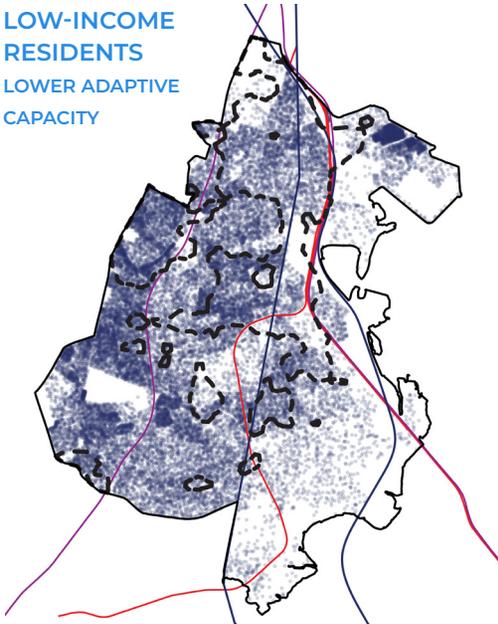
YOUNG CHILDREN (<5 YRS) HIGHER SENSITIVITY



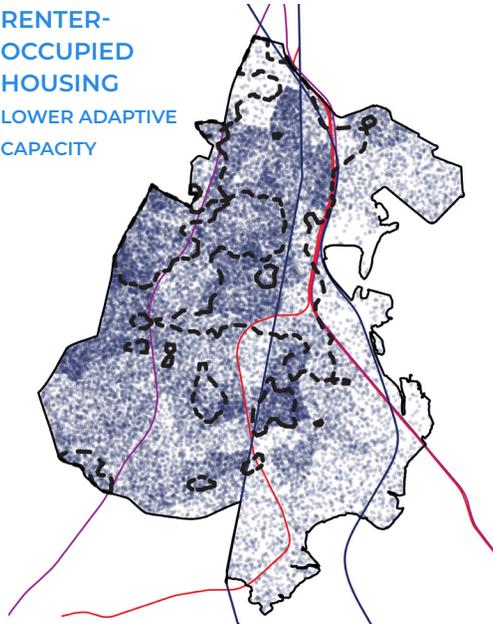
OLDER ADULTS (>65 YRS) LOWER ADAPTIVE CAPACITY HIGHER SENSITIVITY



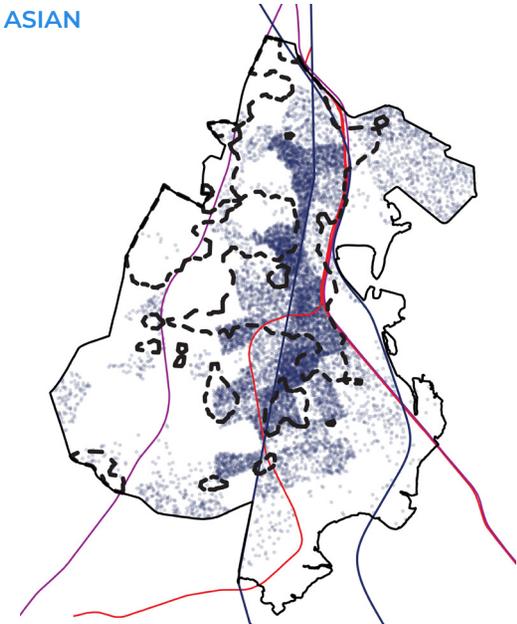
LOW-INCOME RESIDENTS LOWER ADAPTIVE CAPACITY



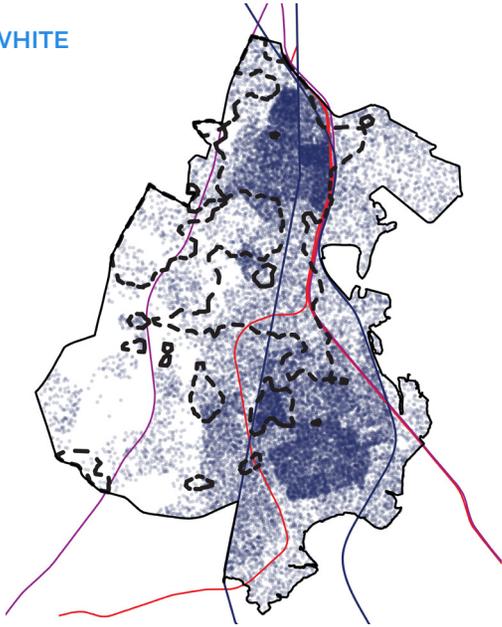
RENTER- OCCUPIED HOUSING LOWER ADAPTIVE CAPACITY



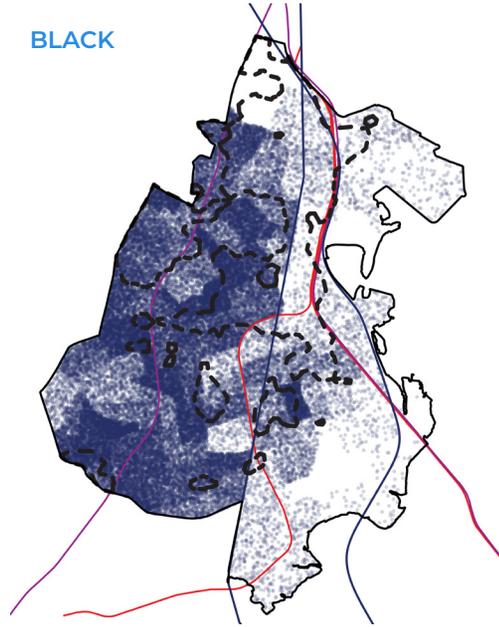
ASIAN



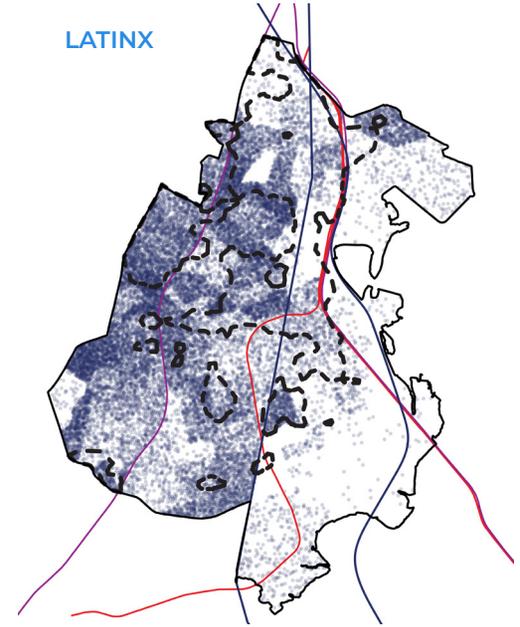
WHITE



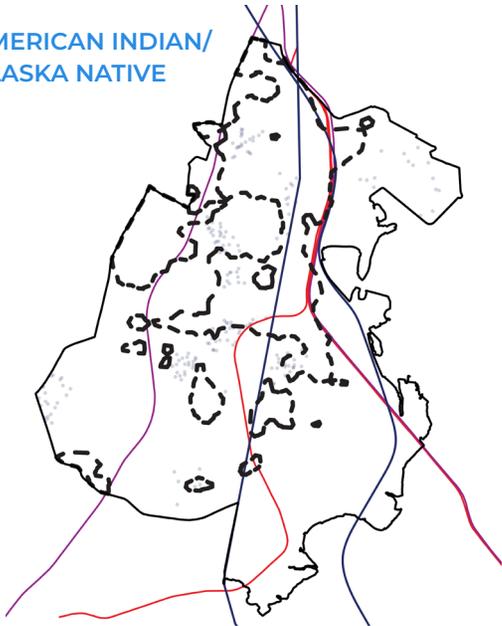
BLACK



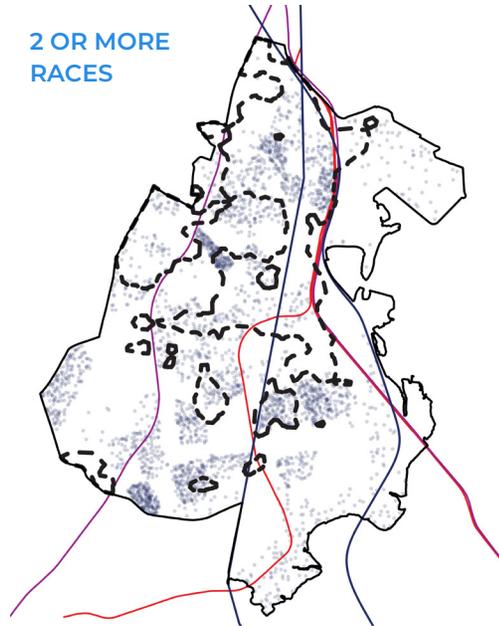
LATINX



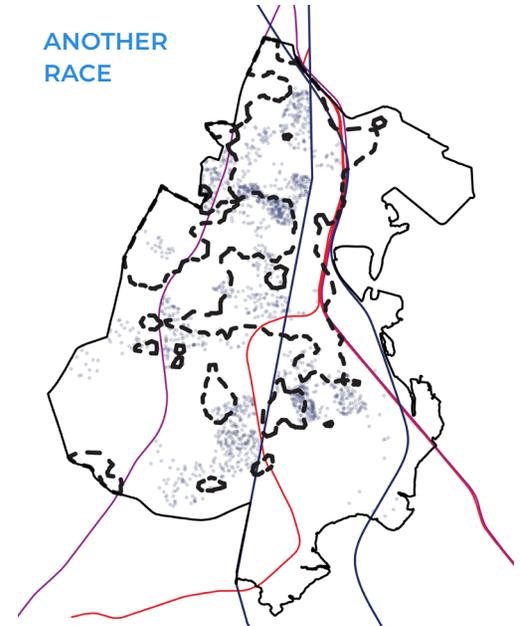
AMERICAN INDIAN/
ALASKA NATIVE



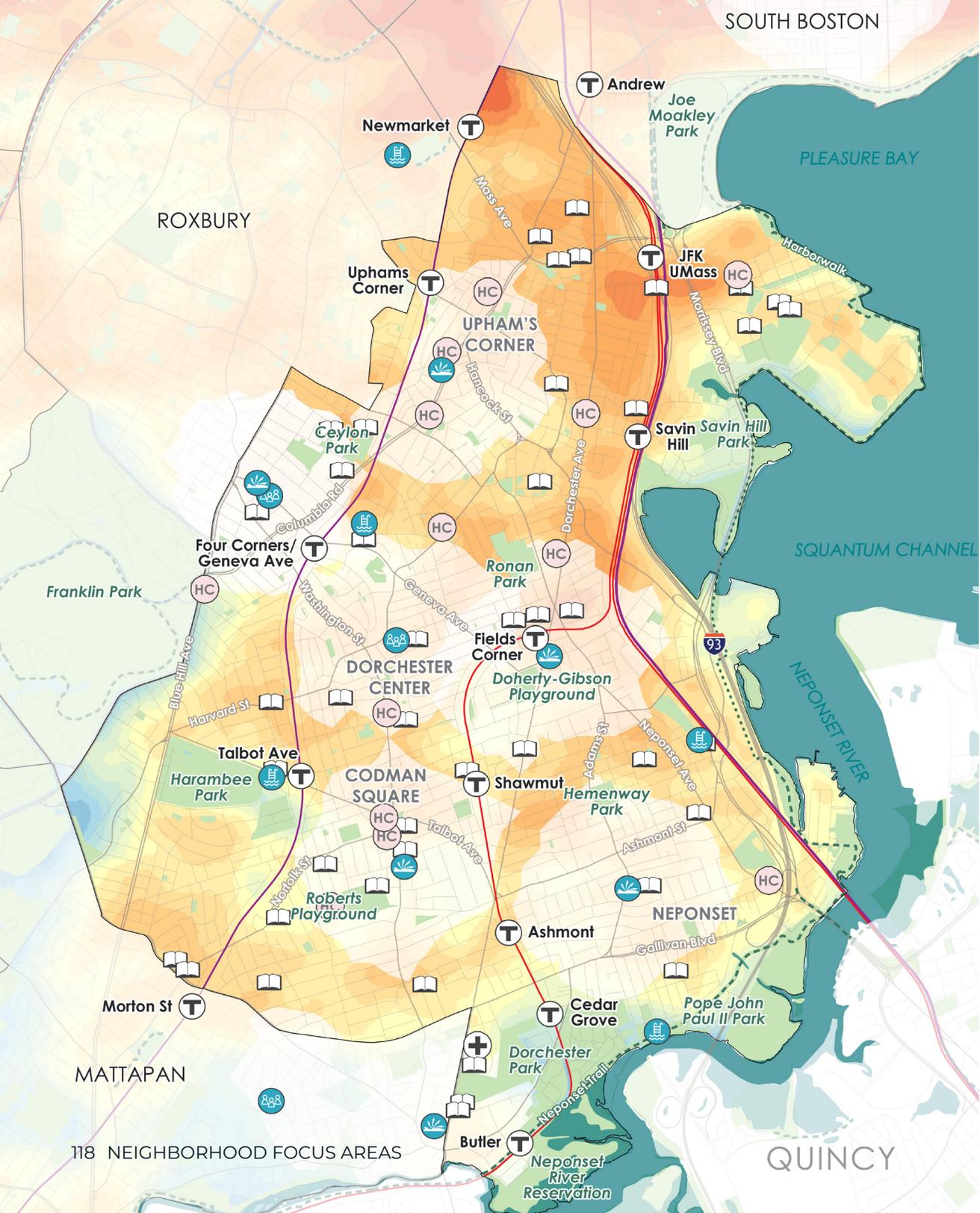
2 OR MORE
RACES



ANOTHER
RACE



Data Source: ACS 5-year estimates, 2015-2019
 [] Longest Heat Event (More than 30 hrs) 1 DOT = 1 PERSON



GAPS IN INDOOR COOLING NETWORK

- School
- Hospital
- Community Health Center
- BHA Public Housing: Elderly/Disabled
- BHA Public Housing: Family
- Indoor Cooling Center
- Pools (BCYF and DCR)
- Tot Sprays
- Beaches
- Libraries

Areas masked in white are within a 10-minute walk of indoor cooling centers and libraries. Areas in orange red experience extreme heat during heat waves, and are not within a 10-minute walk of an indoor cooling center or a library.ⁱ

3PM:
AIR TEMPERATURE



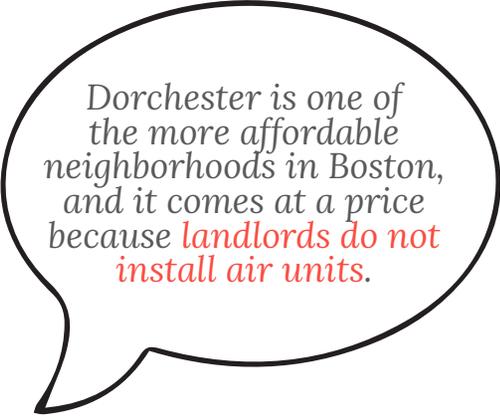
ⁱ BCYF Summer 2020 Cooling centers were used for this map.



COMMUNITY HEAT EXPERIENCES AND COOLING IDEAS

HEAT EXPERIENCES

Dorchester residents discussed their heat experiences and cooling ideas during the Neighborhood Ideas Workshop and through responses to the citywide survey. Areas of concern mentioned by participants included the cost of staying cool at home, the ability to access indoor cooling options outside of the home, the effects of new development on heat and green space, and the impacts of heat on outdoor workers, older adults, and people experiencing homelessness.



Dorchester is one of the more affordable neighborhoods in Boston, and it comes at a price because **landlords do not install air units.**

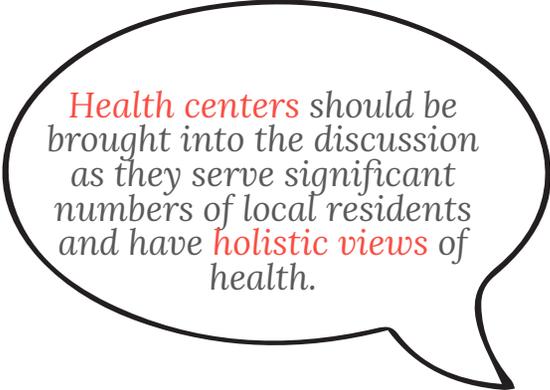


Walking to parks is very hot, even if parks themselves are cooler.

COMMUNITY COOLING IDEAS

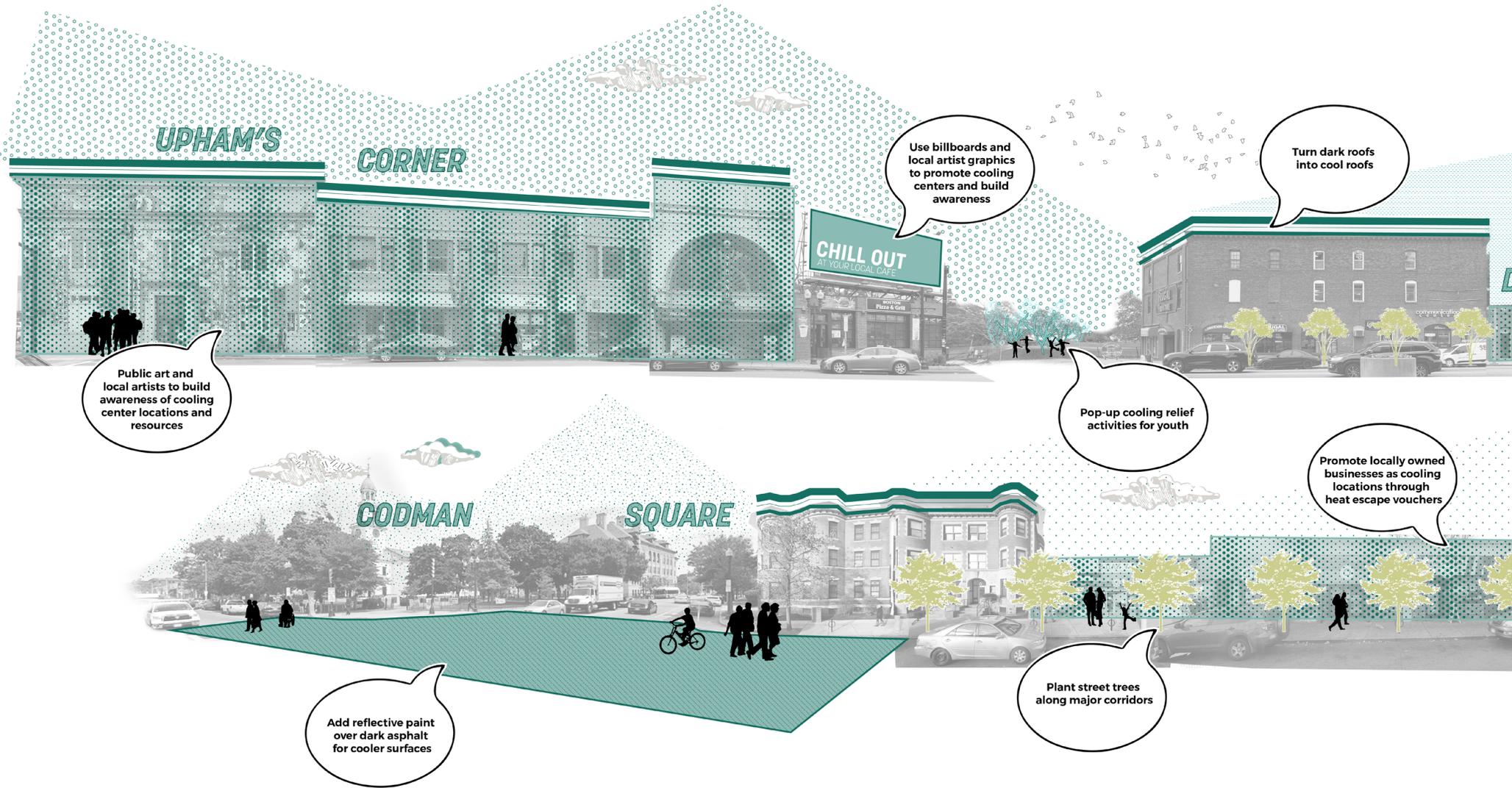
Dorchester residents suggested cooling strategies that expand access to cooling at home and in the neighborhood and increase cool outdoor spaces. Participants shared the following ideas to increase access to cooling in Dorchester:

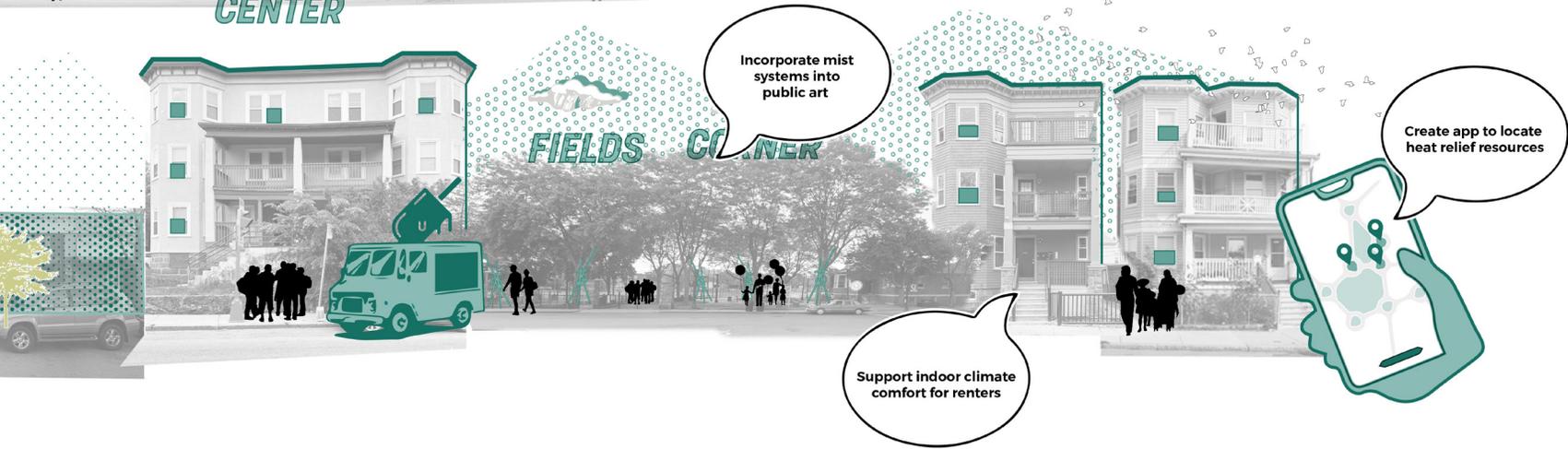
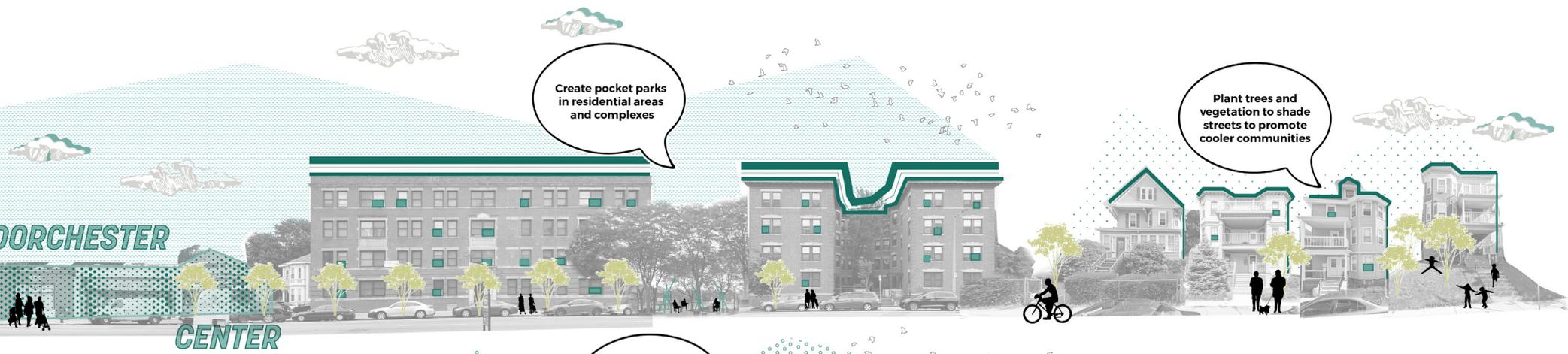
- » **Cool Accessible Parks:**
Additional shade elements and hydration stations in parks paired with digital wayfinding tools to help identify nearby open spaces
- » **Public Cooling Centers:**
Opportunities to integrate public art and community engagement at Cool Spots and cooling centers
- » **Affordable Ways to Stay Cool at Home:**
Opportunities to expand awareness about energy and utilities assistance programs to overcome challenges of staying cool at home and the cost of using air conditioning



Health centers should be brought into the discussion as they serve significant numbers of local residents and have **holistic views** of health.

