

Market Analysis 2018

Better
Bus
Project



Better
Bus
Project



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DARTMOUTH STREET

JCDecaux

#OPEN MORNING ROUTINE

ST JAMES AVENUE

39 FOREST HILLS

1272

HEALTHWORKS
LESS CENTERS FOR WOMEN
Financial District



Introduction

What is the Better Bus Project?

To provide the most effective service possible, the MBTA must match its services to market demands. This includes providing more service where demand is greater and less where demand is lower, getting people from where they are to where they are going, and doing so as quickly and conveniently as possible.

Between 2000 and 2016, Greater Boston has changed significantly, adding over 165,000 people and 44,000 jobs. In addition, there have been major changes in the places to and from which people travel across the region. While many improvements have been made to MBTA services during this time, these improvements have not kept pace with the changes in transit demand. The Better Bus Project is designed to rethink how the MBTA delivers bus service in response to the evolving needs of the Greater Boston area.



What is the Market Analysis?

The Market Analysis is an evaluation of where transit demand is located in the MBTA service area. Specifically, this analysis examines:

1. The underlying demand for transit services based on population density, job density, demographics, and other factors
2. Where people are traveling from and where they are going
3. The extent to which existing MBTA services meet those demands

The Market Analysis is one of the first steps in understanding the existing conditions in the MBTA service area. A State of the System report was produced to provide an in-depth look at the MBTA's existing bus network and how it performs today. In addition, a detailed evaluation was conducted for each individual route and the services provided in major corridors.

The findings of those efforts will be combined with the findings in this document to provide a complete picture of existing conditions for bus service, and will ultimately help to identify improvements that should be made as part of the Better Bus Project.

Additional Planned MBTA Efforts

The Better Bus Project marks the beginning of a long range planning effort by the MBTA. In the near term, this Market Analysis, the accompanying State of the System, and the Route Profiles describing each MBTA bus route in detail, together will inform a series of new schedules and bus routes to be implemented by the end of 2019.

Beginning in 2020, the MBTA will be undertaking a comprehensive network redesign of its bus system informed by a pending 2020 Multiyear Investment Strategy and enabled by potential new funding.

BUNKER HILL
COMMUNITY COLLEGE

Bellingham Square



NO STOPPING
TOW ZONE

BUNKER HILL
COMMUNITY COLLEGE

Chelsea Campus





Underlying Transit Demand

- Overview of Transit Demand
- Population-Based Demand
- Employment-Based Demand
- Major Activity Centers
- Combined Population and Employment-Based Demand



Overview of Transit Demand

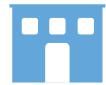
Underlying transit demand is strongly related to six factors:



Population and Population Density: Since transit relies on having more people in close proximity to service, higher population density makes it feasible to provide higher levels of service.



Socioeconomic Characteristics: People may be more or less likely to use transit based on socioeconomic characteristics. For example, households with many cars are much less likely to use transit than those with one or none.



Employment and Employment Density: The location and density of jobs is a strong indicator of transit demand, as traveling to and from work often accounts for the most frequent type of transit trip.



Development Patterns: In all cities, there is a strong correlation between development patterns and transit ridership. In areas with denser development, mixed-use development, and a good pedestrian environment, transit can become very convenient.

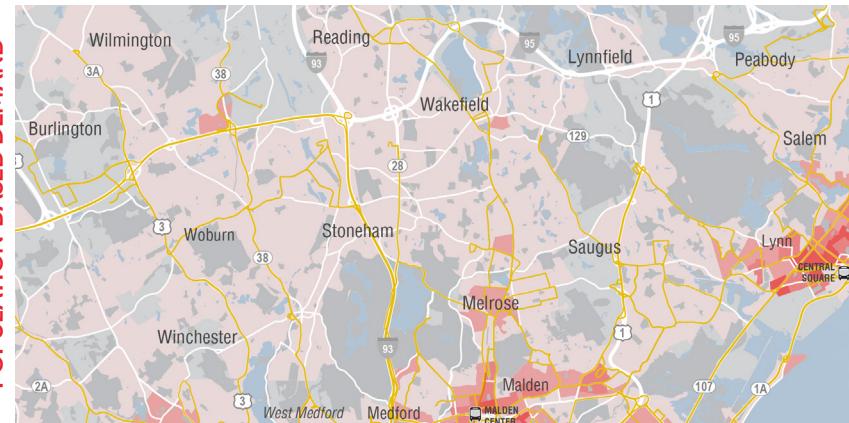


Major Activity Centers: Large employers, universities, tourism destinations, and other high-activity areas attract large volumes of people and can generate a large number of transit trips.

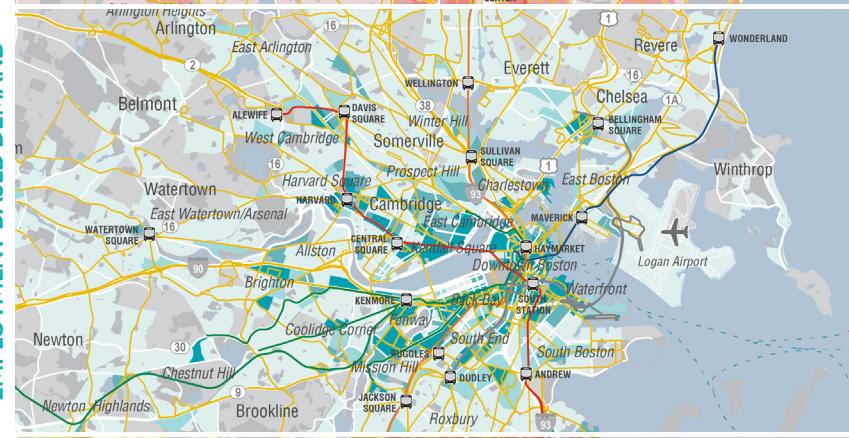


Travel Flows: People use transit to get from one place to another. Major transit lines such as rapid transit services and Key Bus (high frequency) routes are designed to serve corridors with high volume travel flows.

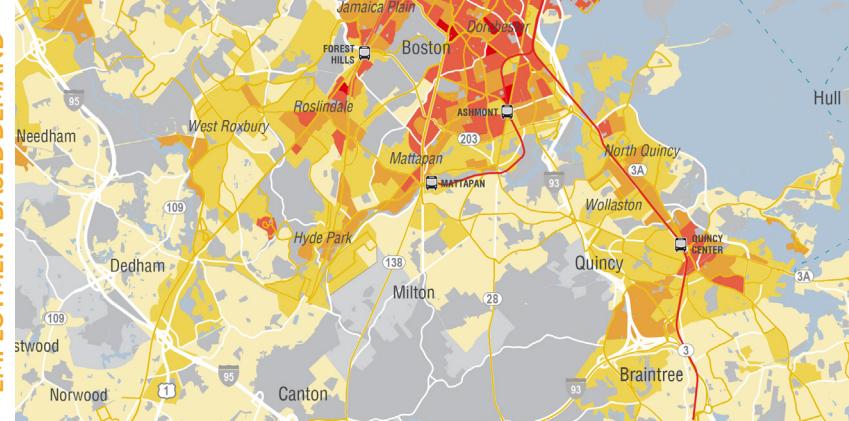
POPULATION-BASED DEMAND



EMPLOYMENT-BASED DEMAND



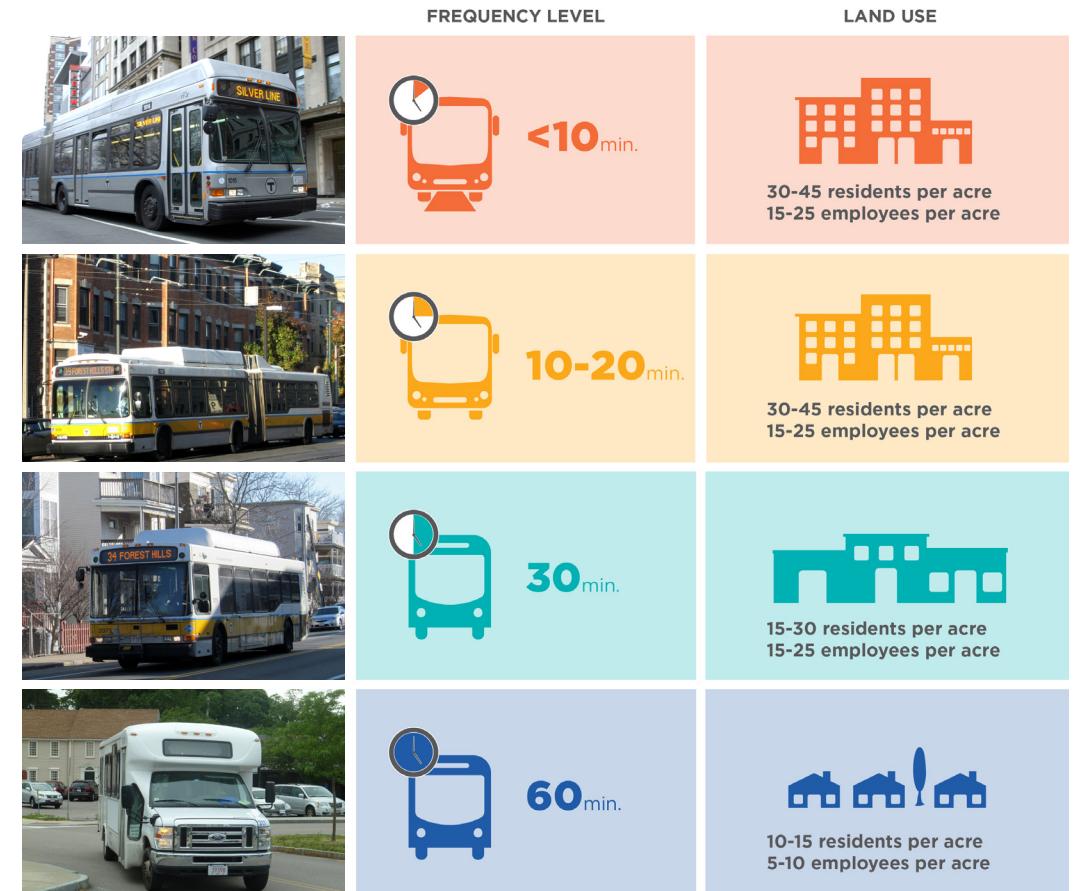
COMBINED POPULATION- AND EMPLOYMENT-BASED DEMAND



Of these six factors, **population and employment density** are the most important in determining the underlying demand for transit. This is because:

- The reach of transit is generally limited to within one-quarter mile of the bus stop or station. As a result, the size of the travel market is directly related to the density of development in that area.
- Transit service frequencies, in turn, are closely related to market size. Bigger markets support more frequent service, while smaller markets can support only less frequent service.
- To attract travelers who have other options, such as private automobiles, transit service must be relatively frequent.

Population and job densities also provide an indication of the underlying population-based demand for transit in terms of the type and frequency of service that would be most appropriate. For example, to support 30-minute service, there generally must be at least 15 households per acre or more than 15 jobs per acre, or a combination thereof. However, these densities broadly indicate demand across contiguous and nearby areas. Clusters of density throughout an area or along a corridor are strong indicators of demand, while a dense but small block in an isolated area would not produce sufficient demand in and by itself. Demand can also “accumulate” along corridors: for example, if there are many blocks along a corridor that each have the density to support 30-minute service, the entire corridor may actually be able to produce enough demand for 15-minute or better service.



Source: Composite data compiled by Nelson\Nygaard from various sources

Population-Based Demand

Population Density

The MBTA serves a large, diverse service area. As of 2016, the service area was home to 2.4 million residents, with the largest populations located in Boston and the immediately surrounding cities. Specifically, the highest concentrations are within the urban areas of Boston, Cambridge, Somerville, Chelsea, Everett, Malden, Revere, Winthrop, and Brookline.

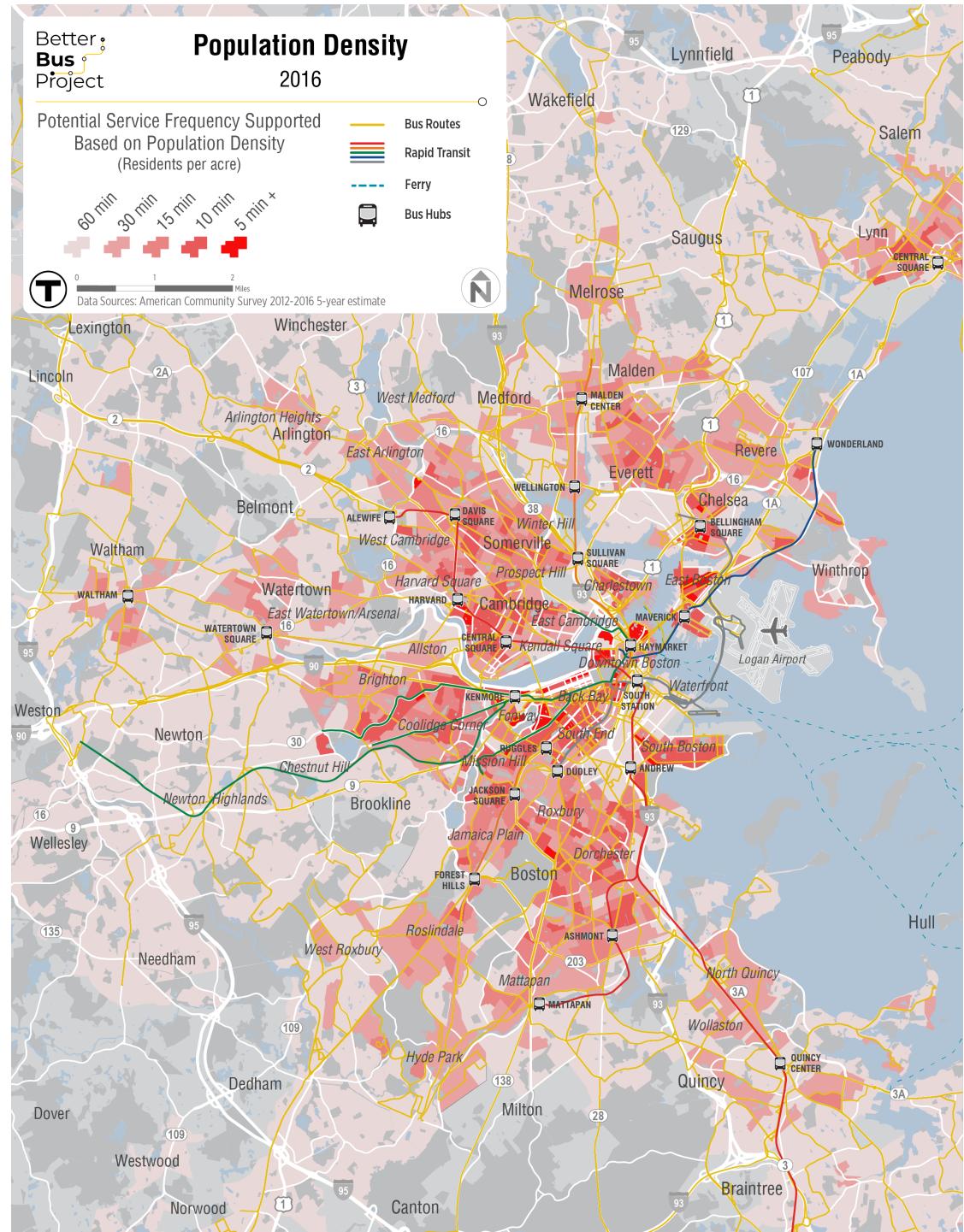
Several areas demonstrate a potential to support very high levels of service, based on underlying population density. Boston neighborhoods with high population densities include:

- Chinatown
- South End
- Mission Hill
- East Boston
- Dorchester
- South Boston
- Allston
- Brighton
- Roxbury

Other communities with high population densities include:

- Chelsea
- Everett
- Cambridge
- Somerville
- Lynn

Most of these areas are served by both rapid transit or Silver Line service and high levels of local bus service. In general, major bus service issues are related to crowding, poor reliability due to traffic and scheduling issues, and slow and often circuitous service.



Population Growth Since 2000

Between 2000 and 2010, the MBTA service area population grew from 2.2 million to 2.3 million, an increase of 3%, and grew by another 4% to 2.4 million by 2016. Most of this growth was focused in Greater Boston's core cities and in some communities just to the north.

