

# State of the Bus System 2018

Better  
**Bus**  
Project



Better  
**Bus**  
Project



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## 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.

Greater Boston has changed significantly in recent decades, with large amounts of growth in many areas, and changes in the places people travel to and from. While many improvements have been made to MBTA services during this time, these improvements have not kept pace with changes in transit demand. Additionally, across the country the expectations of bus riders has changed. New technologies and alternative options to traditional transit mean that customers expect high quality service. Anything short of fast, frequent, and convenient service encourages riders to seek alternative options that better meets their needs – decreasing ridership and reducing revenues.

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 and align the MBTA's service with the expectations of today's riders.



### What is the State of the Bus System Report?

This state of the system report provides:

1. A review of the MBTA's existing bus transit service and operating characteristics.
2. An assessment of MBTA bus ridership at the service type, route, and stop level.
3. An assessment of the MBTA's bus service compared to best practices and industry standards.
4. An assessment of issues with the MBTA's bus system.

The State of the System is one of the first steps in understanding the existing conditions in the MBTA service area. A Market Analysis was produced to evaluate where demand for transit is located and where people are traveling 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.



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## Transit Service Today

Overview of Existing Services

Service Frequency

Span of Service

Duplication

Complexity

Transit Facilities

## Overview of Existing Services

The MBTA operates 176 total routes in Greater Boston.

These routes are categorized by the MBTA into six service types:

- Silver Line (5 routes)
- Key Bus (15 routes)
- Local (117 routes)
- Commuter (28 routes)
- Supplemental (10 routes)
- Community (1 route)

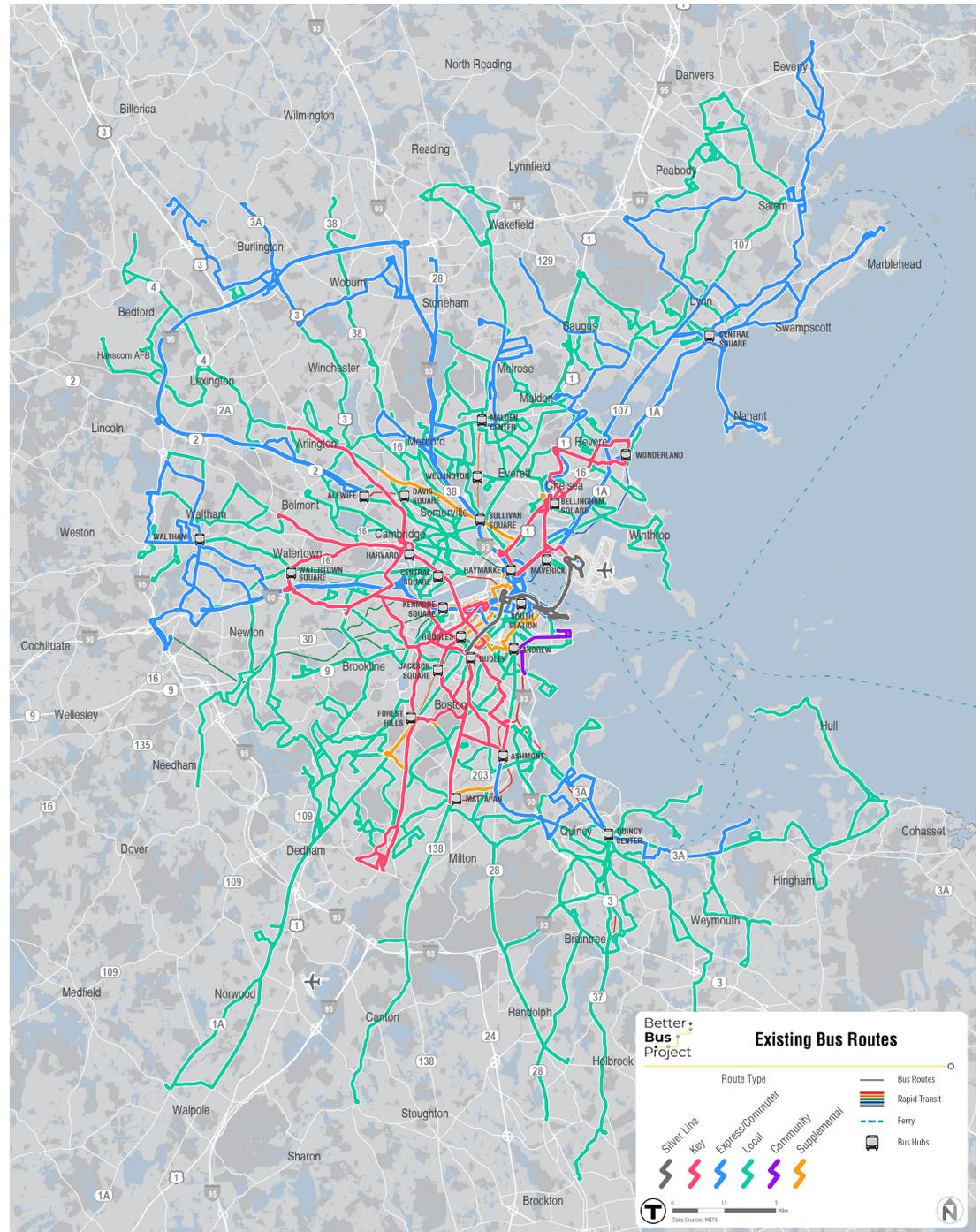
### Silver Line Routes

Five routes are classified by the MBTA as Silver Line routes, which include elements of bus rapid transit (BRT), such as enhanced stations, off-board fare collection, transit signal priority, and some dedicated bus lanes. These routes provide frequent service connecting downtown Boston to Boston Logan Airport, the Seaport District, Chelsea, and Dudley Station.

### Key Bus Routes

An additional 15 routes are classified as Key Bus routes, or bus routes that serve high passenger demand in high-density travel corridors, providing higher frequency service for longer spans:

- 1 Harvard Square - Dudley Station via Mass. Avenue
- 15 Kane Square or Fields Corner - Ruggles Station
- 22 Ashmont Station - Ruggles Station via Talbot Avenue
- 23 Ashmont Station - Ruggles Station via Washington Street
- 28 Mattapan Station - Ruggles Station
- 32 Wolcott Square or Cleary Square - Forest Hills Station
- 39 Forest Hills Station - Back Bay Station
- 57/57A Watertown Yard - Kenmore Station
- 66 Harvard Square - Dudley Station via Brookline
- 71 Watertown Square - Harvard Station



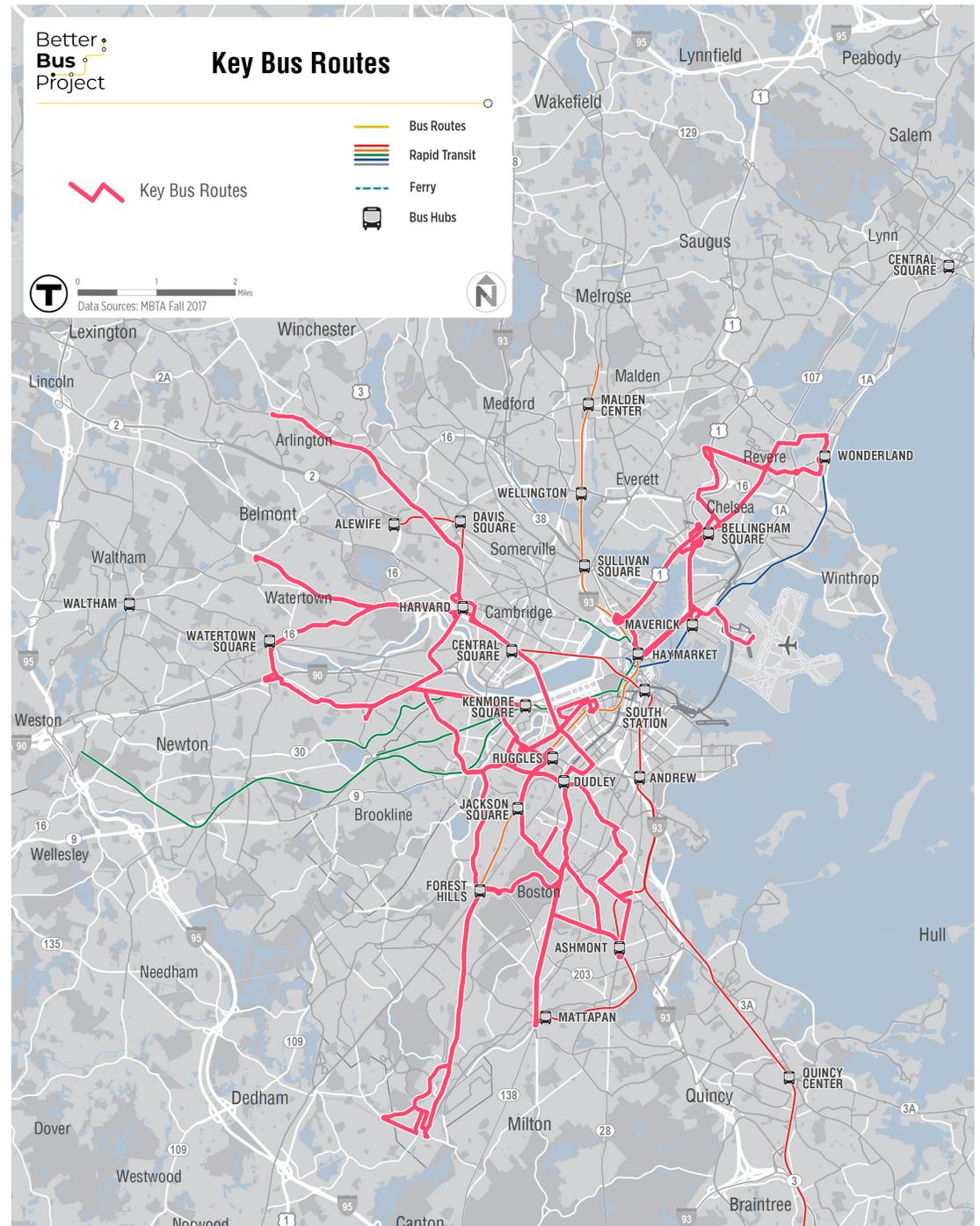
- 73 Waverly Square - Harvard Station
- 77 Arlington Heights - Harvard Station
- 111 Woodlawn or Byway and Park - Haymarket Station
- 116 Wonderland Station - Maverick Station via Revere
- 117 Wonderland Station - Maverick Station via Beach

Key Bus routes operate primarily in Boston, Cambridge, Chelsea, and Watertown. While there is high transit demand in communities such as Everett, Somerville, and South Boston, all of which have high population and employment density, no Key Bus routes serve these areas.

## Local Routes

The overwhelming majority of MBTA routes are Local routes, which provide full weekday service that extends beyond the morning and afternoon peak travel hours. These routes provide service along major arterials and local streets. Ridership on Local routes ranges from very high to relatively low. Several of the Local routes have higher average daily ridership than some Key Bus routes, while others serve as few as 250 daily passengers. Local routes with more than 3,000 daily riders per weekday include:

- 34/34E Walpole Center or Dedham Line - Forest Hills Station (6,541)
- 70/70A Cedarwood - Central Square Cambridge (6,539)
- 9 City Point - Copley Square via Broadway Station (6,430)
- 86 Sullivan Station - Reservoir Station (6,147)
- 31 Mattapan Station - Forest Hills Station (6,096)
- 16 Forest Hills Station - U Mass or Andrew Station (5,539)
- 47 Central Square Cambridge - Broadway Station (4,807)
- 93 Sullivan Station - Downtown via Bunker Hill (4,662)
- 7 City Point - Otis and Summer Streets (4,383)
- 101 Malden Station - Sullivan Station via Medford Square (4,352)
- 21 Ashmont Station - Forest Hills Station (4,285)
- 104 Malden Station - Sullivan Station via Ferry Station (4,088)