OPPORTUNITIES FOR A COOLER DORCHESTER





HEAT RESILIENCE OPPORTUNITIES

This section describes key needs for heat reduction or increasing access to cooling resources and opportunities to integrate resilience, based on neighborhood-level heat analysis and community feedback.

While all the strategies may be relevant to each neighborhood, each section lists specific heat resilience strategies that respond to the particular needs that have been identified. More details on the strategies listed below can be found in Chapter 6: Citywide Heat Resilience Strategies.

COOL STREETS CONNECTING LOCAL DESTINATIONS AND MAIN STREETS

Major streets that link neighborhood destinations could be opportunities for more shade and cooling strategies, including shaded bus stops. Roads that had higher heat temperatures measured in the heat analysis include Dorchester Avenue, Columbia Road, Geneva Avenue, Neponset Avenue, Adams Street, Washington Street, Blue Hill Avenue, Bowdoin Street, and streets around Codman Square.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 7.1: COOL COMMUTES

STRATEGY 7.3: COOL MAIN STREETS

COMMERCIAL BUILDINGS WITH COOL ROOFTOPS AND COOL SOCIAL SPACES

Newmarket and South Bay Center in the northwest corner of Dorchester have expansive surface parking lots with limited vegetation, contributing to heat exposure in this area. Opportunities to mitigate heat include cool roofs, shaded bus stops, shaded parking lots, vegetation, and light surfaces.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 5.2: COOL ROOFS PROGRAM

RESILIENT DESIGN FOR NEW DEVELOPMENT

Like many Boston neighborhoods, Dorchester has been experiencing increasing development pressures in many parts of the neighborhood. Chapter 6 of this document includes three strategies related to development review, zoning, and heat resilience design guidelines. Development review could provide opportunities to consider how building massing affects the local microclimate. Continuing to support and expand affordable housing options is a priority throughout Boston

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 8.1: UPDATED CLIMATE RESILIENCY CHECKLIST

STRATEGY 8.2: HEAT RESILIENCE BEST PRACTICE GUIDELINES

STRATEGY 8.3: ZONING REVISIONS TO SUPPORT COOLER NEIGHBORHOODS

COOL HOMES

As development pressure in Boston continues to build, residents of Dorchester are experiencing rising rents and home prices as housing demand continues to outpace supply. Sharing resources about subsidized home energy retrofits with homeowners and landlords could support energy efficiency retrofits. These improvements can help reduce energy bills, as air conditioning does not need to be in use as frequently or for as long a time.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 5.1: HOME COOLING RESOURCES DISTRIBUTION

STRATEGY 5.3: HOME ENERGY RETROFITS

STRATEGY 5.4: AFFORDABLE HOUSING RESOURCES AND RETROFITS

MORE SHADED GATHERING SPACES WITH NATURAL PLAY SPACE

Although parks generally help cool their surroundings, some parks that have fewer trees or more hardscape surfaces can have less of a cooling effect. Ceylon Park, which includes an artificial turf field, measured approximately 101°F during the day in the heat analysis, 4°F higher than Harambee Park. Ronan Park measured approximately 102°F in the heat analysis. Upham's Corner, Four Corners, Fields Corner, and Codman Square were all hotter areas in the heat analysis. More vegetation, pocket parks, or shaded outdoor gathering spaces could be opportunities to provide relief from the heat in these areas.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.1: POP-UP HEAT RELIEF

STRATEGY 6.1: ENHANCED COOLING IN POCKET PARKS AND STREET-TO-PARK CONVERSIONS

STRATEGY 6.4: PLANNING FOR FUTURE PARKS

EAST BOSTON

LOGAN AIRPORT

CENTRAL SQUARE

EAST BOSTON WATERFRONT

EAST BOSTON MEMORIAL PARK

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**EAST
BOSTON
GREENWAY**



**BELLE ISLE
MARSH**



**MAVERICK
SQUARE**

NEIGHBORHOOD CONTEXT

East Boston experiences a range of heat experiences, shaped by its geographic context, development pattern, and neighborhood history. Waterfront areas enjoy cooling coastal breezes, while inland neighborhoods, squares, and corridors are hotter.

Approximately 46,000 people live in East Boston today,²⁶ with over 50% of the population consisting of immigrants, the largest immigrant population of any neighborhood in Boston.²⁷ For much of the 1900s East Boston was dominated by Italian immigrants whose descendants still live in the neighborhood popularly known as Eastie. The majority of current residents who immigrated to East Boston came from Spanish-speaking countries, such as El Salvador, Columbia, Guatemala, and the Dominican Republic. More than half of East Boston's households speak Spanish at home.

Formed by filling in land between five harbor islands, East Boston has dealt with the tension of development since its beginning. Most notably in 1923, the opening of what would become Logan

Airport has shaped the evolution of East Boston. Wood Island Park—a beloved park designed by Frederick Law Olmsted—was removed in the 1960s due to airport expansion.²⁸ The cooling effects of a large urban park (more than 10ha) can reduce temperatures by 1.8°F to 3.6°F within a quarter of a mile from the park boundary.²⁹ The high concentration of transportation infrastructure contributes to neighborhood air pollution from airplanes, truck traffic, and regional transportation routes.

East Boston has seen significant new development over the past fifteen years, especially along the waterfront in Jeffries Point and the edges of Eagle Hill. East Boston is one of Boston's neighborhoods that is most vulnerable to coastal flooding and sea level rise. Of the neighborhood's land area today, 38% could be exposed to flooding in a 1% chance storm. A 1% chance storm is a more severe coastal storm, similar to the winter storms of 2018, that has a 1% chance of occurring each year, based on historical data. With rising seas, the flooding from 1% chance storms is projected to increase over time, with 58% of East Boston's land area exposed in a 1% annual chance storm in 2070.³⁰

While residents of East Boston have always carried a disproportionate level of environmental burden

for the region, they have responded with the kind of neighborhood organizing across racial and cultural lines that have made them a strong voice in the environmental justice movement.

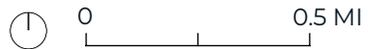
RECENT AND ONGOING PLANNING EFFORTS

- » PLAN: Downtown (Mayor's Office of Planning/BPDA)
- » Coastal Resilience Solutions: East Boston, Phase 2

-  Parks
-  Greenways
-  Roads
-  Major Roads
-  MBTA Blue Line
-  MBTA Silver Line
-  MBTA Station

COMMUNITY ASSETS

-  School
-  Libraries
-  Police Station
-  Fire Station
-  Community Health Center
-  Paris Street Community Center
-  Paris Street Pool
-  Pino Community Center
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family



HEAT ANALYSIS

East Boston's heat story varies between coastal areas and inland areas.

In the heat analysis, East Boston's daytime (3 p.m.) and nighttime (3 a.m.) median temperature showed 101°F and 81.5°F, respectively, and temperatures vary significantly across the neighborhood. The temperature in East Boston's waterfront areas are generally below the neighborhood median temperature while inland areas experience temperatures that are higher than the neighborhood median. The heat analysis found the hottest part of the neighborhood to be the Eagle Hill and Day Square areas, where daytime temperatures measured at 105°F, and nighttime temperatures measured at 85°F. In waterfront areas, coastal breezes and the proximity

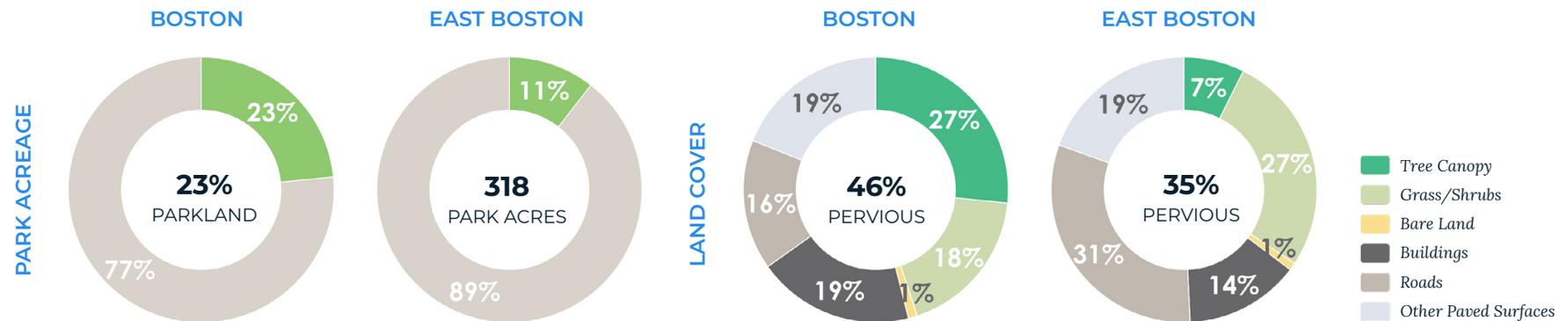
to the waterfront moderate temperature increases. Piers Park measured 93°F at 3 p.m., 12°F cooler than Eagle Hill and Day Square areas. Belle Isle Marsh provides a similar cooling effect on nearby areas. Although areas along the coast cool down at night, many residential areas of the neighborhood are still above the city median (daytime is 99.5°F, nighttime is 81.9°F).

The cooling effects of coastal breezes bring cooler air into the neighborhood at night. East Boston's street grid supports the flow of air through the neighborhood. Streets like Bennington, Chelsea, and Saratoga have a generally southwest to northeast alignment. This direction lines up with prevailing

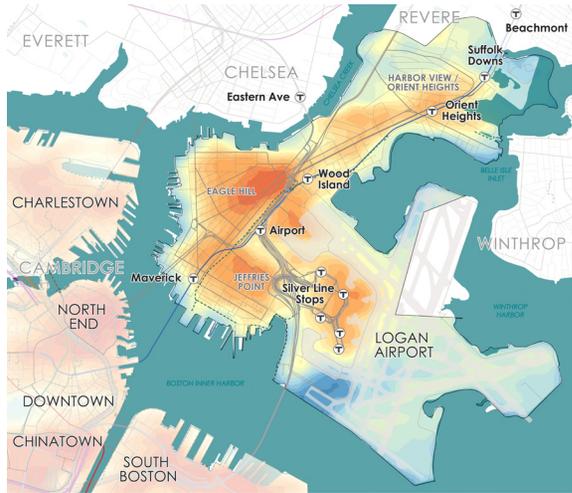
wind patterns in Boston's summer. When wind blows from the coast, it can travel up these streets in a more unobstructed manner, bringing cooler air deeper into the neighborhood.

Contributing factors for East Boston's heat experiences include land cover, arterial roadways, and building density.

East Boston has a higher percentage of impervious surfaces than the city as a whole at 65%. Parklands comprise 11% of the neighborhood's land cover, which include Belle Isle Marsh, East Boston Memorial Park, Mary Ellen Welch Greenway, Piers Park, and Constitution Beach.

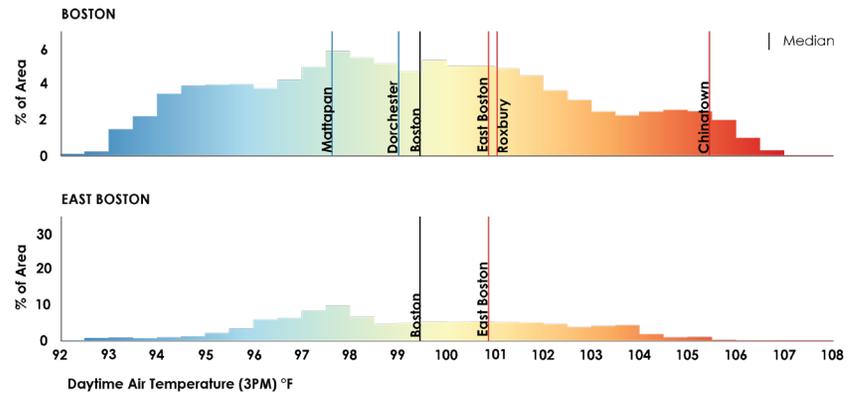


Data Source: Tree Canopy Assessment 2019, BPRD

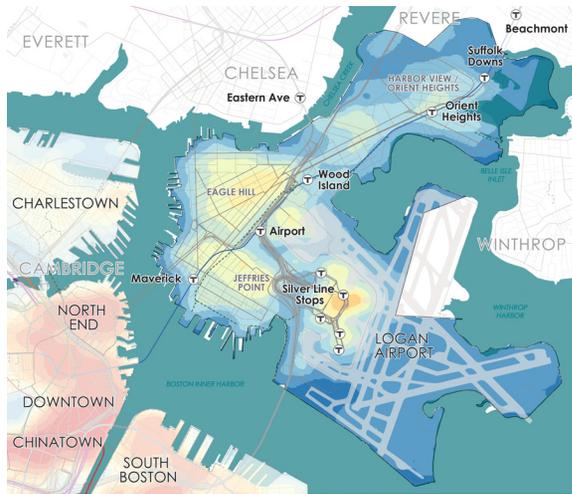


DAYTIME AIR TEMPERATURES

3PM:
AIR TEMPERATURE

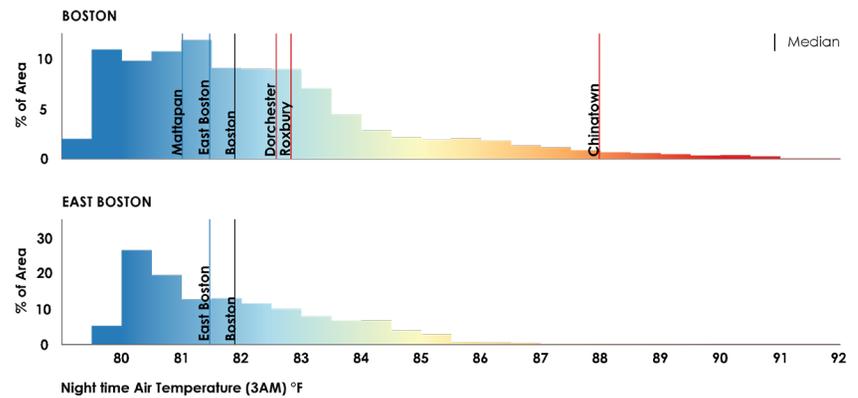
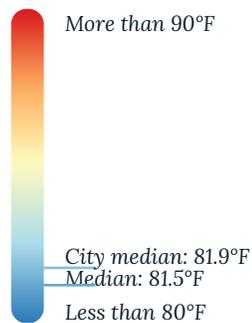


Daytime Air Temperature (3 p.m.): Median neighborhood air temperature at 3 p.m. is 1.5°F hotter than the Boston median.



NIGHTTIME AIR TEMPERATURES

3AM:
AIR TEMPERATURE



Nighttime Air Temperature (3 a.m.): Median neighborhood air temperature at 3 a.m. is less than 1°F cooler than the Boston median.



SAMPLE OF HEAT FINDINGS

These three areas illustrate examples of how East Boston's land use affects daytime and nighttime temperatures, based on the citywide heat analysis.



1. ROADWAY INTERCHANGES

Areas with lots of roadway interchanges and infrastructure, like Orient Heights, experience high daytime temperatures. During the evenings, cool air comes into the neighborhood from the coastal areas, bringing temperatures down.



2. MULTIWAY INTERSECTIONS

Neighborhoods with multiway intersections, like eastern Eagle Hill neighborhood and Day Square, have roadways, higher density, less vegetation, and parking lots that contribute to high daytime temperatures. These areas are some of the hotter residential areas at night because they are further from the coast, too far for waterfront breezes to bring cooler air into the area.



3. LARGE SURFACE PARKING LOTS

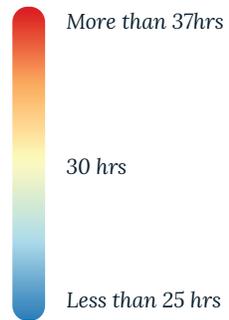
The areas around the Rental Car Center and north Jeffries Point neighborhood have large parking areas, large building footprints, and few street trees, contributing to high daytime air temperatures. The area's closer proximity to the coastal edge helps it cool down a bit more at night than the Eagle Hill neighborhood, but it is still one of the neighborhood's hotter areas at night.

AREAS EXPERIENCING LONGER HIGH-HEAT EVENTS

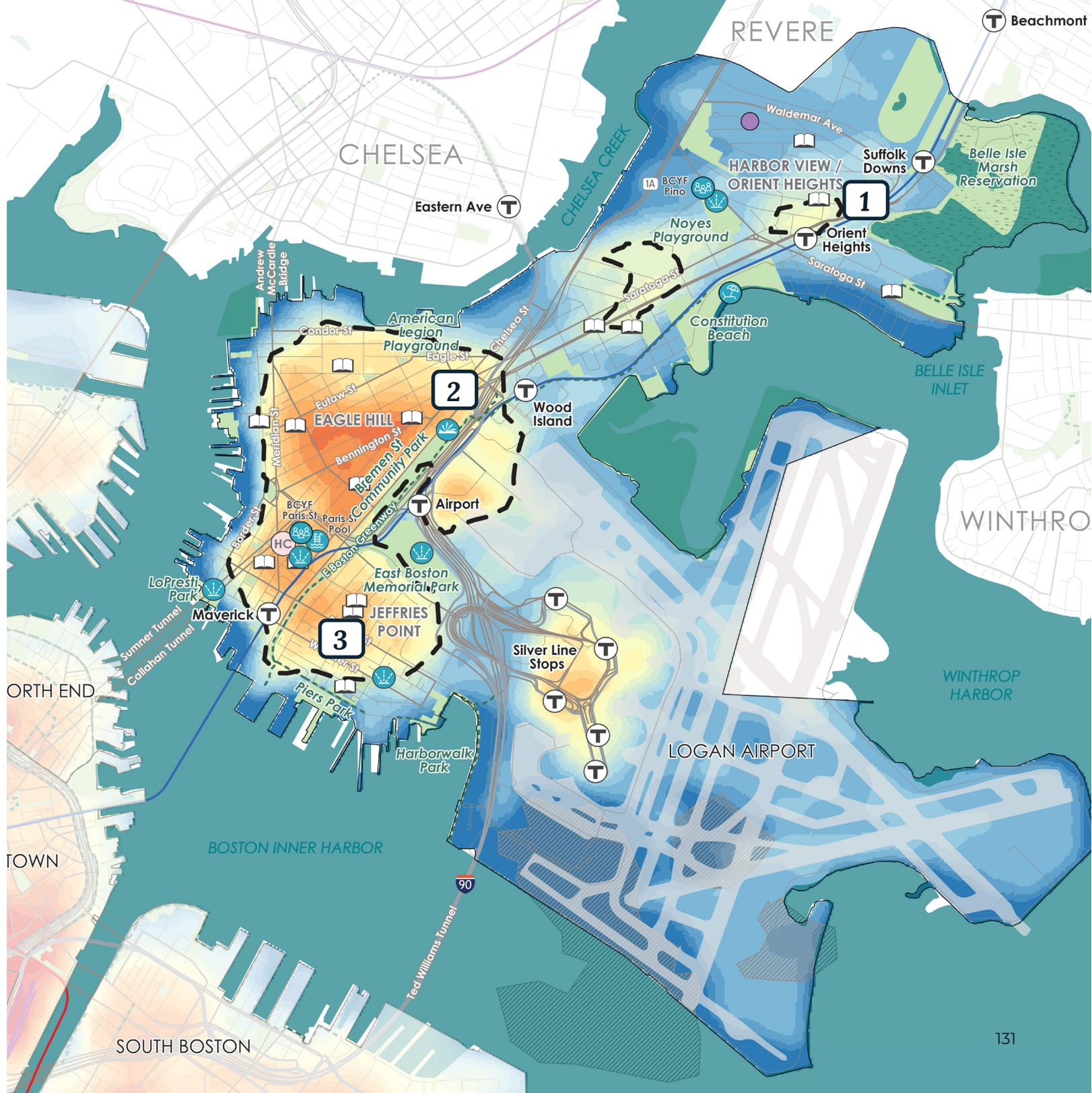
-  Schools
-  Community Healthy Center
-  Community Center
-  Pools (BCYF and DCR)
-  Tot Sprays
-  Beaches
-  Libraries

Heat Event Duration is the sum of all the hours during the analysis week (a heat wave week in July 2019) that the local modeled heat index is above 95°F, for days that the nighttime temperature does not drop below 75°F.