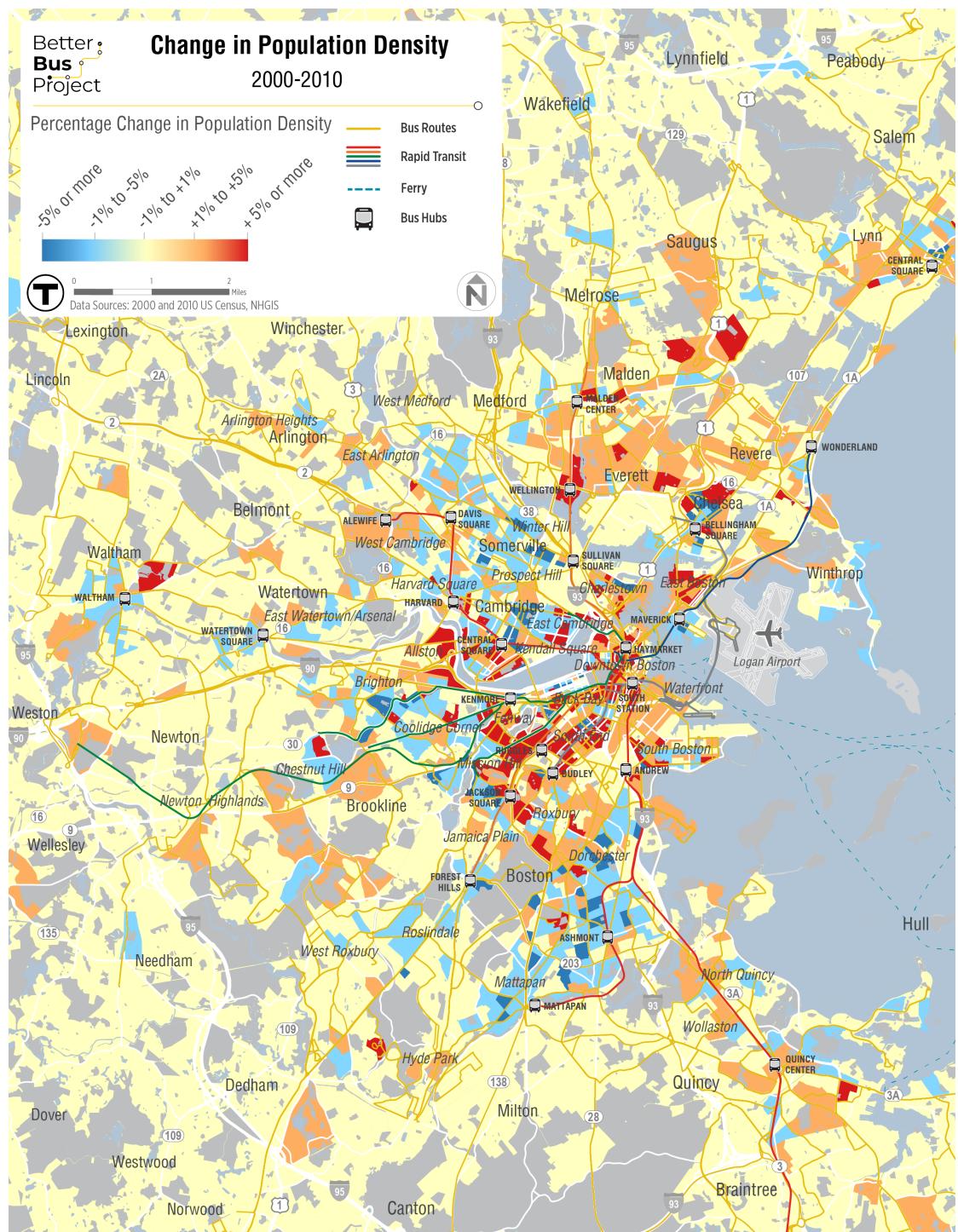
The highest levels of growth in Boston were in:

- Back Bay
- South End
- Mission Hill
- East Boston
- Downtown
- Chinatown
- Eastern portions of Roxbury
- Waterfront and the western portion of South Boston

Population also significantly grew in some cities to the north, including:

- Everett
- Cambridge, around Central Square and Cambridgeport
- Eastern Medford around Wellington
- Western Malden around Malden Center
- Chelsea north of Bellingham Square
- Central Lynn
- Waltham south of Bentley University

Many of the bus routes that serve these areas are slow and experience overcrowding. These problems are due to a combination of the population growth that has occurred in these areas and reliability issues that lead to higher than normal loads on delayed buses.



Socioeconomic Characteristics

In addition to population density, socioeconomic characteristics influence people's propensity to use transit. National research shows that many population groups have a higher propensity for transit use than the overall population. Socioeconomic characteristics that are related to transit propensity include:

Vehicle Ownership and Access: Households with limited or no access to a personal vehicle, either by choice or by necessity, are more likely to rely on transit. The Greater Boston area features relatively robust transit options, and many residents choose to use transit because it is relatively easy to live "car free". Other residents may use transit for other reasons, such as cost or due to a disability.

Income: Residents with lower incomes tend to use transit to a greater extent because it is less expensive than owning and operating a personal vehicle, and they may rely on transit as their primary mode of transportation.

Race and Ethnicity: Minority residents generally have higher rates of transit use, and the provision of effective transit service to minority populations is also particularly important to the Federal Transit Administration and is a requirement under Title VI of the Civil Rights Act of 1964.

Immigrant Communities: In many other countries, transit use is more common among the general public. As a result, many foreign-born residents are more inclined to use transit when they arrive in the United States and are more likely to use it than the general population.

Disability: Many residents with disabilities may be unable to drive or have difficulty driving, and may be more likely to rely on transit as well as paratransit services to meet their transportation needs and maintain an independent lifestyle.

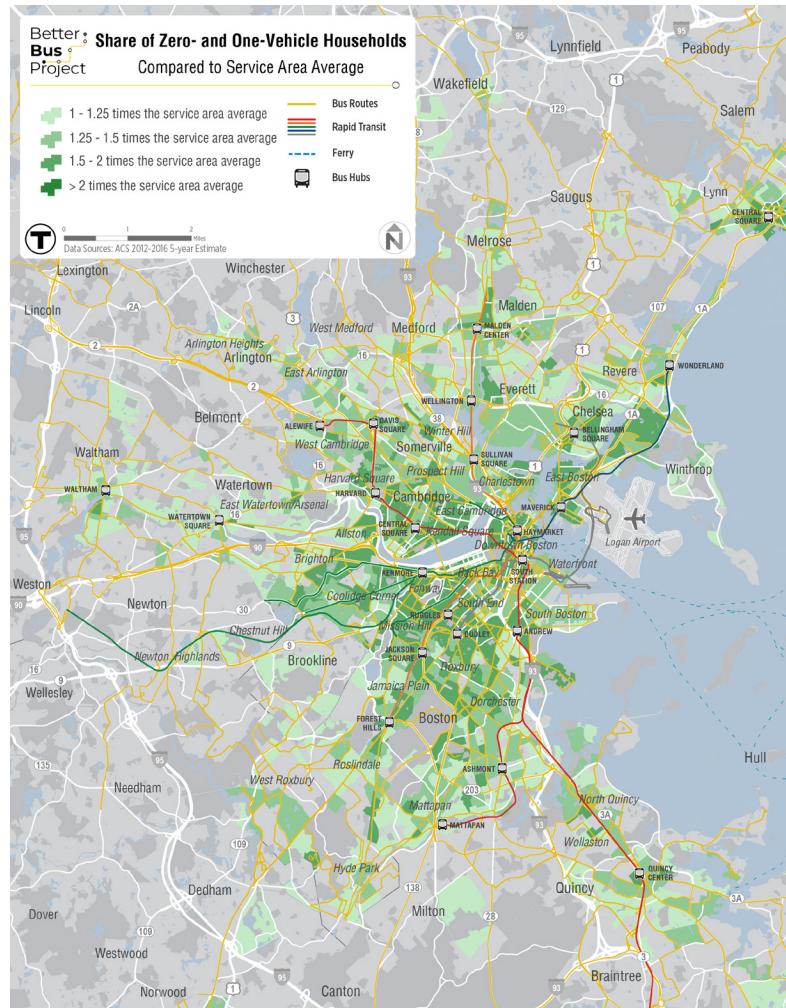
Age: Residents from different age groups may be more or less likely to use transit:

- Youth (age 10-17) are potential transit riders as they are old enough to independently travel to school (and potentially employment), but still too young to drive.
- Young Adults (age 18-24) are often enrolled in college or just entering the workforce, and may not be able to afford to own and operate a personal vehicle. Many young adults, especially in a major urban area, may have used transit in their youth to go to school, and are already in the habit of using transit to get around.
- Millennials (age 25-34) generally have a higher interest in using many transportation options such as transit, walking, and biking and a lower interest in driving.
- Older Adults (age 65 and over) may no longer be comfortable driving or are no longer able to drive, and may begin or continue to use transit to maintain their independence as they age.

It is important to note that there is often a large amount of overlap between these groups. For example, minority residents tend to have lower incomes and rates of auto ownership. Of the above characteristics, auto ownership and income levels are the greatest determinants of transit use, and the others are secondary.

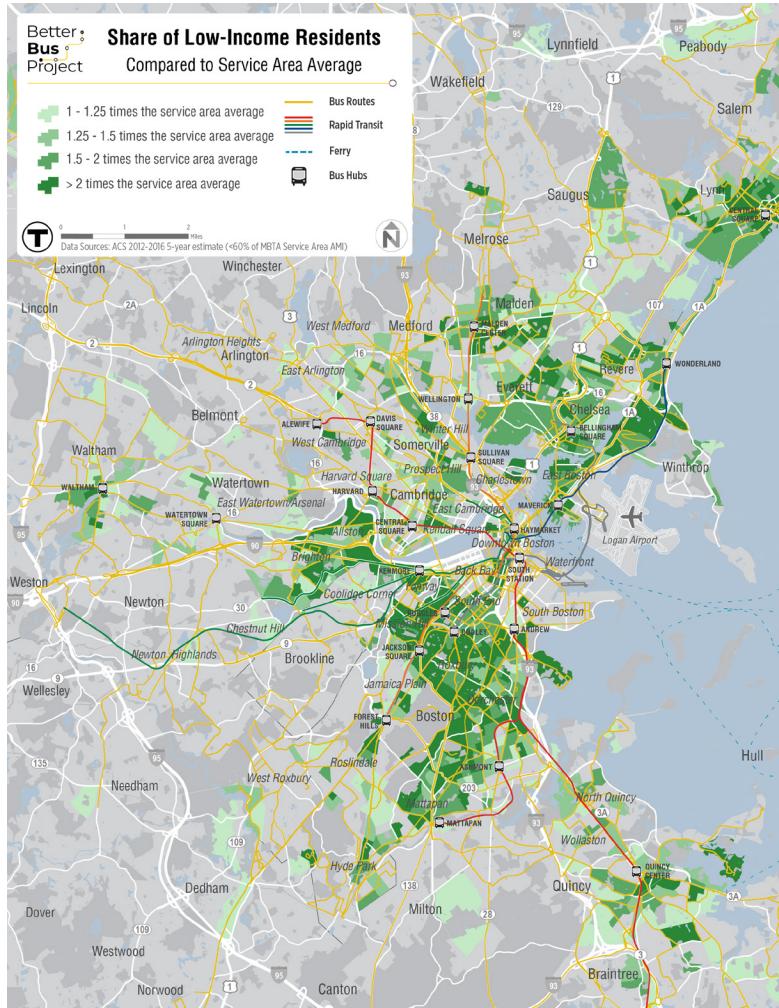
The following maps show areas where there are relatively high concentrations of different socioeconomic groups, as compared to the MBTA's service area population average.

Zero- and One-Vehicle Households



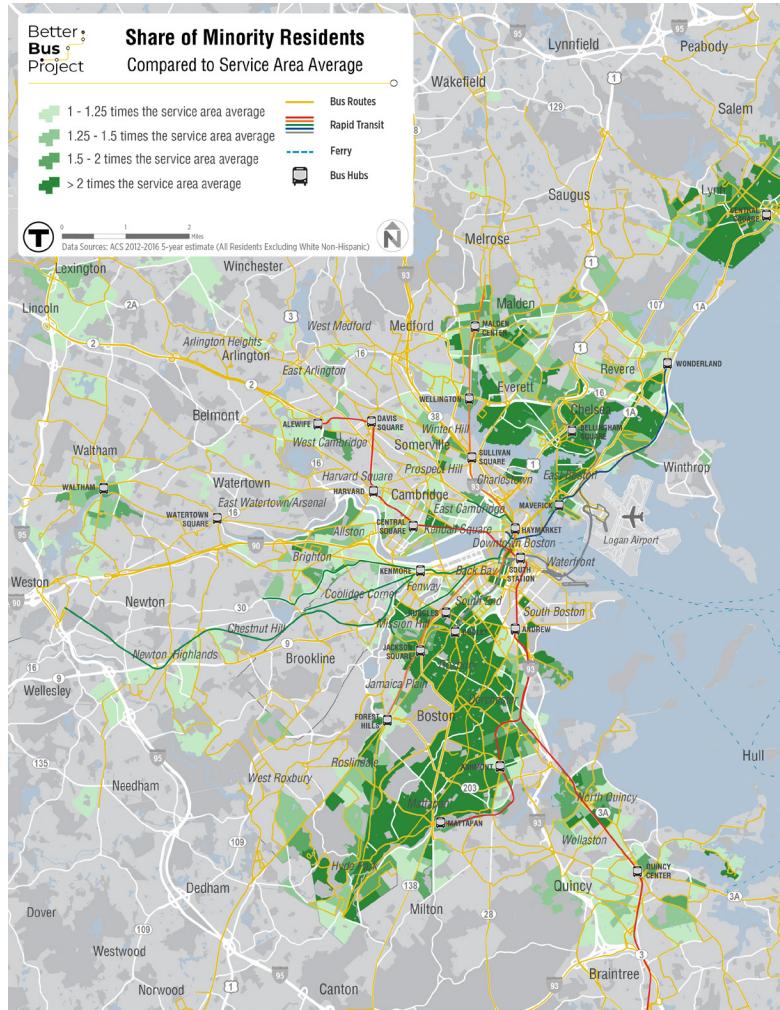
Most areas of Boston and the cities to the north have above-average shares of zero-vehicle and one-vehicle households. The highest concentrations in Boston are in Back Bay, Roxbury, Mission Hill, Fenway, Brighton, and East Boston, as well as portions of Dorchester and Jamaica Plain. To the north, Chelsea, Cambridge, Somerville, Everett, Malden, and Lynn also have high concentrations of zero- and one-vehicle households.

Low-Income Residents



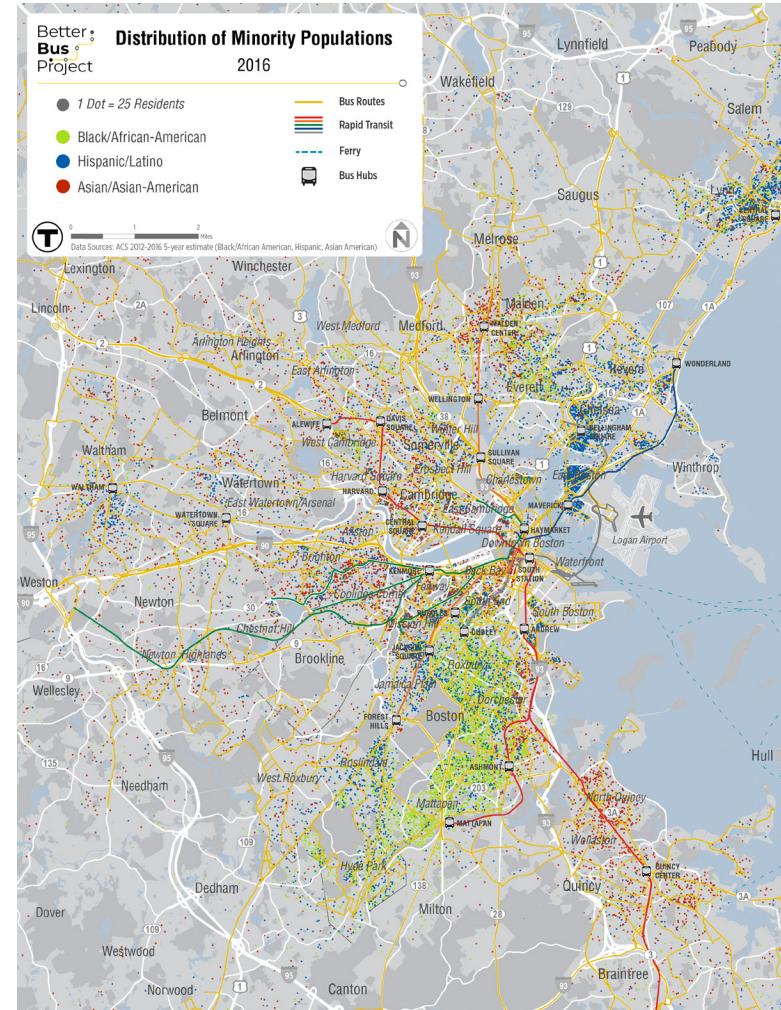
There is a stark contrast between areas with a very high share of residents with low incomes and areas with a very small share of low-income residents. The highest concentrations are focused in the Boston neighborhoods of Dorchester, Roxbury, Mattapan, Mission Hill, Allston, and Brighton, as well as the communities of Chelsea, Everett, Lynn, and parts of Malden and Revere. Other areas with relatively high concentrations include Hyde Park in Boston, Cambridge in The Port and East Cambridge, East Somerville, parts of Waltham, and Quincy Center.

Minority Residents



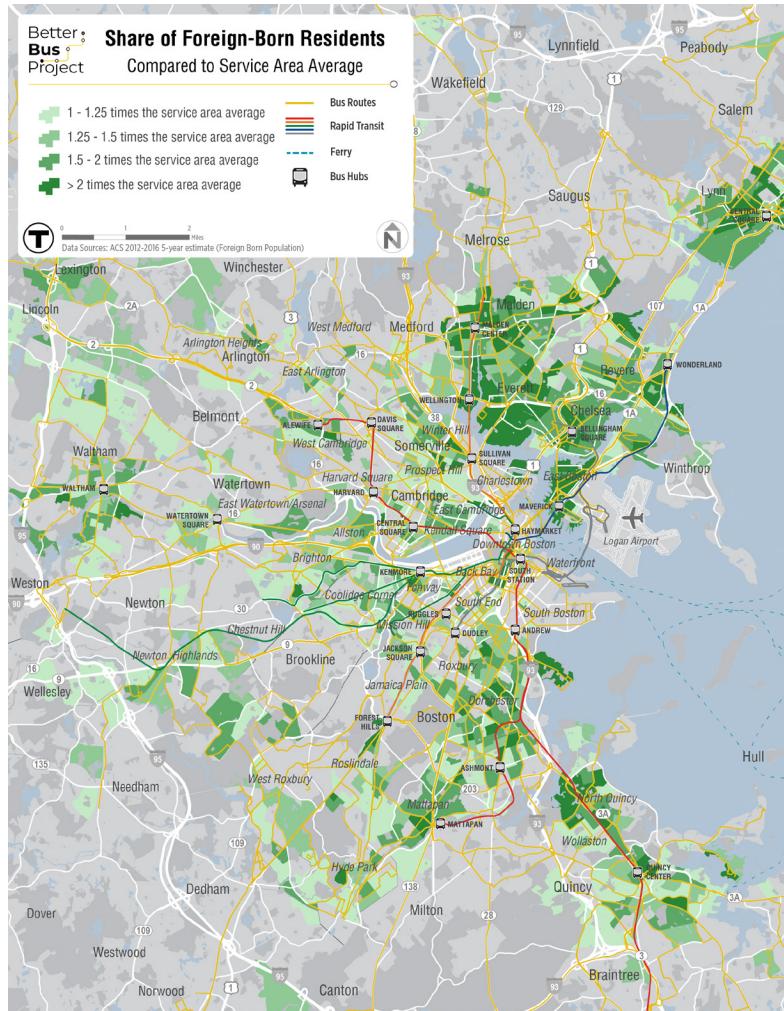
Minority residents are highly concentrated, with a sharp distinction between areas with very high shares of minority residents (often over twice the service area average) and areas with average or below average shares of minority residents. The highest concentrations, by far, are focused in the Boston neighborhoods of Roxbury, Mission Hill, Dorchester, Mattapan, Hyde Park, East Boston, and Chinatown, and to the north in the cities of Chelsea, Everett, and Lynn. Other areas with relatively high shares of minority residents include Malden, Revere, Waltham, and North Quincy.