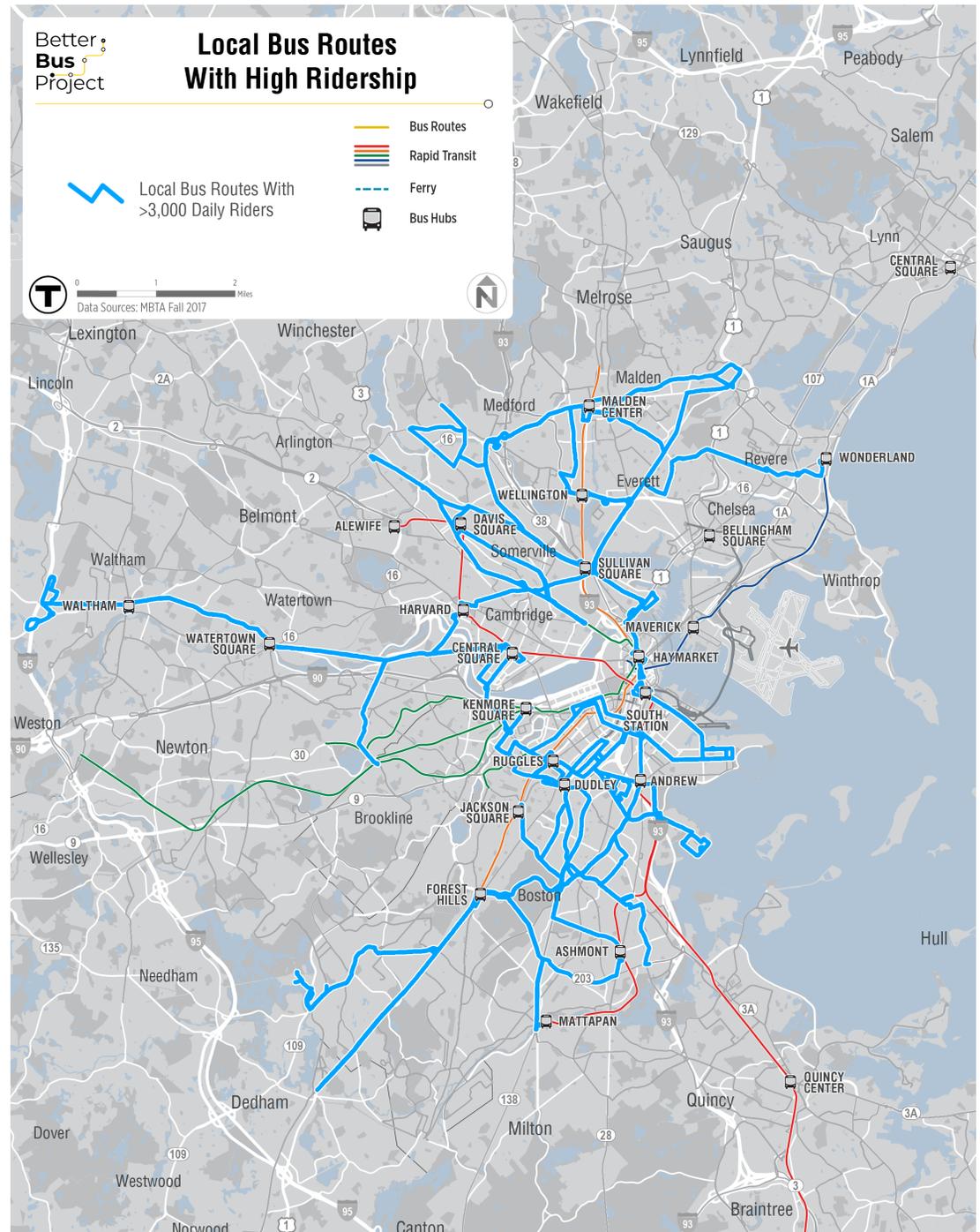


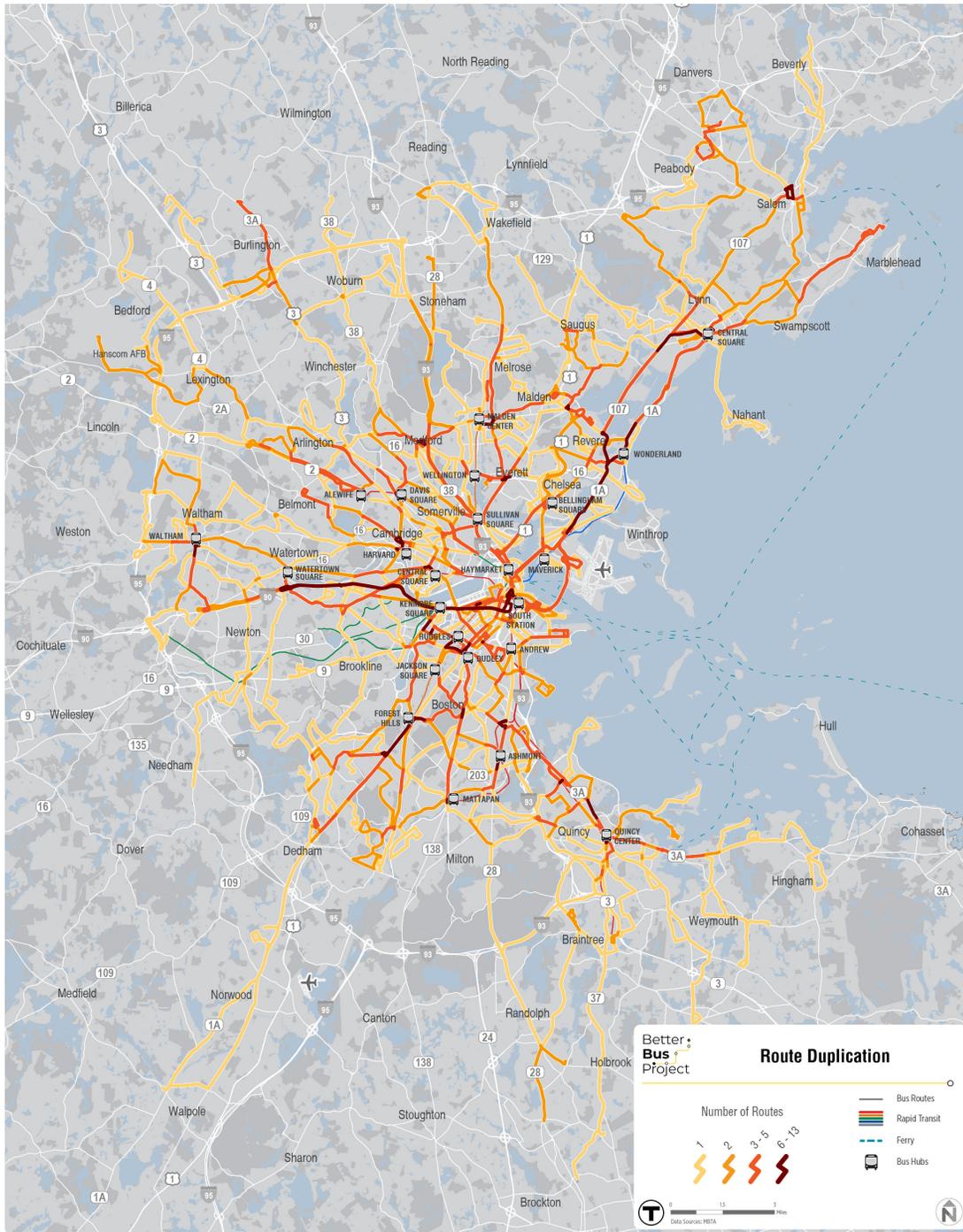
- 88 Clarendon Hill - Lechmere Station via Highland Avenue (3,970)
- 87 Arlington Center or Clarendon Hill - Lechmere Station via Somerville Avenue (3,638)
- 110 Wonderland Station - Wellington Station (3,517)
- 44 Jackson Square Station - Ruggles Station (3,453)
- 89 Clarendon Hill or Davis Square - Sullivan Station via Broadway (3,399)
- 109 Linden Square - Sullivan Station (3,212)
- 45 Franklin Park - Ruggles Station (3,142)
- 19 Fields Corner Station - Ruggles or Kenmore Station (3,125)
- 17 Fields Corner Station - Andrew Station (3,091)
- 108 Linden Square - Wellington Station (3,071)
- 8 Harbor Point/U Mass - Kenmore Station (3,048)
- 36 VA Hospital - Forest Hills Station via Charles River Loop (3,004)

Local routes serving a significant number of riders operate primarily south and southwest of downtown Boston in Dorchester, Dudley Square, Roxbury, South Boston, and the South End, and north of Boston in Everett, Malden, Medford, and Somerville.

## Commuter Routes

The MBTA operates 28 Commuter routes. These routes provide a limited number of peak-direction trips during periods when commuters would use the services. Some of these function as express routes, which have a limited number of stops provided only near the ends of routes. Commuter routes operate primarily in the northeast, north, and west. Few Commuter routes operate in the southern portion of the MBTA service area.





## Supplemental and Community Routes

Eleven routes are classified as Supplemental routes, which either provide limited early morning service, or are designed to support other bus routes. Only one route is classified as a Community route, which is intended to provide weekday service between morning and afternoon peak hours, primarily for non-work travel.

## Network Design

The MBTA's bus network is designed to serve a number of roles, primarily to:

- Provide connections with the rapid transit system - 162 of 176 routes connect with at least one rapid transit station.
- Fill gaps in the rapid transit network, both in between rapid transit lines and crosstown/circumferential services.

Boston's bus network emphasizes one-seat rides to rapid transit. Current trends in transit network design focus on development and marketing of a grid of frequent bus routes. Cities that have done this include Portland and San Francisco, two cities that similarly have extensive rail networks focused on moving people downtown.

Duplicative service design is also a contributing reason that many routes do not fully comply with the MBTA's Service Design Policy standards. When ridership is split between two routes, service levels are also, and many of the MBTA's non-compliance issues are related to the splitting of service between a number of routes. In most cases where routes overlap, multiple routes operate at the same time. In some cases, multiple routes operate along the same corridor but at different times of the day or on different days of the week, increasing the system's complexity. Near rapid transit stations, where multiple routes funnel into the same corridors, some duplication is unavoidable.

The MBTA bus network's one-seat ride approach is a major reason why almost every primary arterial in Greater Boston's core is served by multiple bus routes. The different bus routes duplicate each other in many or most respects, but also have differences. For example, trips between Salem and Boston via Lynn and Route

1A are served by one 12.5-mile long route that operates to Wonderland Station (Route 455 Salem Depot - Wonderland) and a second 20-mile long route that operates to Downtown Crossing Station (Route 459 Salem Depot- Downtown Crossing). A frequent bus network would eliminate this duplication and instead require passengers make a convenient transfer to the Blue Line to reach their final destination.



## Service Frequency

Frequent service is one of the most important factors in making transit a convenient choice for riders. Increased frequencies improve the flexibility and predictability of transit and increase the overall convenience of service, making transit a viable option for more people. Frequent service allows transit to better compete with the convenience of the personal vehicle, making it more attractive to people who have other options. The following service frequency analysis uses a 15-minute or better “frequent” standard that is used by some systems.

On weekdays, the majority of the MBTA’s 176 routes operate throughout the day. However, only 19 MBTA routes provide frequent service (15 minutes or better) from at least 7:00 AM to 8:00 PM. Fourteen of these routes are Key Bus routes, four are Silver Line routes, and one is a Local bus route (Route 31).

### MBTA Service Frequency Standards

The MBTA’s service frequency standards are presented in the Service Delivery Policy (SDP). These standards, which are shown in the table below, represent the least amount of service that should be provided, with higher levels provided based on demand.

The Silver Line and Key Bus route standards are generally robust, but operate less frequently than every 15 minutes during evenings and weekends. The Local and Community route standards, which apply to the large majority of routes, apply to routes with very high ridership as well as those with very low ridership. The Local and Community routes require relatively little service (every 30 to 60 minutes).

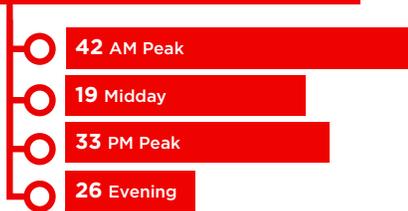
ROUTE TYPE	WEEKDAY TIME PERIOD	MINIMUM FREQUENCY OR HEADWAY
Silver Line	AM and PM Peak	Every 10 minutes
	All other periods	Every 15 minutes
	Saturday and Sunday	Every 15 minutes
Key Bus Routes	AM and PM Peak	Every 10 minutes
	Early AM and Midday Base/School	Every 15 minutes
	Evening and Late Evening	Every 20 minutes
	Saturday and Sunday	Every 20 minutes
Local, Community	AM and PM Peak	Every 30 minutes
	All other periods	Every 60 minutes
	Saturday and Sunday	Every 60 minutes
Commuter	AM Peak	3 trips in the peak direction
	PM Peak	3 trips in the peak direction

Source: MBTA Service Delivery Policy Frequency Standards, 2017

## Existing Frequent Transit Network

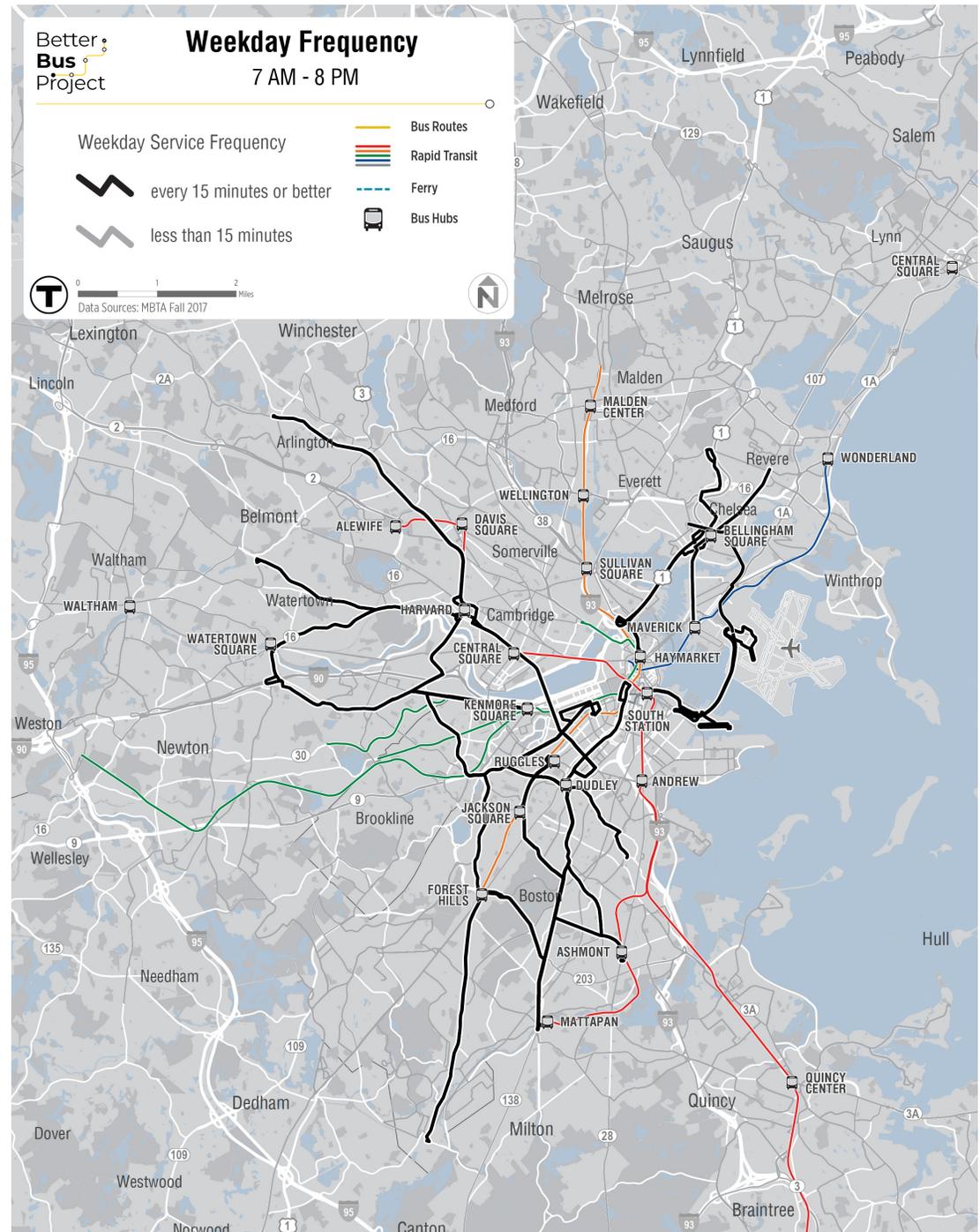
# 176 Routes

**Only 19** routes provide all day frequent service



### Only 19 routes operate frequently all day:

- 1 Harvard Square - Dudley Station via Mass Ave
- 15 Kane Square/Fields Corner - Haymarket Station
- 22 Ashmont Station - Ruggles Station via Talbot Ave
- 23 Ashmont Station - Ruggles Station via Washington St
- 28 Mattapan Station - Ruggles Station
- 31 Mattapan Station - Forest Hills Station
- 32 Wolcott Square or Cleary Square - Forest Hills Station
- 39 Forest Hills Station - Back Bay Station
- 57/57A Watertown Yard - Kenmore Station
- 66 Harvard Square - Dudley Station via Brookline
- 71 Watertown Square - Harvard Station
- 73 Waverley Square - Harvard Station
- 77 Arlington Heights - Harvard Station
- 111 Woodlawn - Haymarket Station
- 116/117 Revere - Maverick Station
- SL1 Logan Airport - South Station
- SL2 Boston Design Center - South Station
- SL3 Chelsea Station - South Station via Airport Station
- SL5 Dudley Station - Downtown