HEAT EVENT HOURS



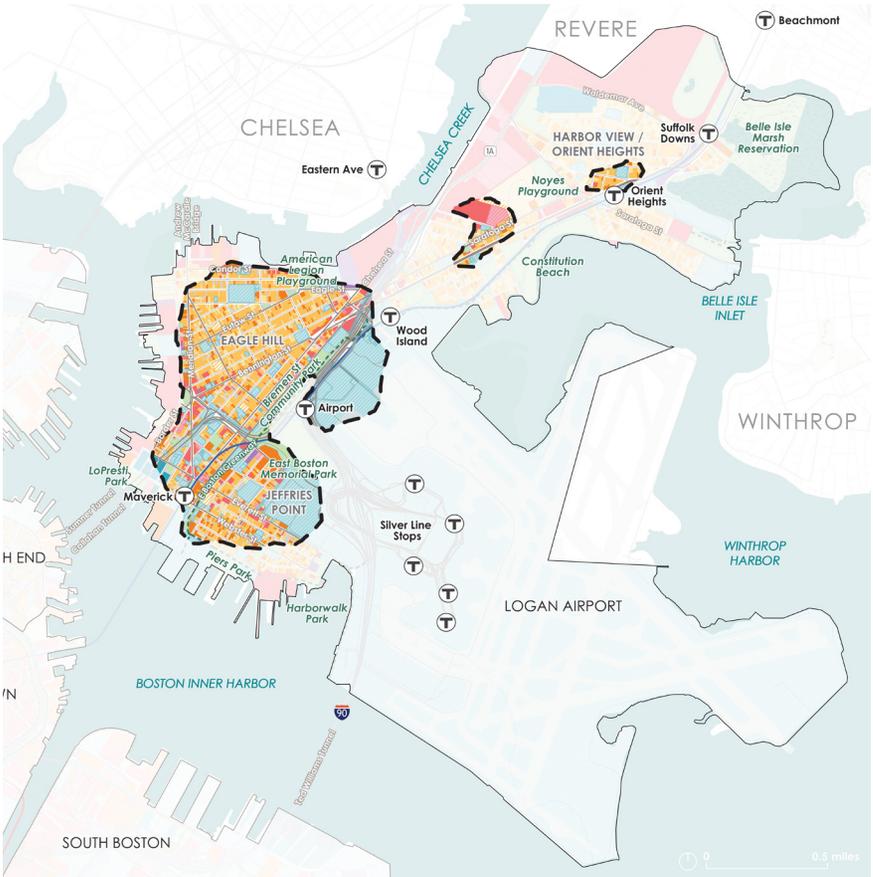
 Longest Heat Event (More than 30 hrs)



LAND USE AND PEOPLE

Residential and commercial land uses are the most common land uses in the areas of East Boston that experience the most intense and longest heat events. This means that extreme temperatures in East Boston are affecting areas primarily home to homes and businesses, including residents, workers, and visitors to local shops.

As described in Chapter 3, hot weather can create disproportionate health risks for some people, especially for those who are younger or older, who have preexisting health conditions, or who are exposed to heat for longer periods of time. In East Boston, young children (under 5 years) make up 6% of neighborhood residents (compared to 5% citywide), and older adults (over 65 years) make up 9% of neighborhood residents (compared to 12% citywide).³³ Of East Boston's total population, 20% are low-income (compared to 16% citywide), and 81% of housing units are renter-occupied (compared to 64% citywide).³⁴ Low-income residents and renters may face barriers to home retrofits or affording cooling options.



Land Use Map: The hottest and most intense areas of East Boston include a mixture of residential and commercial land use.

LAND USE

- Single-Family Housing
- Multi-Family Housing
- Apartment (7+ Units)
- Condo
- Mixed Use
- Residential Land
- Commercial
- Commercial Land
- Industrial
- Exempt (Chapter 121A)
- Exempt

Longest Heat Event (More than 30 hrs)

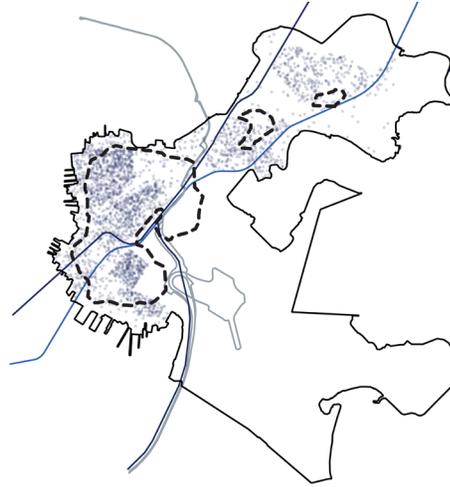
0 0.5 MI

Data Source: Analyze Boston

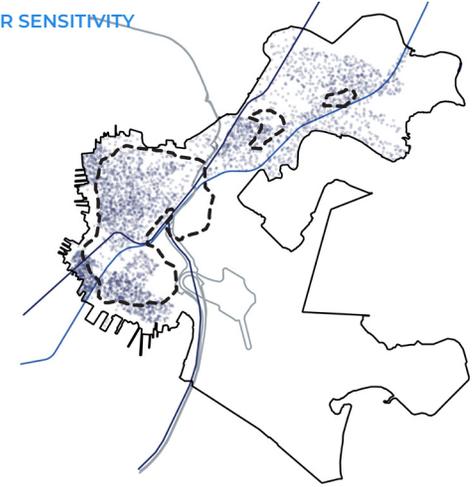
RESIDENT DEMOGRAPHICS AND HEAT DURATION

These maps compare the density of East Boston residents to areas with the longest duration event in the heat analysis. Renter-occupied housing is concentrated in Eagle Hill and Jeffries Point. Lower-income households are also located in Eagle Hill. Due to longer heat events and heat intensity, heat risk may be higher for residents in these areas. Eagle Hill experiences long heat events (35 hours) and intense heat (7°F hotter than areas like Franklin Park).

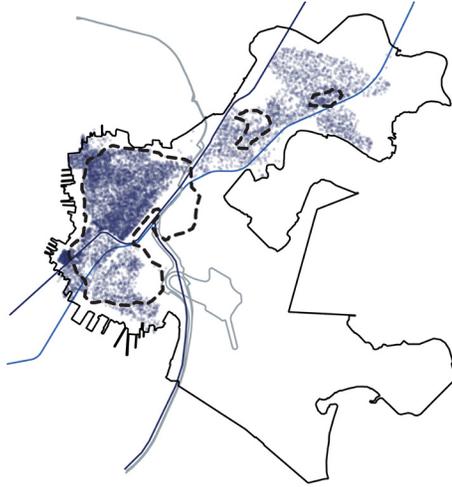
YOUNG CHILDREN (<5 YRS)
HIGHER SENSITIVITY



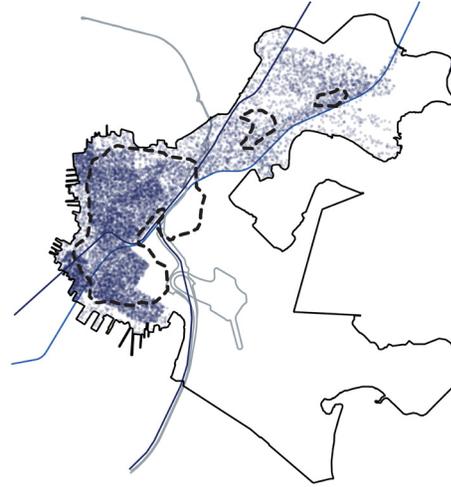
OLDER ADULTS (>65 YRS)
LOWER ADAPTIVE CAPACITY
HIGHER SENSITIVITY



LOW-INCOME RESIDENTS
LOWER ADAPTIVE CAPACITY



RENTER-OCCUPIED HOUSING
LOWER ADAPTIVE CAPACITY



ASIAN



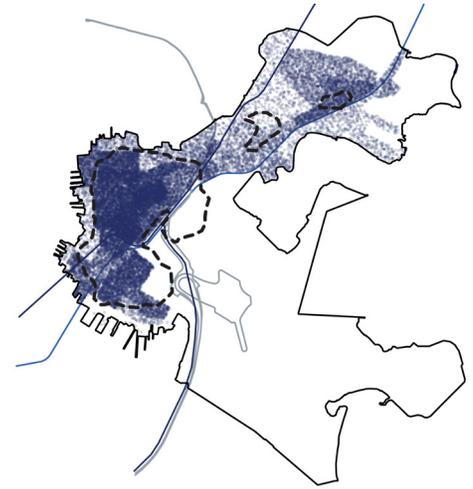
WHITE



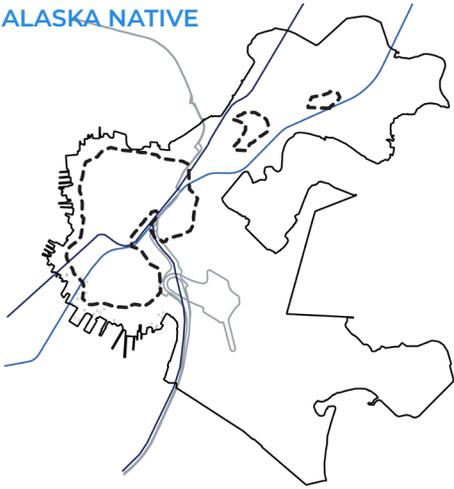
BLACK



LATINX



AMERICAN INDIAN/
ALASKA NATIVE



2 OR MORE RACES



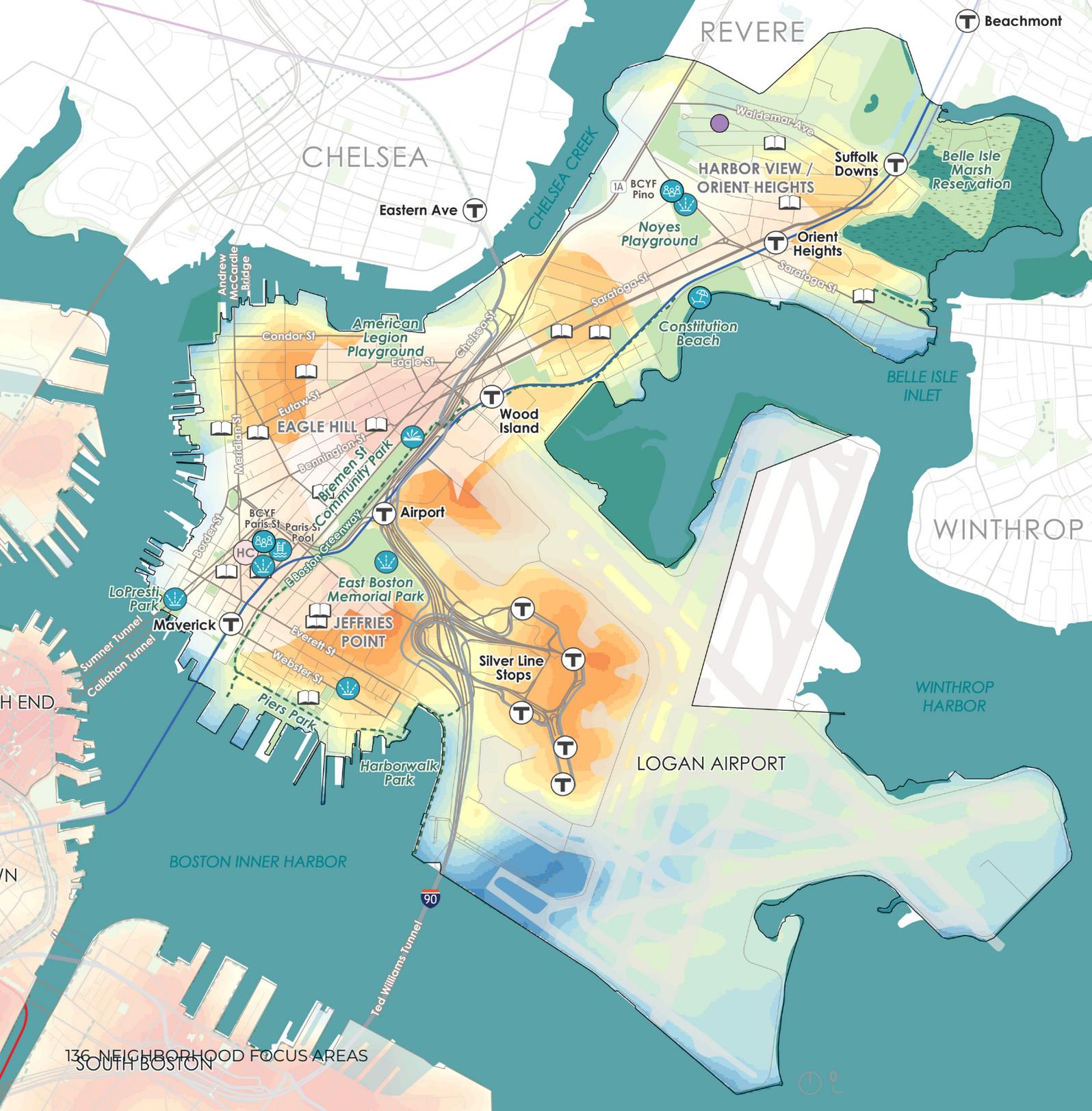
ANOTHER RACE



Data Source: ACS 5-year estimates, 2015-2019

[] Longest Heat Event
(More than 30 hrs)

1 DOT = 1 PERSON



GAPS IN INDOOR COOLING NETWORK

- Schools
- Community Healthy Center
- Indoor Cooling Center
- Pools (BCYF and DCR)
- Tot Sprays
- Beaches
- Libraries

Areas masked in white are within a 10-minute walk of indoor cooling centers and libraries. Areas in orange red experience extreme heat during heat waves, and are not within a 10-minute walk of an indoor cooling center or a library.ⁱ

3PM: AIR TEMPERATURE



ⁱ BCYF Summer 2020 Cooling centers were used for this map.



136 NEIGHBORHOOD FOCUS AREAS SOUTH BOSTON

COMMUNITY HEAT EXPERIENCES AND COOLING IDEAS

HEAT EXPERIENCES

East Boston residents discussed their heat experiences and cooling ideas during the Neighborhood Ideas Workshop and through responses to the citywide survey. Areas of concern mentioned by participants included the challenges of cooling in older homes, air pollution, dark surfaces, new development increasing temperatures, cooling for young people, hot outdoor spaces and transit stops, and potential barriers to the use of city cooling centers by undocumented community members.

COMMUNITY COOLING IDEAS

East Boston residents suggested cooling strategies that adapt the civic realm to better serve the community on hot days, cool the built environment, and promote equity in access to cooling. Residents shared the following ideas to increase access to cooling in East Boston:

- » Accessible public indoor cooling:
Opportunities to increase access to indoor air-conditioned spaces without real or perceived barriers to entry for all community members
- » Staying cool at home:
Opportunities for retrofitting homes
- » Cooling the built environment:
Opportunities for additional trees coupled with maintenance strategy, lighter-colored pavement, heat resilient zoning, and development review
- » Community partnerships:
Opportunities to partner with and support community-based organizations to advance heat resilience, and partnerships with local entrepreneurs to offer cool beverages or ice cream
- » Cooler outdoor gathering places:
Opportunities for more hydration stations, cooler playgrounds, shaded bus stops, cooling strategies implemented in neighborhood squares, and shade and fans at bus stops and T stations

The current system of individual residents requesting street trees in front of their properties only reproduces existing inequities

Cooling centers aren't the most accessible or comfy places: pocket parks as an informal cooling center as alternative

OPPORTUNITIES FOR A COOLER EAST BOSTON



EAST BOSTON



Provide cooling relief on hot days through safely organized programs

BELLE ISLE

MARSH

GREENWAY

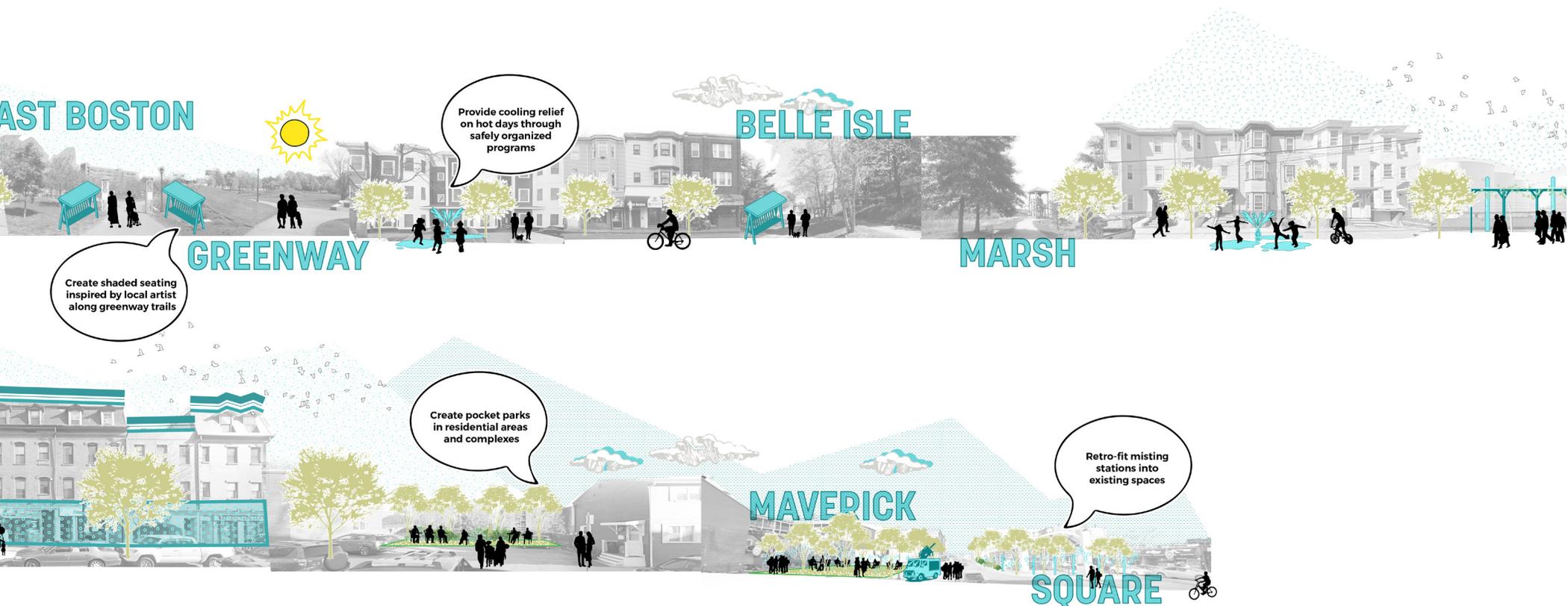
Create shaded seating inspired by local artist along greenway trails

Create pocket parks in residential areas and complexes

MAVERICK

Retro-fit misting stations into existing spaces

SQUARE



HEAT RESILIENCE OPPORTUNITIES

This section describes key needs for heat reduction or increasing access to cooling resources and opportunities to integrate resilience, based on neighborhood-level heat analysis and community feedback.

While all the strategies may be relevant to each neighborhood, each section lists specific heat resilience strategies that respond to the particular needs that have been identified. More details on the strategies listed below can be found in Chapter 6: Citywide Heat Resilience Strategies.

SHADED, VEGETATED, COOL WALKS TO LOCAL DESTINATIONS

Many residents mentioned uncomfortable conditions for transit riders, in part due to less tree canopy than in other Boston neighborhoods. Specific hot streets named by residents included Bennington Street, Lexington Street, and Meridian Street. Buses stop along those corridors, so people are more likely to use these streets to walk to other local destinations. Streets with higher levels of pedestrian and transit uses are particularly appropriate for additional shade and cooling strategies like vegetation and shade structures.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 7.1: COOL COMMUTES

STRATEGY 7.3: COOL MAIN STREETS

COOL, SHADED PAVEMENT AND SURFACE PARKING

Many of East Boston's hottest areas include large surface parking lots and parking structures with limited tree canopy. The neighborhood heat modeling shows shading pavement can reduce surface and air temperatures by 11 to 24°F and 3 to 12°F, respectively, depending on the material and opacity of the shade structure.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 6.1: ENHANCED COOLING IN POCKET PARKS AND STREET-TO-PARK CONVERSIONS

STRATEGY 6.2: INCREASED SHADE ON MUNICIPAL SITES

COOL SCHOOLS

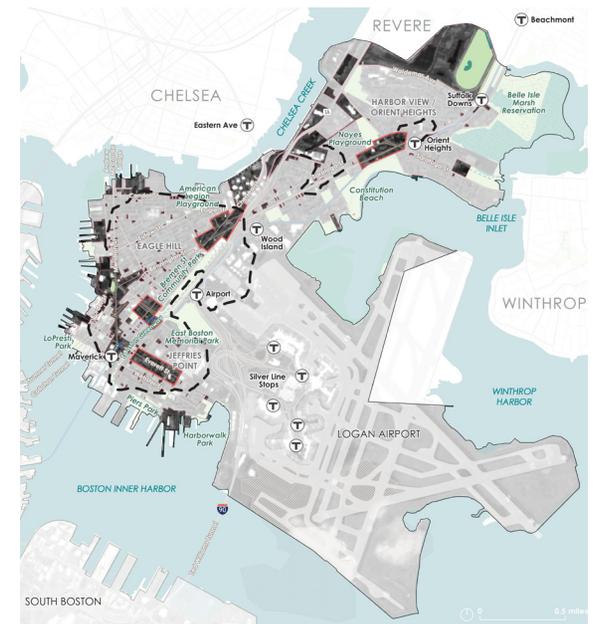
Many of East Boston's schools are located in areas with high daytime air temperatures, based on the heat analysis. Opportunities for indoor and outdoor cooling—like air conditioning upgrades, outdoor shading structures and vegetation, and educational information on heat—could be prioritized at these schools. For example, Kennedy Patrick Elementary is located in an area where daytime air temperatures reached 105°F in the heat analysis.

RELATED HEAT RESILIENCE STRATEGIES STRATEGY 5.5: COOL SCHOOLS

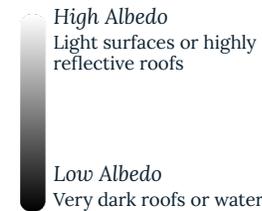
SHADE AND COOL ROOFS ALONG MAIN STREETS AND IN COMMERCIAL AREAS

Many surfaces along main streets and commercial areas are dark, contributing to high heat exposure. These areas also have higher pedestrian volumes. Better thermal performance in roofs, as well as more vegetation along primary corridors, would help reduce air temperatures. Programs to support small businesses and community organizations along main streets and commercial areas can reduce air temperatures and increase pedestrian safety.

RELATED HEAT RESILIENCE STRATEGIES STRATEGY 5.2: COOL ROOFS PROGRAM



SURFACE REFLECTANCE



Many roofs and surfaces in mixed-use neighborhood centers and corridors are dark, contributing to hotter temperatures.

Longest Heat Event (More than 30 hrs)

COOL HOMES

Providing support for homeowners and landlords to make improvements could help people stay cool in their homes. This strategy could especially benefit areas of East Boston beyond a 10-minute walk from cooling centers or that experience the longest duration heat events, based on the heat analysis.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 5.1: HOME COOLING RESOURCES DISTRIBUTION

STRATEGY 5.3: HOME ENERGY RETROFITS

STRATEGY 5.4: AFFORDABLE HOUSING RESOURCES AND RETROFITS

MORE SHADED GATHERING SPACES WITH NATURAL PLAY SPACE

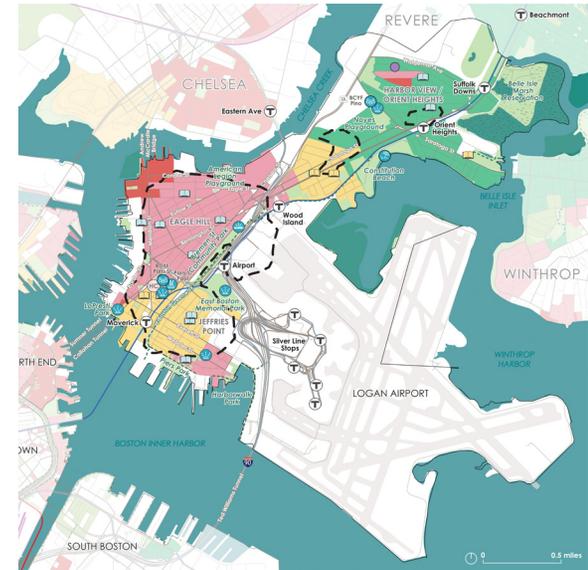
Some parks are hotter than others, and some areas of East Boston have less park and greenspace access. The heat analysis measured daytime temperatures at Noyes Playground at 102°F, 4°F higher than Piers Park. Noyes Playground has a hard surface playground and three large fields with few trees and shade. Hotter areas of East Boston, like the Eagle Hill neighborhood, could be cooler with additional vegetation trees and open spaces.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.1: POP-UP HEAT RELIEF

STRATEGY 6.1: ENHANCED COOLING IN POCKET PARKS AND STREET-TO-PARK CONVERSIONS

STRATEGY 6.4: PLANNING FOR FUTURE PARKS



PARK ACCESS PER 1000 RESIDENTS

- 0 Acres
- 0-2 Acres
- 2-5 Acres
- 5-10 Acres
- 10-50 Acres
- 50+ Acres

Many areas of East Boston that experience longer duration high-temperatures also have less public open space per capita.