Distribution of Minority Populations



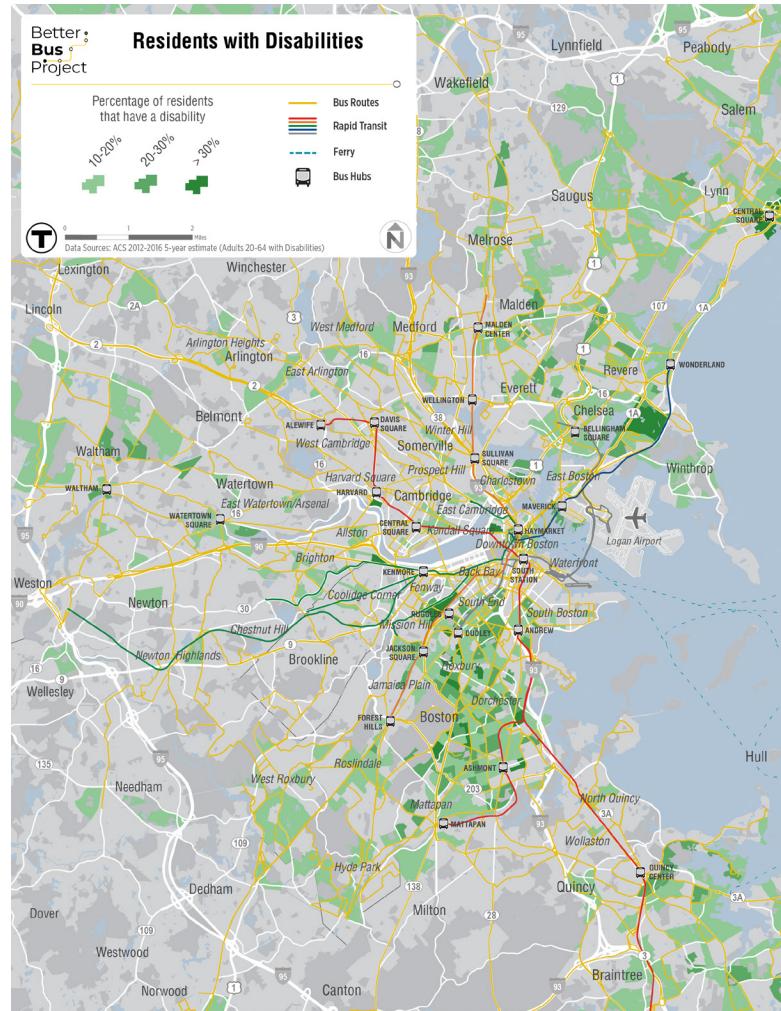
Individual minority populations are also concentrated in a few key places. Black/African-American residents are most highly concentrated in Roxbury, Dorchester, and Mattapan, which are served by bus routes but with limited rapid transit access. Hispanic/Latino residents are concentrated in East Boston and Chelsea, which are connected to downtown Boston by the Blue Line and the recent Silver Line extension, respectively, as well as in Lynn. Asian/Asian-American residents are mostly concentrated in Brighton, Chinatown, South End, Malden, North Quincy, and Wollaston.

Foreign-Born Residents



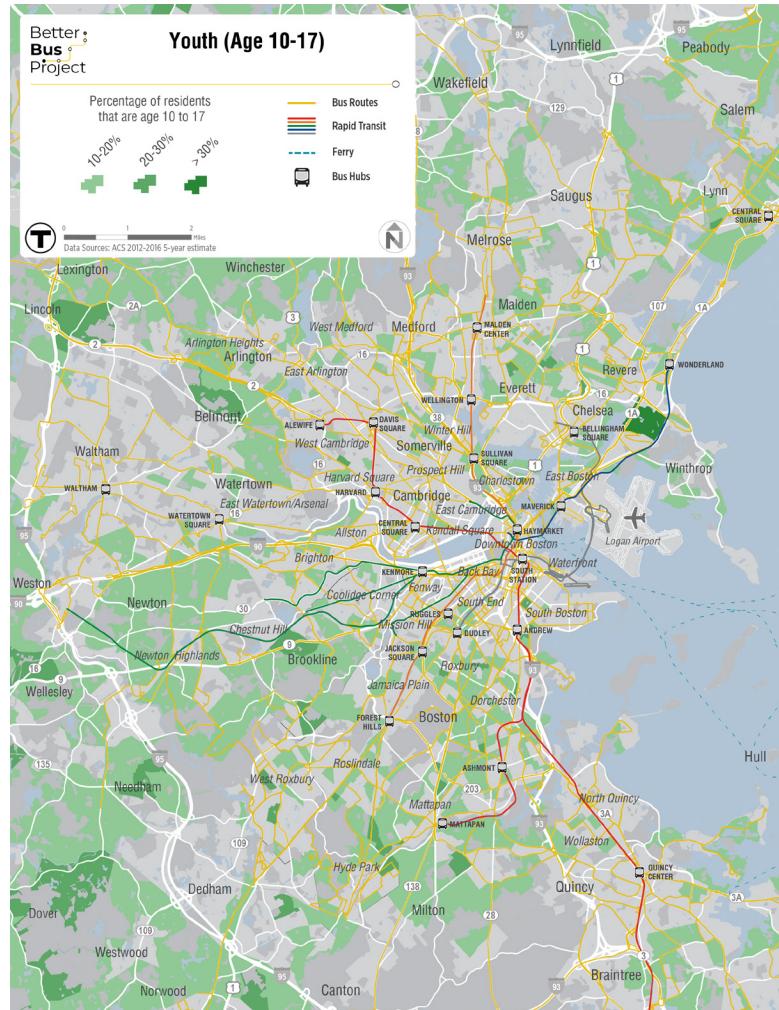
The highest shares of foreign-born residents in the service area are concentrated in cities north of Boston, particularly in Everett, Chelsea, Malden, Revere, and Lynn. Several areas in these cities have more than double the service area average share of foreign-born residents. The Boston neighborhoods of East Boston and Chinatown also have very high shares of foreign-born residents. Relatively high shares of these communities are also located in Dorchester and Mattapan, in North Quincy and Quincy Center, in East Somerville, and in several parts of Waltham.

Residents with a Disability



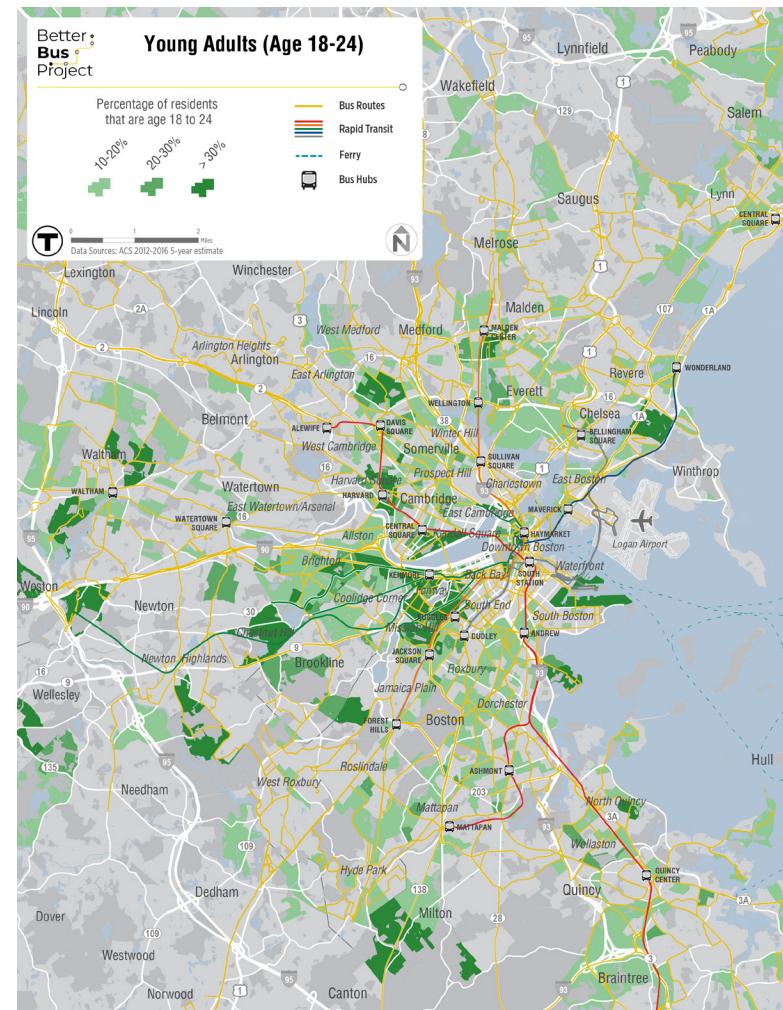
People with disabilities live throughout the Greater Boston region. However, there are also concentrations of residents with disabilities in proximity to major institutions, such as Northeastern/Longwood Medical Area, Boston University (particularly Allston), Harvard University, Massachusetts General Hospital in the West End, and Perkins School for the Blind in Watertown. Concentrations of people with disabilities can also be found in Chelsea, Malden, Lynn, Quincy, and East Braintree/Weymouth.

Youth



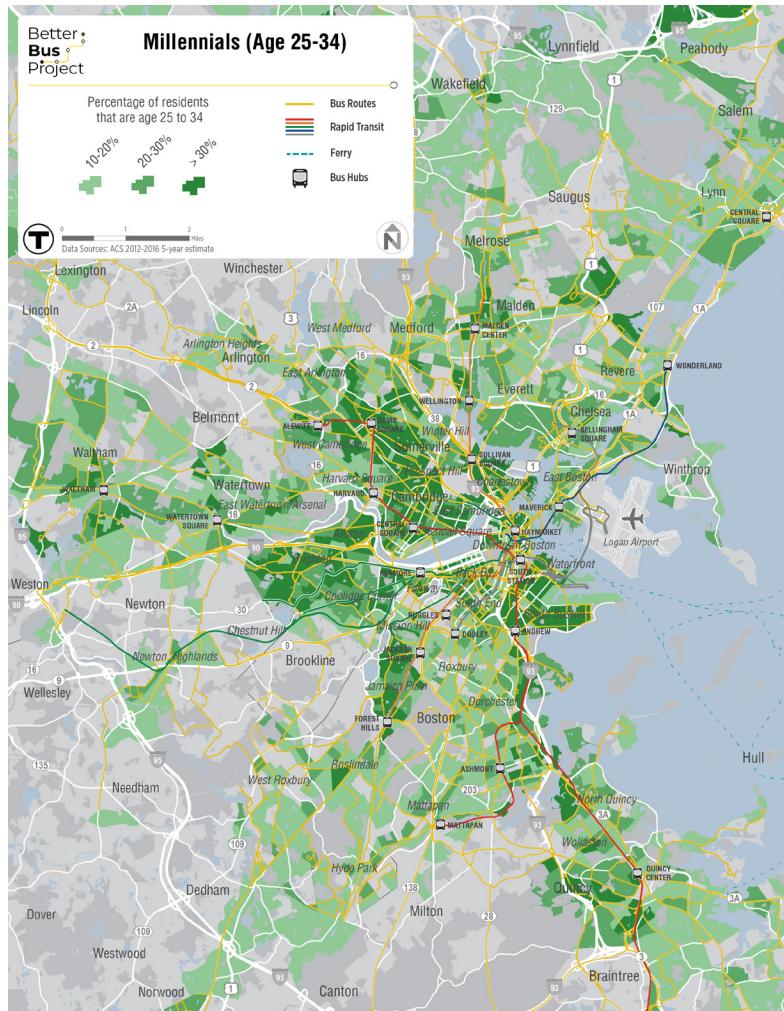
Few areas have high concentrations of youth population, and most areas within the core of the service area have relatively low shares of youth residents. A few pockets with somewhat high shares of youth population are scattered throughout Charlestown, Everett, South Boston, Roxbury, Dorchester, Mattapan, West Roxbury, and Hyde Park. Other areas with concentrations of youth include several parts of Lynn and Brookline, Newton, Milton, and Belmont.

Young Adults



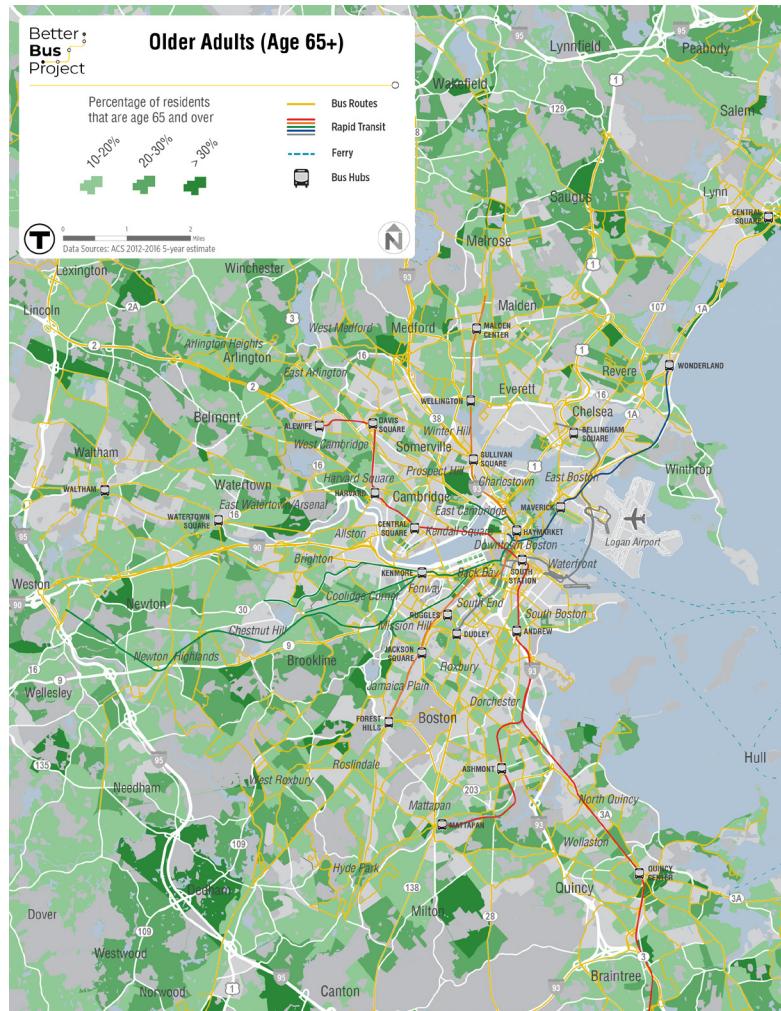
The highest concentrations of adults age 18 to 24 are focused in a few clusters in the service area, especially around colleges and universities. Large shares of young adults are most likely to be focused in Mission Hill/Fenway around the Longwood Medical Area; Allston and Brighton; around MIT and Cambridgeport; around Harvard Square; north of Davis Square around Powder House Square and Tufts University; Newton around Chestnut Hill; and parts of Waltham.

Millennials



Millennial populations are much more highly concentrated in the core parts of the service area, with the highest concentrations focused in northern parts of Boston and in Cambridge and Somerville. Within Boston, Millennial residents are most highly focused in Allston, Brighton, Back Bay, South End, Jamaica Plain, and South Boston and the Waterfront, as well as the North End and Charlestown. High concentrations of Millennials are also focused to the south in portions of Quincy, to the west in Watertown and Waltham, and to the north in Malden and Chelsea.

Older Adults



Older adults live in the suburbs to a much greater extent than younger residents. Older adults make up over 10% of the population of most suburbs and over 30% in many areas. In particular, communities with higher shares of older adults include Milton, Dedham, Brookline, Newton, Lexington, Wakefield, and Saugus. By contrast, older adults comprise less than 10% of the population in much of the inner core. Exceptions include parts of Brookline and Jamaica Plain, East Watertown, East Somerville, and Revere.

Demographics and Transit Propensity

When significant numbers of individuals and households from these high-transit propensity groups cluster together, they can influence the underlying demand for transit to an extent that is not captured when only considering total population. In a given location, groups of people from transit-supportive demographic groups may be too small individually to indicate significant demand for transit service, but their clustering may result in potentially high levels of transit use. Similarly, in a location where transit-supportive demographic groups have low representation, the level of potential transit demand may actually be lower than total population alone would indicate.

To take this into account, a measure called the transit propensity factor² was developed to measure relative demand for transit in different areas as compared to the overall region. Transit propensity factors take into account demographic characteristics for the population aged 16 and over who are employed. These factors measure the likelihood of certain demographic groups to use transit relative to the study area's general population. The propensity of different demographic groups to use transit in the study area generally follows the trends discussed earlier.

Differences in transit propensity are based on vehicle ownership, race and ethnicity, annual income, and immigration status.

Those experiencing poverty are more likely to use transit, as are minority residents and foreign-born residents. Residents living in a household with no vehicle were the most likely demographic group to use transit, with over twice the propensity of an average resident.