7:00 AM 9:00 AM



### AM Peak Frequency 7:00 AM - 9:00 AM

9:00 AM 4:00 PM

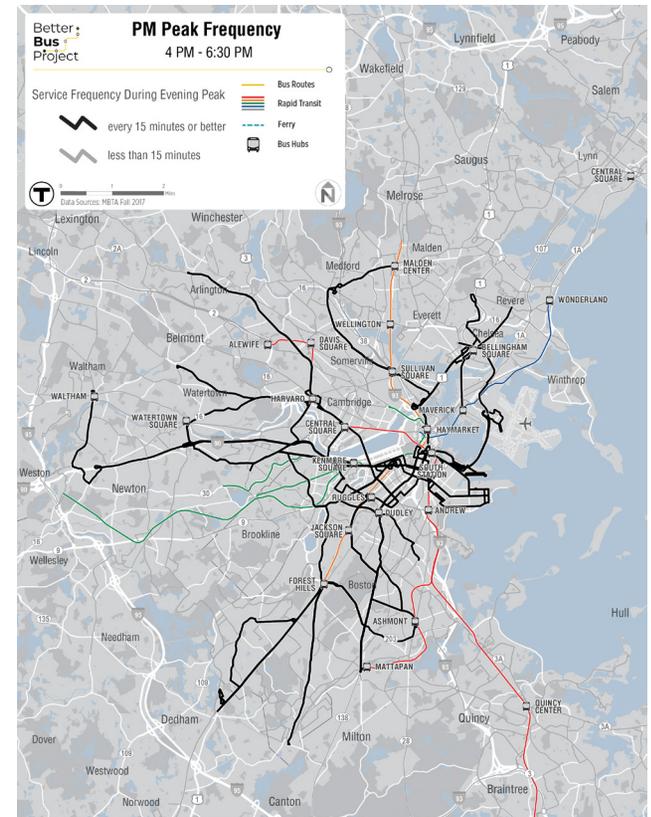
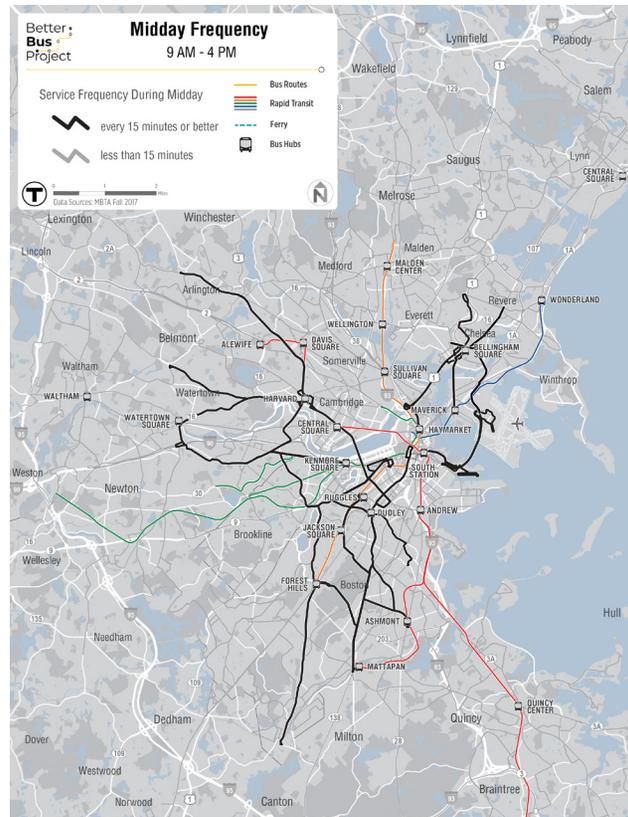
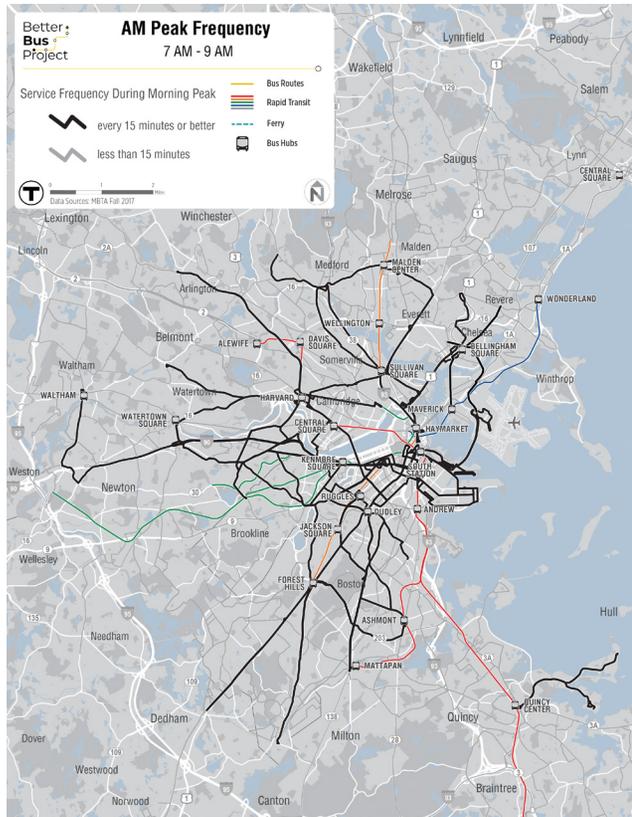


### Midday Frequency 9:00 AM - 4:00 PM

4:00 PM 6:30 PM



### PM Peak Frequency 4:00 PM - 6:30 PM



Nearly all MBTA routes operate during the AM peak, and one-fourth of these routes operate every 15 minutes or better.

- 166 total routes
- **42 routes provide frequent service**
- 124 routes provide less frequent service

Nearly all MBTA routes operate during midday, and 27 routes operate every 15 minutes or better.

- 165 total routes
- **19 routes provide frequent service**
- 146 routes provide less frequent service

Nearly all MBTA routes operate during the PM peak, but 30 routes operate every 15 minutes or better.

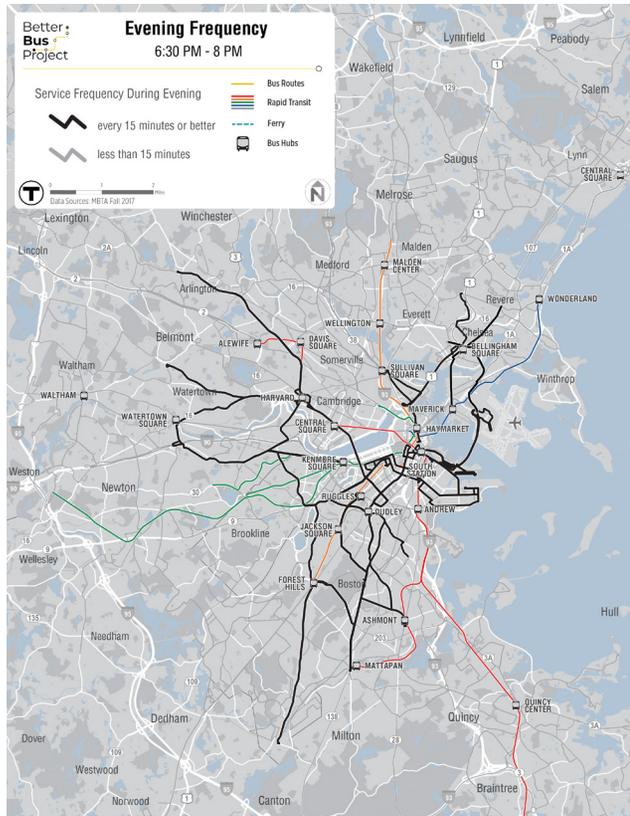
- 167 total routes
- **33 routes provide frequent service**
- 134 routes provide less frequent service

6:30 PM 8:00 PM



## Evening Frequency

### 6:30 PM - 8:00 PM



153 MBTA routes operate during the evening, and 15 routes operate every 15 minutes or better.

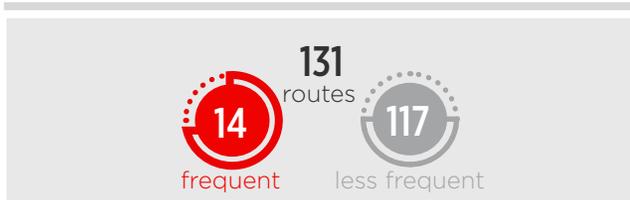
- 153 total routes
- **26 routes provide frequent service**
- 127 routes provide less frequent service

The MBTA offers more frequent service during the AM peak than during any other time period. **During the AM peak, about 25% of routes operate every 15 minutes or better.** Many of these frequent routes serve areas west and southwest of downtown Boston and several routes duplicate service provided by the MBTA rapid transit network. Few frequent routes serve areas north of Boston, including Everett, Malden, Somerville, and the North Shore.

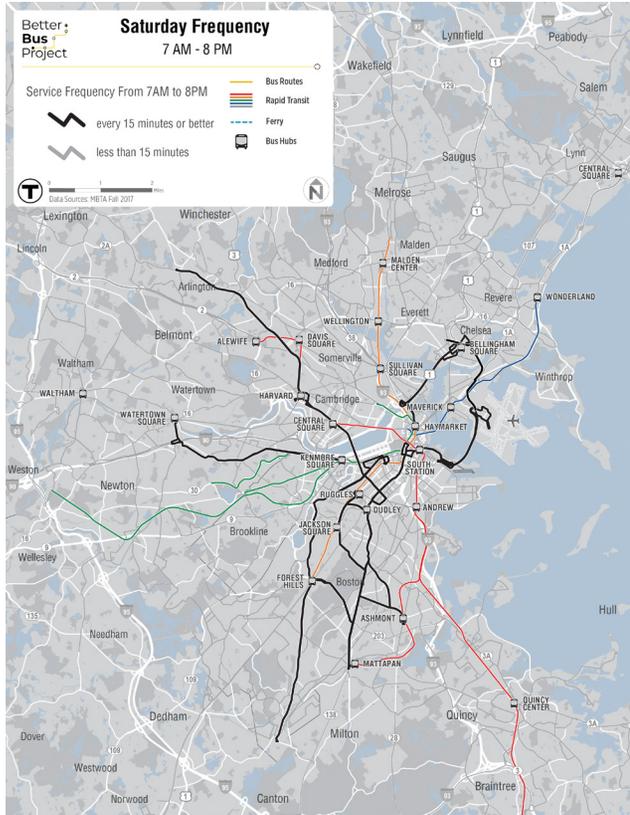
**Only 19 routes operate frequently during the midday:** 14 Key Bus routes (including the trunk corridor of routes 116 & 117), four Silver Line routes, and one Local route. Frequent service during this time period is concentrated in Boston, Cambridge, and Chelsea.

**Thirty-three bus routes operate frequently during the PM peak, significantly fewer than during the AM peak.** Most frequent service during the PM peak operates south and west of downtown, serving commuters traveling from downtown Boston to other parts of the region. As in the AM peak and midday, few frequent routes serve areas north of Boston. Most routes operating frequently during this time period are Key Bus routes or Silver Line routes. Fourteen Local routes also operate frequently during this time period.

**Only 26 bus routes operate frequently during evenings,** the majority of which are Key Bus routes or Silver Line routes. Seven Local routes operate frequently from 6:30 PM to 8:00 PM.

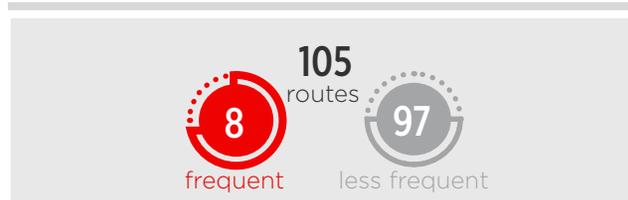


## Saturday Frequency 7:00 AM - 8:00 PM

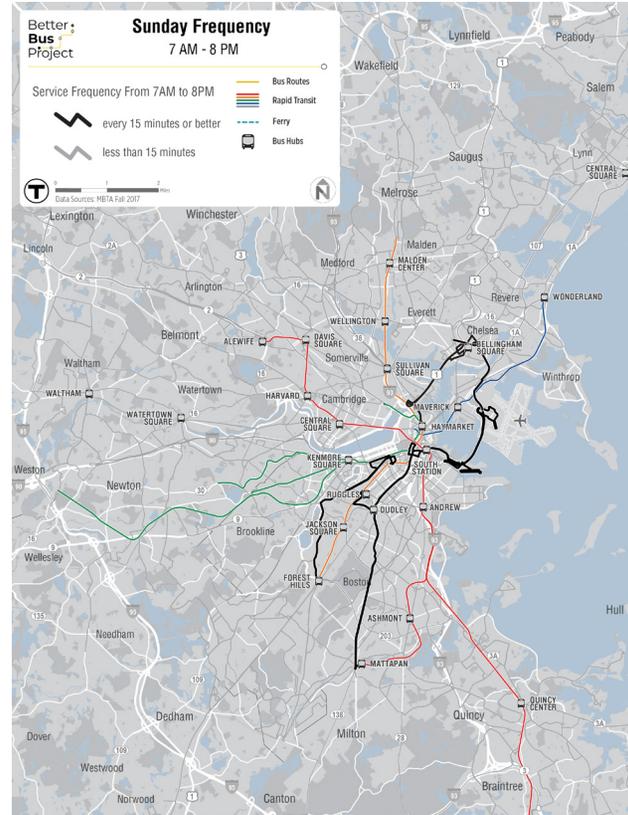


131 MBTA routes operate on Saturdays, and only seven of these routes operate every 15 minutes or better.

- 131 total routes
- **14 routes provide frequent service**
- 117 routes provide less frequent service



## Sunday Frequency 7:00 AM - 8:00 PM



105 MBTA routes operate on Sundays, and only four operate every 15 minutes or better.

- 105 total routes
- **8 routes provide frequent service**
- 97 routes provide less frequent service

Similar to weekdays, few routes operate frequently throughout the service day on Saturdays and Sundays.

While 131 routes operate on Saturdays, only 14 of these routes operate frequently throughout the service day. All of these routes are Key Bus routes or Silver Line routes.

On Sundays, only eight routes operate frequently throughout the service day: three Key Bus routes and Silver Line routes.