 Longest Heat Event (More than 30 hrs)

INDOOR COOLING NETWORK

East Boston has two BCYF centers: Paris Street and Pino. Based on a 10-minute walk analysis from indoor BCYF cooling centers and libraries, some East Boston residents have little access to public indoor cooling centers. Of East Boston's two BCYF centers, only one (Paris Street) functioned as a designated public cooling center in heat emergencies during 2021.³⁵ The East Boston Branch of the BPL provides another public air-conditioned option. Additional alternatives for indoor cooling could expand, especially for areas not currently within a 10-minute walk of a library or community center. An expanded network could

increase cooling options for low-income residents and renters in hotter areas of East Boston, such as northwest of Eagle Hill. The expanded network could also include community cooling network partners, such as churches, community recreation providers, and other community-based organizations. Community cooling network spaces could expand access by providing spaces that residents will feel comfortable visiting, while exploring ways to adjust potential barriers like registration that may concern some residents who are recent immigrants.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.2: ENHANCED AND EXPANDED CITY-RUN COOLING CENTERS

STRATEGY 2.3: CITYWIDE COOLING NETWORK

RESILIENT DESIGN FOR NEW DEVELOPMENT

Like many Boston neighborhoods, East Boston has been experiencing increasing development pressures in many parts of the neighborhood. Chapter 6 of this document includes three strategies related to development review, zoning, and heat resilience design guidelines. Continuing to support and expand affordable housing options is a priority throughout Boston.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 8.1: UPDATED CLIMATE RESILIENCY CHECKLIST

STRATEGY 8.2: HEAT RESILIENCE BEST PRACTICE GUIDELINES

STRATEGY 8.3: ZONING REVISIONS TO SUPPORT COOLER NEIGHBORHOODS

MATTAPAN

**HUNT ALMONT
PLAYGROUND**



**MATTAPAN
SQUARE**



BLUE HILL AVE



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COMMUNITY HEAT EXPERIENCES AND COOLING IDEAS	159
HEAT RESILIENCE OPPORTUNITIES	162



NEIGHBORHOOD CONTEXT

Although Mattapan experiences daytime and nighttime temperatures similar to Boston's median temperatures, its history and land use patterns have increased the neighborhood's vulnerability to extreme temperatures.

Mattapan is a medium-density neighborhood in the southwestern part of Boston. It is a family-centric neighborhood where 68% of households identify as families, compared with only 48% of households in the city as a whole.³⁶ Over 40% of the housing units are single family residences, and 50% of the housing units are in two-family or three-family buildings. Several large churches and a tight-knit Hatian immigrant community contribute to neighborhood stability and strong community ties.

Mattapan's civic and commercial destinations are in some of the neighborhood's hottest areas. Mattapan Square lies at the intersection of River Street and Blue Hill Avenue, and is home to many local shops and restaurants, but relatively few street trees or other shade features. Many of these places are often the

sites of outdoor gatherings but are also surrounded by impervious surfaces, which tend to be surfaces that heat up throughout the day if unshaded. Along Blue Hill Avenue, community institutions such as the library, schools, and community centers provide touchpoints for community members throughout the neighborhood. Neighborhood parks and open spaces, like Almont Playground, the Mattahunt Woods, and Ryan Playground, offer recreational opportunities for Mattapan residents and a place to cool down.

Commuting directly relates to Mattapan residents' heat experience. Over 50% of Mattapan residents take personal vehicles to work. Local sections of arterial roads in Mattapan are more congested than other sections of the same road.³⁷ The traffic congestion on local roads generates more air pollution, which can affect the health of residents and can make it harder to breathe during hot weather, especially for residents with asthma. The areas around Mattapan Square and Morton Street Station experience the hottest daytime temperatures in the neighborhood and have some of the least amount of shade and vegetation. These conditions affect the health and comfort of many of Mattapan's many transit riders who walk to the stations daily.

Housing affordability is a major concern for residents, but recent development pressure may create

opportunities to address these and other concerns. In response to housing demand, new housing is being proposed near several of Mattapan's transit stops. As in communities across Boston, residents of Mattapan are advocating for new developments to include streetscape and public realm improvements, which would not only benefit residents of the new development but community members who pass the new development on their way to other local destinations.

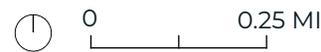
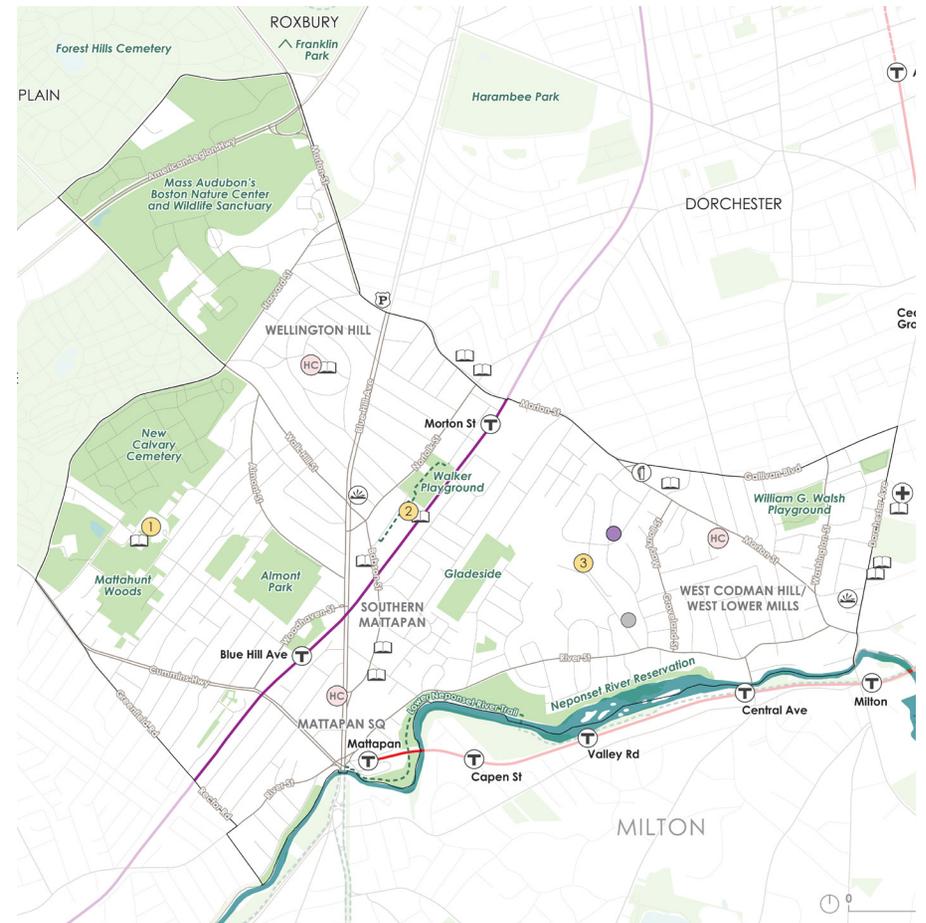
RECENT AND ONGOING PLANNING EFFORTS

- » PLAN: Mattapan
- » Blue Hill Avenue Transportation Action Plan
- » Blue Hill Avenue/Cummins Highway Station Area Plan
- » Cummins Highway Design Trial

-  Parks
-  Greenways
-  Major Roads
-  Mattapan Trolley
-  MBTA Red Line
-  MBTA Commuter Rail
-  MBTA Station

COMMUNITY ASSETS

-  School
-  Libraries
-  Police Station
-  Fire Station
-  Hospital
-  Community Health Center
-  Mattahunt Community Center
-  Mildred Avenue Community Center
-  Gollivan Community Center
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family



Mattapan's community assets and landmarks are well-distributed throughout the neighborhood.

HEAT ANALYSIS

Hot Days, Cooler Nights.

Mattapan's daytime and nighttime median temperature were 97.6°F and 81°F in the heat analysis, respectively, both of which were cooler than the city's median (daytime is 99.5°F and nighttime is 81.9°F). Of the five environmental justice neighborhoods, Mattapan had the coolest temperatures based on the heat analysis.

Importantly, even though the temperatures do not climb as high in Mattapan during a heat wave as in the other neighborhoods, heat resilience and access to cooling is still important. On average, Mattapan experienced 29 hours of extreme temperature conditions that exceeded Boston's heat emergency level (above 95°F and nighttime lows above 75°F) based on the week-long heat analysis.³⁸ Heat exposure (i.e., intensity and duration), sensitivity, and adaptive capacity are critical factors that contribute to the risk of heat-related health problems. While Mattapan is not Boston's hottest environmental justice neighborhood, heat still poses significant risks for some residents, especially for residents with elevated risk factors: those who are younger or older, lack air conditioning or access to cooling, experience limited mobility, or have preexisting health conditions. See Chapter 3 for more details on factors that increase heat-related health risks.

Temperatures vary across the neighborhood. The hottest part of the neighborhood is around Morton Street Station, where daytime temperatures were measured over 100°F in the heat analysis. The western part of Mattapan remains relatively cool during both daytime and nighttime, with temperatures of 94°F and 80°F, respectively. However, nighttime temperatures above 80°F can still be uncomfortable for people, especially those at higher risk of heat-related illness.

The temperatures experienced in different parts of Mattapan reflect different patterns of building density, tree canopy, and green space.

Of the five neighborhoods, Mattapan has the lowest percentage of impervious surfaces at 42%, which is lower than the citywide percentage. Approximately 51% of the land cover is tree canopy, grass, or shrubs, and 24% of the neighborhood is dedicated to parks.³⁹ These factors can help moderate temperature increases, especially in the parts of the neighborhood that are closest to green space and forests. Mattapan's relatively low-density development pattern in some residential areas allows for significant tree canopy coverage in backyards, though sidewalks and local streets remain largely unshaded.

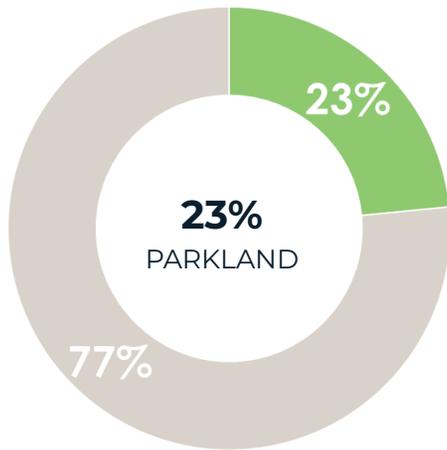
Factors contributing to hotter temperatures in other parts of the neighborhood include unshaded pavement and streets. Arterial streets, especially

wider ones like Blue Hill Avenue and Cummins Highway, have few street trees to shade the pavement, which heats up during the day. In addition, large paved areas, mostly for parking, serve the commercial, religious, and community institutions in Mattapan, but absorb heat and offer little shade for pedestrians.

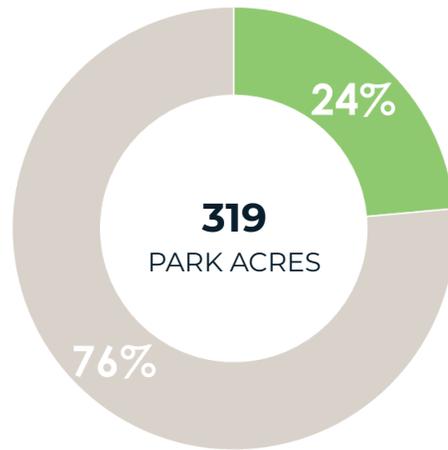
PARK ACREAGE AND LAND COVER COMPARISON

PARK ACREAGE

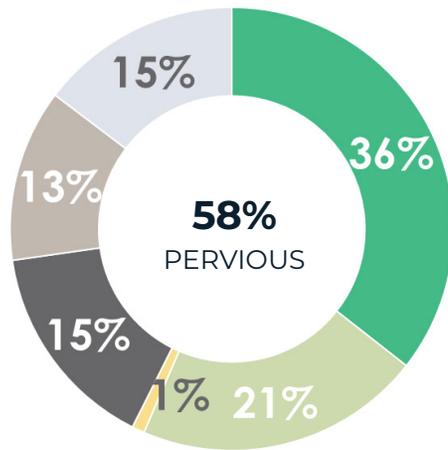
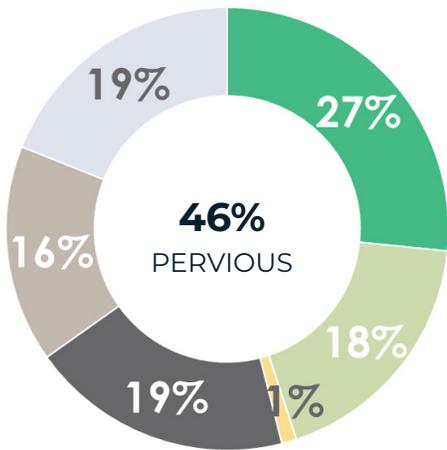
BOSTON



MATTAPAN



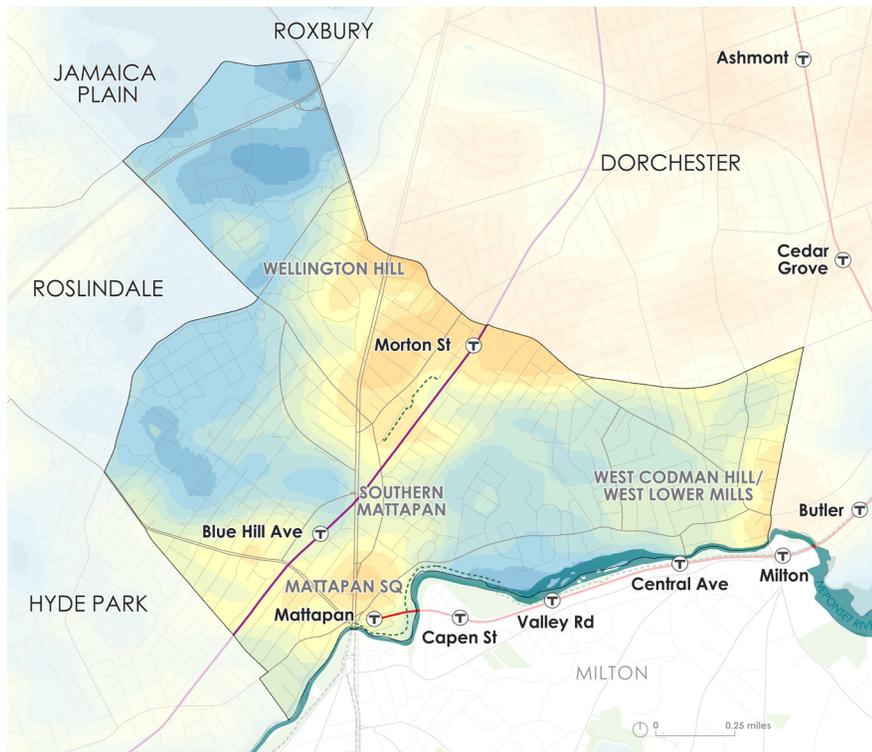
LAND COVER



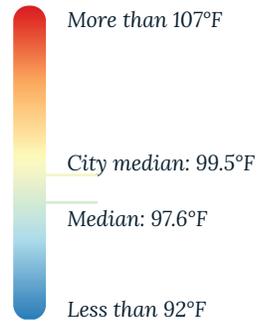
- Tree Canopy
- Grass/Shrubs
- Bare Land
- Buildings
- Roads
- Other Paved Surfaces

Data Source: Tree Canopy Assessment 2019, BPRD

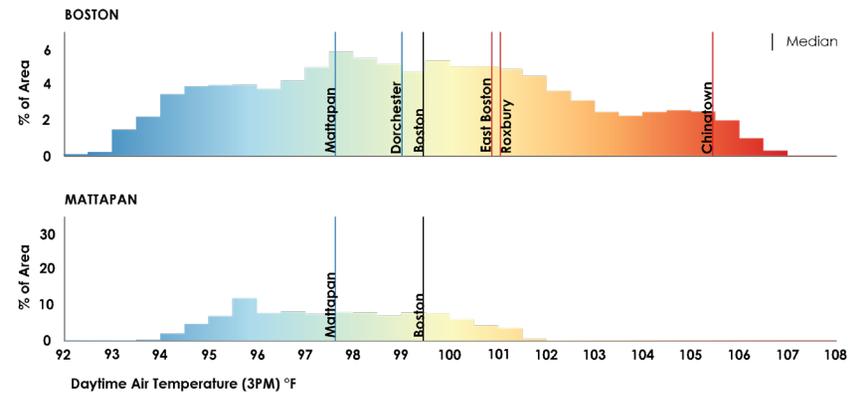
DAYTIME TEMPERATURES



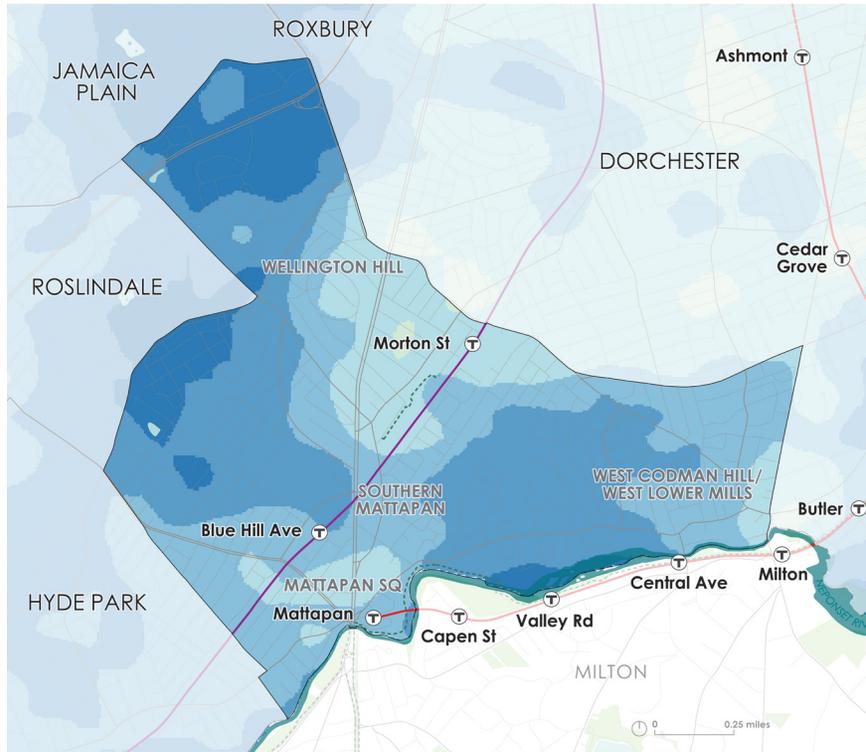
3PM:
AIR TEMPERATURE



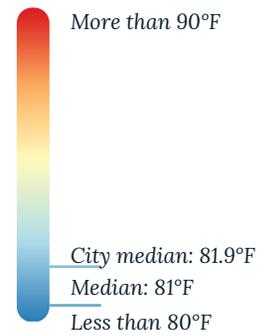
Daytime Air Temperature (3 p.m.): Daytime air temperature is hottest near the Morton Street and Mattapan T stations.



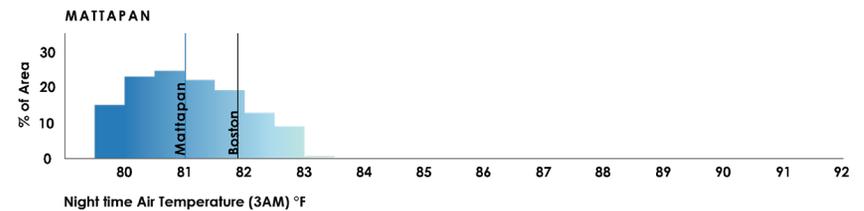
NIGHTTIME TEMPERATURES



3AM:
AIR TEMPERATURE



Nighttime Air Temperature (3 a.m.): Nighttime air temperatures are relatively cool in the residential areas of the neighborhood.



SAMPLE OF HEAT FINDINGS

These three areas illustrate examples of how Mattapan's land use affects daytime and nighttime temperatures, based on the citywide heat analysis.



1. TRANSIT HUBS

The areas around transit hubs are hotter because they are often surrounded by large, unshaded paved areas and nearby development is often higher density with dark roofs, as seen near Morton Street Station. Based on the heat analysis, the Morton Street Station measured air temperatures around 100°F during the day. At night, the temperatures cooled to 82°F, similar to the city median.



2. SQUARES AND CORRIDORS

Active squares and corridors like Mattapan Square have significant paved areas and a high density of buildings with dark roofs and limited tree canopy in the commercial area. These factors all contribute to higher daytime temperatures. Proximity to the forested areas on the Neponset River corridor helps cool the area to the south of Mattapan Square at night.



3. LOWER DENSITY RESIDENTIAL NEIGHBORHOODS

During the day, lower density residential neighborhoods, like the western areas of Mattapan, are significantly cooler than the median temperature in Boston, and remain cooler at night. Temperatures do not climb as high in this area because of the significant tree canopy, and the neighborhood development pattern of single-family homes offers more space between buildings, which increases airflow. Many homes have lighter roofs which reflect the sun during the day.