DEMOGRAPHIC GROUP ¹	TRANSIT PROPENSITY ²
RACE AND ETHNICITY	
White Alone (Not Hispanic or Latino)	0.69
Black or African-American	2.67
Asian (Not Hispanic or Latino)	1.10
Other Race (Not Hispanic or Latino)	1.42
Hispanic or Latino	1.19
VEHICLE OWNERSHIP	
No Car	6.87
One or More Cars	0.39
COUNTRY OF ORIGIN	
Native	0.91
Foreign	1.24
POVERTY LEVEL	
Under the Poverty Line	1.55
At 100% - 149% of the Poverty Line	1.42
At 150% of the Poverty Line or Above	0.96

Source: Calculations developed using 2012-2016 American Community Survey 5-Year Estimates.

¹While persons with disabilities, young adults, and older adults are also documented to use transit at higher rates, transit propensity for these demographics is not captured accurately by using journey-to-work data as these groups are employed at lower rates than the total population.

²These figures indicate the relative propensity of different groups to use transit. For example, transit propensity factor of 1.77 indicates that the group is 1.77 times more likely to use transit than the general population. This is based on the transit mode share of 21.5% for the Census Designated Places that comprise the service area, and the available demographic split on journey-to-work data.

Relative Transit Propensity

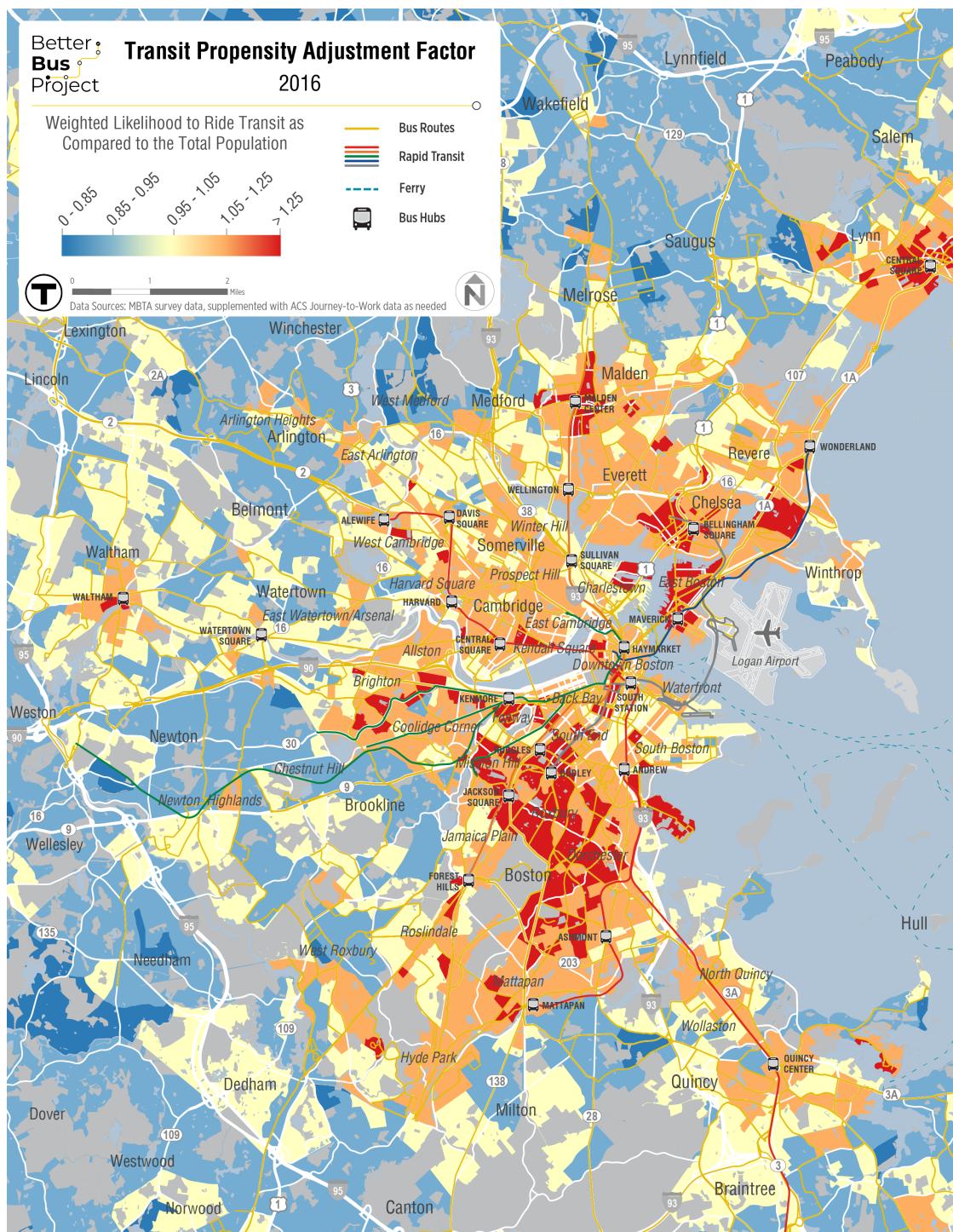
When the socioeconomic characteristics described above are considered, residents of the urban core have a higher propensity to use transit, and most residents of outer areas have a lower propensity to use transit.

In Boston, the neighborhoods where residents have the highest propensity to use transit include:

- East Boston
- Chinatown
- Allston
- Brighton
- Mission Hill
- Roxbury
- Dorchester
- Mattapan

Other communities where residents have a very high propensity to use transit (more than 1.25 times more likely to use transit than the general population) include:

- Lynn, especially surrounding Central Square
- Parts of Revere
- Malden
- Chelsea
- Parts of Everett
- Malden
- Cambridge
- Parts of Waltham



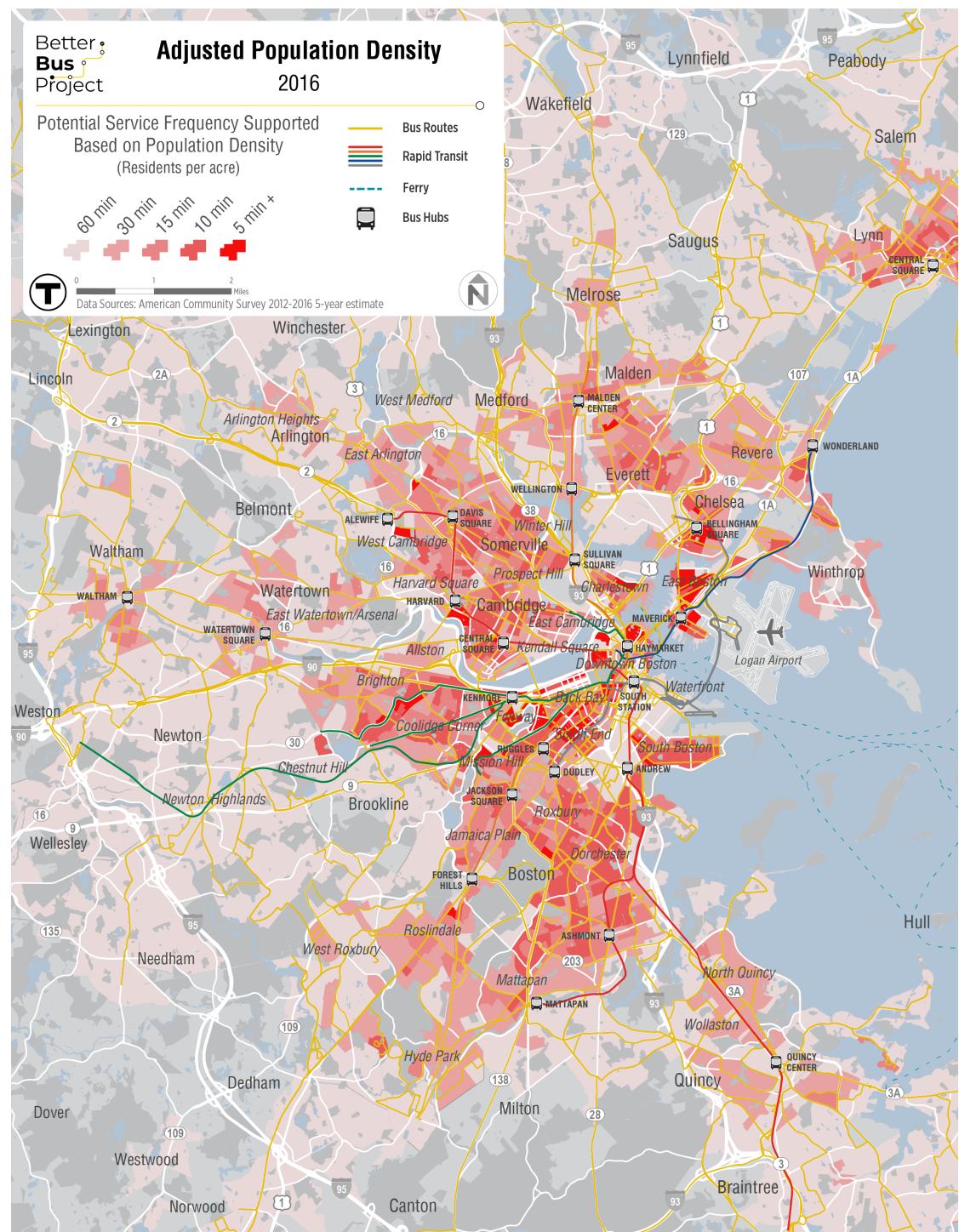
Adjusted Population-Based Demand

When the demographic factors are considered in the context of population densities, the effective underlying demand is higher in some areas and lower in others. Areas that have a very high underlying demand for transit include all of Boston and most inner core communities. Boston neighborhoods with the highest levels of population-based demand are:

- Chinatown
- Dorchester
- East Boston
- Brighton
- The northern half of Jamaica Plain
- Mattapan
- Mission Hill
- Roxbury
- South Boston
- South End

Other communities with particularly high population-based demand include:

- Cambridge
- Chelsea
- Everett
- Lynn
- Malden
- Revere
- Somerville



In total, most of the areas with the highest population-based demand are currently served by rapid transit or Silver Line routes and high levels of local bus service. **However, areas of Roxbury and Dorchester south of Dudley Square, between the Orange and Red Lines, are an exception.** The MBTA provides numerous local bus service in both of these areas. However, the majority of the service is very slow, and many routes are overcrowded and have poor reliability.

Other exceptions are:

- **Everett**, which is very close to the Orange Line. Service issues in Everett are more related to service quality in terms of slow and complex service than to the overall amount of service that is provided.
- **Lynn**, where the focus is on connections to the Blue Line plus direct services to Boston, and significantly less on local service. Bus service issues here are also more related to service design than the total amount of service that is provided.

Outer area communities with higher population-based demand include all or parts of:

- Arlington
- Malden
- Medford
- Melrose
- Quincy
- Revere
- Waltham
- Watertown
- Winthrop

Of these communities:

- Malden, Melrose, and Quincy are served by rapid transit and many local bus routes.

- Medford is served by rapid transit and many local bus routes, and will be served by the upcoming Green Line extension.
- Arlington and Watertown are served by high levels of local bus service.
- Waltham is largely served by routes that operate to and from Boston, with a much lower emphasis on local service.
- Winthrop, which is a narrow peninsula, is connected to the Blue Line by two bus routes and is also served by ferry.

In the outer area communities, bus service issues are related to both amount of service that is provided and service design issues. As described in the State of the System report, many services operate too infrequently at many times of the day to be convenient. They are also often slow (although faster than in the core) and complicated.

Many of the communities highlighted here are also identified by Focus40 as Priority Places, or places that need and can potentially support more transit service than they have today.

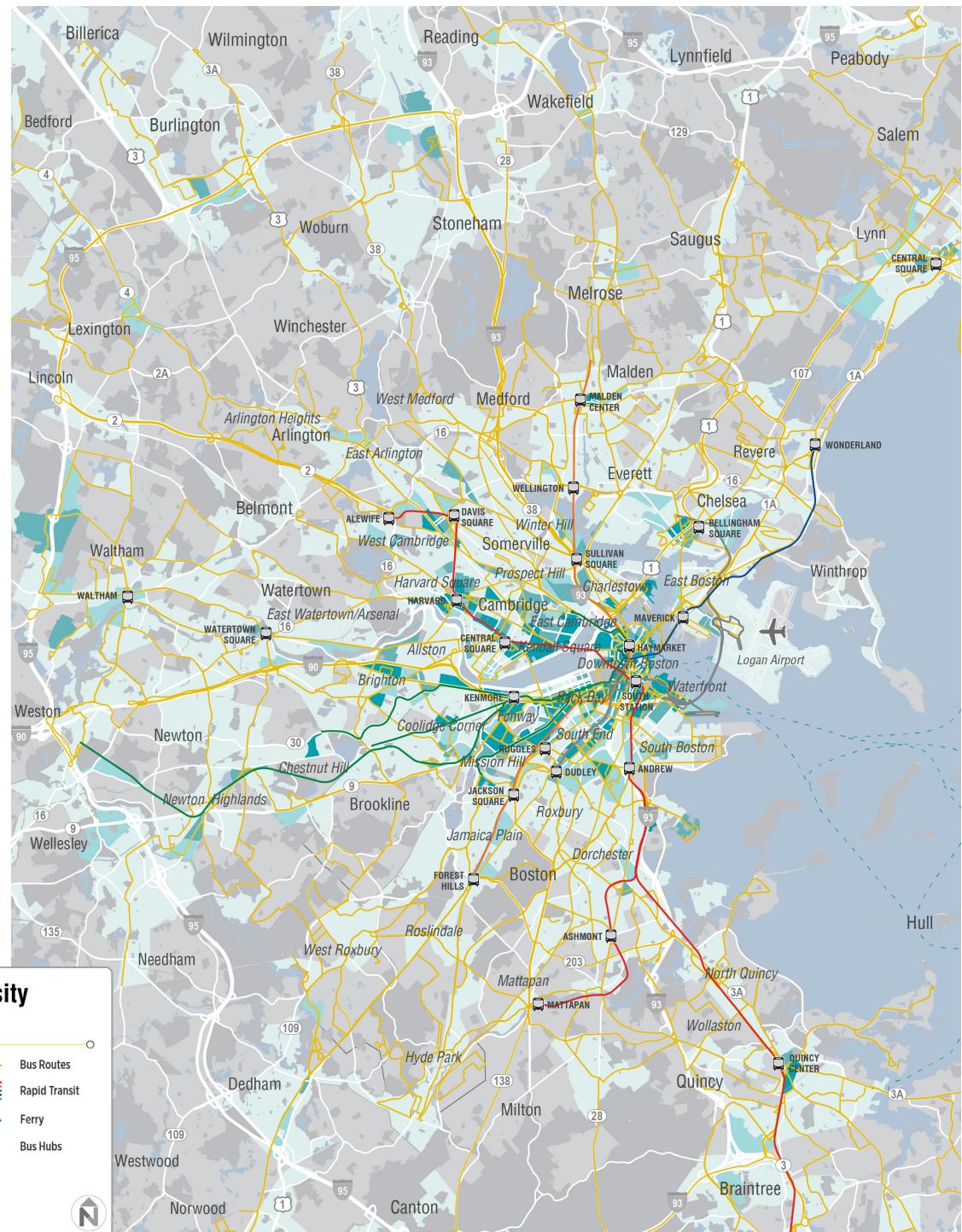
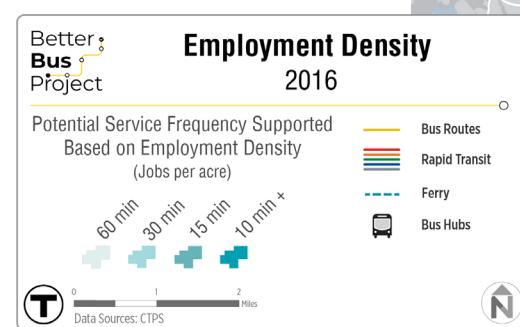
Employment-Based Demand

Employment Density

More people use transit to travel to and from work than for any other purpose, and thus employment density is also a strong indicator of underlying transit demand. As densities increase, the demand for transit grows, particularly for more frequent service.