**Only 14 routes operate frequently on Saturdays. Only 8 routes operate frequently on Sundays.**

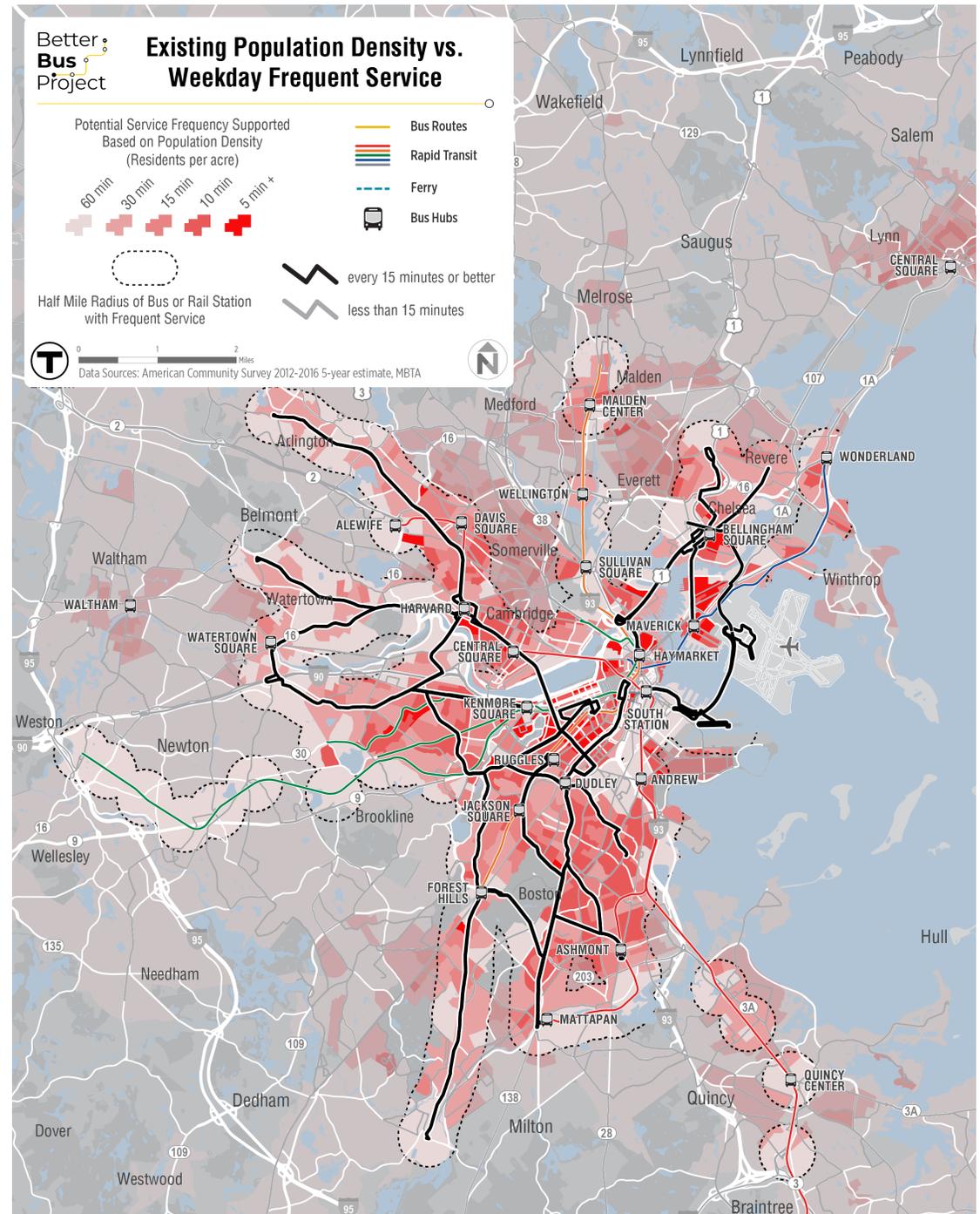
## Population Demand versus All-Day Frequent Service

Several areas demonstrate a potential to support very high levels of service - based on underlying population density. Many of these areas are served by rapid transit or Silver Line service. However, there are several areas with high demand that lack access to frequent rapid transit or bus service (every 15 minutes or better):

- Parts of Cambridge
- Parts of East Boston
- Parts of Dorchester
- Everett
- Lynn
- Parts of Roxbury
- Parts of Somerville
- South Boston

Less than one-quarter of residents in the MBTA service area are served by routes that operate frequently in the AM peak (within a half-mile). Including rapid transit, only 37% of residents are served by frequent transit in the AM peak.

**63%** of residents in the MBTA service area are not served by any route that offers all-day frequent service.



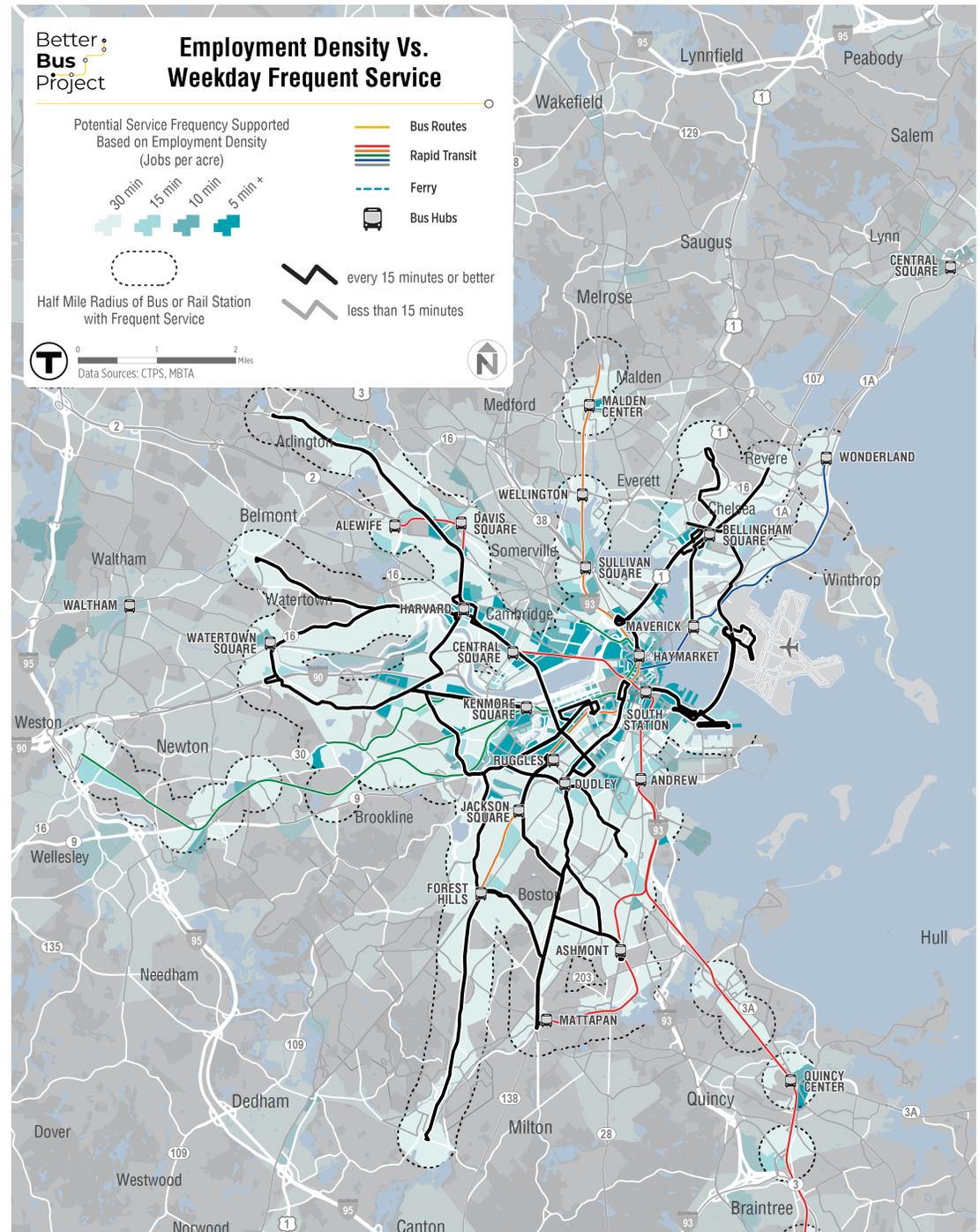
## Employment Demand versus All-Day Frequent Service

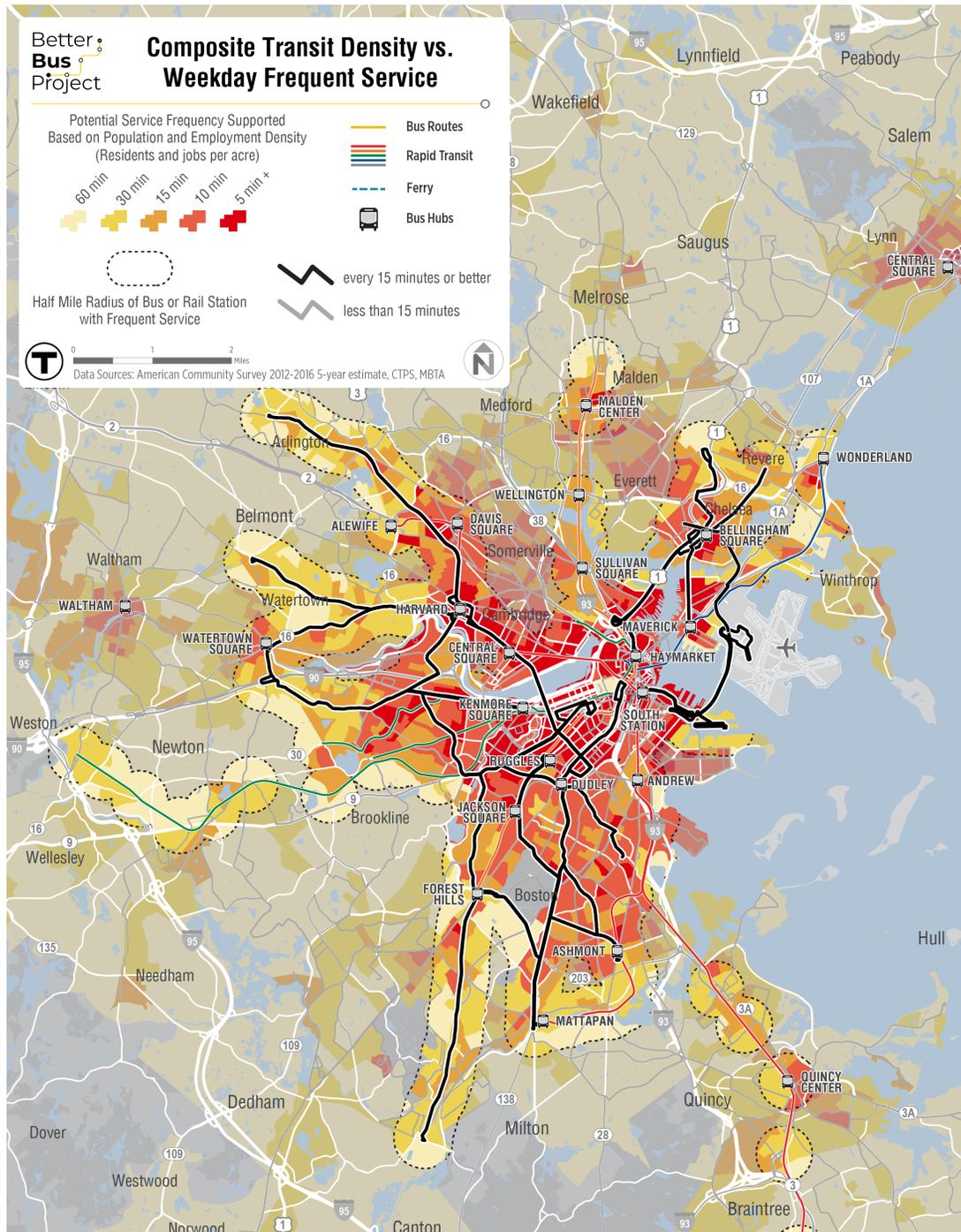
The locations of jobs are more highly concentrated than population, with the largest and most dense employment areas focused in a few key areas. Downtown Boston, is, by far, the region's largest job center and the hub of the MBTA system; and most of the region's other large job centers are also in the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

Given the radial design of the MBTA's rapid transit and bus networks, many of the region's largest job centers are served by rapid transit or bus service operating every 15 minutes or better, from at least 7:00 AM to 10:00 PM. One exception is the areas along Route 128, including Waltham and Woburn.

Just over one-third of jobs in the MBTA service area are served by routes that operate frequently in the AM peak (within a half-mile). When including rapid transit for this analysis, just under half of all jobs are served by frequent transit in the AM peak.

**Over 50% of jobs in the MBTA service area are not served by any route that offers all-day frequent service.**





## Overall Population and Employment Demand versus All-Day Frequent Service

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 described in the market analysis, the largest gap between demand and service is focused between the southern portions of the Orange and Red Lines in Roxbury, Dorchester, and Mattapan. These areas have some of the highest transit demand in the MBTA service area, but are served by few routes that operate frequently from at least 7:00 AM to 10:00 PM. Other communities with high demand and no frequent bus or rapid transit include:

- Parts of Cambridge
- Parts of Somerville
- South Boston
- Roslindale
- Parts of Revere
- Waltham

Many of these areas are served by several bus routes, but all provide infrequent service, and most serve similar areas in different ways, making service complicated. Outside of Boston, cities such as Lynn are served by many routes, but most service is oriented to and from Boston, with a much lower emphasis on providing service within the city.

## Span of Service

The span of service – the hours that a service operates during the day – is a second factor that strongly influences the convenience of a transit system. Service that runs for longer hours during the day is more convenient, allowing people to travel when they want.

On weekdays, 57 routes run from at least 6:00 AM to 12:00 AM, which is the same minimum span of service on weekdays for Key Bus routes. The majority of routes that operate throughout this span are concentrated in and around Boston, Cambridge, and Somerville.

Few routes provide service from at least 6:00 AM to 12:00 AM in the northern portion of the MBTA service area: parts of Brookline and Newton that are not directly served by the Green Line, and parts of Quincy and Braintree that are not directly served by the Red Line.

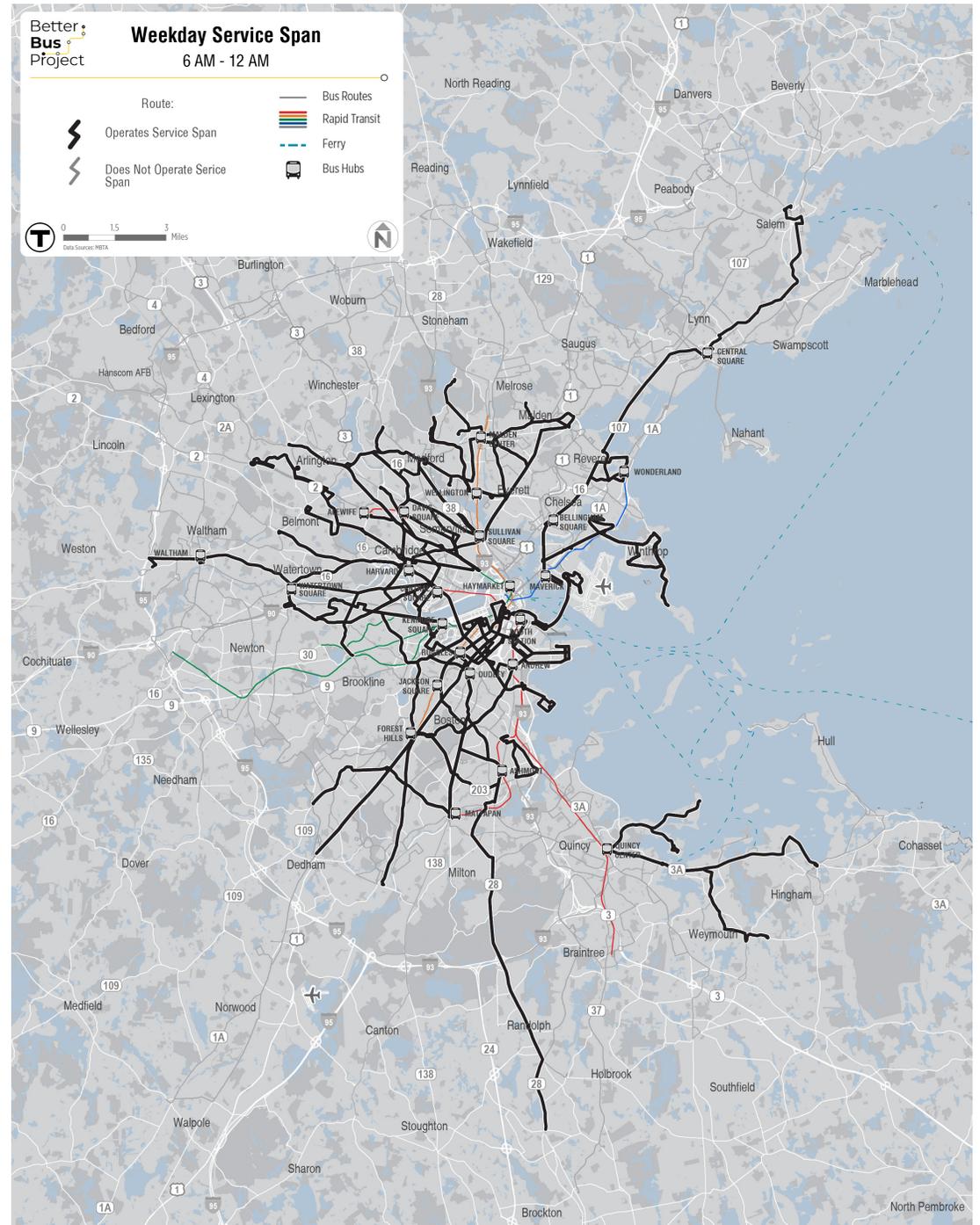
### MBTA Span of Service Standards

The MBTA's Span of Service standards, which are shown in the table below, represent the minimum hours that service should be provided, with longer hours based on demand.