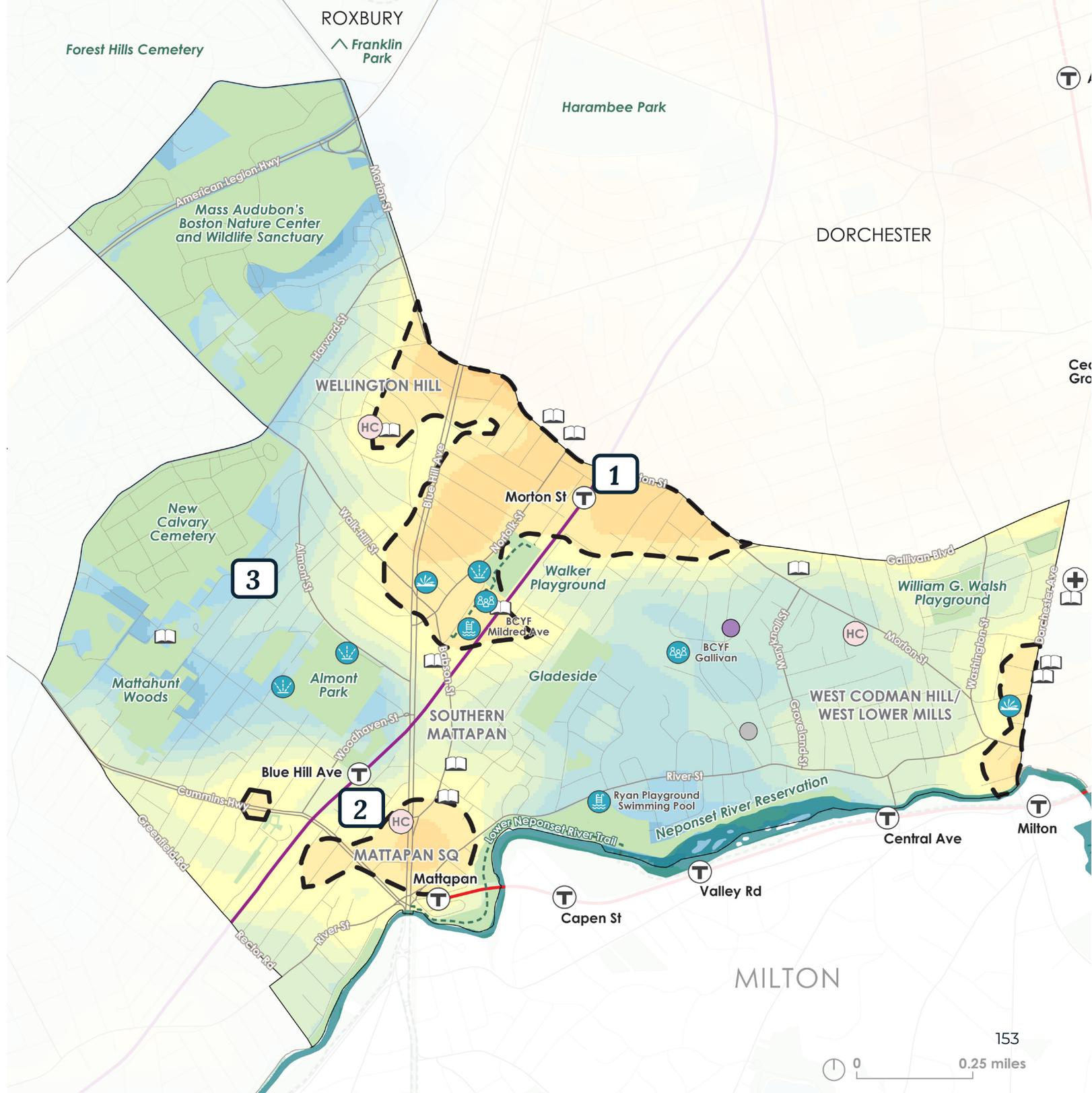
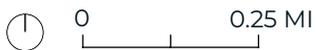
AREAS EXPERIENCING HIGHER DAYTIME TEMPERATURES

-  School
-  Hospital
-  Community Health Center
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family
-  Community Centers
-  Pools (BCYF and DCR)
-  Tot Sprays
-  Libraries

3PM:
AIR TEMPERATURE



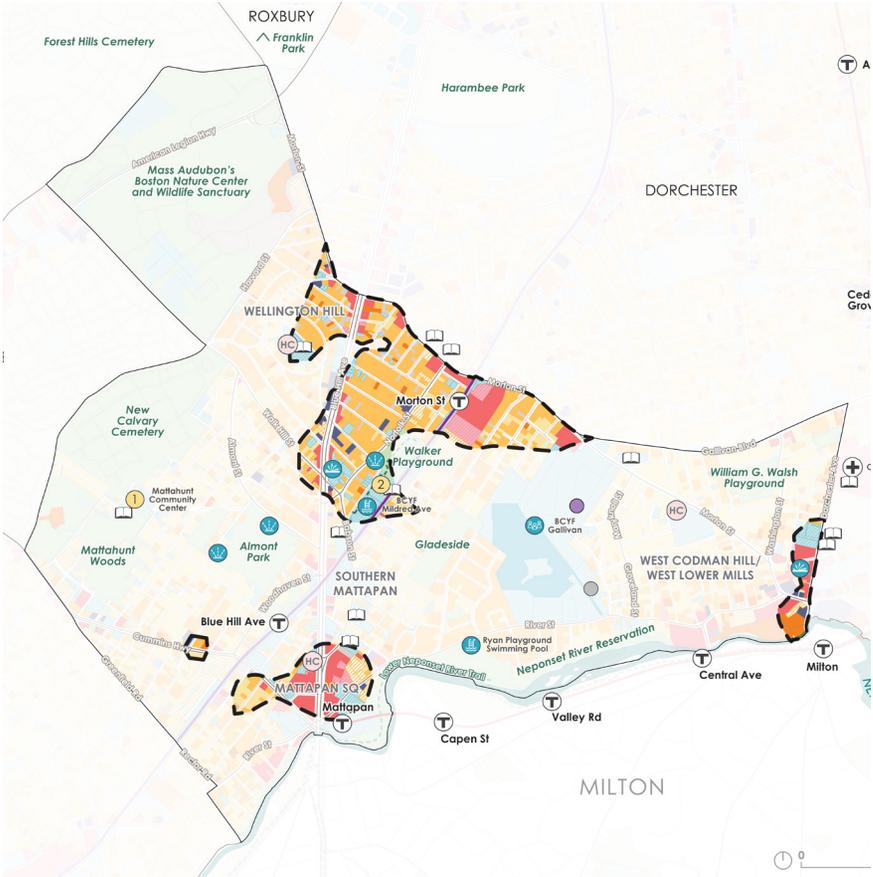
 Hottest Daytime Areas (More than 100°F)



LAND USE AND PEOPLE

Denser multi-family residential buildings and commercial or mixed-use areas experience the hottest temperatures in Mattapan. Density, some brick buildings, and the lack of vegetation contribute to higher heat experiences by residents, workers, and neighborhood visitors.

As previously described, hot weather can create disproportionate health risks for some people, especially for those who are younger or older, who have preexisting health conditions, or who are exposed to heat for longer periods of time. In Mattapan, young children (under 5 years) make up 7% of neighborhood residents (compared to 5% citywide), and older adults (over 65 years) make up 13% of neighborhood residents (compared to 12% citywide).⁴⁰ Of Mattapan residents, 19% are low-income (compared to 16% citywide), and 62% of housing units are renter-occupied (compared to 64% citywide).⁴¹ Low-income residents and renters may face barriers to home retrofits or affording cooling options.



Data Source: Analyze Boston

Land Use Map: The hottest and most intense areas in Mattapan include a mixture of residential and commercial land use.

- LAND USE**
- Single-family Housing
 - Multi-family Housing
 - Apartment (7+ Units)
 - Condo
 - Mixed Use
 - Residential Land
 - Commercial
 - Commercial Land
 - Industrial
 - Exempt (Chapter 121A)
 - Exempt
 - Hottest Daytime Areas (More than 100°F)

0 0.25 MI

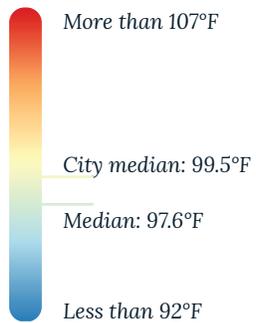
POPULATION DENSITY AND HIGH-HEAT EVENT DURATION

-  School
-  Hospital
-  Community Health Center
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family
-  Community Centers
-  Pools (BCYF and DCR)
-  Tot Sprays
-  Libraries

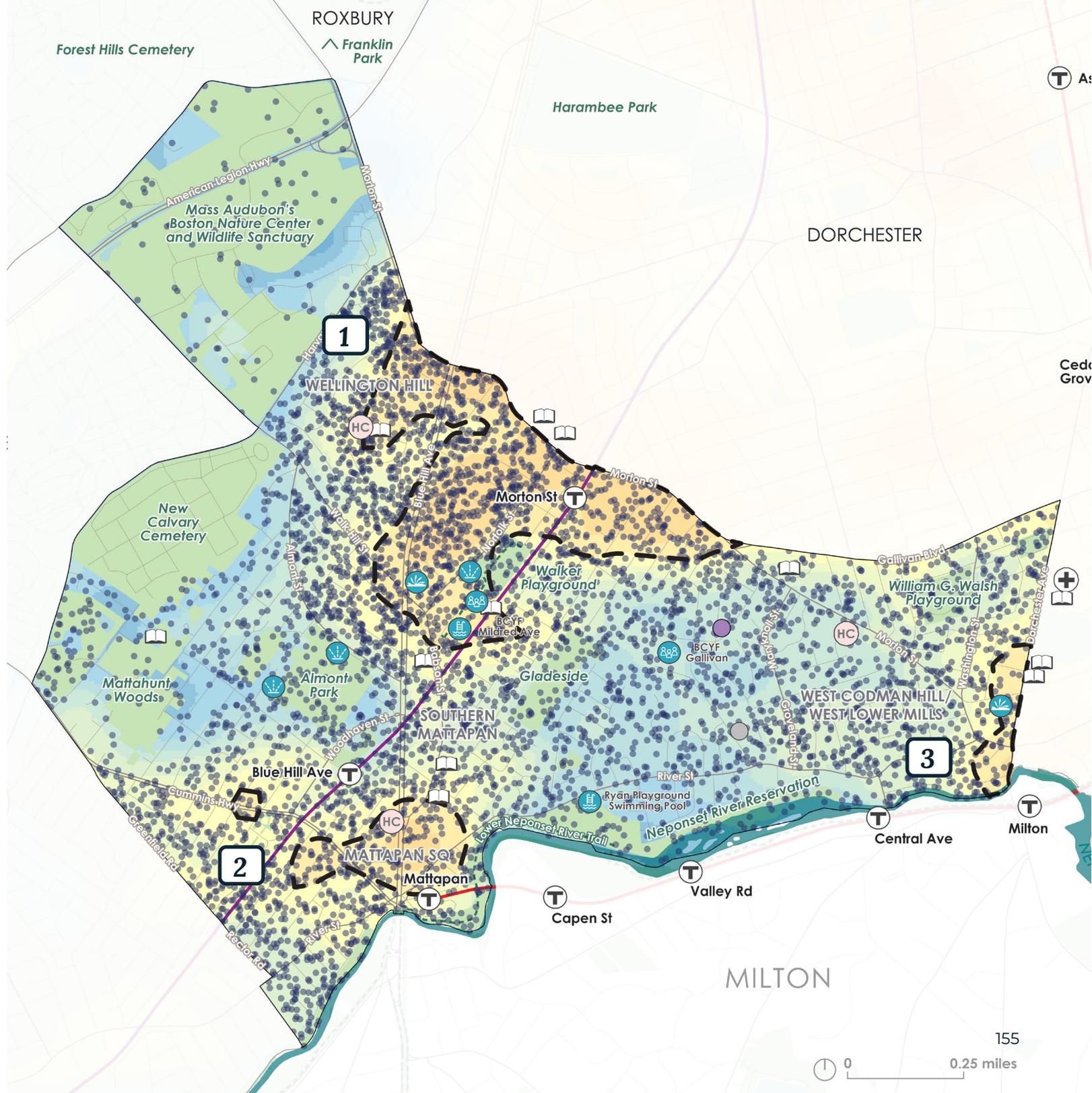
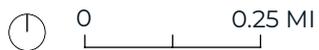
The areas experiencing longer and more intense heat are also the areas that have the highest population density.

1 DOT = 5 PEOPLE

3PM:
AIR TEMPERATURE



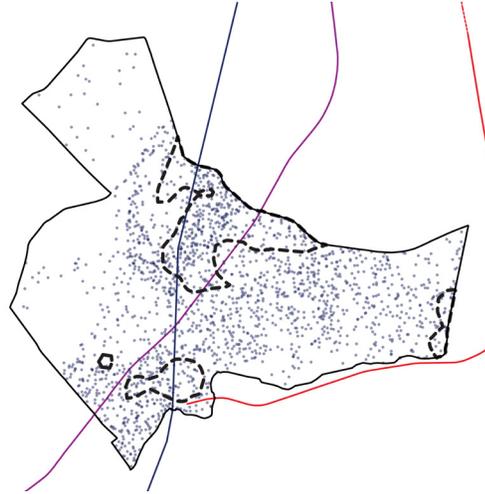
 Hottest Daytime Areas (More than 100°F)



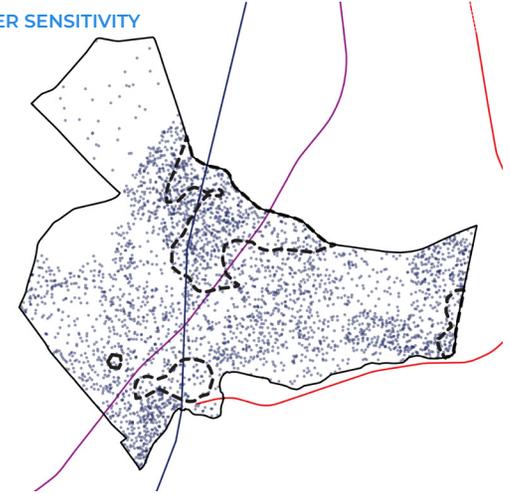
RESIDENT DEMOGRAPHICS AND HEAT DURATION

These maps compare the density of Mattapan residents to the areas in Mattapan that experience the hottest daytime temperatures in the heat analysis. The areas experiencing longer and more intense heat are also the areas that have a high density of low-income and renter-occupied housing. Due to longer heat event duration (29 hrs) and intensity (3.7 to 4.5°F above Franklin Park), heat risk may be higher for residents in these areas. Strategies that increase adaptive capacity should be prioritized in areas such as around the Morton Street Station, Mattapan Square, and the eastern Dorchester border.

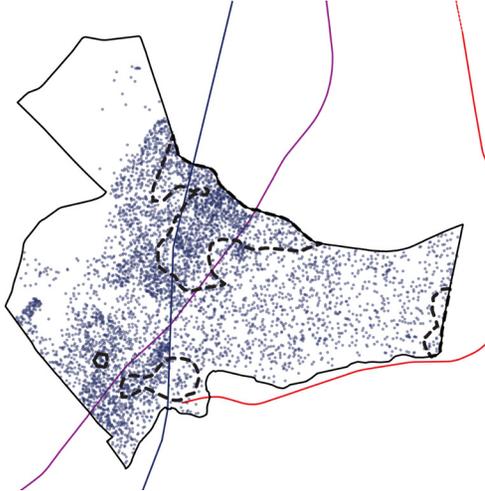
YOUNG CHILDREN (<5 YRS) HIGHER SENSITIVITY



OLDER ADULTS (>65 YRS) LOWER ADAPTIVE CAPACITY HIGHER SENSITIVITY



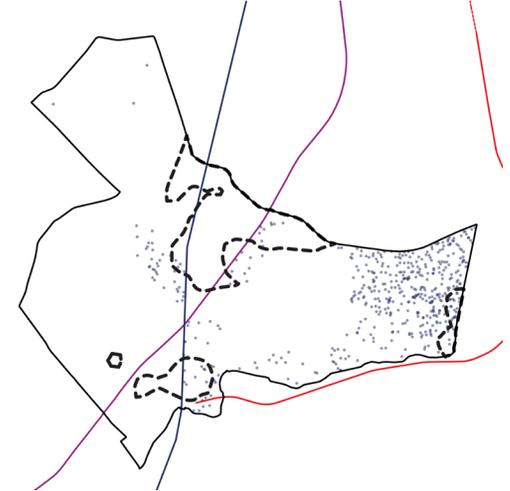
LOW-INCOME RESIDENTS LOWER ADAPTIVE CAPACITY



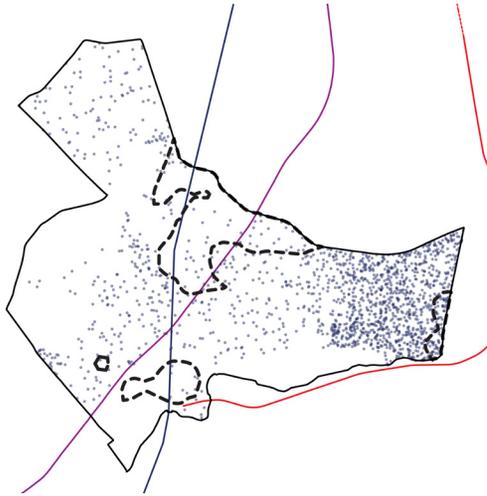
RENTER-OCCUPIED HOUSING LOWER ADAPTIVE CAPACITY



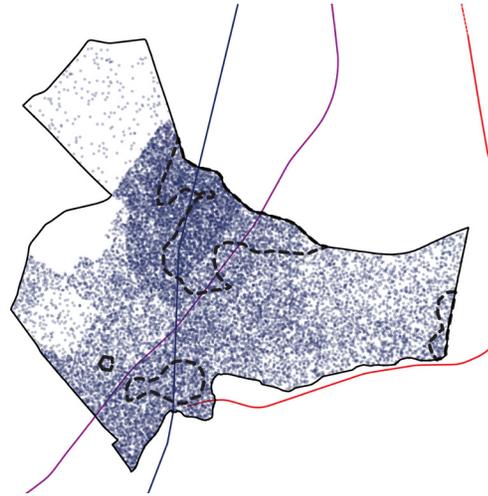
ASIAN



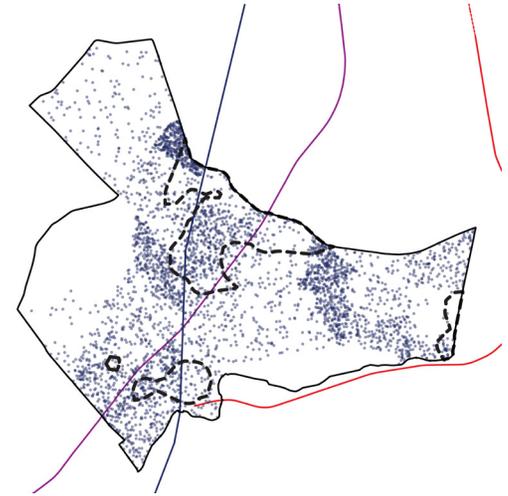
WHITE



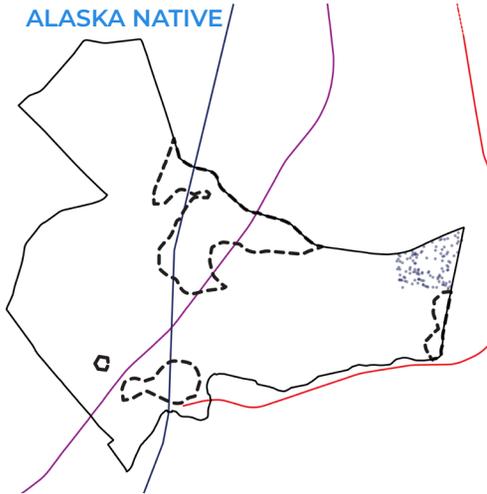
BLACK



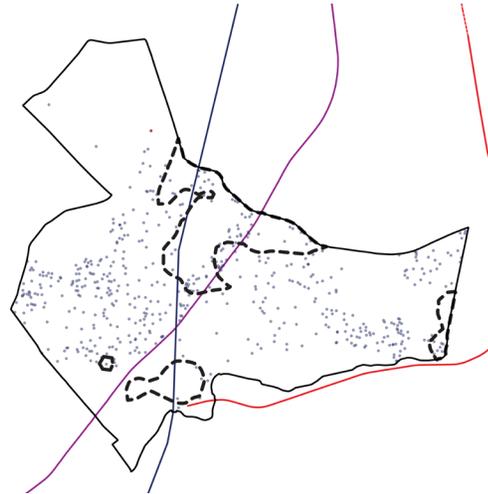
LATINX



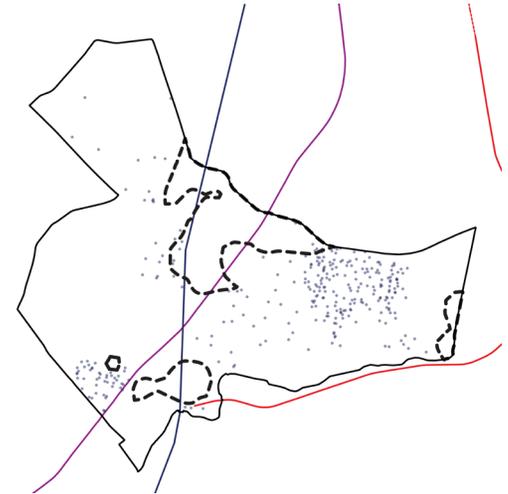
AMERICAN INDIAN/
ALASKA NATIVE



2 OR MORE RACES



ANOTHER RACE



Data Source: ACS 5-year estimates, 2015-2019

[] Hottest Daytime Areas
(More than 100°F)

1 DOT = 1 PERSON

Forest Hills Cemetery

ROXBURY

Franklin Park

Harambee Park

DORCHESTER

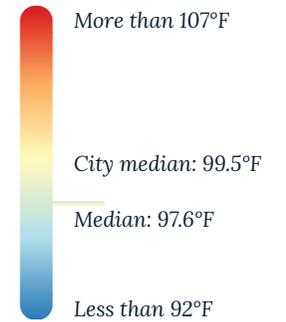
Ashmont

GAPS IN INDOOR COOLING NETWORK

-  School
-  Hospital
-  Community Health Center
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family
-  Indoor Cooling Center
-  Pools (BCYF and DCR)
-  Tot Sprays
-  Libraries

Areas masked in white are within a 10-minute walk of indoor cooling centers and libraries. Areas in orange red experience extreme heat during heat waves, and are not within a 10-minute walk of an indoor cooling center or a library.ⁱ

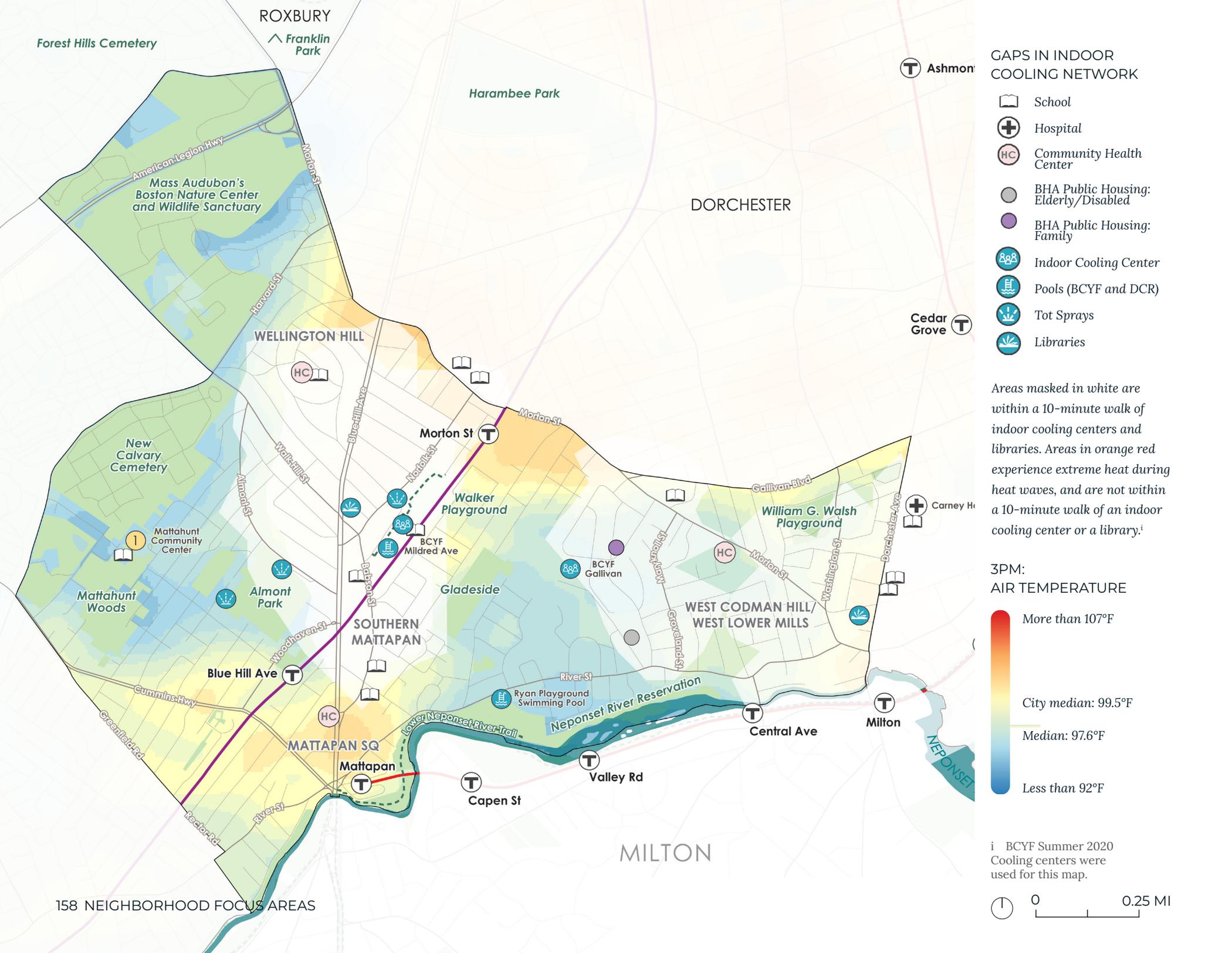
3PM: AIR TEMPERATURE



ⁱ BCYF Summer 2020 Cooling centers were used for this map.