The location of jobs is more highly concentrated than population, with the largest and most dense employment areas focused in a few key areas. Downtown Boston is, by far, the region's largest job center and the hub of the MBTA system. Most of the region's other largest job centers are:

- Back Bay
- Longwood Medical Area
- Fenway
- Seaport District
- The Red Line corridor in Cambridge from Harvard Square to Kendall Square
- The Washington Street corridor between downtown Boston and Dudley Square through the South End and Roxbury
- Quincy Center
- A few areas along Route 128, including in Waltham and Woburn



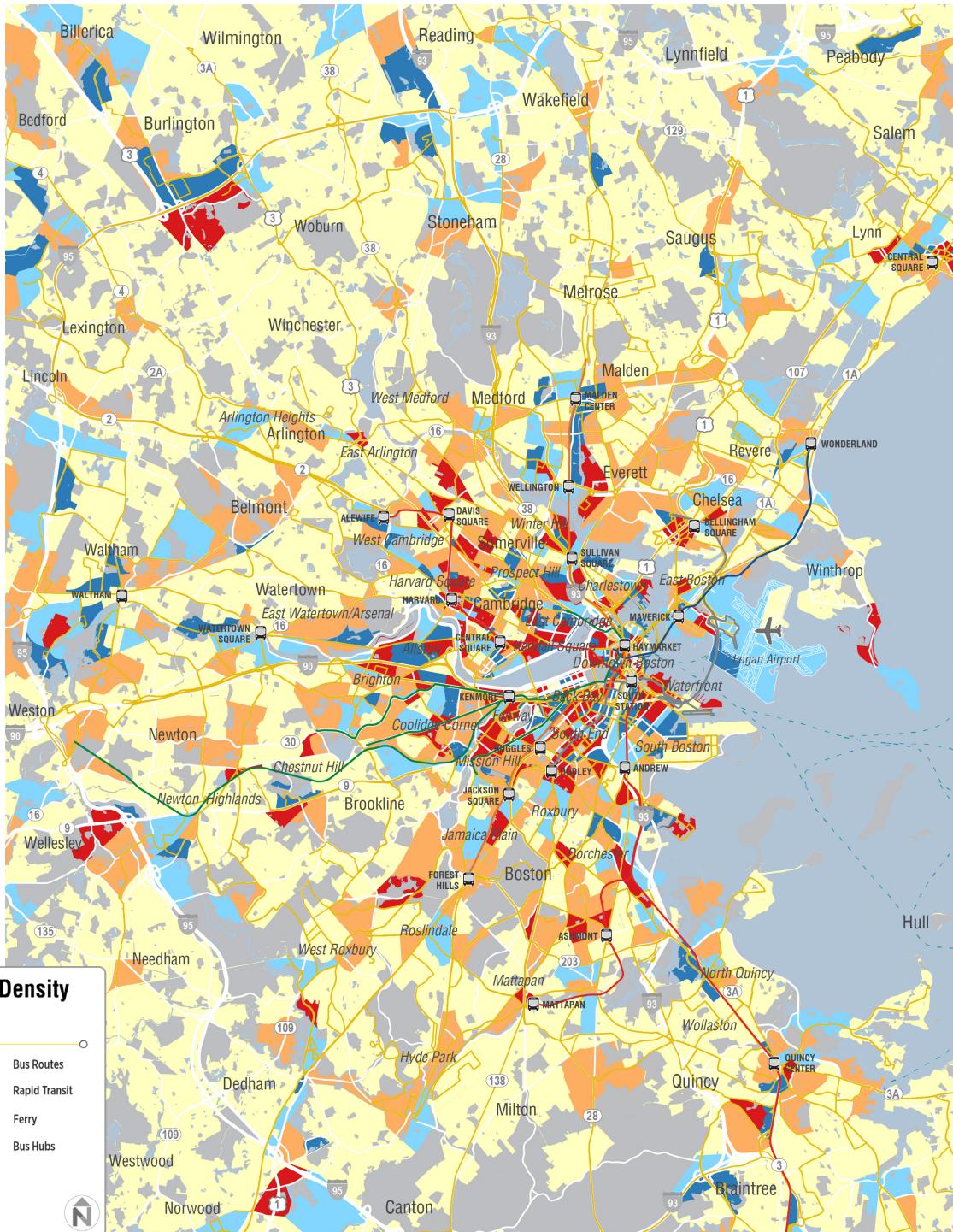
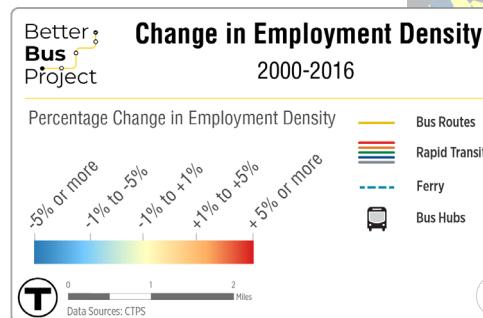
Employment Growth Since 2000

Between 2000 and 2016, the number of jobs in the MBTA service area increased by 3%, from 1.4 million jobs to 1.5 million. Most of this growth occurred in the core and some locations along Route 128. Areas that experienced employment increases of 5% or more include:

- Back Bay, South End, and northern parts of Roxbury
 - Seaport District
 - West End around Massachusetts General Hospital
 - Longwood Medical Area
 - Fenway
 - Cambridge's Red Line corridor between Harvard Square and Kendall Square
 - Somerville
 - Everett
 - Chelsea

With the exception of the Seaport District, the areas where rapid growth is occurring are places that have been employment centers throughout the region's modern history and have long had high levels of transit service. However, job increases have resulted in overloaded trips on many routes. In addition, the route alignments that are provided today have changed little over the years, and thus do not necessarily reflect today's volumes or travel patterns.

The Seaport District is a relatively new and rapidly growing employment center. The Silver Line provides high frequency service from South Station, but connections from other rapid transit lines and service from other areas beyond downtown Boston remain limited.



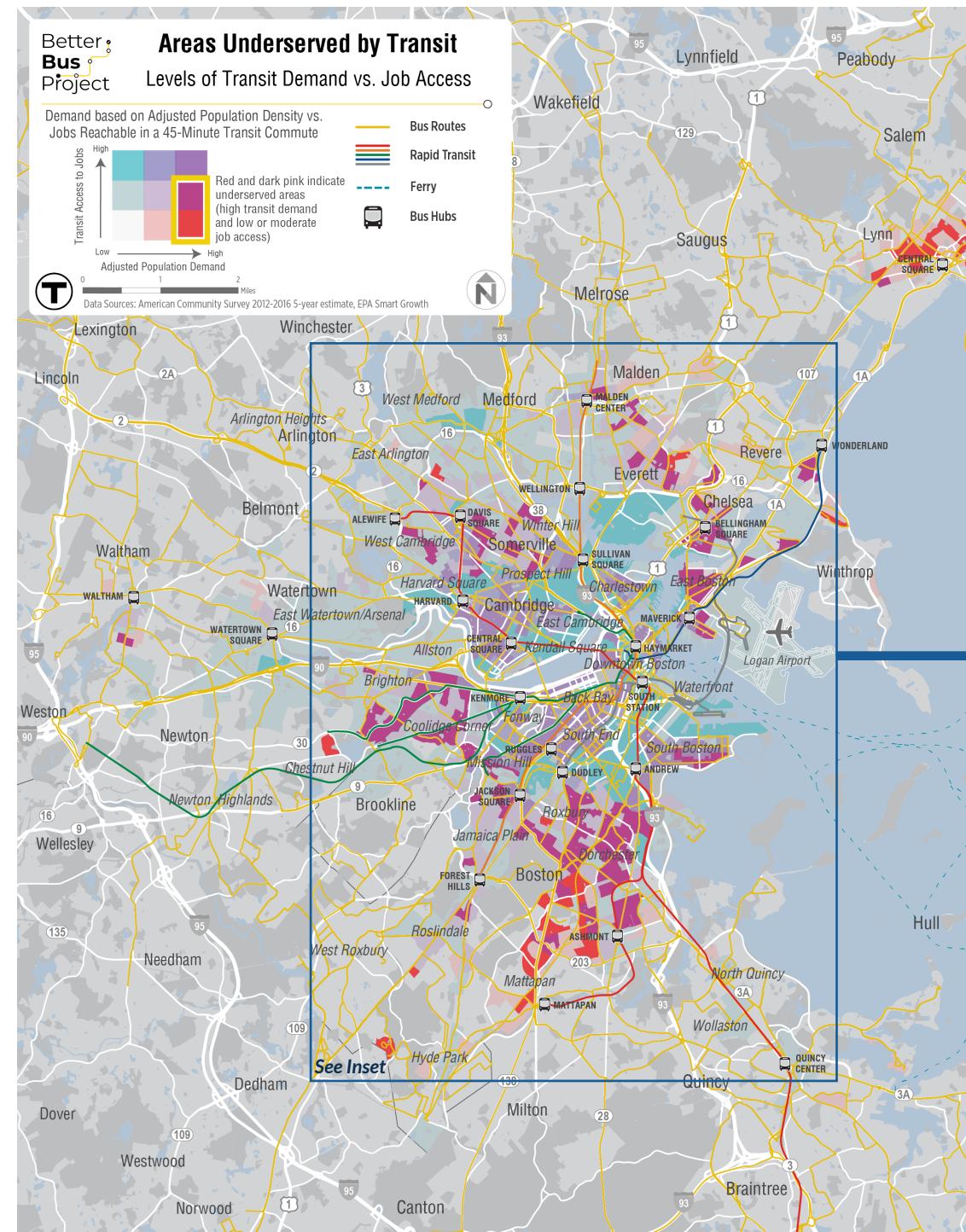
Underserved High-Demand Areas

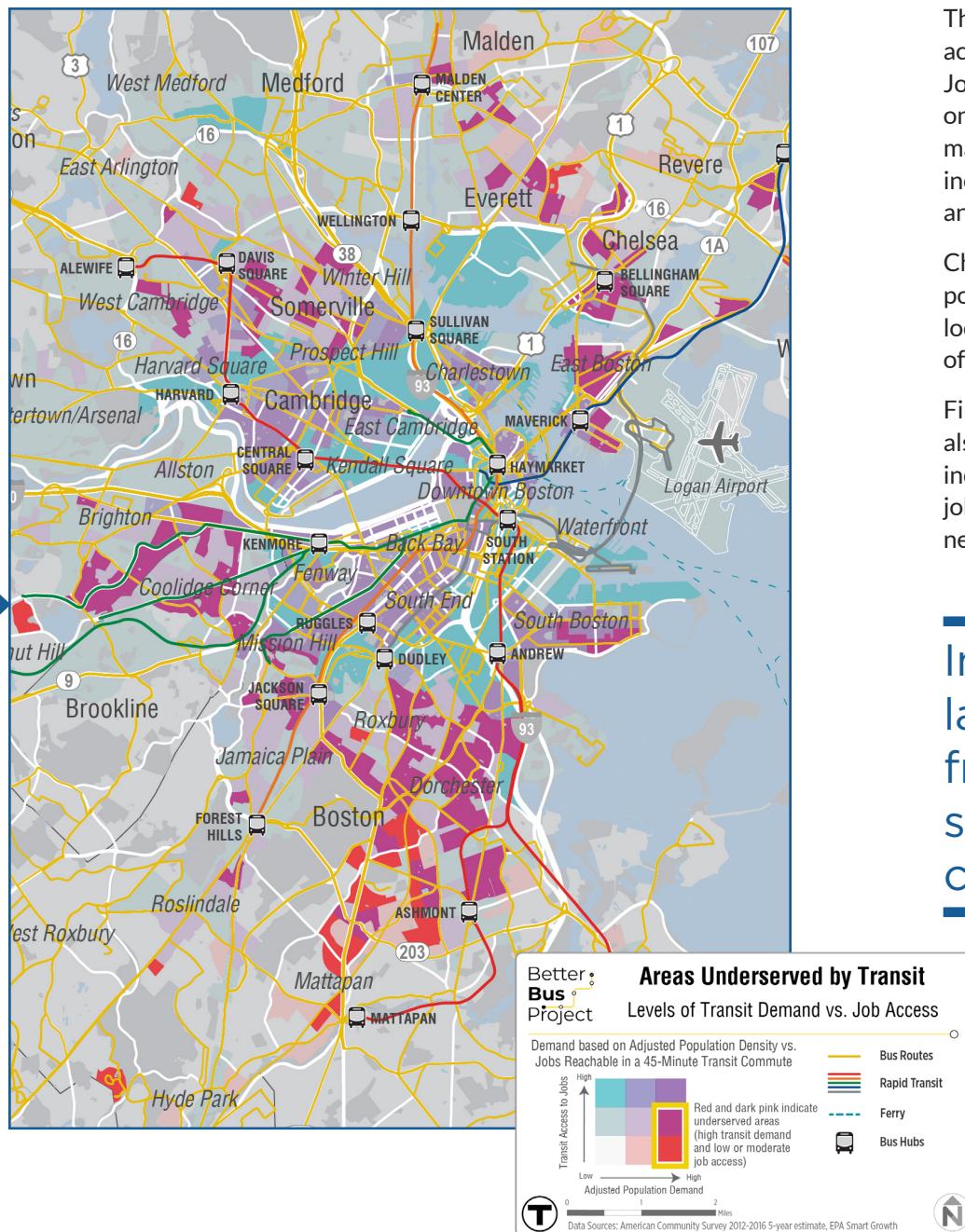
The ability of residents to access jobs using transit is critical to people's livelihoods and quality of life, and residents of some areas can access far more jobs within a given amount of time than others. In general, residents who live along rapid transit lines can access more of the region's jobs because those lines provide fast service, and those who are served by buses can access fewer jobs in the same commute time because buses are much slower. The places that buses travel to are also important, as more jobs can be accessed via direct services than circuitous services.

The map to the right relates the underlying demand for transit with the number of jobs that residents of those areas can access within 45 minutes. Areas shown in bright red are areas where the underlying demand for transit is very high, but access to jobs is relatively low. These areas include:

- Dorchester, Mattapan, and southern parts of Roxbury
- East Boston
- Eastern parts of Brighton
- Northern parts of Jamaica Plain
- Bayview in South Boston
- Spring Hill, Winter Hill, and Union Square in Somerville
- Lynn
- Parts of West Cambridge
- Several parts of Chelsea, Everett, and Malden

The relatively low access to jobs from these areas may be because they are primarily served by slow, infrequent, and/or circuitous local bus routes. A key to improving job access will be to upgrade the bus services that serve these areas.





The most notable discrepancies between service need and access to jobs are in Roxbury, Dorchester, and Mattapan. Job access is limited because most of these areas are served only by very slow bus routes. The most effective ways to make more jobs accessible would be to make service faster, including measures such as transit priority, stop consolidation, and more direct route alignments.

Chelsea, Everett, and Lynn are also areas with relatively poor transit access to jobs. To a certain extent, this is due to location and geographic barriers. However, it is also a function of service design.

Finally, it should be noted that most of these areas are also home to large numbers of minority residents with low incomes. Transit improvements to provide better service to jobs would increase economic opportunities in areas where needs are the greatest.

In high-demand areas, a lack of reasonably fast, frequent, and direct bus service limits access to job centers.

Residents Who Work Early and Late Shifts



While most jobs are still based on traditional 9-to-5 hours, a growing number of people work non-traditional hours. For example, many food service and retail jobs have start times that are much earlier, and later second-shift and third-shift jobs are increasingly common.

Several areas have concentrations of residents who depart early for work, in some cases before bus or rapid transit service begins. This is particularly true between 5 AM and 7 AM. The places with the highest concentrations of residents (over 30% of residents in a block group)



who leave very early for work are in Chelsea, Revere, Everett, Malden, Lynn, and Quincy, as well as in the Boston neighborhoods of East Boston, Roxbury, Dorchester, Mattapan, Hyde Park, Roslindale, and West Roxbury.

In contrast, there are very few areas where more than 10% of residents leave for work after 4 PM. Among these places are the neighborhoods of Roxbury, Mission Hill, and parts of Dorchester in Boston, as well as several areas of Lynn.

Retail Industry Jobs

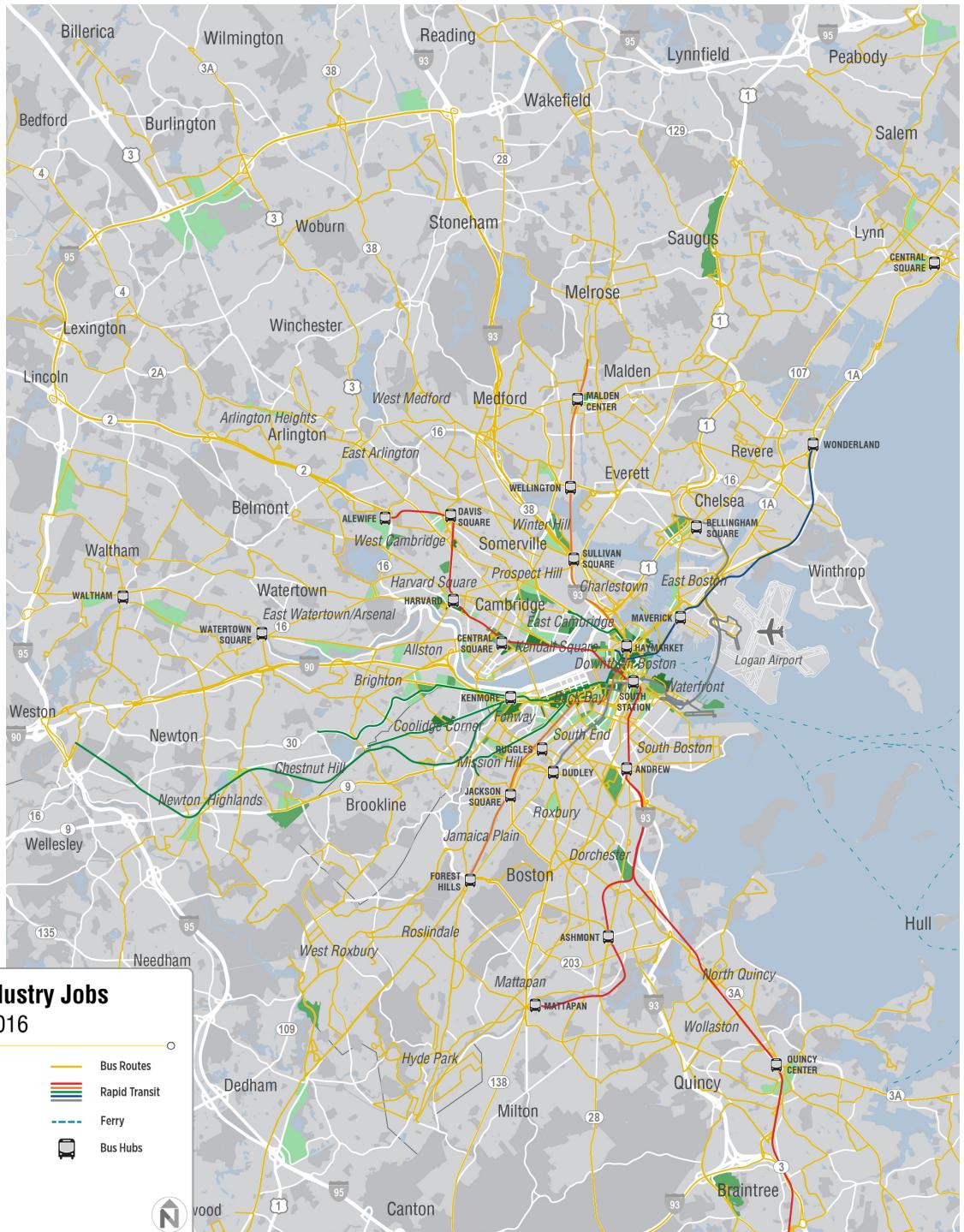
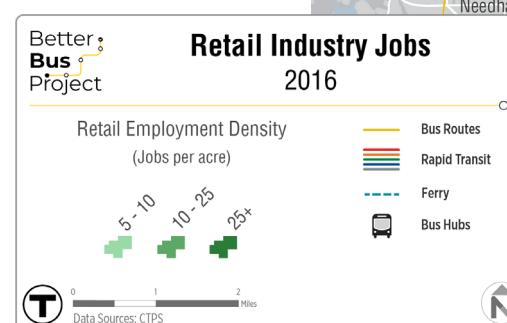
Many retail employees in urban areas rely on transit to reach their jobs. In addition, retail work shifts start and end outside of traditional work hours, and employees need to travel earlier or later than typical peak commute hours.