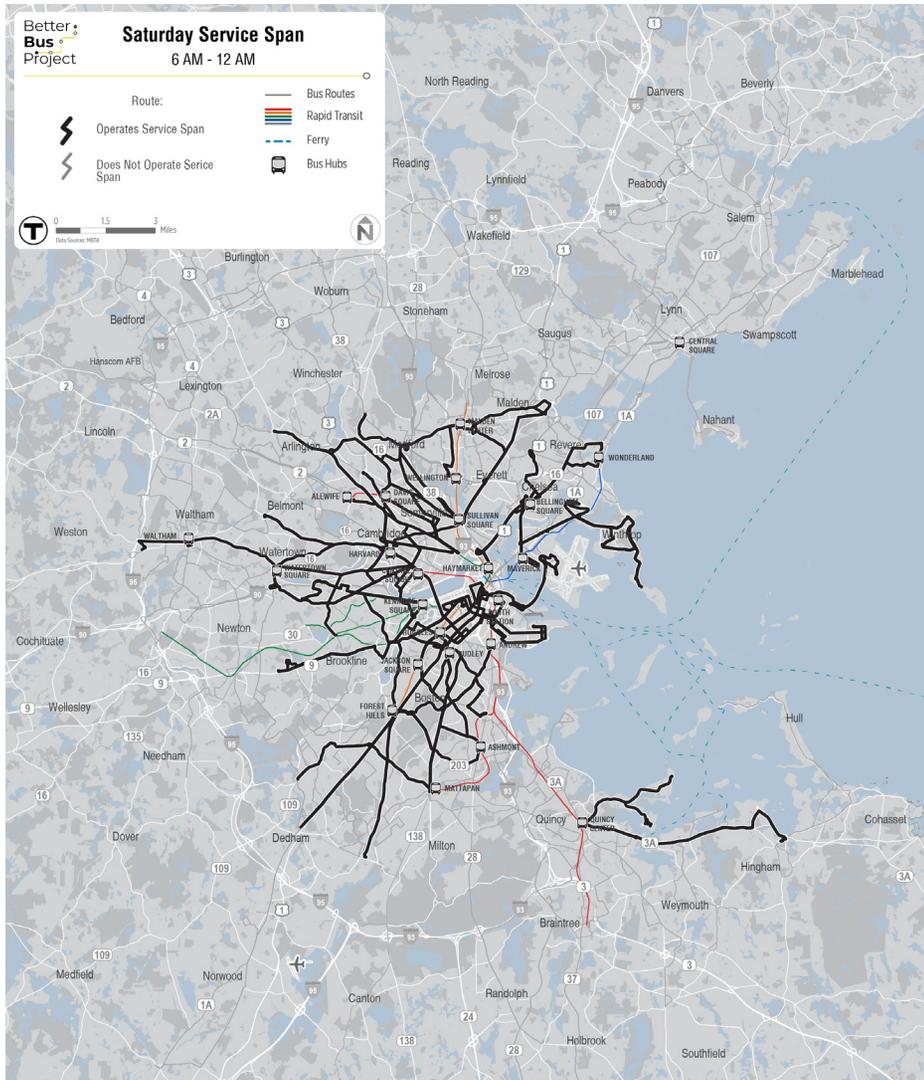
The Silver Line and Key Bus route standards are the longest at 6:00 AM to midnight on weekdays and Saturdays, and 7:00 AM to midnight on Sundays. The Local and Community route standards, which apply to the large majority of routes, are shorter at 7:00 AM to 7:00 PM on weekdays, 8:00 AM to 6:30 PM on Saturdays, and 10:00 AM to 4:00 PM on Sundays.

ROUTE TYPE	DAY OF WEEK	MINIMUM SPAN OF SERVICE
Silver Line	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Key Bus Routes	Weekday	6:00 AM – midnight
	Saturday	6:00 AM – midnight
	Sunday	7:00 AM – midnight
Local	Weekday	7:00 AM – 7:00 PM
	Saturday	8:00 AM – 6:30 PM
	Sunday	10:00 AM – 6:30 PM
Commuter	Weekday	7:00 AM – 9:00 AM 4:00 PM – 6:30 PM
	Weekday	No minimum span
Community	Weekday	10:00 AM – 4:00 PM

Source: MBTA Service Delivery Standards, 2017



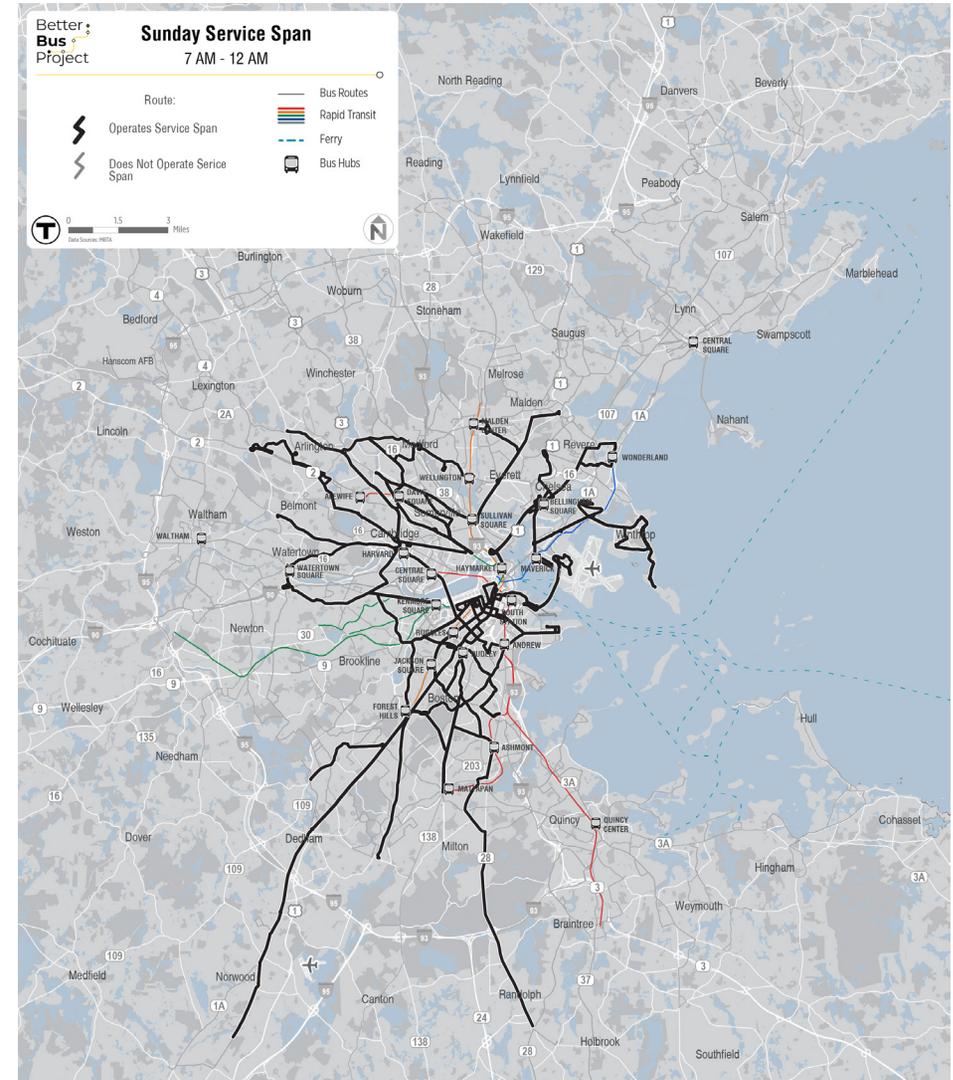
## Saturday Span of Service



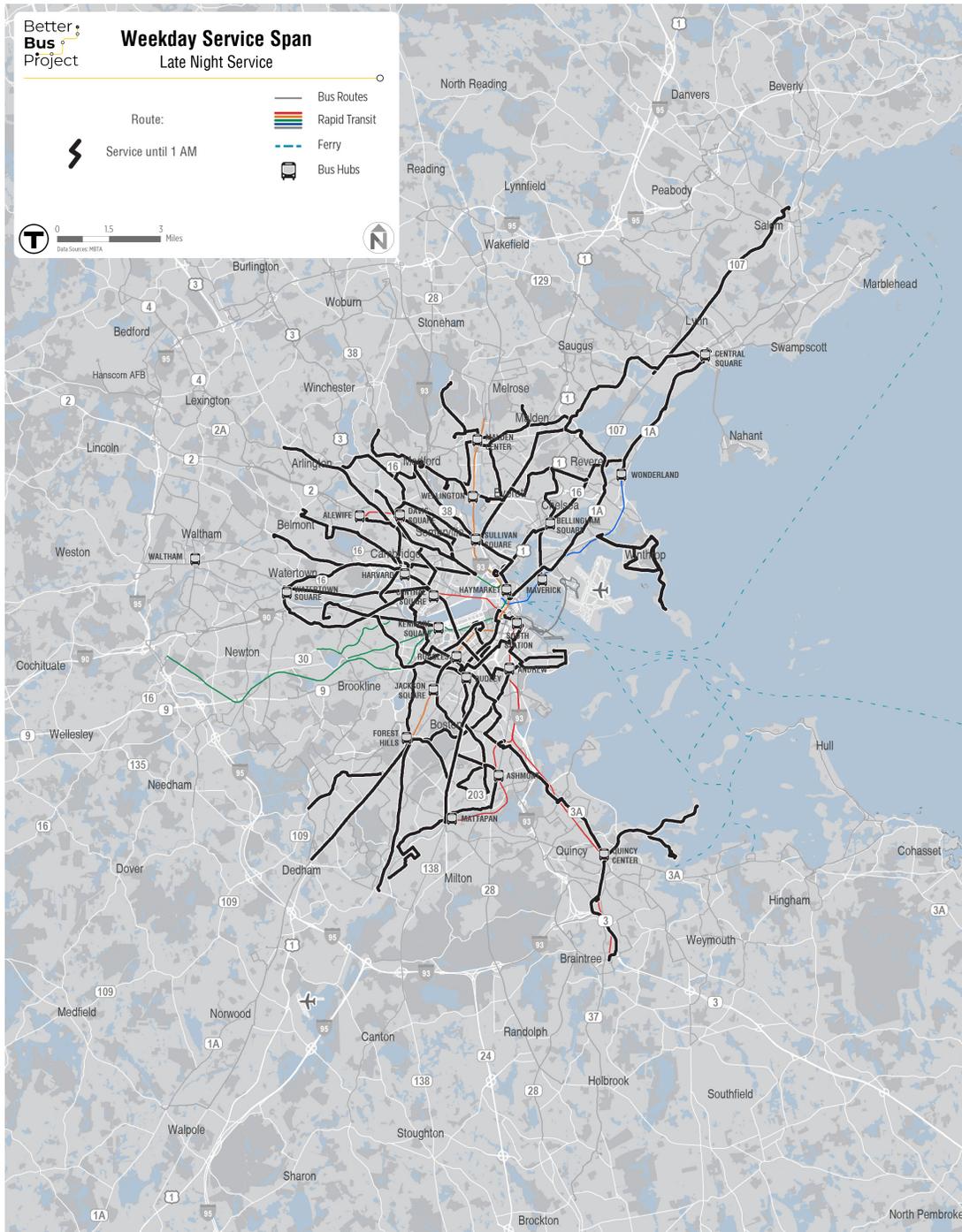
Of the 131 MBTA bus routes that operate on Saturdays, 50 routes operate from at least 6:00 AM to 12:00 PM. Routes operating during this span are concentrated in Boston, Cambridge, Chelsea, Somerville, and Watertown.

Few routes that serve areas beyond the reach of the rapid transit network operate from at least 6:00 AM to 12:00 PM.

## Sunday Span of Service



Of the 105 MBTA bus routes that operate on Sundays, 41 routes operate from 7:00 AM to 12:00 PM, the minimum span of service for Key Bus routes on Sundays, which is shorter than the minimum span for Key Bus routes on weekdays and Saturdays. Routes operating during this span are concentrated in Boston, and to a lesser extent Cambridge, Chelsea, and Somerville.



## Late Night Service

While most jobs in the Boston area are still based on traditional 9-to-5 hours, a growing number of people in the region work non-traditional hours. Jobs that start outside of traditional 9-to-5 hours, such as food service jobs that have start time that are much earlier than 9:00 AM and later second-shift and third-shift jobs, are becoming increasingly common. As such, there is a growing demand for late-night and early-morning bus service in the MBTA service area.

While 74 of the MBTA's 176 bus routes operate through midnight on weekdays, only 48 operate until 1:00 AM, and only two operate until 1:30 AM (16 Forest Hills Station - Andrew Station or UMass, and 36 Charles River Loop or VA Hospital - Forest Hills Station). Until recently, no MBTA bus routes operated after 2:00 AM.