158 NEIGHBORHOOD FOCUS AREAS



COMMUNITY HEAT EXPERIENCES AND COOLING IDEAS

HEAT EXPERIENCES

Mattapan residents discussed their heat experiences and cooling ideas during the Neighborhood Ideas Workshop and through responses to the citywide survey. Areas of concern mentioned by participants included hot streets and sidewalks, hot homes and cooling affordability, limited cool social spaces, and effects of development on airflow patterns and trees.

COMMUNITY COOLING IDEAS

Mattapan residents suggested cooling strategies that reduce heat in the civic realm, support local businesses, and beautify the neighborhood. Residents shared the following ideas to increase access to cooling in Mattapan:

- » **Cool Streets:**
Opportunities for street trees, shade structures, seating, awnings, planters, and cooler bus stops, with suggestions for cooling options like planters that would also beautify the neighborhood
- » **Cool Homes and Energy Affordability:**
Opportunities for home cooling, including energy assistance for community members with elevated heat sensitivity
- » **Cool Community Spaces:**
Opportunities for new cool, social outdoor gathering spaces, especially in commercial areas, including misters, greenery, seating, and shade structures or fabric shading; opportunities for



More **public places** that are open all day and in the evenings that have activities for kids and space for adults that have **air conditioning**



Sun shade sails are inexpensive to install on streets where there may not be enough space for trees.

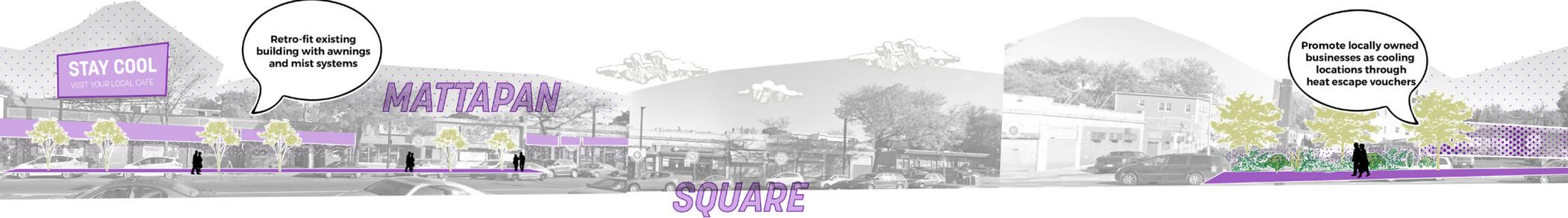
cool indoor spaces for gathering, including community centers, cafes with outdoor seating, art spaces, and more public cooling centers with programming during heat events; and opportunities for public art and murals to increase visibility of cooling places

- » **Heat Resilience and Economic Development:**
Opportunities to work with local business owners and entrepreneurs to improve heat resilience, support businesses, and keep money in the community; and opportunities for vouchers for residents to use at locally-owned businesses with air conditioning during heat events



Hottest place in Mattapan: Morton Street and River Street

OPPORTUNITIES FOR A COOLER MATTAPAN





HEAT RESILIENCE OPPORTUNITIES

This section describes key needs for heat reduction or increasing access to cooling resources and opportunities to integrate resilience, based on neighborhood-level heat analysis and community feedback.

While all the strategies may be relevant to each neighborhood, each section lists specific heat resilience strategies that respond to the particular needs that have been identified. More details on the strategies listed below can be found in Chapter 6: Citywide Heat Resilience Strategies.

COOL HOMES

Participants shared concern over the costs of home cooling. Enhancing the energy efficiency of homes and larger multi-family housing could help reduce the operational costs of air conditioning. In addition, programs to distribute air conditioners and window fans could help residents overcome the initial cost barrier.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 5.1: HOME COOLING RESOURCES DISTRIBUTION

STRATEGY 5.3: HOME ENERGY RETROFITS

STRATEGY 5.4: AFFORDABLE HOUSING RESOURCES AND RETROFITS

EXPAND ACCESS TO INDOOR COOLING OPTIONS

One concern voiced by Mattapan residents during the planning process was the limited availability of free, indoor cool places that are open all day and in the evenings. Mapping 10-minute walk access from BCYF cooling centers and libraries reveals gaps in access, including residential areas southwest of Mattapan Square and east of Morton Street Station—two of the hottest parts of the neighborhood. Opportunities exist to expand the indoor cooling network.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.2: ENHANCED AND EXPANDED CITY-RUN COOLING CENTERS

STRATEGY 2.3: CITYWIDE COOLING NETWORK

SHADED, VEGETATED, COOL WALKS TO LOCAL DESTINATIONS AND MAIN STREETS

Limited vegetation, shade, and other cooling strategies along some streets in Mattapan can contribute to hotter conditions for pedestrians and bikers in the neighborhood. Wide streets with limited street trees, heavy pedestrian use, or bus stop locations could be opportunities for cooling strategies. Higher-traffic streets, like Morton Street, River Street, and Blue Hill Avenue, were mentioned by participants as opportunities for shade, vegetation, shaded bus stops, and other approaches to provide heat relief. High-activity areas, like Mattapan Square, often present opportunities for shading pavement, including surface parking lots, and increasing cool outdoor gathering spaces.

RELATED HEAT RESILIENCE STRATEGIES

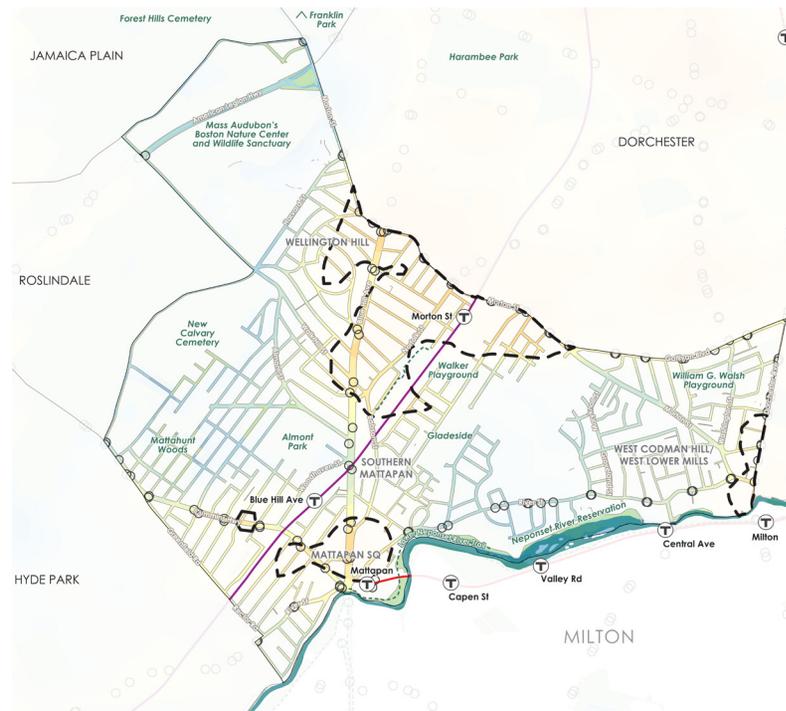
STRATEGY 2.1: POP-UP HEAT RELIEF

STRATEGY 6.1: ENHANCED COOLING IN POCKET PARKS AND STREET-TO-PARK CONVERSIONS

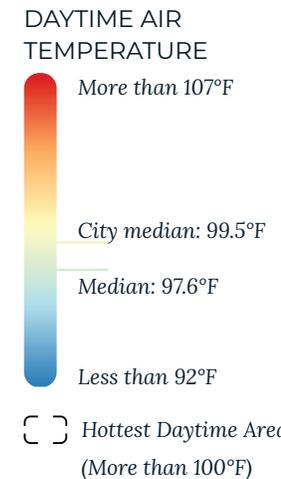
STRATEGY 6.4: PLANNING FOR FUTURE PARKS

STRATEGY 7.1: COOL COMMUTES

STRATEGY 7.3: COOL MAIN STREETS



Mattapan's primary streets and streets in denser residential areas are hotter than streets in its lower density areas.



ROXBURY

FORT HILL



NUBIAN SQUARE



**DUDLEY BRANCH
BOSTON PUBLIC
LIBRARY**



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HEAT RESILIENCE OPPORTUNITIES	180



NEIGHBORHOOD CONTEXT

Roxbury's heat experiences reflect development patterns, neighborhood history, and proximity to large parks. Many parts of the neighborhood experience higher temperatures than other places in Boston.

Roxbury is often described as a central hub of Black culture in Boston,⁴² and approximately 50% of Roxbury's 53,000 residents identify as Black, compared with 23% of residents of Boston as a whole.⁴³ Prominent wall murals of African American leaders and the Roxbury Memory Trail, an official two-mile tour through Roxbury showcasing twentieth century African American history, visibly reinforce the neighborhood's cultural identity. Roxbury has been shaped by the legacy of redlining, which has led to low rates of home ownership (80% of Roxbury residents rent, compared with 65% in the city as a whole), lower median household income (\$27,721 in Roxbury, compared with \$62,021 in Boston as a whole).⁴⁴

Median housing prices in Roxbury increased 80% between 2010 and 2015,⁴⁵ and Roxbury's high percentage of renters means neighborhood residents

are much more vulnerable to displacement as housing costs increase. In 1970, Roxbury was 75% Black. By 2000, Black residents comprised 65% of the neighborhood, and today, Black residents compose 50% of neighborhood residents.

Air pollution in Roxbury directly relates to residents' heat experience. In 1997, half of the diesel-operated public transit vehicle fleet was stored within 1.5 miles of Dudley Square. This contributed to an asthma hospitalization rate more than five times the state average.⁴⁶ Since having asthma increases an individual's sensitivity to heat, Roxbury residents are disproportionately affected by extreme heat.

In light of these external pressures, like many neighborhoods in Boston, many Roxbury residents are deeply engaged in planning and advocacy to improve the neighborhood for current residents. Increasing access to affordable and energy-efficient housing, developing community renewable energy, and improving air quality remain central to ongoing planning and community organizing efforts, and would all directly or indirectly improve heat resilience for Roxbury residents.

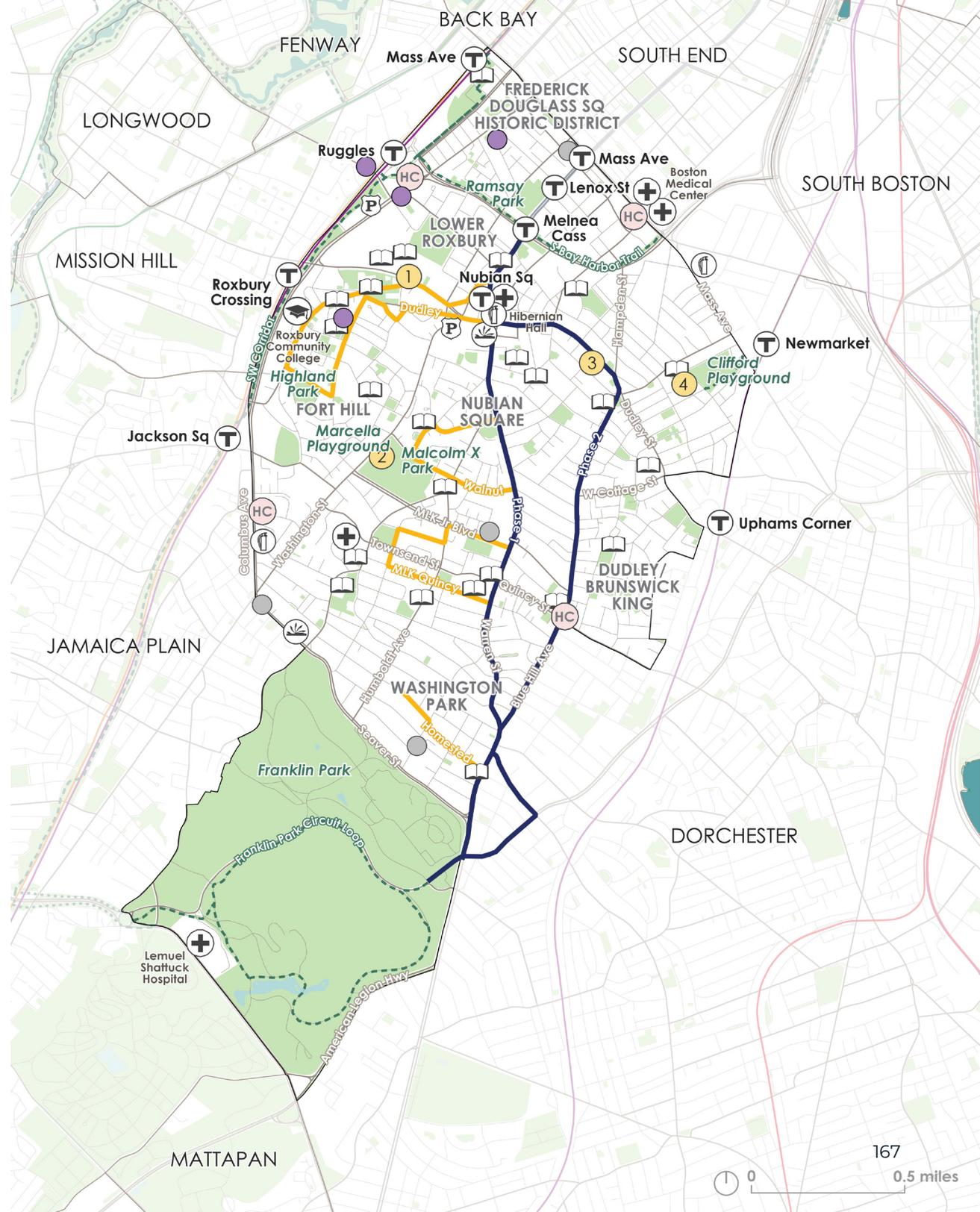
RECENT AND ONGOING PLANNING EFFORTS

- » Roxbury Strategic Master Plan
- » PLAN: Nubian Square: Parcel P3
- » Nubian Square Plan
- » PLAN: Newmarket, the 21st Century Economy Initiative
- » Roxbury Neighborhood Design Overlay District

- Parks
- Greenways
- Roads
- Major Roads
- MBTA Red Line
- MBTA Silver Line
- MBTA Orange Line
- MBTA Commuter Rail
- T MBTA Station
- Roxbury Memory Trail
- Roxbury Memory Trail Loops

COMMUNITY ASSETS

- 🎓 College or University
- 📖 School
- 📖 Libraries
- 🚓 Police Station
- 🚒 Fire Station
- + Hospital
- HC Community Health Center
- 1 Madison Park Community Center
- 2 Shelburne Community Center
- 3 Vine Street Community Center
- 4 Mason Pool
- BHA Public Housing: Elderly/Disabled
- BHA Public Housing: Family



HEAT ANALYSIS

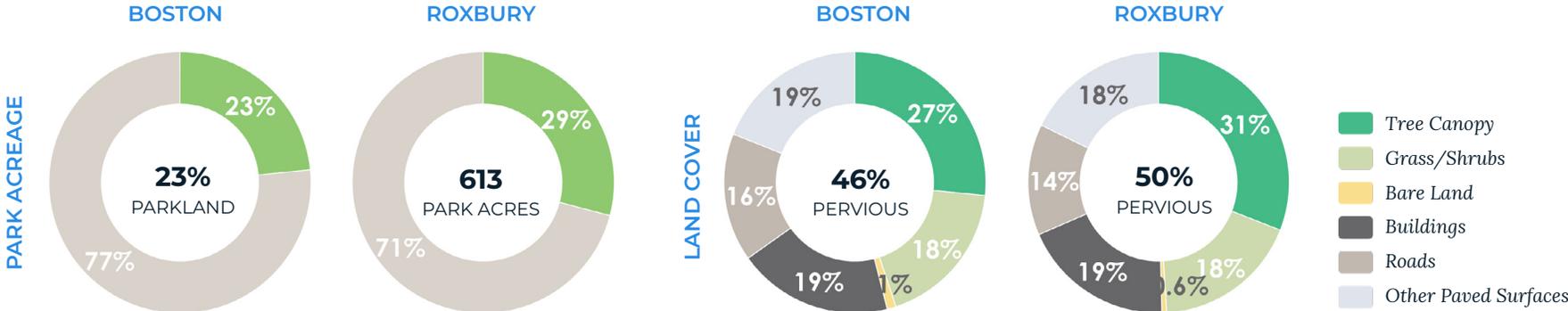
Roxbury experiences elevated temperatures in many parts of the neighborhood, especially areas of the neighborhood that are a greater distance from Franklin Park. Roxbury has

some of the hottest daytime temperatures of the five neighborhoods. In the heat analysis, Roxbury's daytime and nighttime median temperatures measured 101°F and 82.8°F, respectively, both of which are hotter than the city's median (daytime is 99.5°F and nighttime is 81.9°F). The hottest part of the neighborhood is around Newmarket and Frederick Douglass Square Historic District where daytime temperatures can reach 105°F, and nighttime temperatures reach 88°F. In comparison, Franklin Park had daytime temperatures around 90°F in the heat analysis. The southern part of Roxbury cools

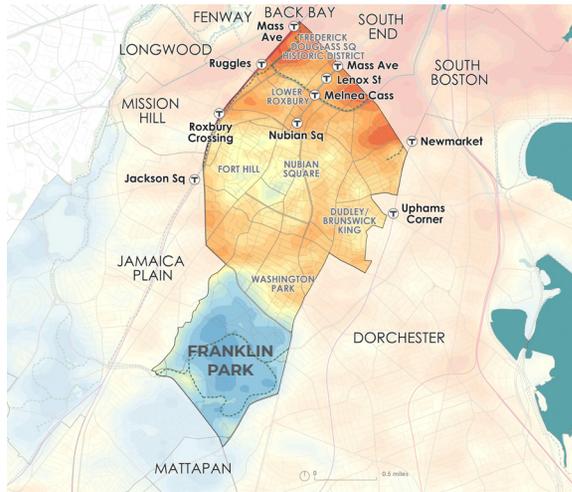
down significantly at night due to the proximity to Franklin Park, but the cooling effect only extends a few blocks out from the park.

Factors including uneven park access and land use patterns contribute to why many areas of Roxbury experience intense heat. Of the five neighborhoods, Roxbury has one of the lowest percentages of impervious surfaces at 50%, but much of that open space is concentrated in Franklin Park. Franklin Park accounts for 80% of the neighborhood's park space acreage, and outside of Franklin Park, only 6% of the neighborhood is park space, lower than the citywide average (23%).⁴⁹ The uneven distribution of green space means many areas of the neighborhood do not benefit from the cooling benefits of parks.

The neighborhood's land use context and density also play roles. Neighboring large institutions have larger, more dense buildings, which contribute to increased heat in the surrounding area. Extreme heat conditions are concentrated around more densely developed areas of Roxbury. The areas along Massachusetts Avenue, from Newmarket to Frederick Douglass Square Historic District, include large-scale commercial buildings, industrial land uses, and dense mixed-use buildings. Many of these building typologies typically have flat black roofs, are surrounded by impervious surfaces, and have few trees, which all contribute to hotter temperatures.

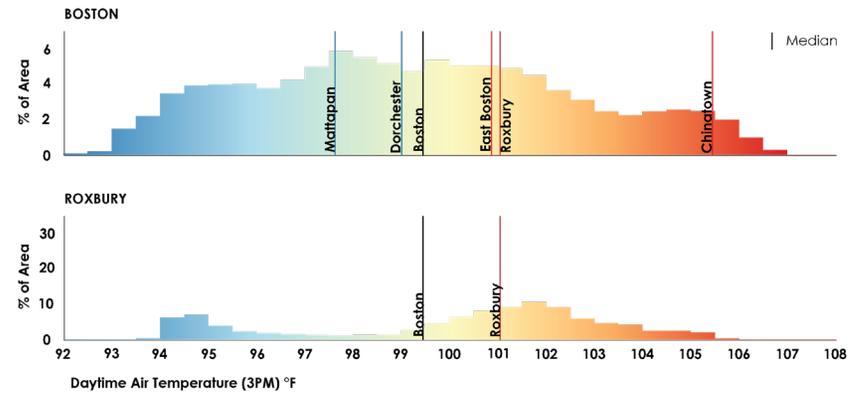
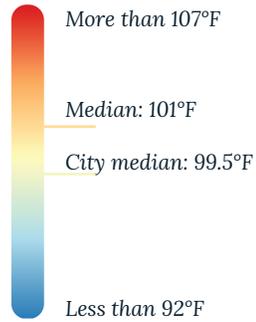


Data Source: Tree Canopy Assessment 2019, BPRD

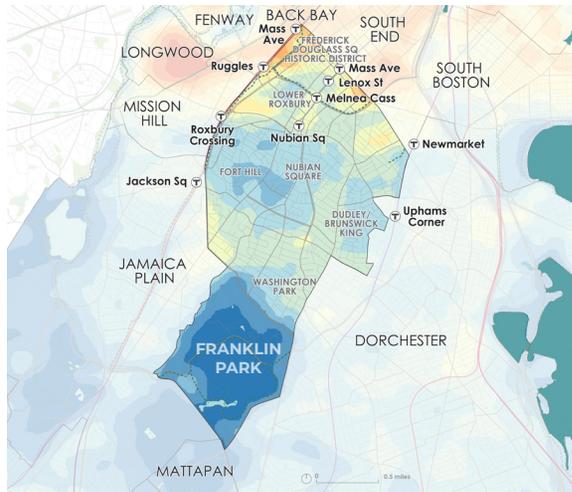


DAYTIME AIR TEMPERATURES

3PM:
AIR TEMPERATURE

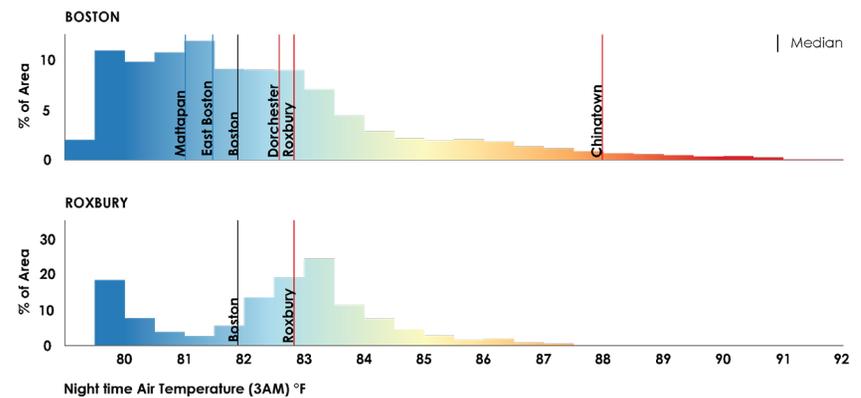
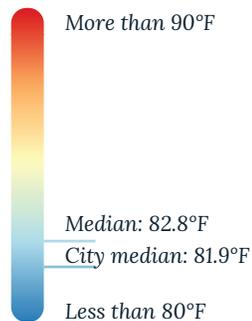


Daytime Air Temperature (3 p.m.): Median neighborhood air temperature at 3 p.m. is 1.5°F hotter than the Boston median.