The highest concentrations of retail employment are mostly focused in the core urban areas of Boston and in parts of Cambridge and Somerville. High densities of retail jobs are focused in the following areas:

- Throughout downtown Boston and Chinatown
- Back Bay
- The Waterfront/Seaport District
- Fenway
- Along Commonwealth Avenue through Fenway, Allston, and Brighton
- Northern Dorchester around South Bay Center
- Central Dorchester along Dorchester Avenue between Savin Hill and Fields Corner
- Central Square, Kendall Square, and parts of East Cambridge
- Somerville near Davis Square, East Somerville, and Assembly Square
- Coolidge Corner
- Quincy Center
- Waltham
- Watertown

Retail jobs are also focused in a few key shopping centers/districts outside the core urban area, including:

- Braintree at South Shore Plaza
- Chestnut Hill around Hammond Pond Parkway
- Legacy Place in Dedham
- Through Saugus along Broadway/Route 1

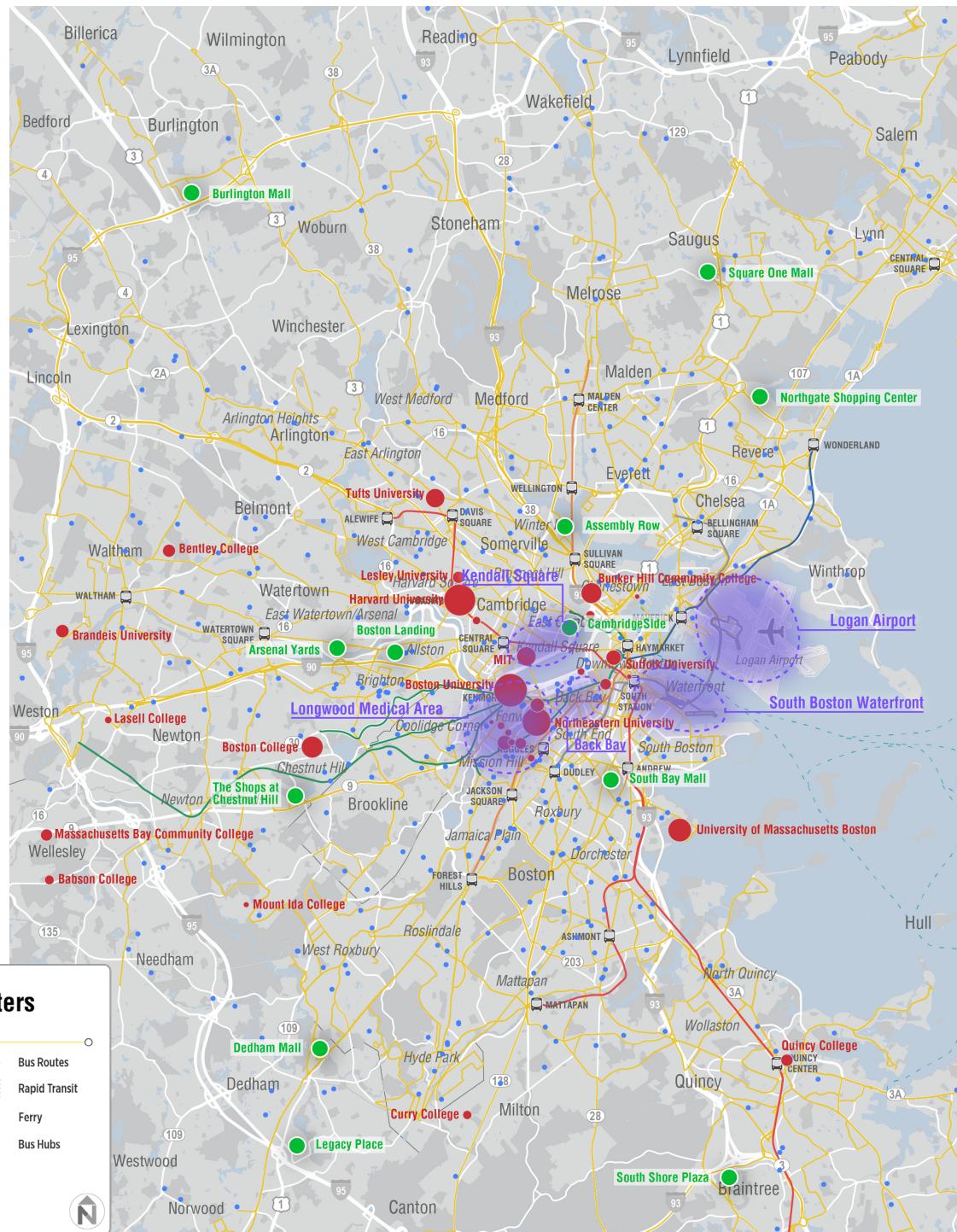
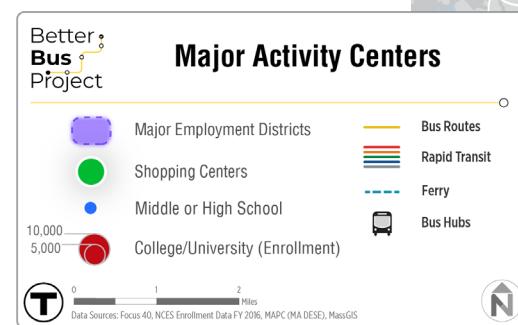


Major Activity Centers

Downtown Boston has traditionally been the employment and commercial heart of Greater Boston, and the radial pattern of existing rapid transit lines reflects this. Today, MBTA rapid transit lines all converge within a few blocks of each other in downtown Boston, and commuter rail lines terminate at the northern and southern ends of downtown, offering significant regional access to jobs and commercial activity. In recent decades, the traditional boundaries of the central business district have evolved. The Back Bay neighborhood, just southwest of downtown, is also a major employment and commercial hub that is directly served by the Orange and Green lines and southern commuter rail lines. Additional areas have also emerged as regionally significant employment centers.

As part of Focus40, the 25-year strategic plan for the MBTA, four Major Employment Districts were identified as significant regional employment centers adjacent to downtown Boston:

- **Longwood Medical Area:** The Longwood Medical Area encompasses several prominent medical, educational, and cultural institutions, and has established itself as the heart of health care and medical research in the region.
 - **South Boston Waterfront:** This neighborhood, coined the Seaport District, has emerged as a high-growth area in the last 20 years with growth in housing, jobs, and attractions such as the Boston Convention and Exhibition Center.



- **Kendall Square:** Home to MIT, Kendall Square has become an international hub for life sciences, biotechnology, pharmaceutical, and information technology firms.
- **Logan International Airport:** The primary airport serving New England, Logan International Airport has experienced continuous growth over the past several years.

Most of these areas already have strong transit access to downtown Boston via the existing rapid transit network, but access from across town or across the region is very limited, and capacity on the rapid transit and bus services that do exist is increasingly strained by rapidly growing demand. This limited transit access poses an increasingly urgent challenge for attracting employees beyond the downtown core; many current or potential employees may be geographically close to these areas, but face long or uncomfortable commutes with existing service.

There are a large number of places, or “activity centers” in Greater Boston that attract very high levels of travel. These include the employment centers described in the previous section, plus others such as town and neighborhood centers, universities, and major shopping centers. These destinations generally attract trips from all of their surrounding areas.

However, since all of the MBTA’s rapid transit lines and most bus routes operate radially to and from downtown Boston, the quality of transit service to these activity centers depends upon the direction in which people are travelling. Those who are traveling in directions that are on a line to downtown Boston generally are very well served, while those who are travelling in other directions are generally less well served.



Combined Population and Employment-Based Demand

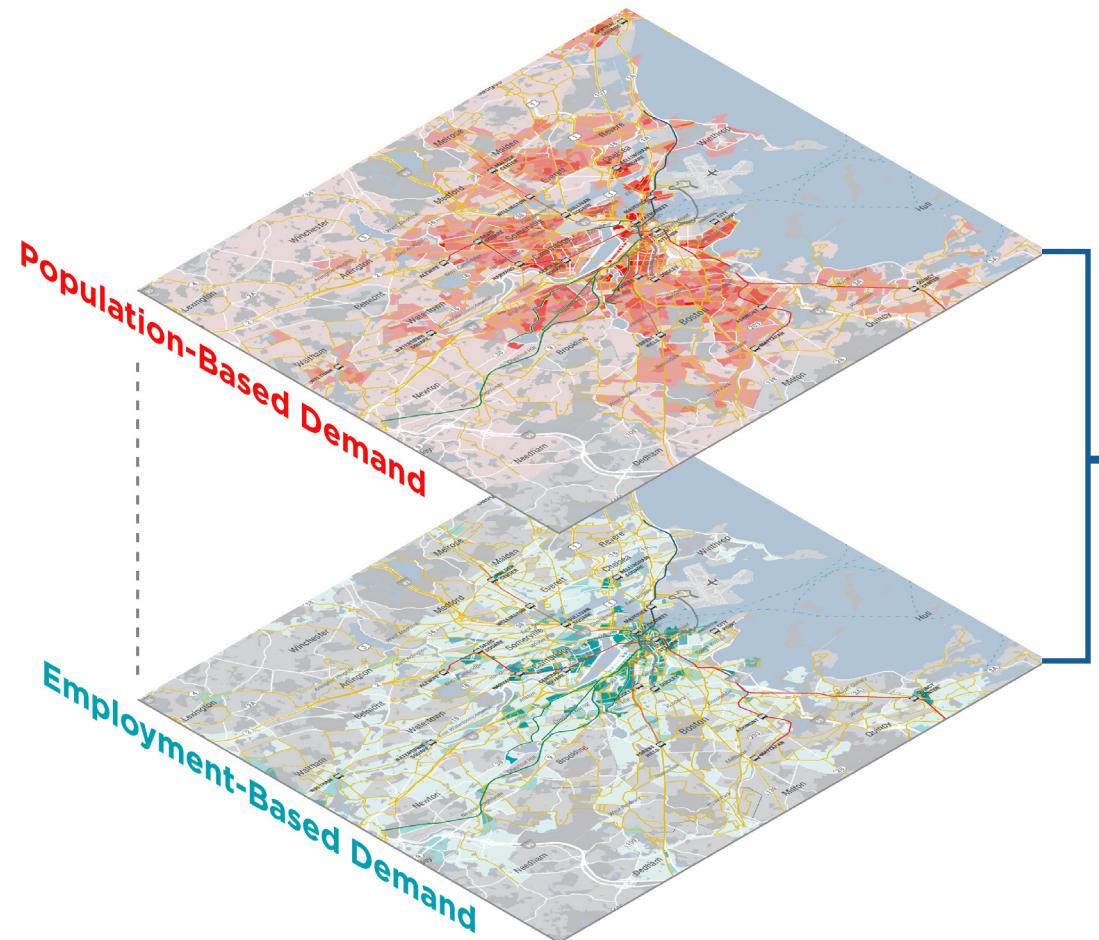
Population density and employment density each provide an indicator of potential transit demand, but when the two are combined and considered together, the demand in many areas will be significantly higher than when looking at each factor alone. This also captures areas with a mix of uses (residential, job centers, commercial areas) that can generate particularly high transit ridership.

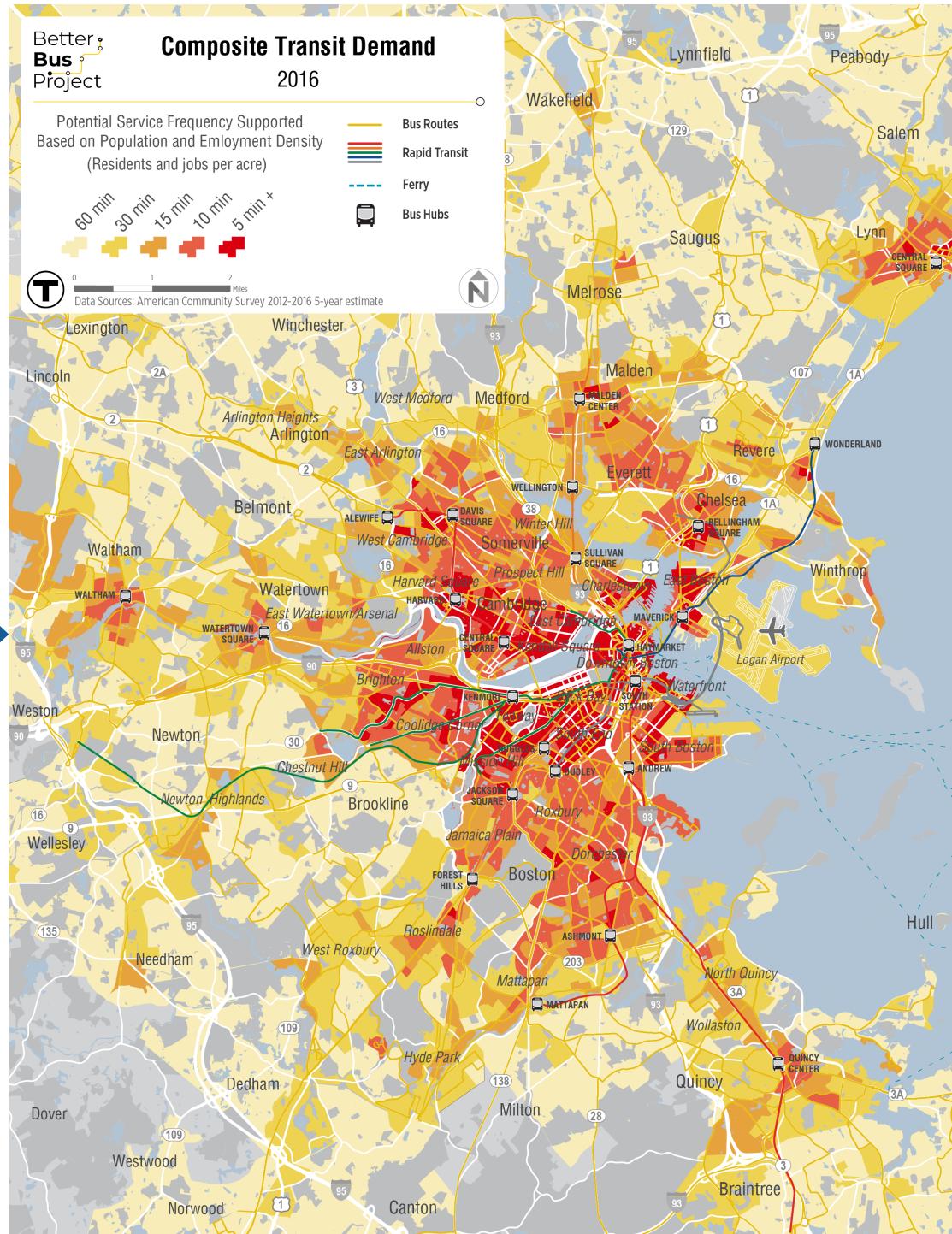
When population and employment-based demand are considered together, it is clear that the underlying demand for transit is very high in nearly all of the core, and generally declines with distance from the core, although with some exceptions.

As would be expected, the highest levels of demand are in the most densely developed areas, which include:

- All of Boston except Hyde Park and West Roxbury
- Lynn
- Malden
- Everett
- Chelsea
- Cambridge
- Somerville
- Quincy around Quincy Center
- North Brookline
- Parts of Waltham
- Parts of Watertown

As described in the previous sections, the MBTA provides a large amount of service in all of these areas. However, much of that service is overcrowded, slow, and not very reliable. It is also often very complex with many routes serving similar areas in slightly different ways, with service spread thin between routes such that span of service and frequency standards are often not met.





The largest gap between demand and service is focused between the southern branches of the Orange and Red Lines in Roxbury, Dorchester, and Mattapan. These areas have some of the highest transit demand in the entire MBTA service area, but because they are served almost exclusively with Key Bus and local bus routes that are very slow, it takes longer for residents of these areas to get to where they are going.

Everett is served by many local bus routes, but most serve similar areas in different ways, making service complicated, and its high underlying demand matches that of other areas that are currently served by rapid transit. Lynn is also served by many routes, but most service is oriented to and from Boston, with a much lower emphasis on providing service within Lynn.

Beyond these communities, demand is lower but still significant in all or part of many other areas:

- Revere
- Arlington
- Melrose
- Stoneham
- Woburn
- Lexington
- Newton
- Needham
- Hyde Park
- West Roxbury
- Dedham
- Braintree

The MBTA provides service to all of these areas. In most cases, this service generally meets demand. However, many services do not operate frequently or long enough to meet the MBTA's service standards. Route alignments are also sometimes circuitous.



8

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EXPRESS
Oak Park,
Bedford
Woods, &
Burlington
Mall Road





Travel Patterns

Regional Travel Flows

Regional Travel Flows: Transit Only

Regional Travel Flows

Average Daily Trips (All Modes)

For transit to be effective, it must take people from where they are to where they want to go. Travel flows, which show the places that people travel within the study area, are one resource to determine where direct or relatively easy connections should be made within an area. Travel flows within the study area were mapped based on all trips taken between travel flow analysis zones, which are defined by municipal and neighborhood boundaries. The flows with the largest number of average daily trips are highlighted.

The map to the right shows travel flows across the Greater Boston region, and includes *all types* of trips made by *all modes*, including both transit and automobile trips. Downtown Boston has traditionally been the primary business district and employment center in the region, and as a result most MBTA services are oriented toward serving the downtown core. However, the largest travel volumes are oriented toward both downtown Boston and the Longwood Medical Area/Fenway/Mission Hill area, demonstrating the significance of the latter as a major activity center.