The MBTA is piloting expanded bus service from 10:00 PM to 3:00 AM as of September 2, 2018. This expansion includes additional evening trips and later scheduling, including:

- Later, more frequent service on some existing late night routes from 10:00 PM - 2:00 AM
- Extended service until 3:00 AM on Routes 15, 93, 104, 108, 109, 117, 442, SL1, and SL4
- Service available after 2:00 AM in Dorchester, Roxbury, Charlestown, Everett, East Boston, and Lynn

## Early Morning Service

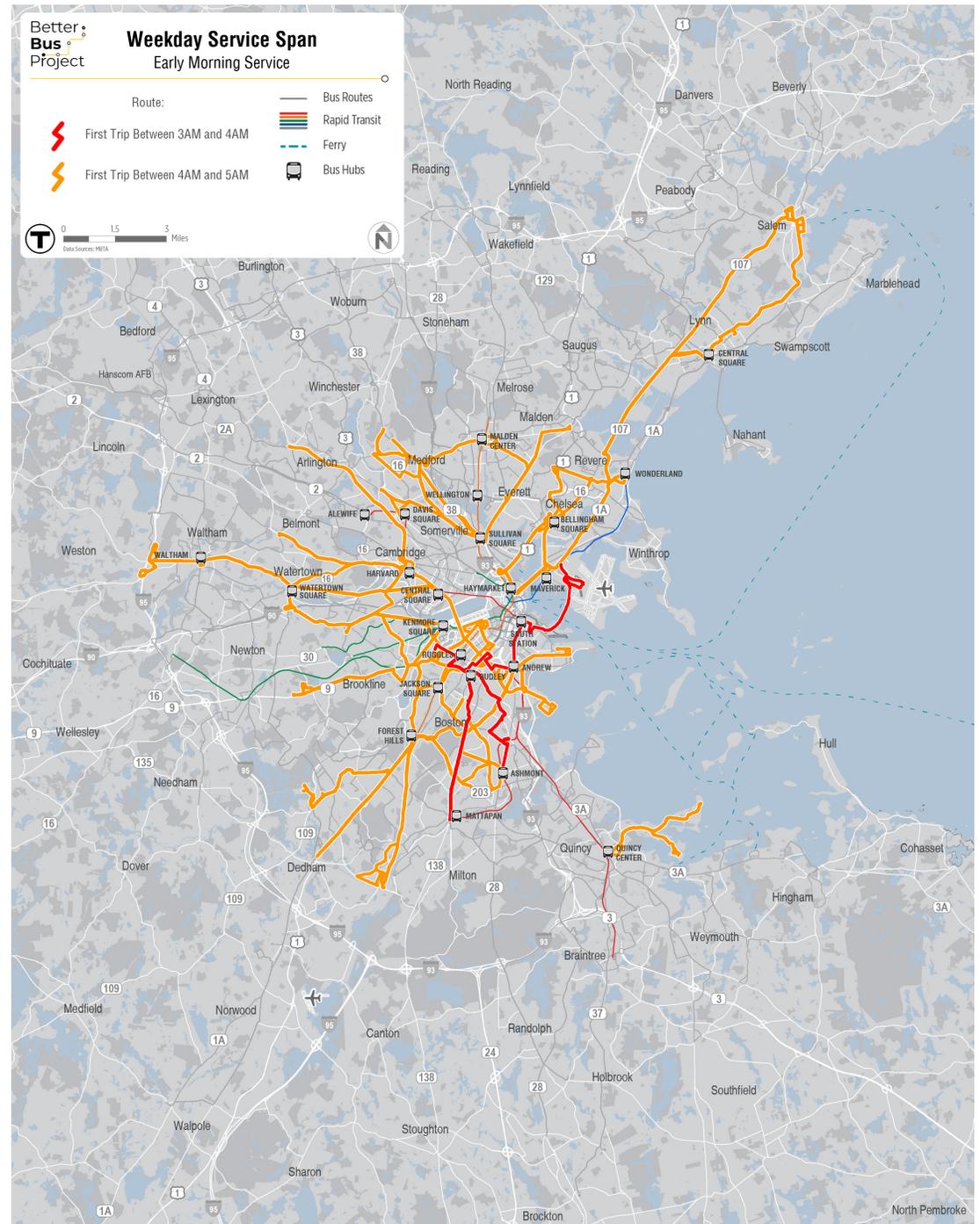
The MBTA recently expanded early morning service, resulting in 17 additional early morning trips on Routes 16, 19, 31, 32, 65, 70, 117, and 455 and nine trips departing earlier, on Routes 31, 104, 109, and 455.

Most recently, the MBTA started operating three routes between 3:00 AM and 4:00 AM:

- 15 Kane Square or Fields Corner - Ruggles Station
- 28 Mattapan Station - Ruggles Station
- 171 Dudley Station - Logan Airport via Andrew Station

An additional 31 routes begin operating between 4:00 AM and 5:00 AM, including 12 Key Bus routes and 19 Local Routes. Local routes that begin operating between 4:00 AM and 5:00 AM include:

- 1 Harvard Square - Dudley Station via Mass Ave
- 10 City Point - Copley Square via BU Medical Center
- 16 Forest Hills Station - U Mass or Andrew Station
- 17 Fields Corner Station - Andrew Station
- 21 Ashmont Station - Forest Hills Station
- 26 Ashmont Station - Norfolk and Morton Belt Line
- 31 Mattapan Station - Forest Hills Station
- 34/34E Walpole Center or Deadham Line - Forest Hills Station
- 36 VA Hospital - Forest Hills
- 41 Centre and Eliot Streets - JFK U Mass Station
- 60 Chestnut Hill Station - Kenmore Station
- 70/70A Cedarwood - Central Square Cambridge
- 89 Clarendon Hill or Davis Square - Sullivan Station via Broadway
- 95 West Medford - Sullivan Station
- 101 Malden Station - Sullivan Station via Medfor Square
- 104 Malden Station - Sullivan Station via Ferry Street
- 109 Linden Square - Sullivan Station
- 216 Quincy Center Station - Houghs Neck
- 450 Salem Depot - Haymarket or Wonderland Station via Western Ave
- 455 Salem Depot - Wonderland Station



## Transit Facilities

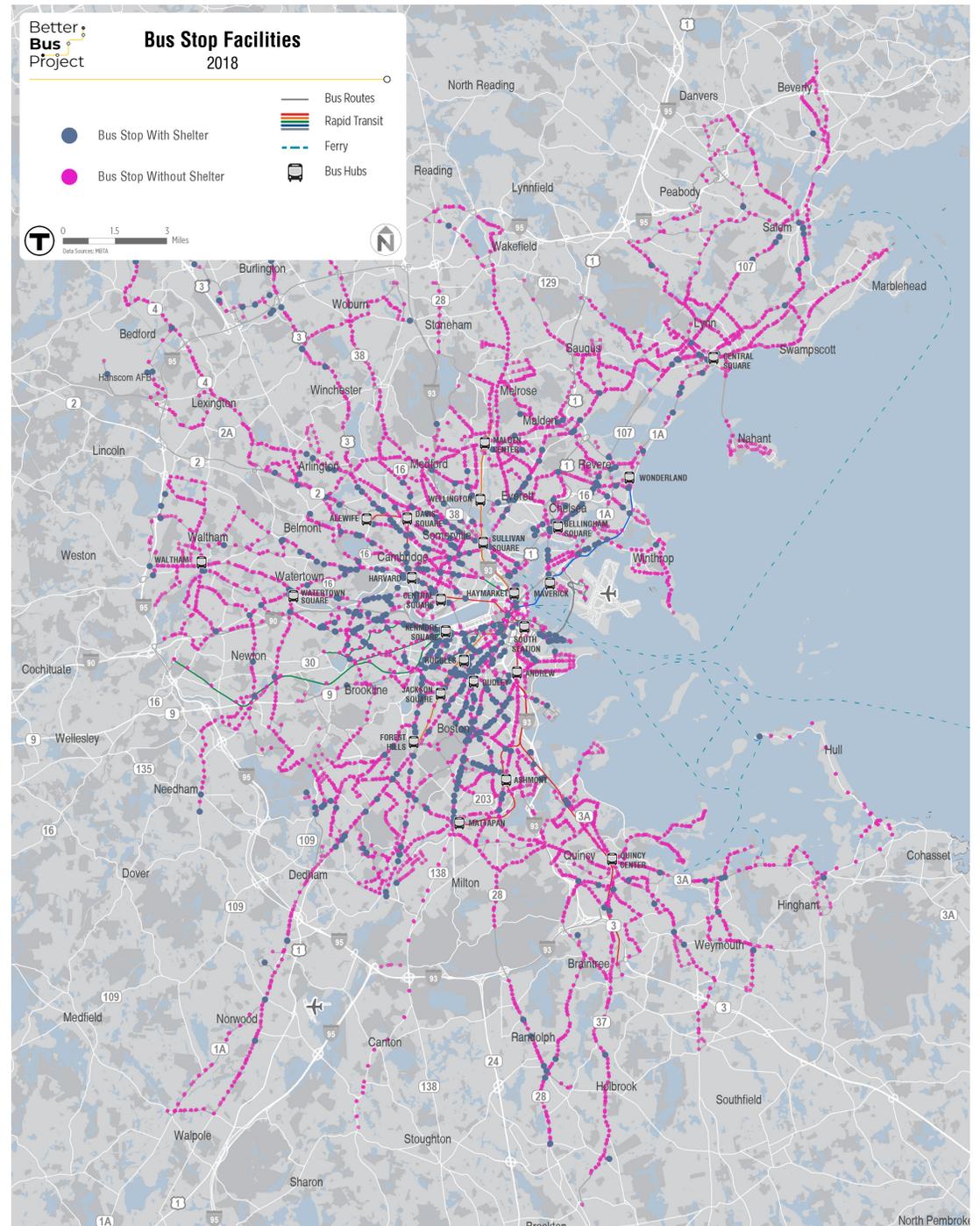
Over the years, the MBTA has invested in transit facilities that make riding the bus more comfortable, and make transit service faster and more reliable. These facilities include bus stations, stop amenities, and transit priority treatments, such as bus lanes and transit signal priority (TSP).

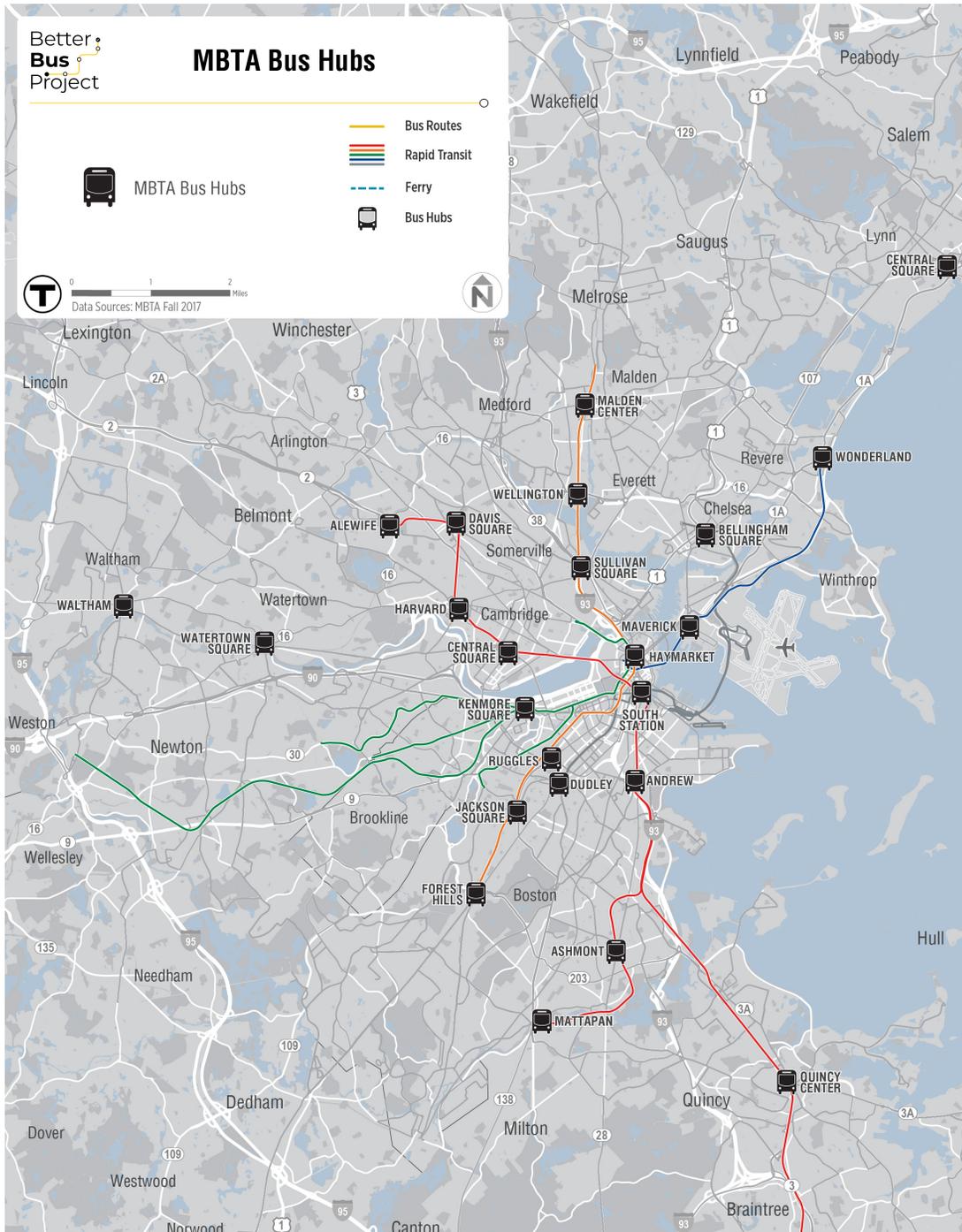
Despite this investment, for a large system, the MBTA's bus stop amenities and transit priority treatments are limited.

### Bus Stops with Shelters

Shelters protect transit riders from the elements, and help to identify stop locations. Aside from buses, they are one of the most visible elements of a transit system.

The MBTA has over 8,000 bus stops. Of these, less than 8%, or 628 stops, have shelters. Nearly half of these (300) are located along Key Bus routes and Silver Line routes, which means that most Local and express routes have very limited bus facilities and amenities. Many high ridership stops, namely throughout downtown Boston and around South Station, lack shelters.





## Major Bus Hubs

The MBTA has major bus hubs at most rapid transit stations and at several major bus transfer stations, including:

- Bellingham Square
- Sullivan Square
- Dudley Station
- Waltham
- Watertown Square
- Andrew Station

The waiting environment at most major hubs could be improved.



## Dedicated Transit Facilities

Dedicated transit facilities make bus trips shorter and more reliable. The MBTA currently has 8.0 miles of dedicated bus tunnels, busways, and bus lanes that reduce delays due to traffic congestion and increase the visibility of MBTA bus service. The MBTA is working with state and municipal partners to pilot and expand these facilities.