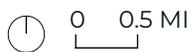


NIGHTTIME AIR TEMPERATURES

3AM:
AIR TEMPERATURE

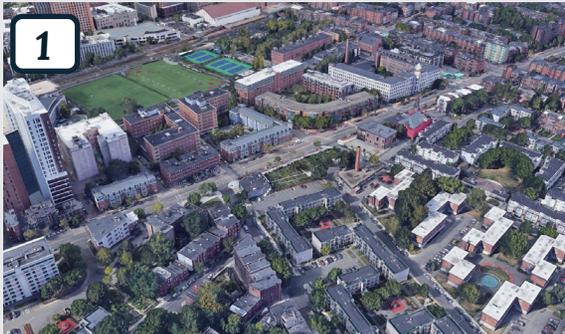


Nighttime Air Temperature (3 a.m.): Median neighborhood air temperature at 3 a.m. is about 1°F cooler than the Boston median.



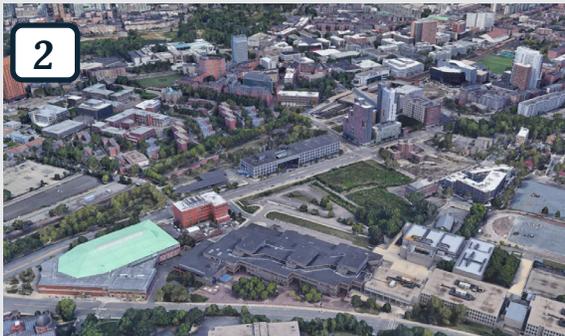
SAMPLE OF HEAT FINDINGS

These three areas illustrate examples of how Roxbury's land use affects daytime and nighttime temperatures, based on the citywide heat analysis.



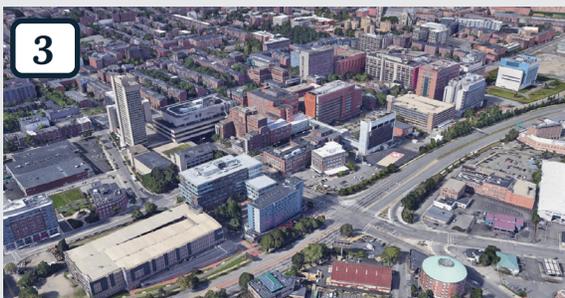
1. DENSE HISTORIC DISTRICTS

Dark roofs and brick building facades in historic districts like the Frederick Douglass Historic District absorb heat during the day, and denser buildings limit air movement which could help cool the neighborhood down at night. Limited tree canopy on parking lots, trees, and institutional athletic fields contribute to extremely long and intense heat events in this part of Roxbury.



2. CIVIC AND INSTITUTIONAL USES

Institutional areas like those around Madison Park High can be very hot, as they often have large dark roofs and significant paved areas in the immediate vicinity, both of which absorb heat. The large buildings and parking lots also limit tree canopy coverage.



3. MEDICAL CAMPUSES

Like civic and institutional uses, medical campuses often have significant paved areas, dense development, some dark roofs, and a surrounding context that is also hot due to extensive paving and dense development, which contribute to sustained high daytime and nighttime temperatures. These hotter temperatures could affect people who are coming to the area to seek medical treatment.

AREAS EXPERIENCING LONGER HIGH-HEAT EVENTS

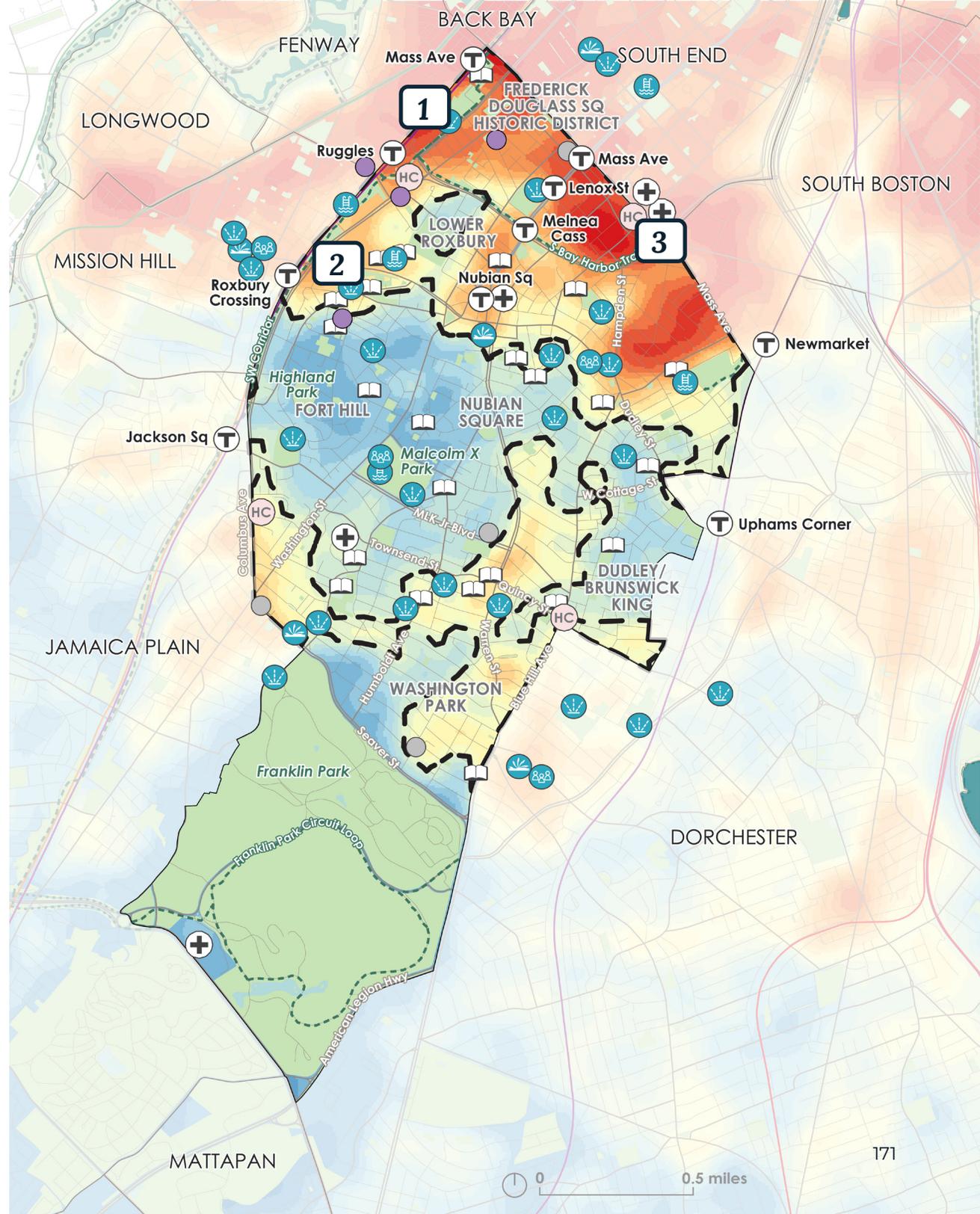
-  School
-  Hospital
-  Community Health Center
-  BHA Public Housing: Elderly/Disabled
-  BHA Public Housing: Family
-  Community Centers
-  Pools (BCYF and DCR)
-  Tot Sprays
-  Libraries

Heat Event Duration is the sum of all the hours during the analysis week (a heat wave week in July 2019) that the local modeled heat index is above 95°F, for days that the nighttime temperature does not drop below 75°F,

HEAT EVENT HOURS



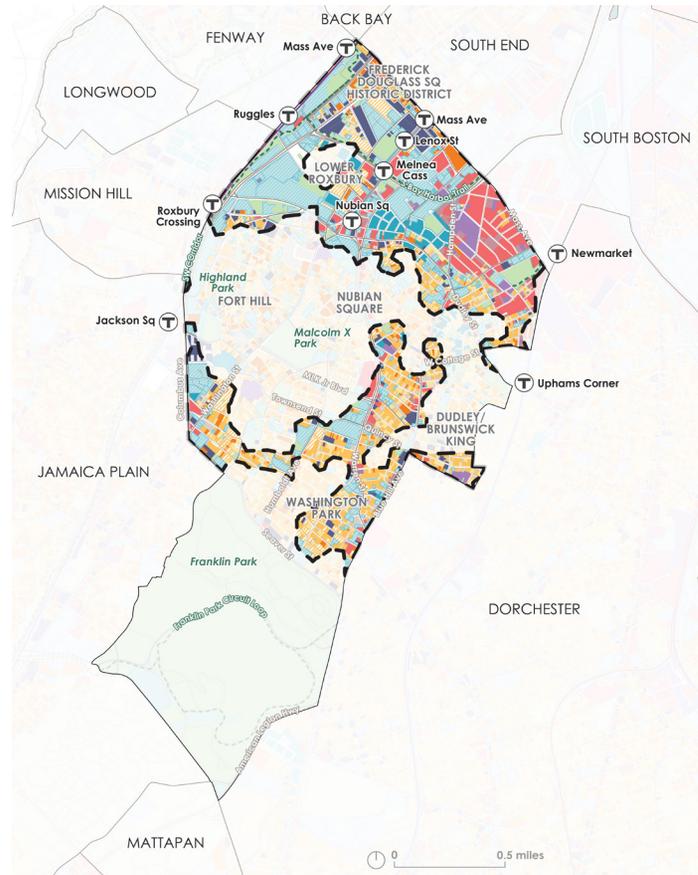
 Longest Heat Event (More than 30 hrs)



LAND USE AND PEOPLE

The parts of Roxbury that experienced the most intense and longest heat events in the heat analysis include a mixture of residential, institutional, and commercial land uses. These areas include parts of the neighborhood generally north and northeast of Malcolm X Boulevard and Dudley Street as well as central parts of the neighborhood, including Egleston Square and the Warren Street corridor south of Washington Park Mall. A higher population density along Massachusetts Avenue near the T stops is due to the presence of larger, mixed-use buildings.

As described in Chapter 3, hot weather can create disproportionate health risks for some people, especially for those who are younger or older, who have preexisting health conditions, or who are exposed to heat for longer periods of time. In Roxbury, young children (under 5 years) make up 6% of neighborhood residents (compared to 5% citywide), and older adults (over 65 years) make up 12% of neighborhood residents (same as the citywide percentage).⁵⁰ Of Roxbury residents, 30% are low-income (compared to 16% citywide), and 78% of housing units are renter-occupied (compared to 64% citywide).⁵¹ Low-income residents and renters may face barriers to home retrofits or affording cooling options.



Land Use Map: The hottest and most intense areas in Roxbury includes a mixture of residential, institutional, and commercial land uses.

LAND USE

- Single-family Housing
- Multi-family Housing
- Apartment (7+ Units)
- Condo
- Mixed Use
- Residential Land
- Commercial
- Commercial Land
- Industrial
- Exempt (Chapter 121A)
- Exempt

Longest Heat Event (More than 30 hrs)

0 0.5 MI

Data Source: Analyze Boston

POPULATION DENSITY AND
HIGH-HEAT EVENT DURATION

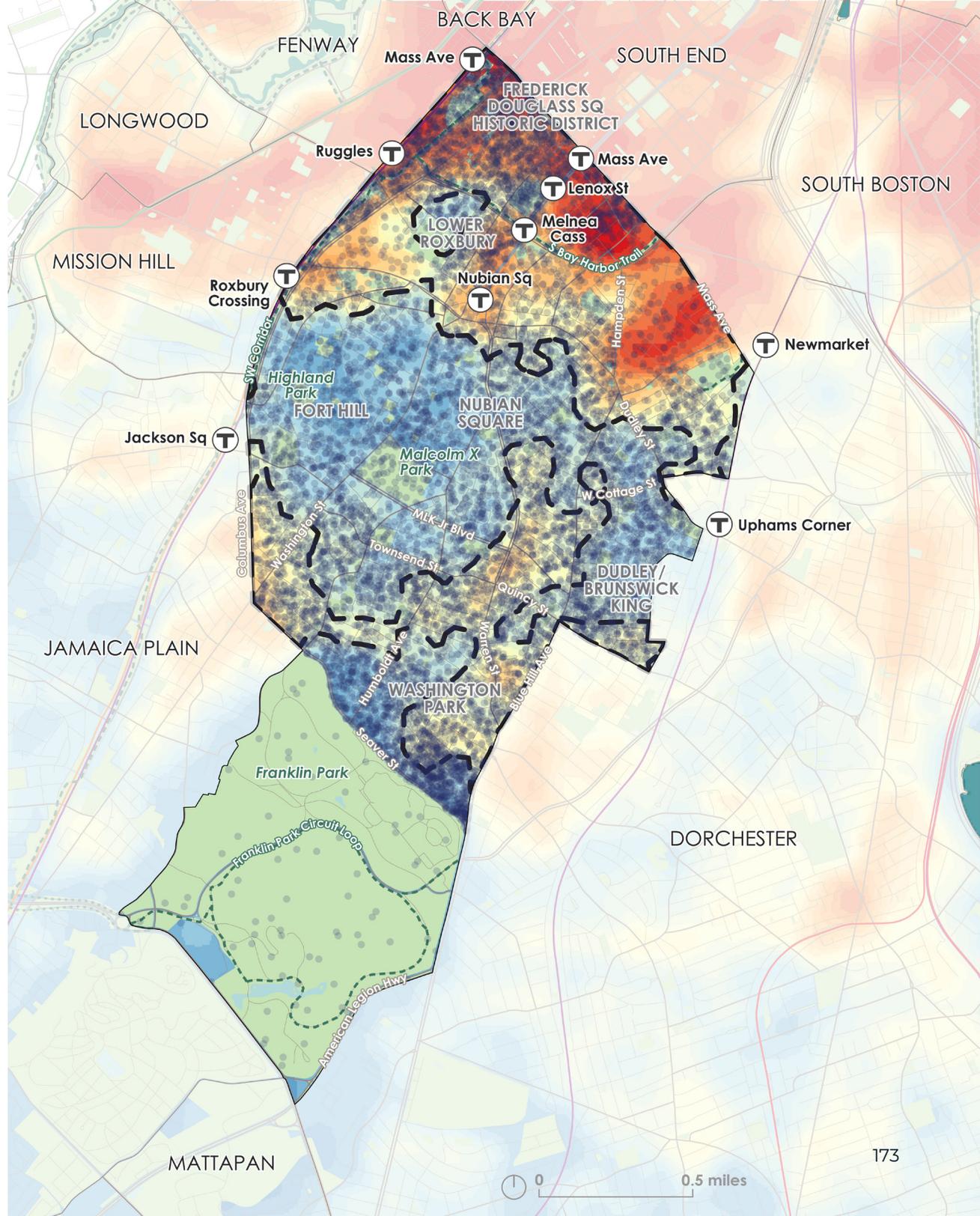
Higher density in areas with longer heat exposure and intensity including Frederick Douglass Square and Nubian Square.

1 DOT = 5 PEOPLE

HEAT EVENT HOURS



Longest Heat Event
(More than 30 hrs)



RESIDENT DEMOGRAPHICS AND HEAT DURATION

The following maps compare the density of Roxbury residents to areas with the longest duration event in the heat analysis. Due to longer heat events and higher heat intensity, heat risk may be higher for residents in many parts of the neighborhood, including the Frederick Douglass Historic District, Lower Roxbury, Newmarket, Nubian Square, Egleston Square, Warren Street corridor, and Boston Medical Center area. For example, the Frederick Douglass Historic District experiences long heat events (34 hrs) that are 5 hours above the neighborhood median (29 hrs). In terms of heat intensity, the Frederick Douglass Historic District is 7°F degrees hotter than Franklin Park.

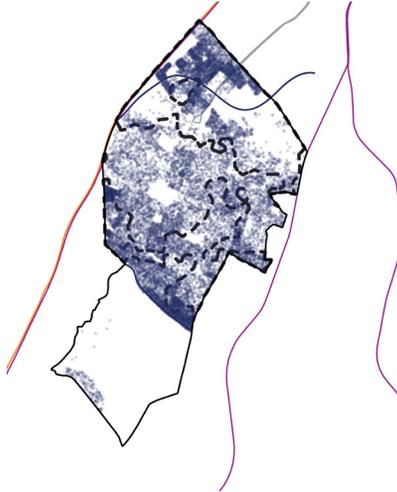
YOUNG CHILDREN (<5 YRS) HIGHER SENSITIVITY



OLDER ADULTS (>65 YRS) LOWER ADAPTIVE CAPACITY HIGHER SENSITIVITY



LOW-INCOME RESIDENTS LOWER ADAPTIVE CAPACITY



RENTER-OCCUPIED HOUSING LOWER ADAPTIVE CAPACITY



ASIAN



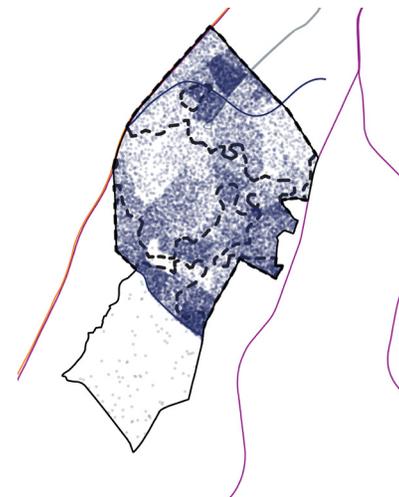
WHITE



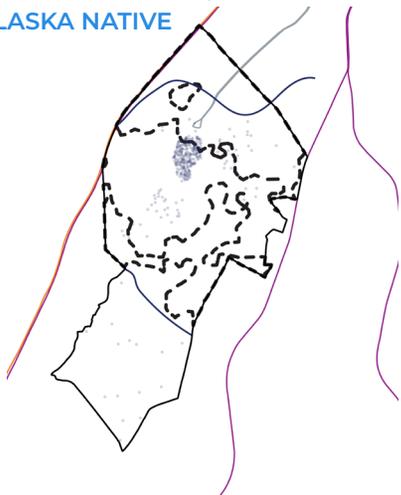
BLACK



LATINX



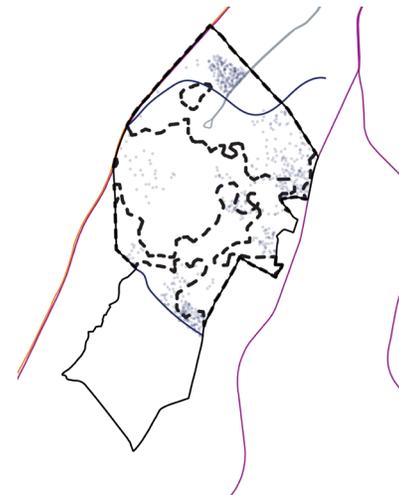
AMERICAN INDIAN/
ALASKA NATIVE



2 OR MORE RACES



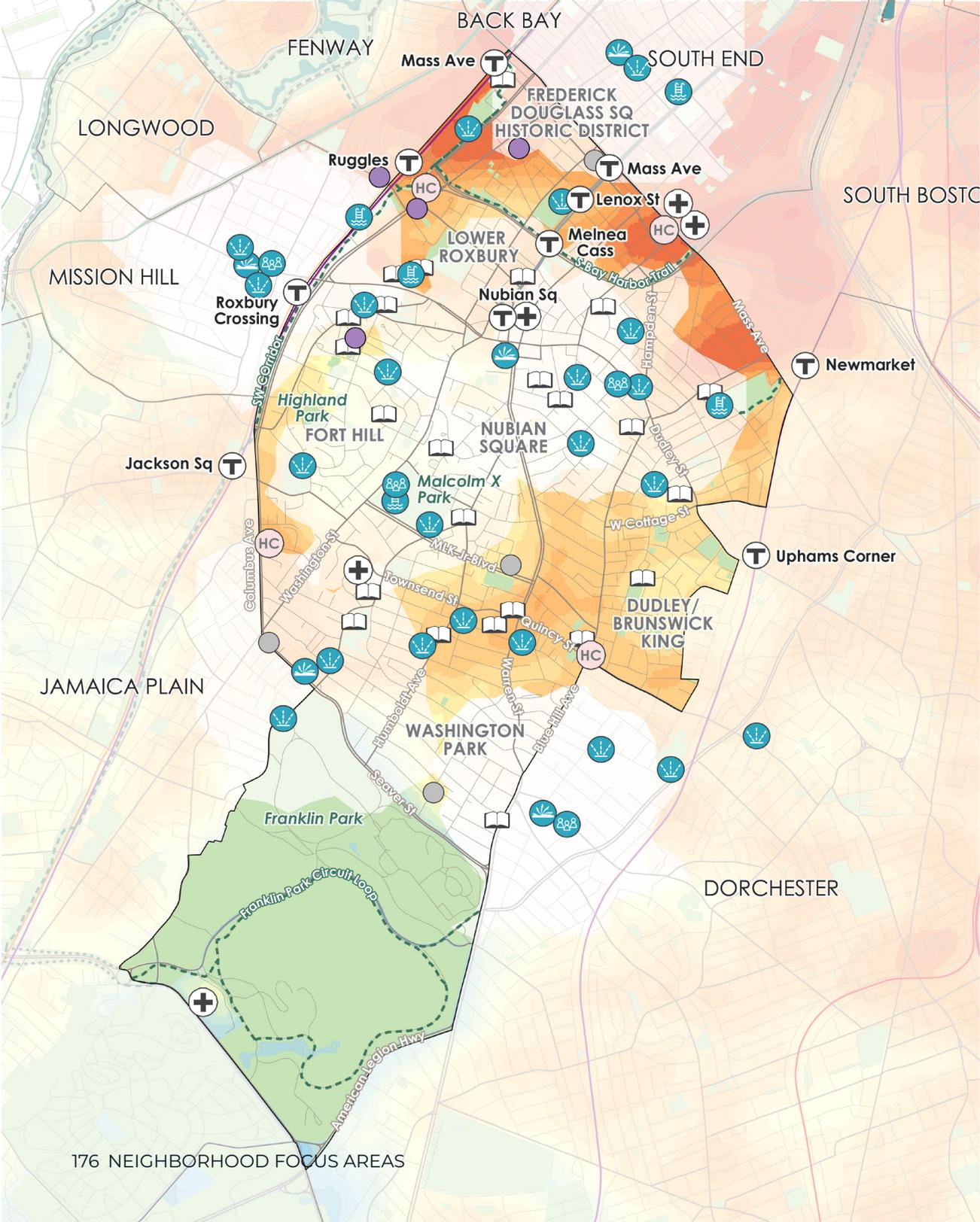
ANOTHER RACE



Data Source: ACS 5-year estimates, 2015-2019

[] Longest Heat Event
(More than 30 hrs)

1 DOT = 1 PERSON

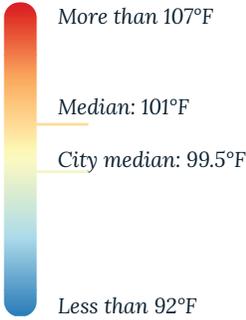


GAPS IN INDOOR COOLING NETWORK

- School
- Hospital
- Community Health Center
- BHA Public Housing: Elderly/Disabled
- BHA Public Housing: Family
- Indoor Cooling Centers
- Pools (BCYF and DCR)
- Tot Sprays
- Libraries

Areas masked in white are within a 10-minute walk of indoor cooling centers and libraries. Areas in orange red experience extreme heat during heat waves, and are not within a 10-minute walk of an indoor cooling center or a library.ⁱ

**3PM:
AIR TEMPERATURE**



ⁱ BCYF Summer 2020 Cooling centers were used for this map.