The largest trip volumes (25,000 daily trips or more) to and from the Longwood Medical Area/Fenway/Mission Hill area are to and from:

- Downtown Boston
- Back Bay/South End
- Northern Brookline (north of the Green D Line)
- Brighton
- Roxbury

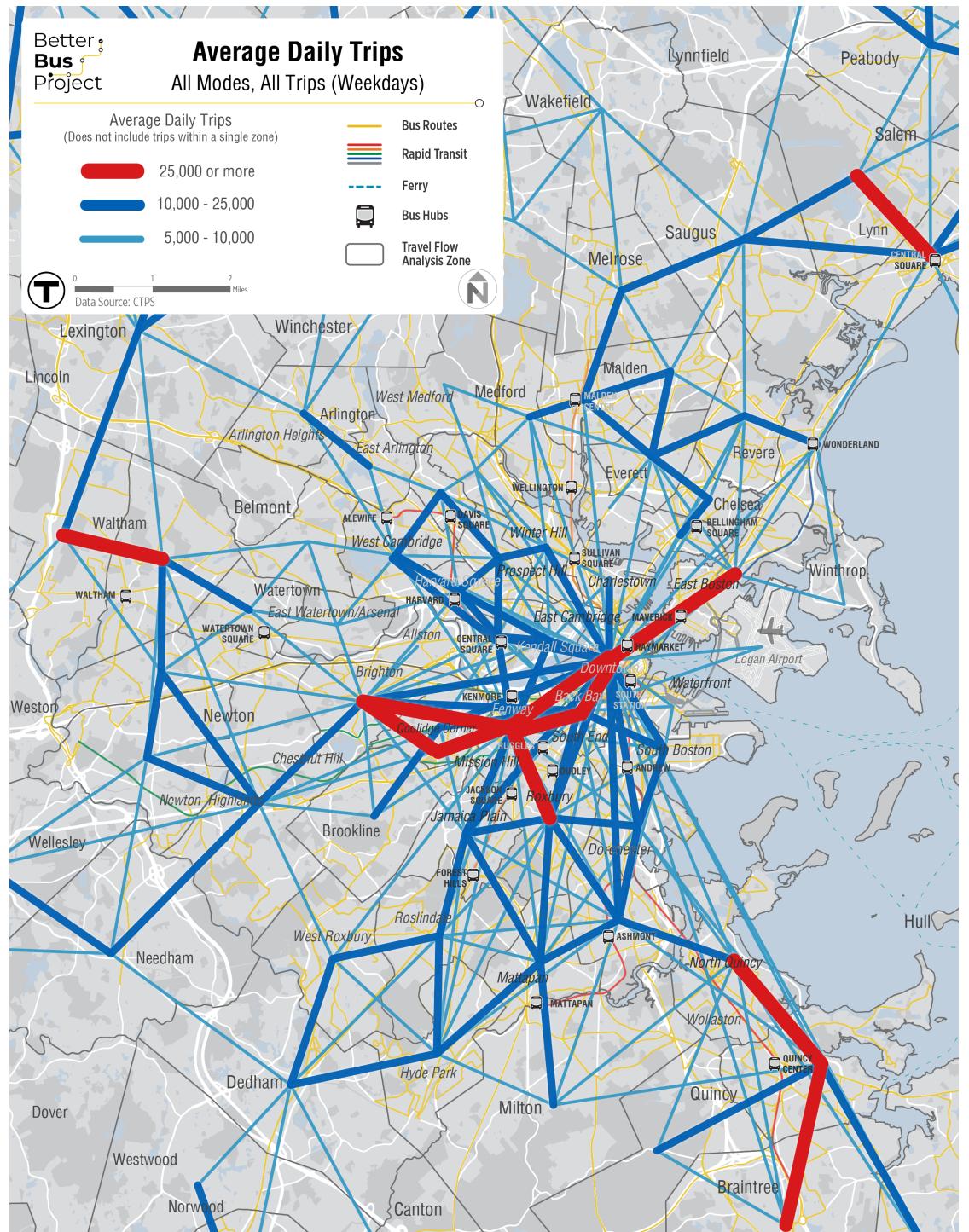
Among trips to and from downtown Boston, the largest trip volumes are to and from:

- Longwood Medical Area/Fenway/Mission Hill
- Back Bay/South End
- East Boston

There are also very large travel volumes between Brighton and northern Brookline, between Quincy and Braintree, and between zones within Quincy, Waltham, and Lynn.



Downtown Boston, Back Bay, and the Longwood Medical Area are the largest trip generators in the Greater Boston area.



Regional Travel Flows: Transit Only

Daily Transit Trips by Day

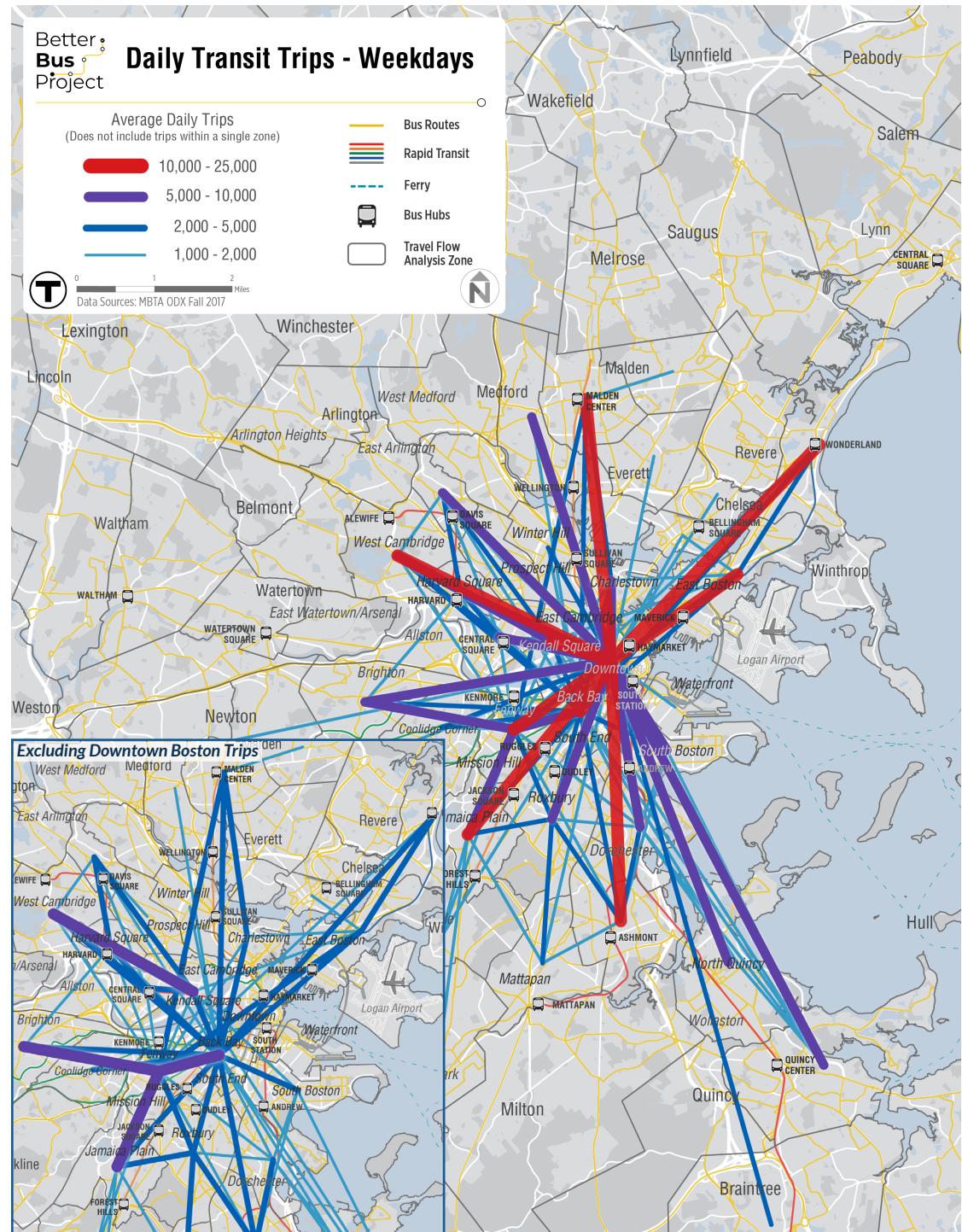
Reflecting the radial design of the T's rapid transit lines and many bus services, the largest transit trip volumes are generally oriented to and from downtown Boston. Trip pairs that have more than 10,000 trips per weekday are all oriented toward downtown to and from the following areas:

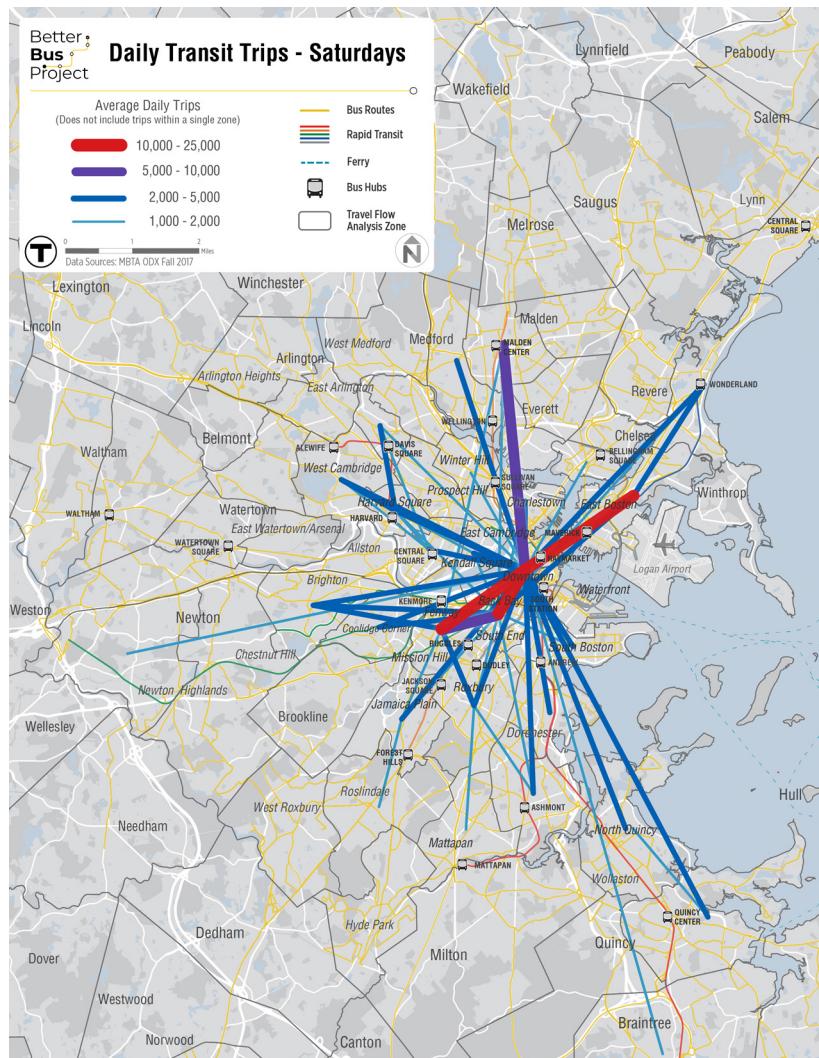
- East Boston
- Southern Dorchester
- Back Bay/South End
- Jamaica Plain
- Longwood Medical Area/Fenway/Mission Hill
- Kendall Square/East Cambridge
- Northwest Cambridge (north and west of Harvard Square out to North Cambridge and Fresh Pond)
- Western parts of Malden
- Revere Beach/Beachmont

In addition to downtown-oriented trips, there are several large travel flows (5,000 to 10,000 daily trips) to and from the Longwood Medical Area/Fenway/Mission Hill area. The largest trip pairs serving the Longwood Medical Area begin and end in the following areas:

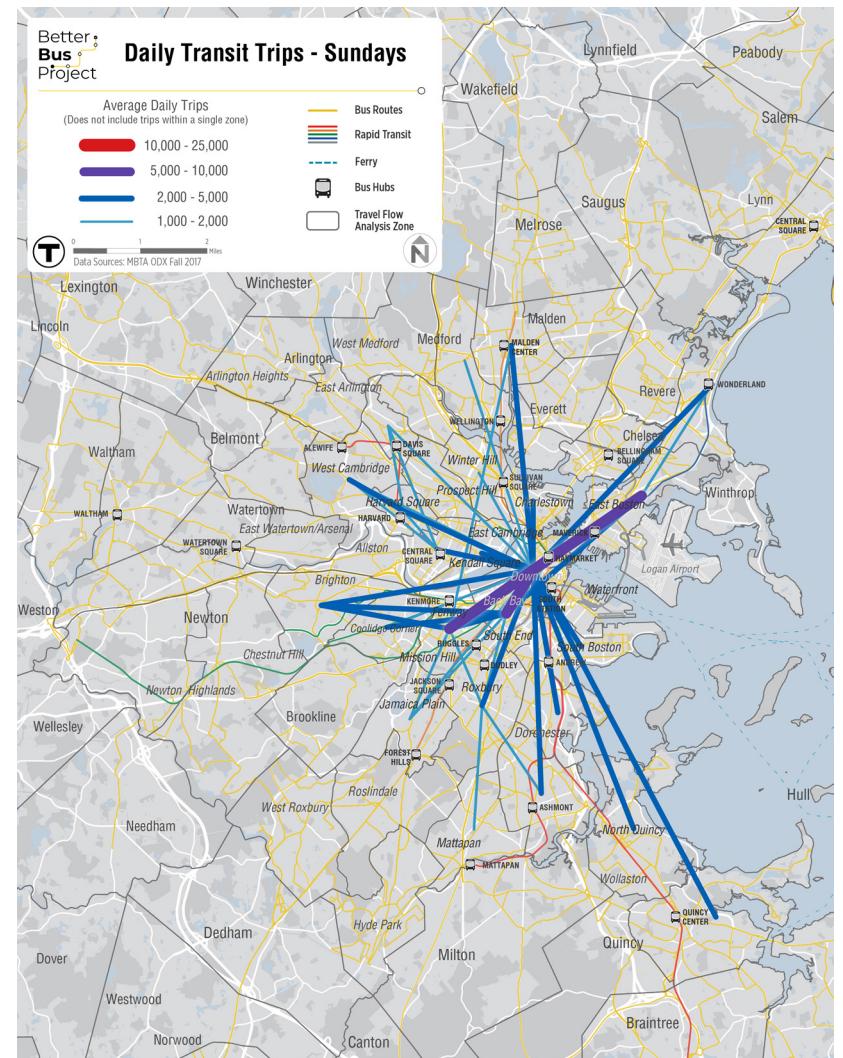
- Downtown
- Back Bay/South End
- Jamaica Plain
- Brighton

There is also a high volume of transit trips between northwest Cambridge and Kendall Square/East Cambridge. Other notable hubs of transit trips include Roxbury, southern Dorchester, and Central and Kendall Squares in Cambridge.





On Saturdays, the largest transit trip volumes are still focused to and from downtown Boston, with the highest volumes from downtown to East Boston, Back Bay/South End, and Longwood Medical Area/Fenway/Mission Hill. Other significant travel flows are also between downtown and western parts of Malden, and between Back Bay/South End and Longwood Medical Area/Fenway/Mission Hill. Other notable crosstown trip pairs include East Boston to Back Bay/South End and Revere Beach/Beachmont, Roxbury to Longwood Medical Area/Fenway/Mission Hill, and Harvard to West Cambridge and North Somerville/Davis Square.



The largest volumes of Sunday transit trips are to and from downtown Boston. The largest trip volumes (5,000 to 10,000 daily trips) are oriented toward downtown from East Boston, Back Bay/South End, and Longwood Medical Area/Fenway/Mission Hill. There are also relatively high volumes of crosstown trips to the west of downtown Boston, particularly between Back Bay/South End, Longwood Medical Area/Fenway/Mission Hill, and Brighton.