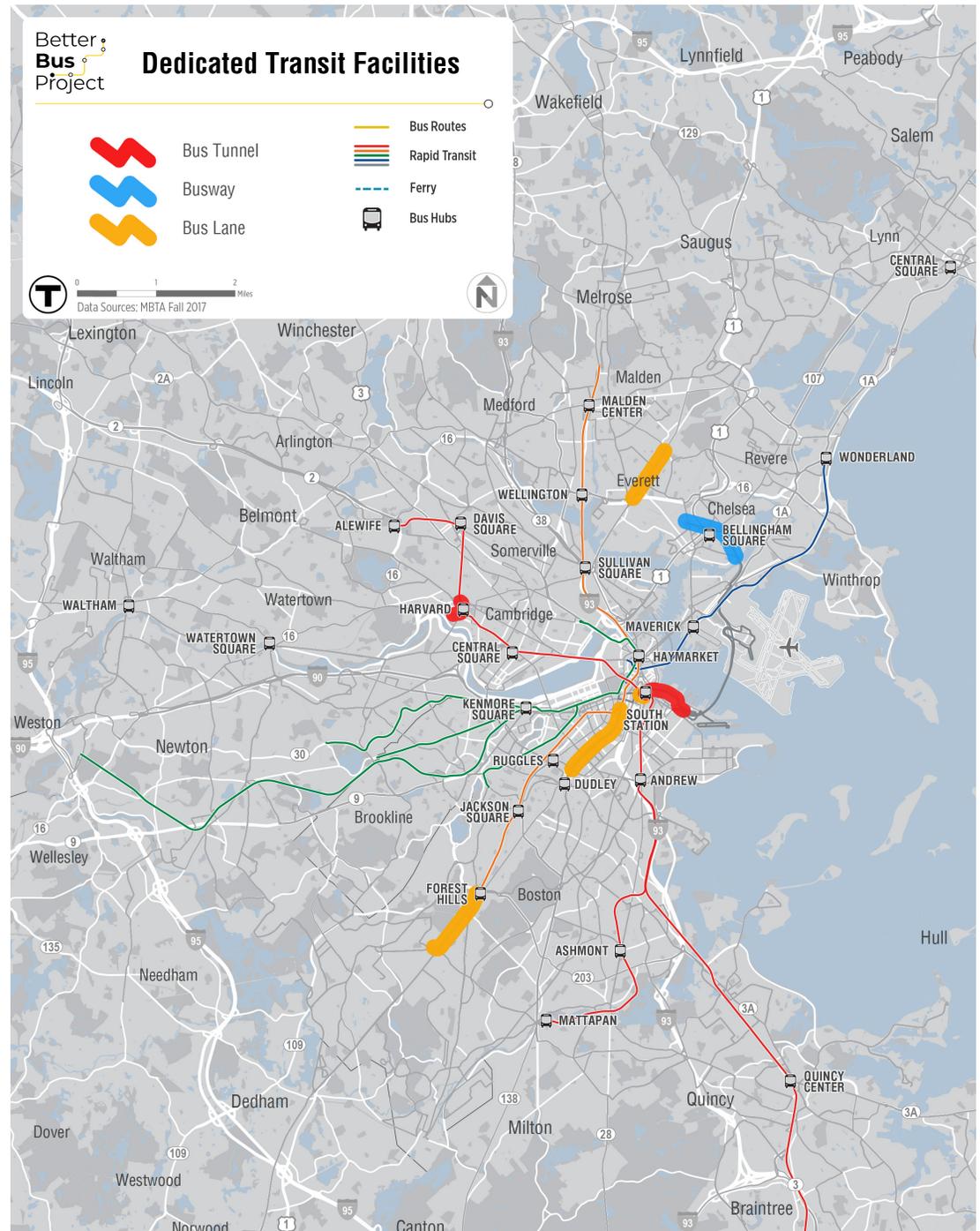
The MBTA operates in 2.1 miles of bus tunnels, the Silver Line Tunnel, and the Harvard Bus Tunnel.

The MBTA also has 4.7 route miles of bus lanes, located along the following corridors:

- Broadway, Everett
- Essex Street, Boston
- Washington Street, South End and Roxbury
- Washington Street, Roslindale
- Mount Auburn Street, Cambridge and Watertown

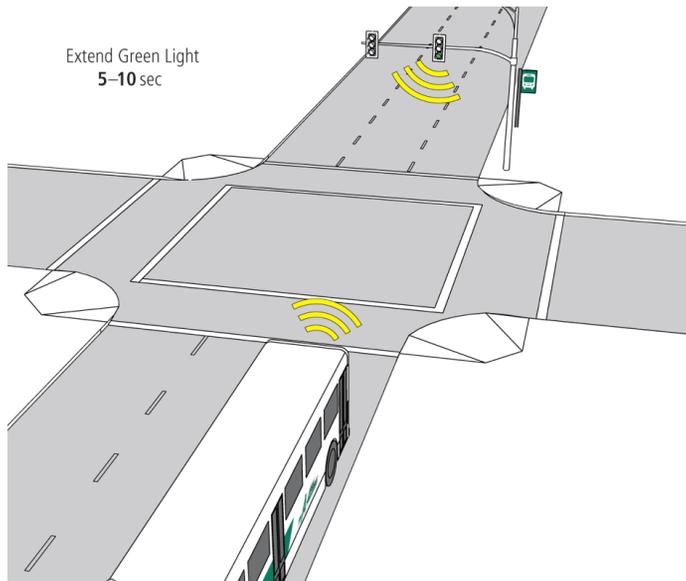
Of the 4.7 route miles of bus lanes, 2.5 miles are all-day bus lanes. These lanes are often used by regular traffic, or as loading zones, due to lack of barriers and enforcement as well as poor maintenance resulting in the deterioration of pavement parking. The remaining 2.2 miles of bus lanes, located along Broadway Street in Everett and Washington Street in Roslindale, are peak-only bus lanes.

The MBTA has 1.2 route miles of dedicated busway in Chelsea utilized by the Silver Line SL3. Additionally, there is a short contraflow busway on Washington Street over the Massachusetts Turnpike used by Silver Line SL4 and Silver Line SL5.



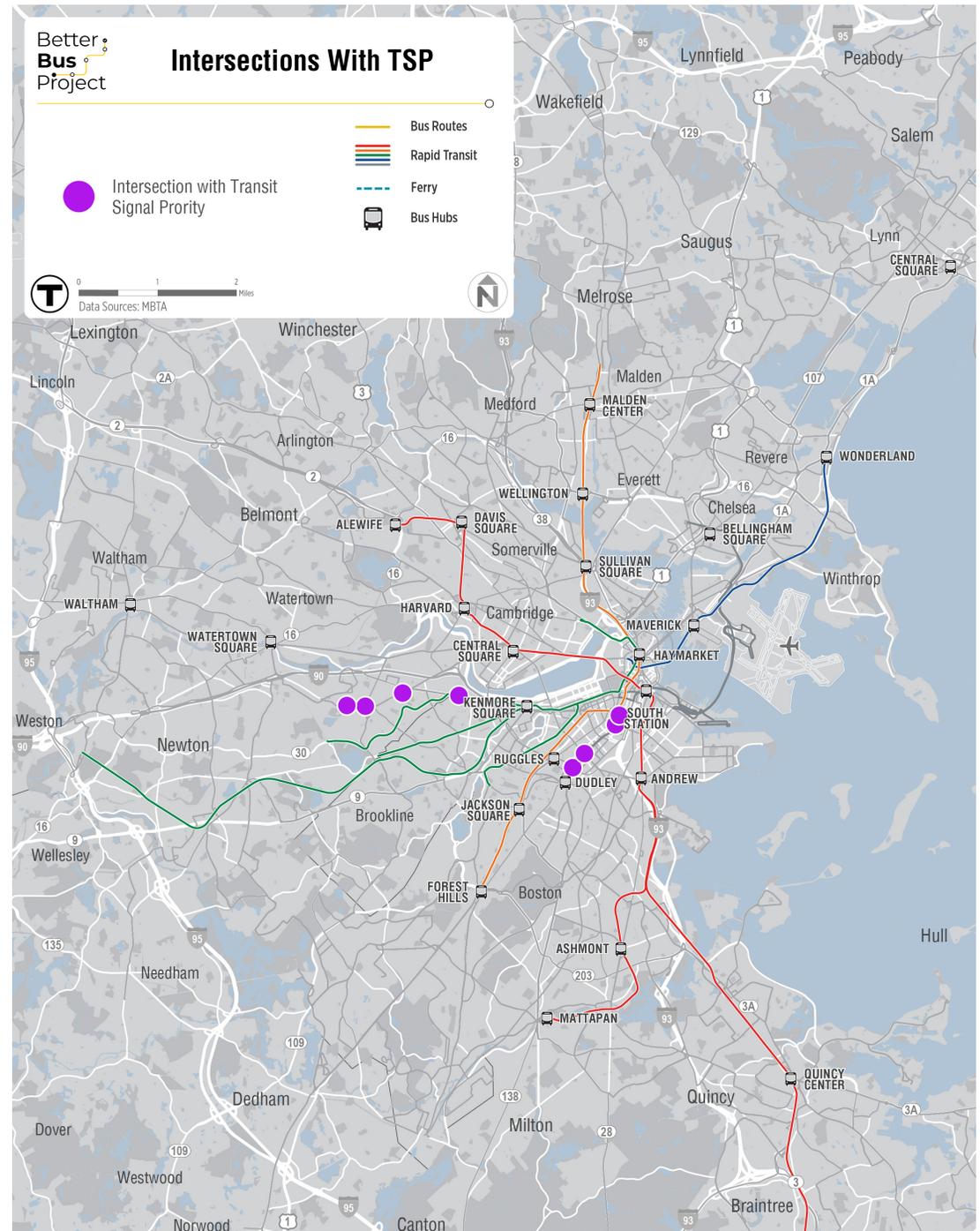
## Locations with Transit Signal Priority

Transit signal priority (TSP) gives preferential treatment to buses at traffic signals. Signal priority modifies normal traffic signal operation to facilitate the movement of transit vehicles by changing the signal to green early or by extending the green signal until the bus passes through. This technology significantly reduces signal delays, and can reduce bus travel times by 5% to more than 20%, depending upon the level of system investment.



The MBTA has TSP at eight intersections. Four intersections with TSP are located on Washington Street Silver Line routes SL4 and SL5. The MBTA also has TSP at four locations along Route 57, including two on Washington Street, one on Cambridge Street, and one on Commonwealth Avenue.

The MBTA is working with the Boston Transportation Department (BTD) and nearby municipalities to expand TSP in the Boston region. Implementing TSP along major transit corridors would speed up service and increase reliability. TSP is being piloted at one intersection on Beacon Street in Brookline and one on Massachusetts Avenue in Cambridge.



BERTH  
3

32 WOLCOTT SQ

32 WOLCOTT SQ

32

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## Ridership

- Current Ridership
- Ridership and Service Levels
- Ridership and Variants

## Current Ridership

### Average Weekday Ridership

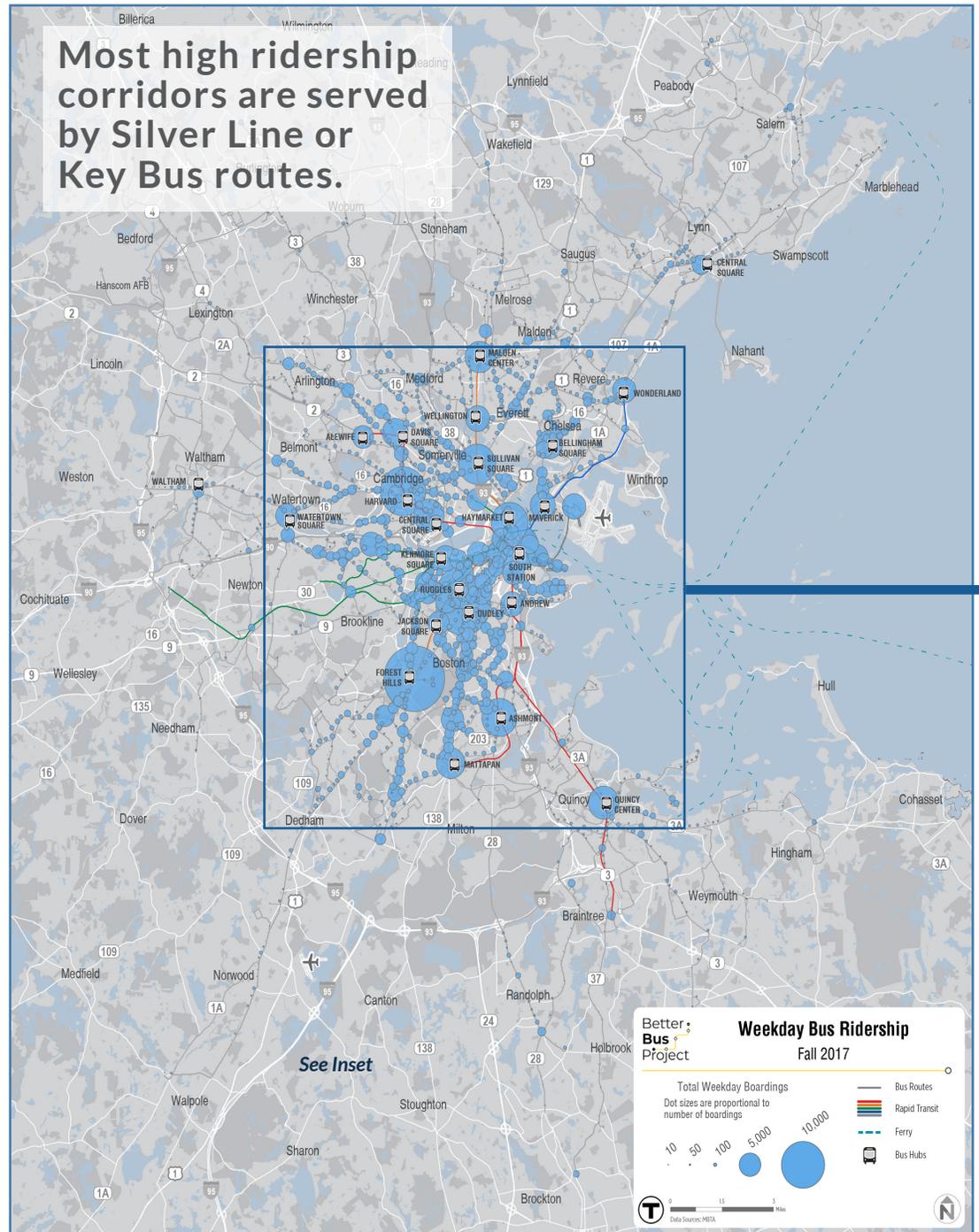
MBTA bus services carry over 400,000 riders on an average weekday. The highest ridership is focused in downtown Boston, around Dudley Square and Roxbury in Boston, and around Harvard Square in Cambridge. Average weekday ridership on the MBTA's 15 Key Bus routes is 169,000, which is 41% of total daily ridership.