COMMUNITY HEAT EXPERIENCES AND COOLING IDEAS

HEAT EXPERIENCES

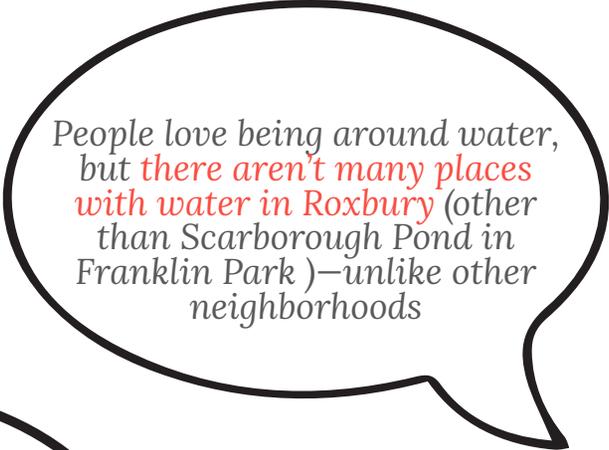
Roxbury residents discussed their heat experiences and cooling ideas during the Neighborhood Ideas Workshop and through responses to the citywide survey. Areas of concern mentioned by participants included financial and information barriers to accessing cooling, temperatures in schools, the amount of hardscape in commercial areas, hot sidewalks, air pollution, displacement risks, cooling for residents in BHA communities, and preserving and maintaining street trees.

COMMUNITY COOLING IDEAS

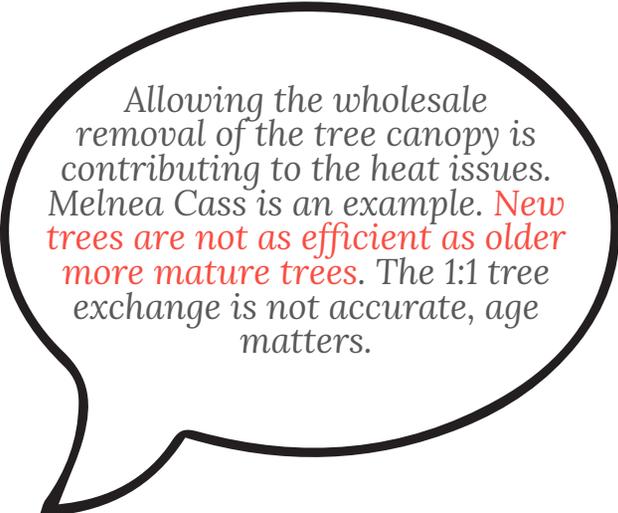
Roxbury residents suggested cooling strategies that would cool the neighborhood, keep students cool, and increase access to cooling and information during heat waves. Participants shared the following ideas to increase access to cooling in Roxbury:

- » **Green Neighborhood Network:**
Opportunities for a network of green spaces, connected via cool routes with trees, awnings, shade structures, light-colored pavement, and misters
- » **Cool Schools and Heat Education:**
Opportunities for schools to offer a safe, comfortable learning environment, as well as shaded outdoor green space, and to share best practices for staying cool and other heat resilience teachable moments

- » **Heat Wave Preparedness:**
Opportunities to increase access to ways to stay cool, including programs to expand the distribution of personal and home cooling devices; and opportunities for improved information sharing including early notifications and alerts of imminent heat waves

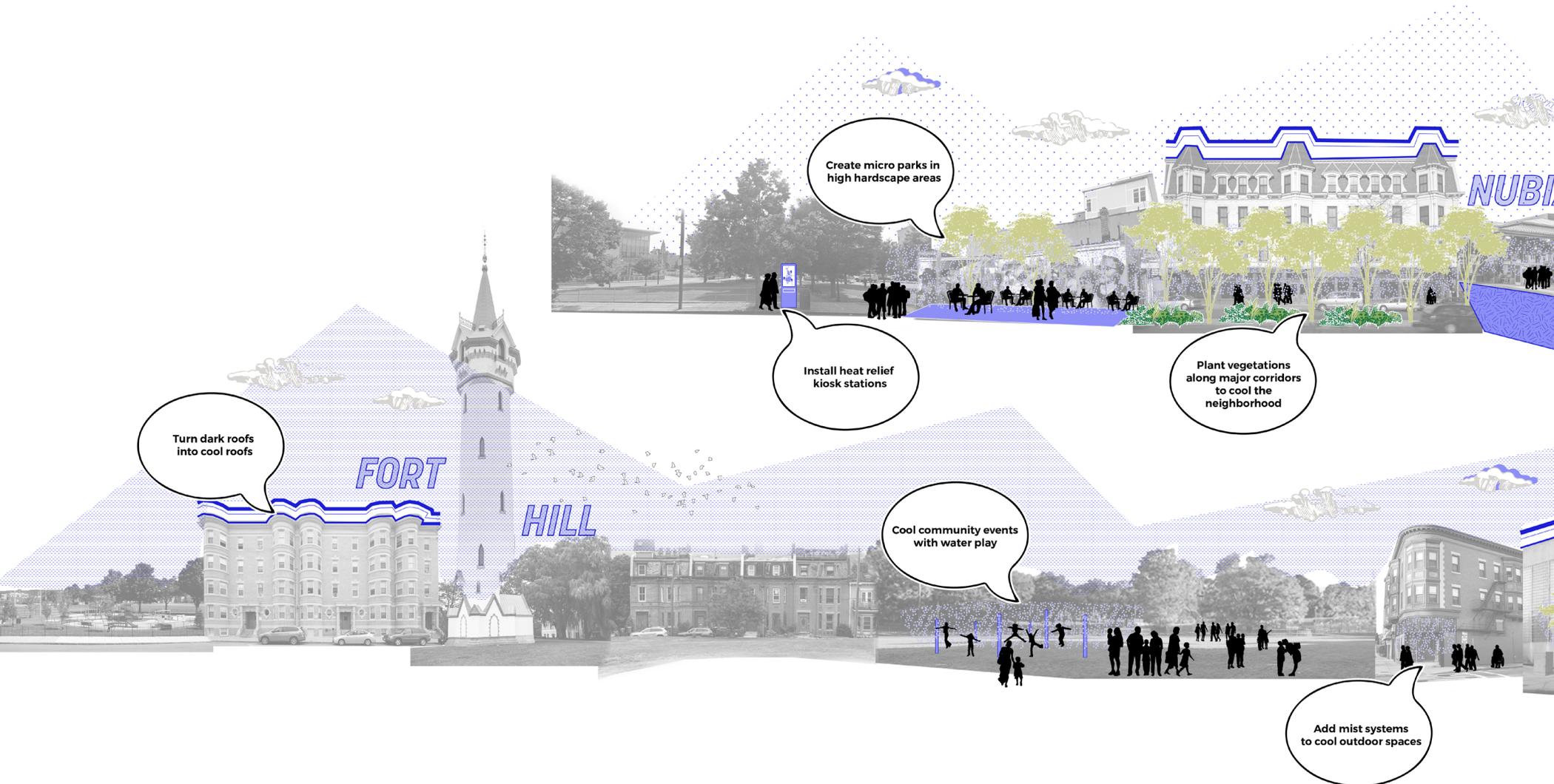


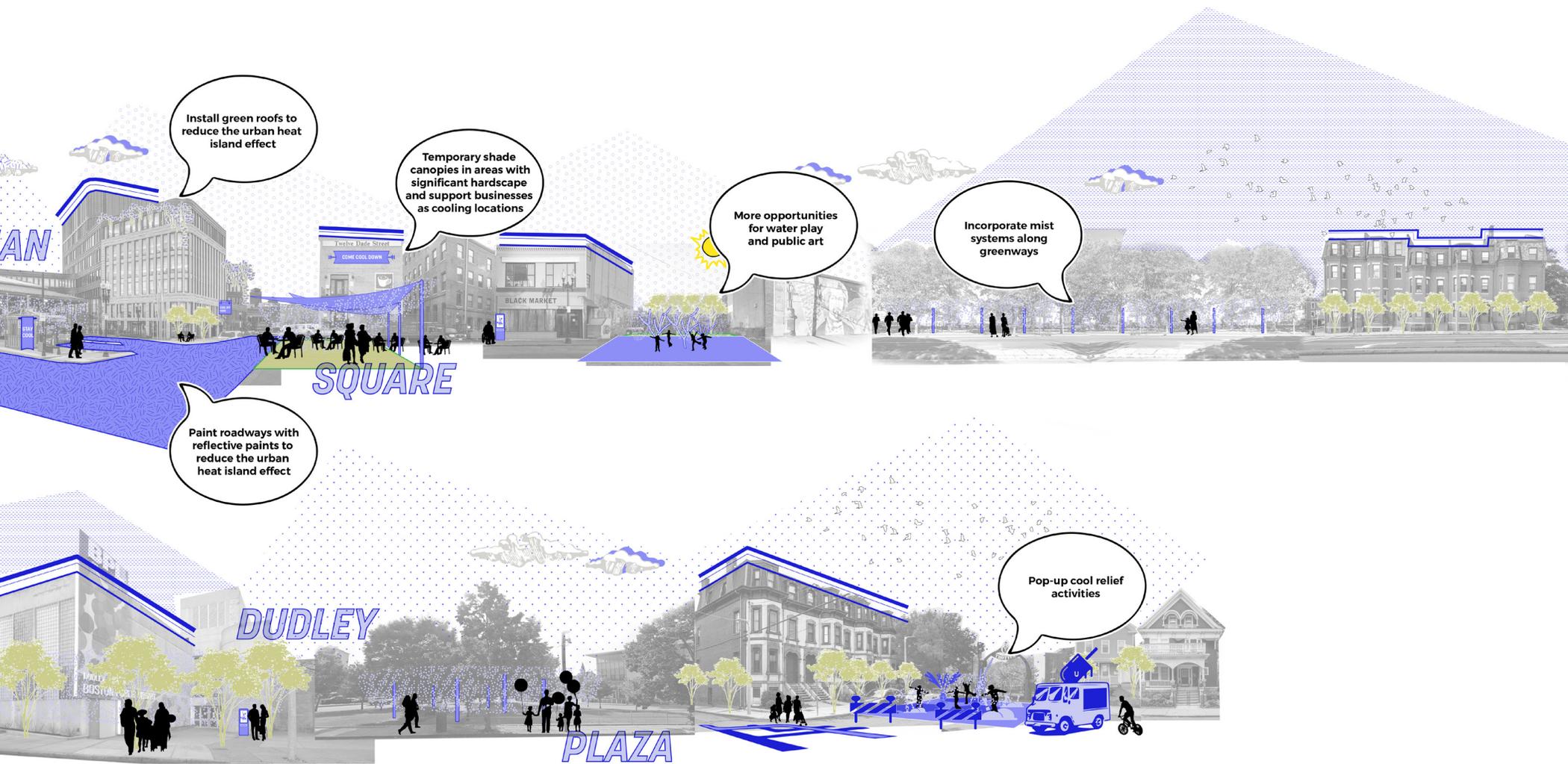
People love being around water, but *there aren't many places with water in Roxbury* (other than Scarborough Pond in Franklin Park)—unlike other neighborhoods



Allowing the wholesale removal of the tree canopy is contributing to the heat issues. *Melnea Cass is an example. New trees are not as efficient as older more mature trees.* The 1:1 tree exchange is not accurate, age matters.

OPPORTUNITIES FOR A COOLER ROXBURY





Install green roofs to reduce the urban heat island effect

Temporary shade canopies in areas with significant hardscape and support businesses as cooling locations

More opportunities for water play and public art

Incorporate mist systems along greenways

Paint roadways with reflective paints to reduce the urban heat island effect

Pop-up cool relief activities

SQUARE

DUDLEY

PLAZA

HEAT RESILIENCE OPPORTUNITIES

This section describes key needs for heat reduction or increasing access to cooling resources and opportunities to integrate resilience, based on neighborhood-level heat analysis and community feedback.

While all the strategies may be relevant to each neighborhood, each section lists specific heat resilience strategies that respond to the particular needs that have been identified. More details on the strategies listed below can be found in Chapter 6: Citywide Heat Resilience Strategies.

INDOOR COOLING NETWORK

Mapping 10-minute-walk access from indoor BCYF cooling centers and libraries revealed gaps in access to indoor cooling centers. Residents in the Frederick Douglass Square Historic District, including those in BHA housing communities, live in one of Boston's hottest areas. Parts of this neighborhood are within a 10-minute walk of cooling centers in the South End, but it is unclear if Roxbury residents would feel as comfortable visiting them given their location across neighborhood boundaries. Other parts of the neighborhood are outside of a 10-minute walk from cooling centers altogether. Opportunities exist to expand access to indoor cooling options, including through partnerships with community organizations.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.2: ENHANCED AND EXPANDED CITY-RUN COOLING CENTERS

STRATEGY 2.3: CITYWIDE COOLING NETWORK

RELIEF DURING HEAT WAVES

As shared by participants in this process, extreme heat is already a challenge for neighborhood residents, workers, and students. While longer-term mitigation strategies are appealing, near-term help is needed. Pop-up heat relief, extended hours for existing public indoor cooling centers, and expanded alerts about upcoming heat events could help provide support and cooling.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 1.2: PRE-HEAT WAVE RESOURCES MOBILIZATION

STRATEGY 2.1: POP-UP HEAT RELIEF

STRATEGY 4.1: HEAT RESILIENCE PUBLIC EDUCATION CAMPAIGN

COMMERCIAL BUILDINGS WITH COOL ROOFTOPS AND INDOOR OR SHADED OUTDOOR SOCIAL SPACES

Many surfaces along main streets, commercial, areas and industrial areas are dark, contributing to high heat exposure. For example, in the heat analysis, the Newmarket and South Bay Center areas are some of the hottest in the city. Opportunities for more shade, pocket gathering spaces, vegetation, and parks could help the neighborhood stay cooler.

RELATED HEAT RESILIENCE STRATEGIES STRATEGY 5.2: COOL ROOFS PROGRAM

COOL, SHADED PAVEMENT AND SURFACE PARKING

Large surface parking lots in several areas of the neighborhood contribute to heat exposure. Areas like the Frederick Douglass Square Historic District, Nubian Square, Egleston Square, and the area around Washington Park Mall could be opportunity areas for increased shade and vegetation.

RELATED HEAT RESILIENCE STRATEGIES STRATEGY 6.1: ENHANCED COOLING IN POCKET PARKS AND STREET-TO-PARK CONVERSIONS STRATEGY 6.2: INCREASE SHADE ON MUNICIPAL SITES

COOL SCHOOLS

Several participants expressed that youth have some of the greatest needs for heat relief in Roxbury. Madison Park High, Orchard Gardens K-8 School, and Mason Elementary are schools within areas experiencing longer heat events, based on the heat analysis. Creating comfortable learning environments and schoolyards will help support the health and learning outcomes of students.

RELATED HEAT RESILIENCE STRATEGIES STRATEGY 5.5: COOL SCHOOLS

RESILIENT DESIGN FOR NEW DEVELOPMENT

Like many Boston neighborhoods, Roxbury has been experiencing increasing development pressures in many parts of the neighborhood. Chapter 6 of this document includes three strategies related to development review, zoning, and heat resilience design guidelines. Continuing to support and expand affordable housing options is a priority throughout Boston.

RELATED HEAT RESILIENCE STRATEGIES

**STRATEGY 8.1: UPDATED CLIMATE
RESILIENCY CHECKLIST**

**STRATEGY 8.2: HEAT RESILIENCE BEST
PRACTICE GUIDELINES**

**STRATEGY 8.3: ZONING REVISIONS TO
SUPPORT COOLER NEIGHBORHOODS**

MORE SHADED GATHERING SPACES

Franklin Park provides cooling relief for nearby areas, while some parks reach higher temperatures. In the heat analysis, Clifford Playground was measured at 102°F during the day, 4°F higher than Malcolm X Park. The area around the park includes significant unshaded parking and buildings with dark roofs, which contribute to the higher temperatures. Ramsay Park reached about 102°F during the heat analysis, despite having a fair number of trees in it. The park has a splash pad and a variety of other amenities. Roxbury residents who participated in the planning process expressed a desire for more outdoor gathering spaces with vegetation, trees, shade, and cooling throughout the neighborhood.

RELATED HEAT RESILIENCE STRATEGIES

STRATEGY 2.1: POP-UP HEAT RELIEF

**STRATEGY 6.1: ENHANCED COOLING IN POCKET
PARKS AND STREET-TO-PARK CONVERSIONS**

STRATEGY 6.4: PLANNING FOR FUTURE PARKS

COOL WALKS TO LOCAL DESTINATIONS AND MAIN STREETS

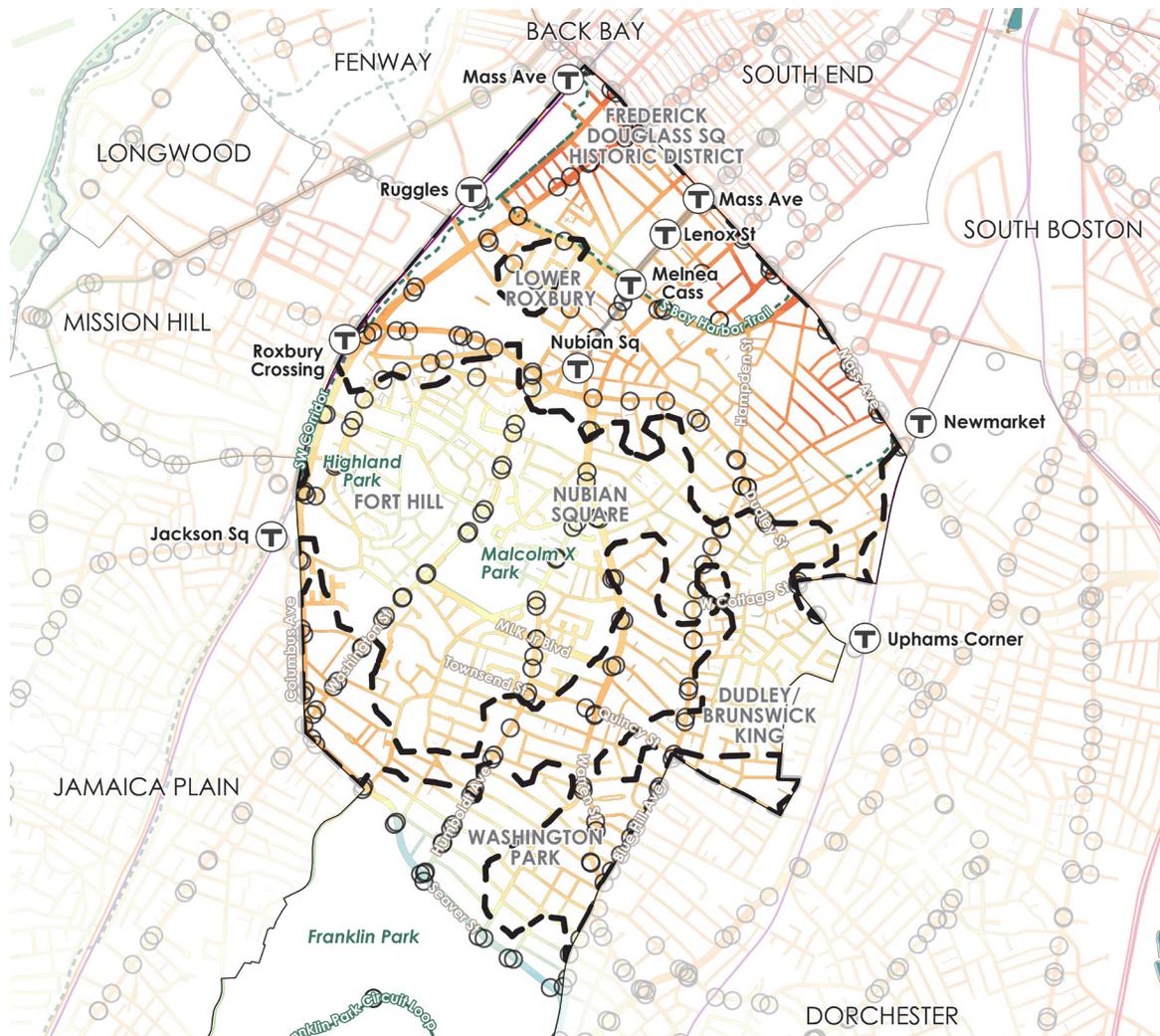
Limited shade and vegetation along some Roxbury streets can create hot walks for residents, as they are moving to local destinations or waiting at bus stops. Streets with higher temperatures and bus stops include Warren Street, Blue Hill Avenue, Dudley Street, Humboldt Avenue, Tremont Street, and Washington Street. Cooling strategies could be prioritized on these streets through strategies like street trees, shade, vegetation, and shaded bus stops.

RELATED HEAT RESILIENCE STRATEGIES

**STRATEGY 6.3: EXPANDED DRINKING
FOUNTAIN NETWORK**

STRATEGY 7.1: COOL COMMUTES

STRATEGY 7.3: COOL MAIN STREETS



Street Daytime Air Temperature: This map illustrates air temperature along Roxbury's streets.

3PM:
AIR TEMPERATURE