Peak Period Transit Trips (7-9 AM and 4-6:30 PM)

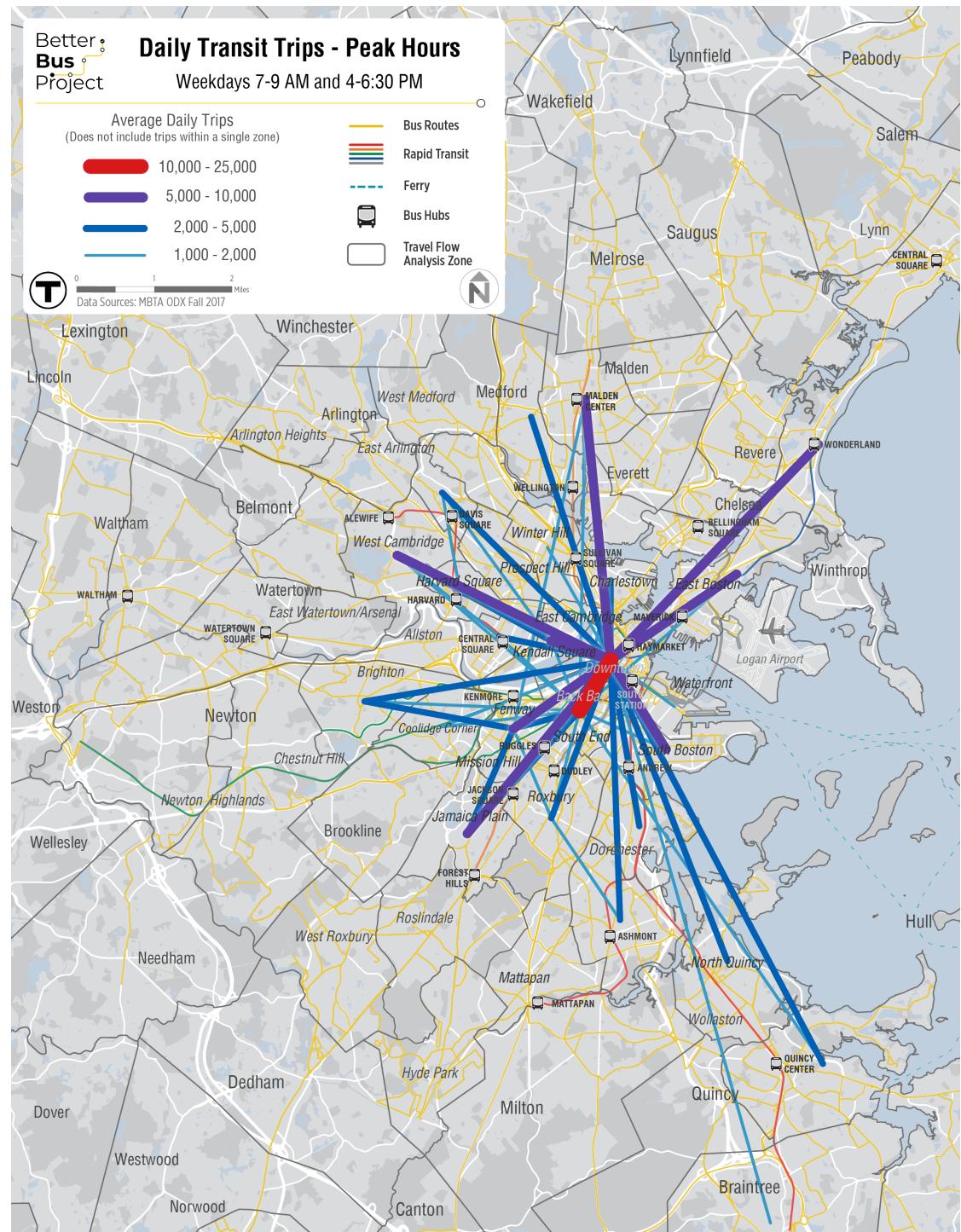
By far, the largest volume of transit trips during peak hours are between downtown Boston and Back Bay/South End, with an average of more than 10,000 peak hour trips per day.

In addition, several major travel flows to and from downtown Boston emerge, including:

- East Boston
 - South Boston
 - Jamaica Plain
 - Longwood Medical Area/Fenway/Mission Hill
 - West Cambridge
 - Western parts of Malden
 - Revere Beach/Beachmont

Although not as large as transit trip flows to downtown, travel flows to and from the Longwood Medical Area/Fenway/Mission Hill area emerge, with between 2,000 and 5,000 daily trips from the following areas during peak hours:

- Back Bay/South End
 - Jamaica Plain
 - Brighton



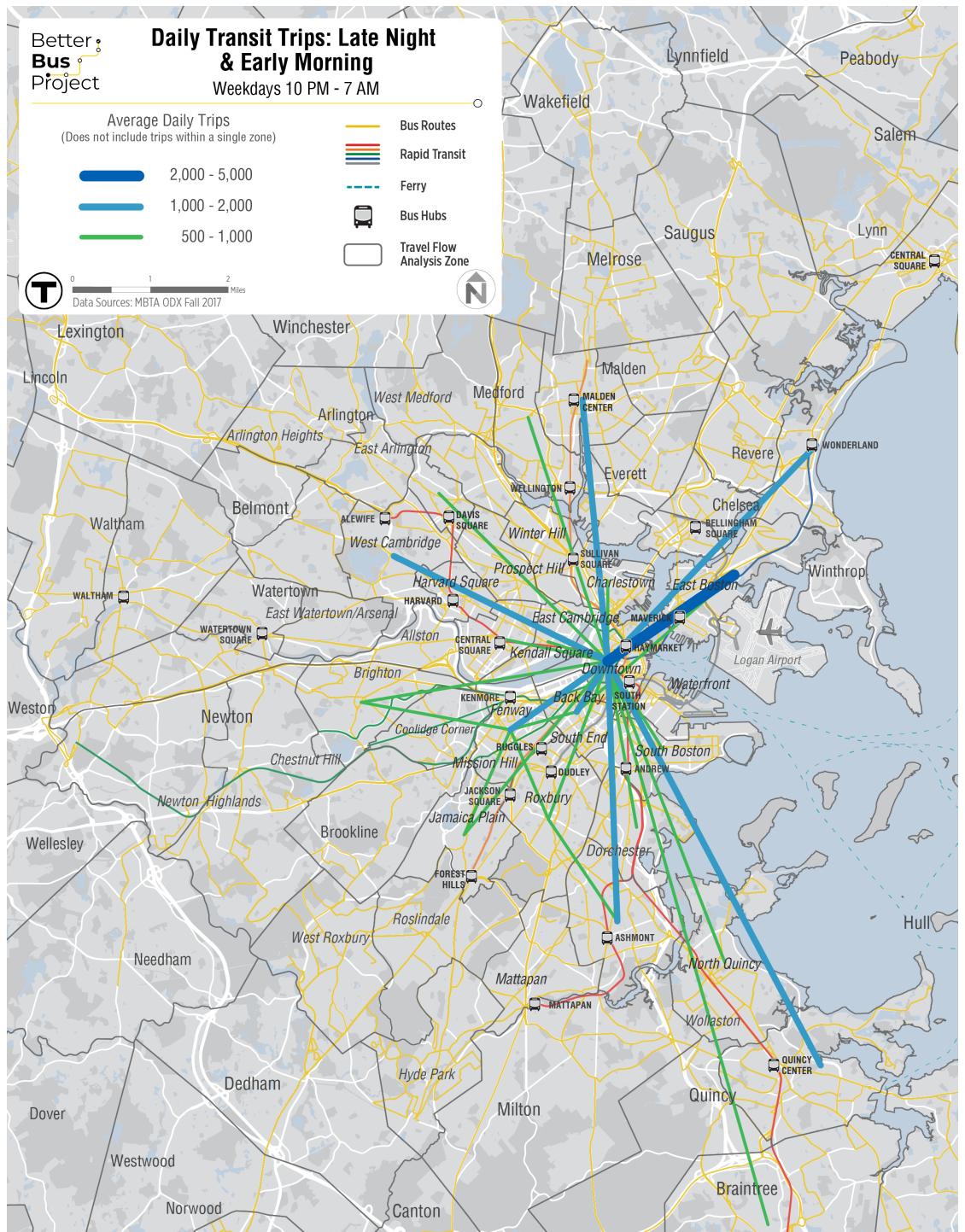
Late Night and Early Morning Transit Trips (10 PM to 7 AM)

There are significantly lower volumes of transit trips during late night and early morning hours, which is largely commensurate with the decreased amount of service that operates during these hours. By far, the largest transit trip volumes are between downtown Boston and East Boston, likely due to the prevalence of jobs at all hours of the day at Logan International Airport.

Other major trip flows during late night and early morning service hours are between downtown Boston and the following areas:

- Longwood Medical Area/Fenway/Mission Hill
 - Southern Dorchester
 - Revere Beach/Beachmont
 - West Cambridge
 - Western parts of Malden
 - Central and eastern Quincy

Other trip pairs have fewer than 1,000 trips per day during late night and early morning hours.



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71 WARREN ST

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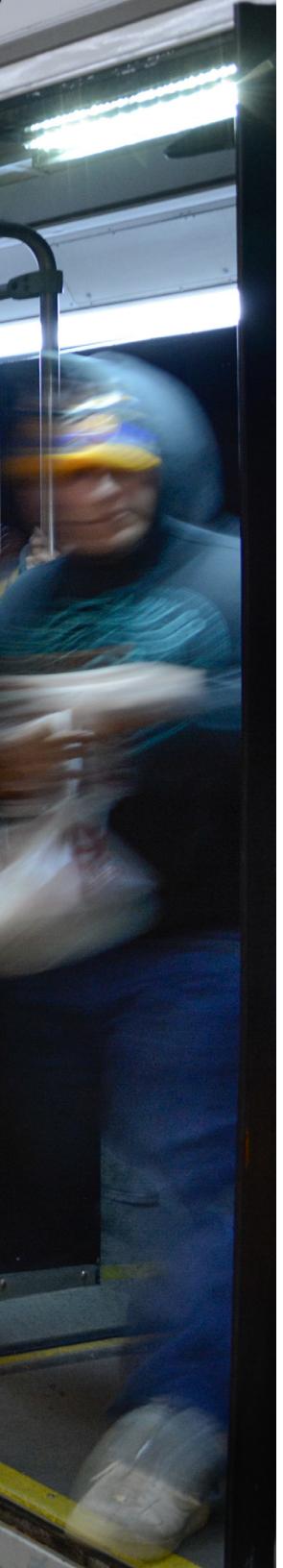
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7A
BELMONT
CENTER
PARK CIRCLE

8





Summary

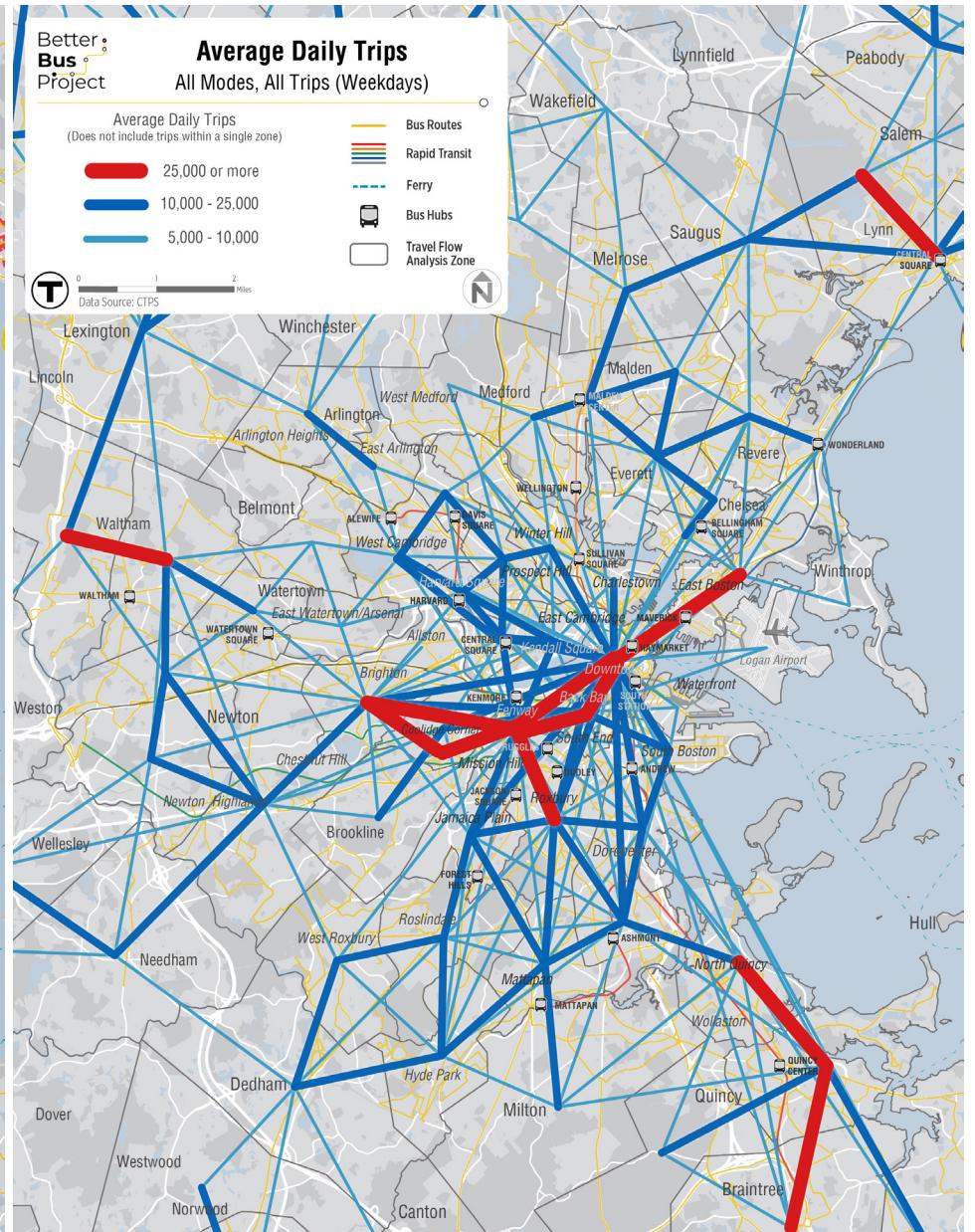
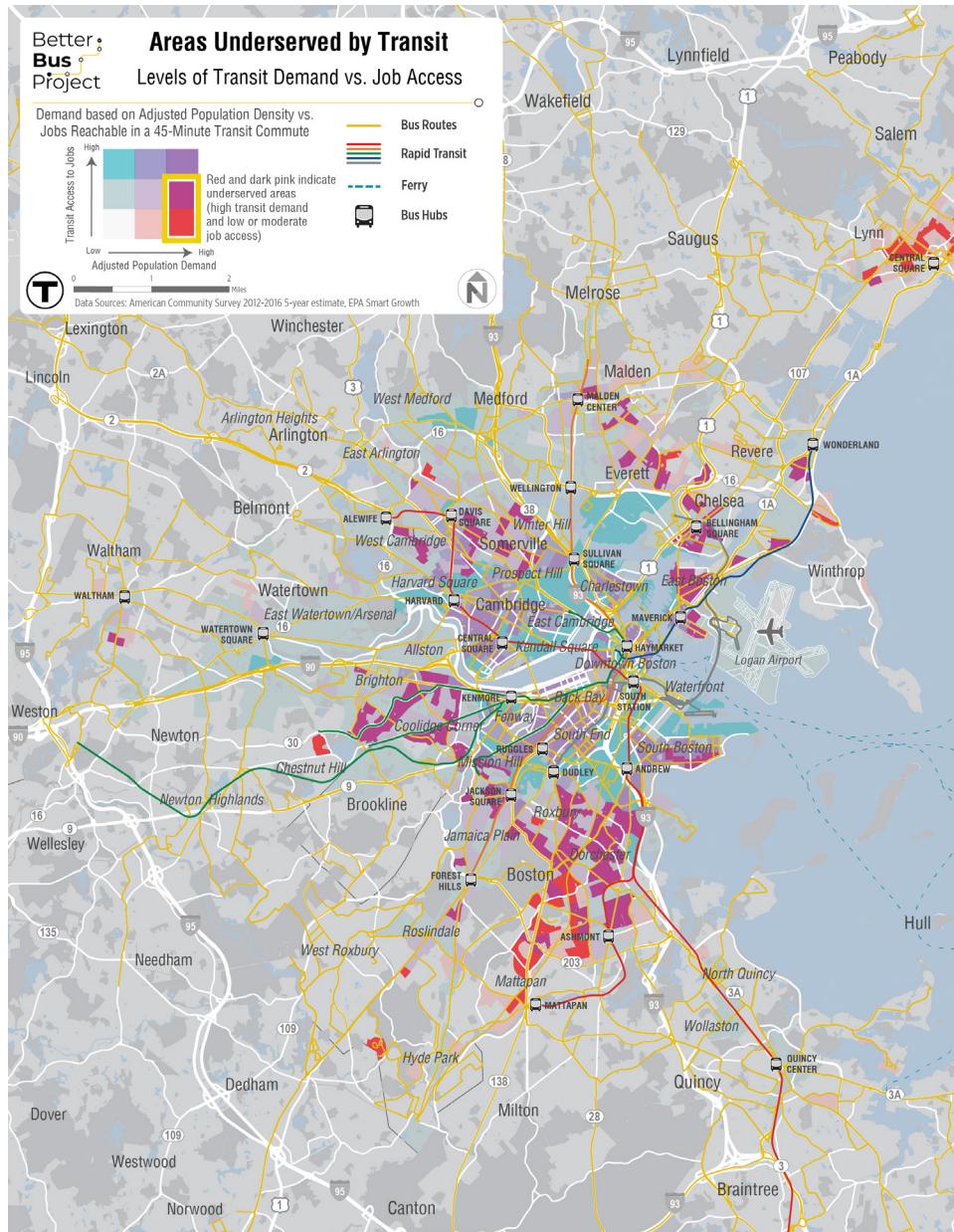
Summary

Gaps between existing MBTA service and market demand for transit include both areas that are underserved and connections that are underserved due to inconvenient service or lack of service. Some communities in the MBTA service area, even those close to the urban core, are served by lower levels of service than is warranted by demand, as indicated by population density, demographics, and job density. Some existing services do not adequately serve crosstown trips, especially to job opportunities and activity centers outside of downtown Boston.

- **The largest gap between underlying transit demand and service is in Roxbury, Dorchester, and Mattapan.** These areas have some of the highest transit demand in the MBTA service area, but the existing service does not match the level of demand for service. These areas are served almost exclusively with Key Bus routes and local bus routes that are generally slow.
- **Lack of crosstown service and limited access to rapid transit hinder access to major job centers.** The most notable discrepancies in access are in Roxbury, Dorchester, and Mattapan in Boston, as well as Chelsea, Everett, and Lynn to the north. Residents of these communities have high underlying demand for transit, but can access very few of the region's jobs quickly via existing transit services.
- **Downtown Boston, Back Bay, and the Longwood Medical Area are the largest trip generators in the MBTA service area regardless of mode.** Across the service area, most of the largest trip volumes are between these areas and East Boston, Roxbury, Brighton, and northern Brookline.

- **Most existing and emerging regional activity centers, such as Kendall Square and the Seaport District, have strong transit access to downtown Boston via the rapid transit network, but access from across town or across the region is very limited.** This limited transit access poses an increasingly urgent challenge for attracting employees beyond the downtown core. Many current or potential employees may be geographically close to these areas, but face long or uncomfortable commutes with existing service.
- **The largest transit trip volumes outside of downtown Boston are oriented around the Longwood Medical Area.** The highest volume trips that connect to this area using transit begin and end in Back Bay/South End, Jamaica Plain, and Brighton.

Gaps between service and demand exist in high-demand areas with slow or infrequent service, as well as crosstown trips that are not well served today.



Better
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