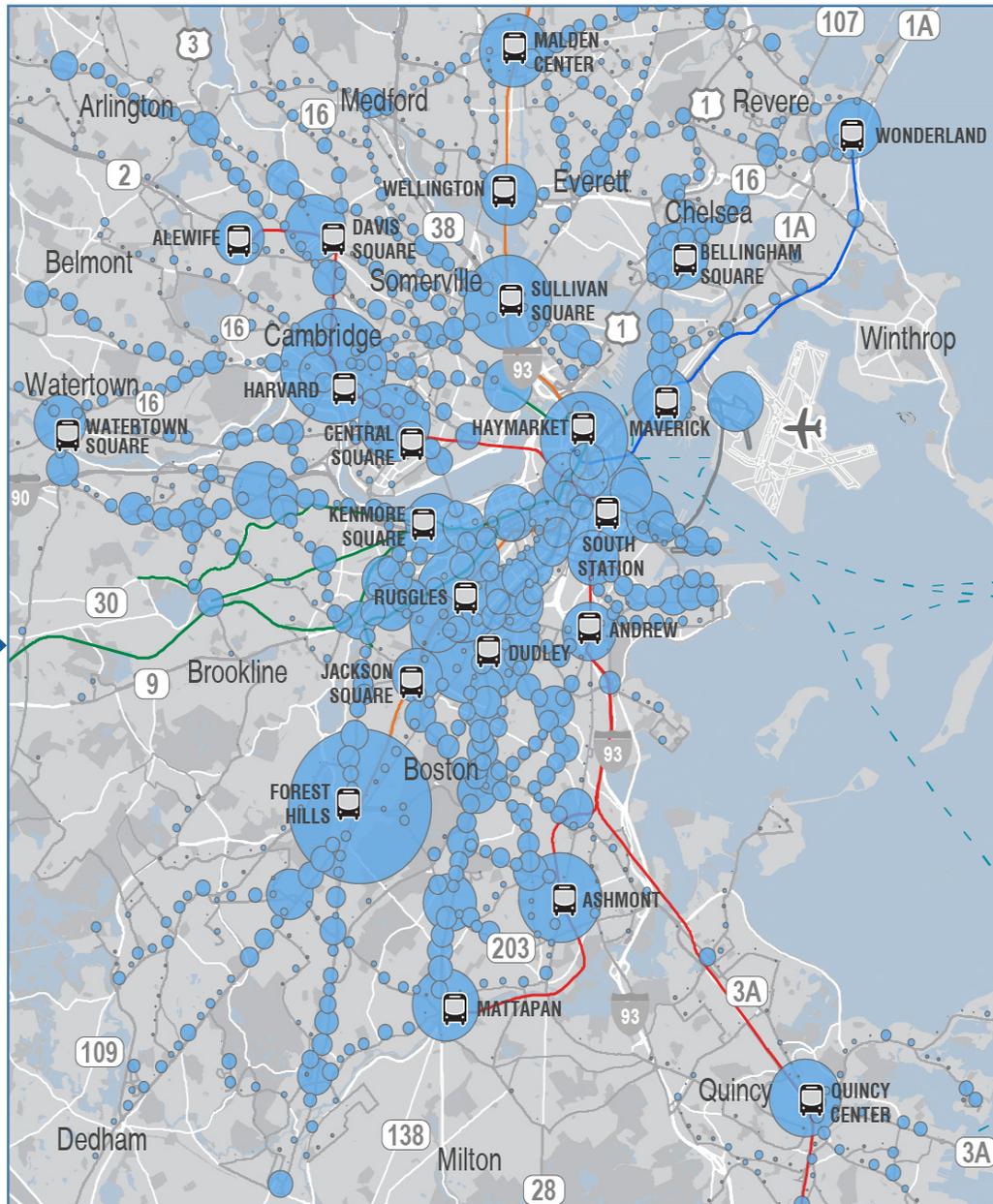
Several corridors that are served by Silver Line routes and Key Bus routes have very high ridership, including:

- Blue Hill Avenue and Warren Street, Boston
- Broadway, Chelsea
- Cambridge Street and Washington Street, Brighton
- Massachusetts Avenue, Cambridge
- Massachusetts Avenue, Arlington
- Washington Street, Roxbury/South End

There are also corridors that do not have frequent service today, but have high ridership:

- Broadway, South Boston
- Broadway, Everett
- Broadway, Somerville
- Salem Street, Malden
- Washington Street, Roslindale





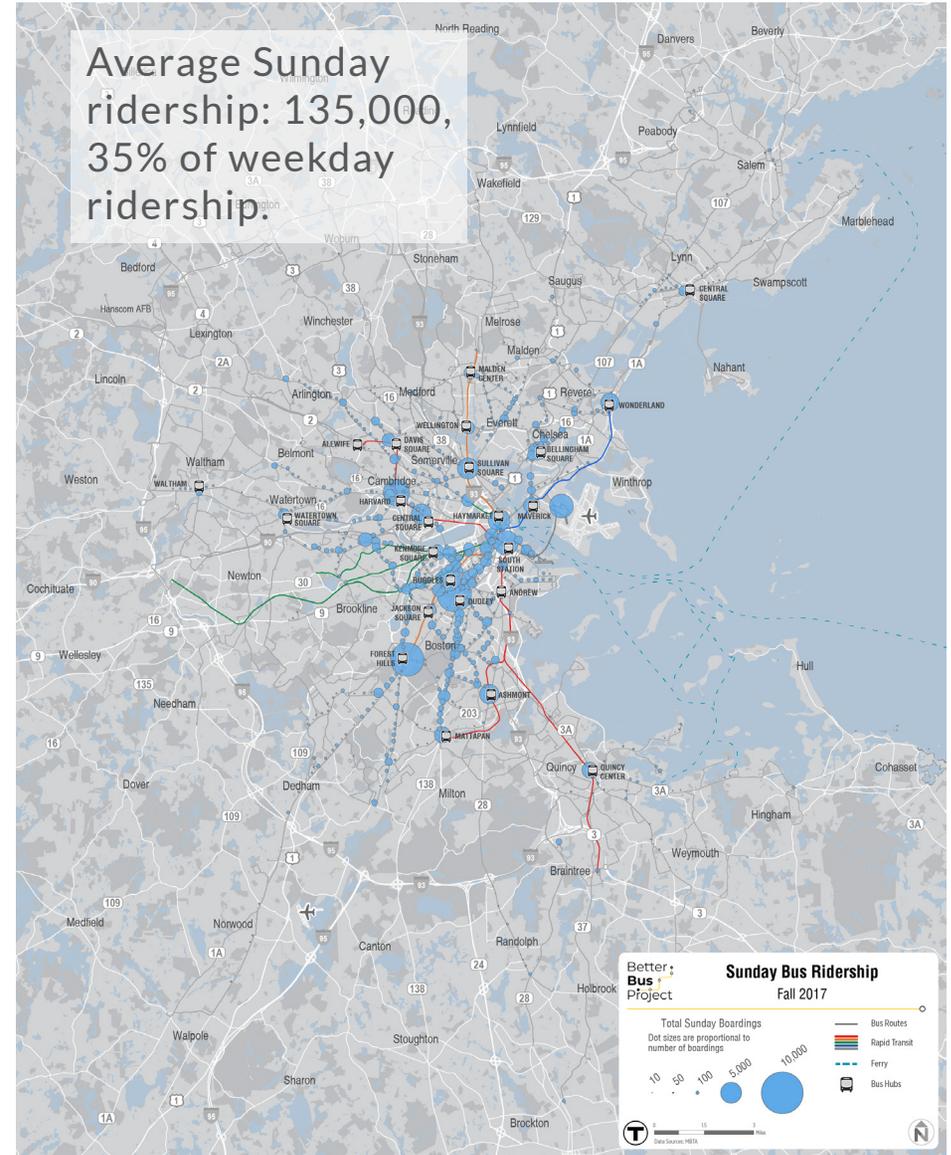
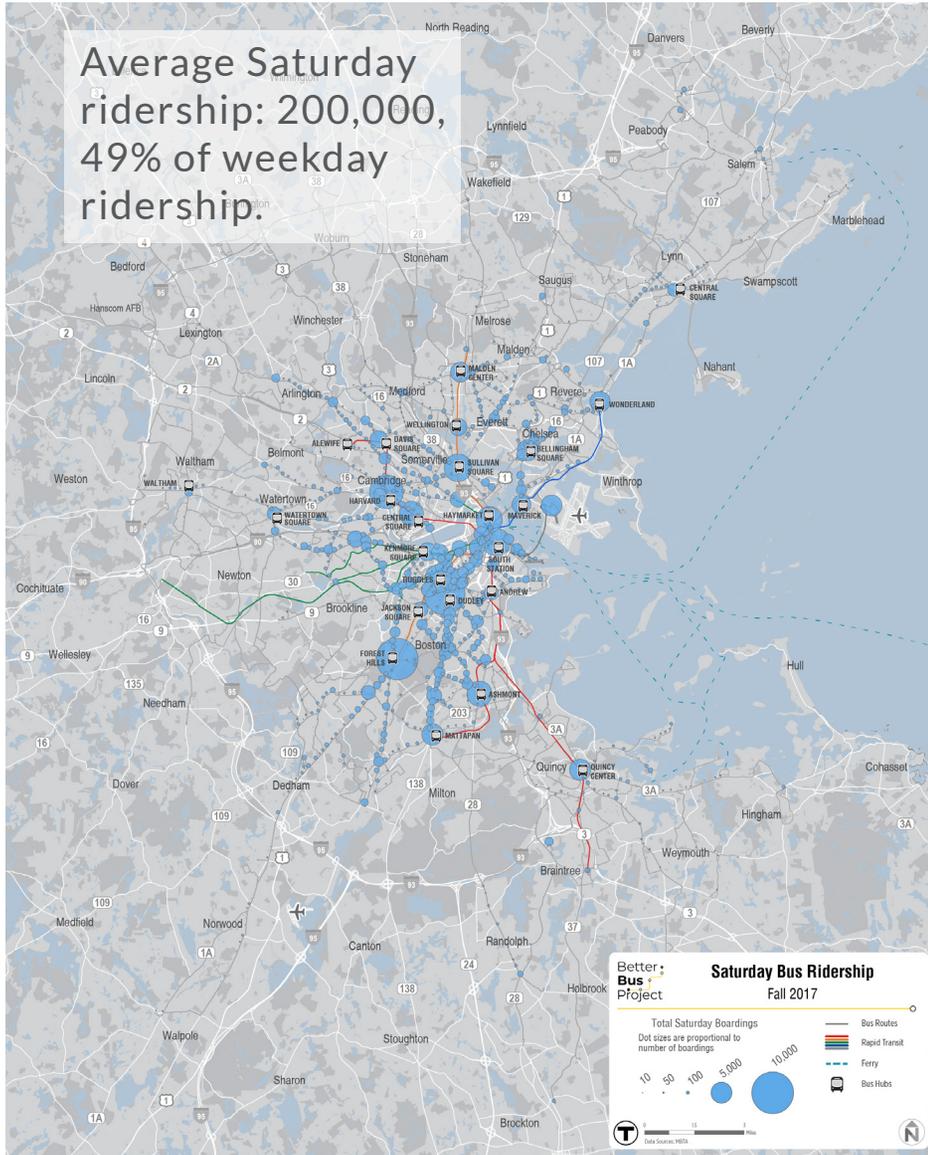
Some of the highest ridership bus stops are located at rapid transit stations, as indicated on the map. Bus stop locations at rapid transit stations with over 3,000 daily boardings are:

- Forest Hill Station
- Harvard Station
- South Stations
- Ruggles Station
- Haymarket Station
- Sullivan Square Station
- Ashmont Station
- Quincy Center Station
- Central Station (Cambridge)
- Malden Center Station
- Mattapan Station
- Maverick Station
- Wellington Station
- Davis Station
- Kenmore Station
- Wonderland Station
- Andrew Station

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**Many of the highest ridership bus stops are located at rapid transit stations.**

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## Average Saturday and Sunday Ridership

Saturday ridership is about half of weekday ridership, which is typical of most systems. Just as with weekday ridership, on Saturdays ridership is highest on Key Bus routes and Silver Line routes. Sunday ridership is about two-thirds of Saturday ridership (one-third of weekday ridership).

Also notable is that Saturday and Sunday ridership patterns are similar to weekday patterns, indicating that riders travel largely to the same corridors and destinations throughout the week.

## Ridership by Route and Route Type

Ridership is generally highest on Key Bus routes, which carry between 4,960 and 12,880 daily riders. Ridership is also high on Silver Line routes, which carry between 3,000 and 10,270 daily riders.

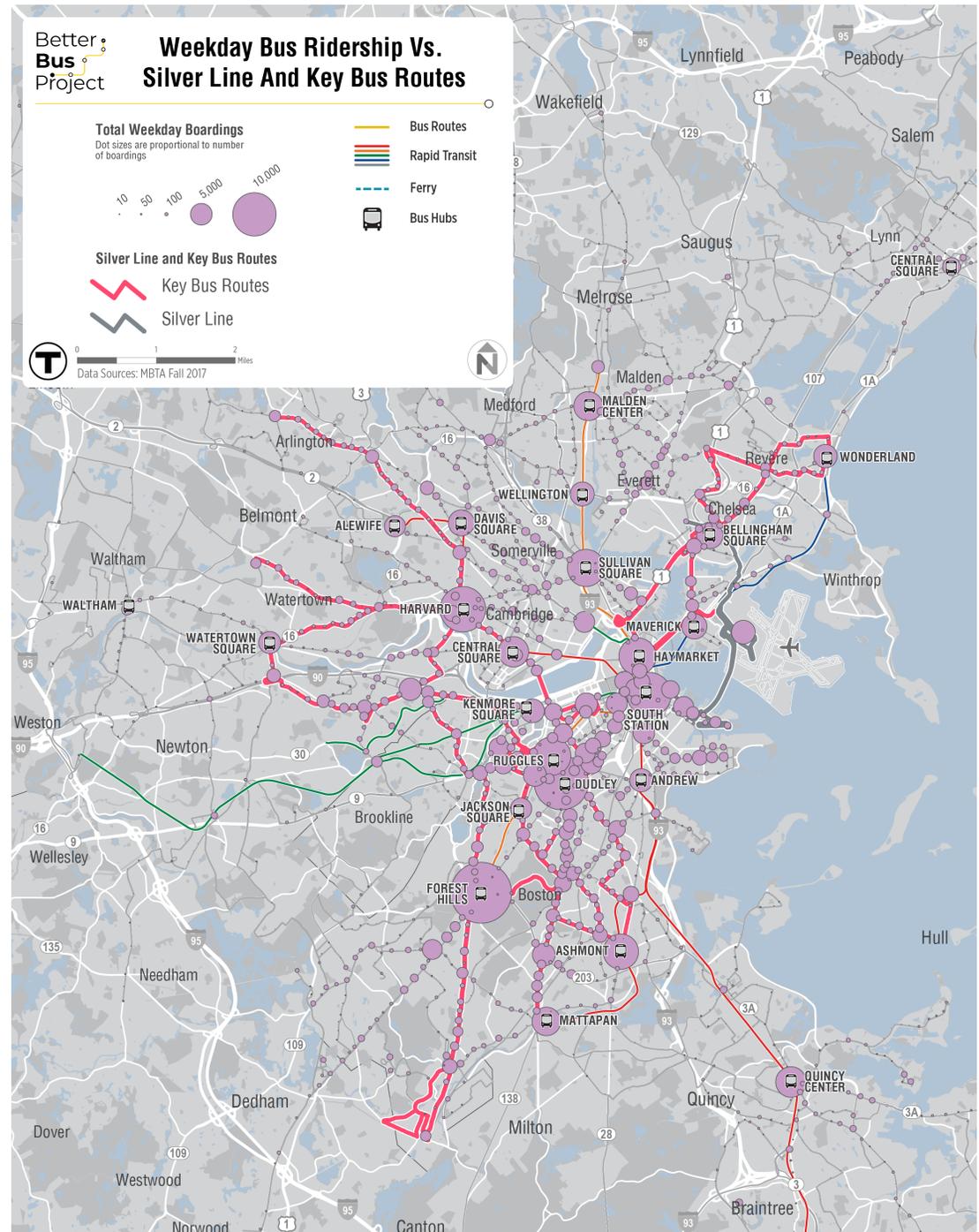
Several Local routes also have high daily ridership, with six routes that carry over 5,000 daily riders:

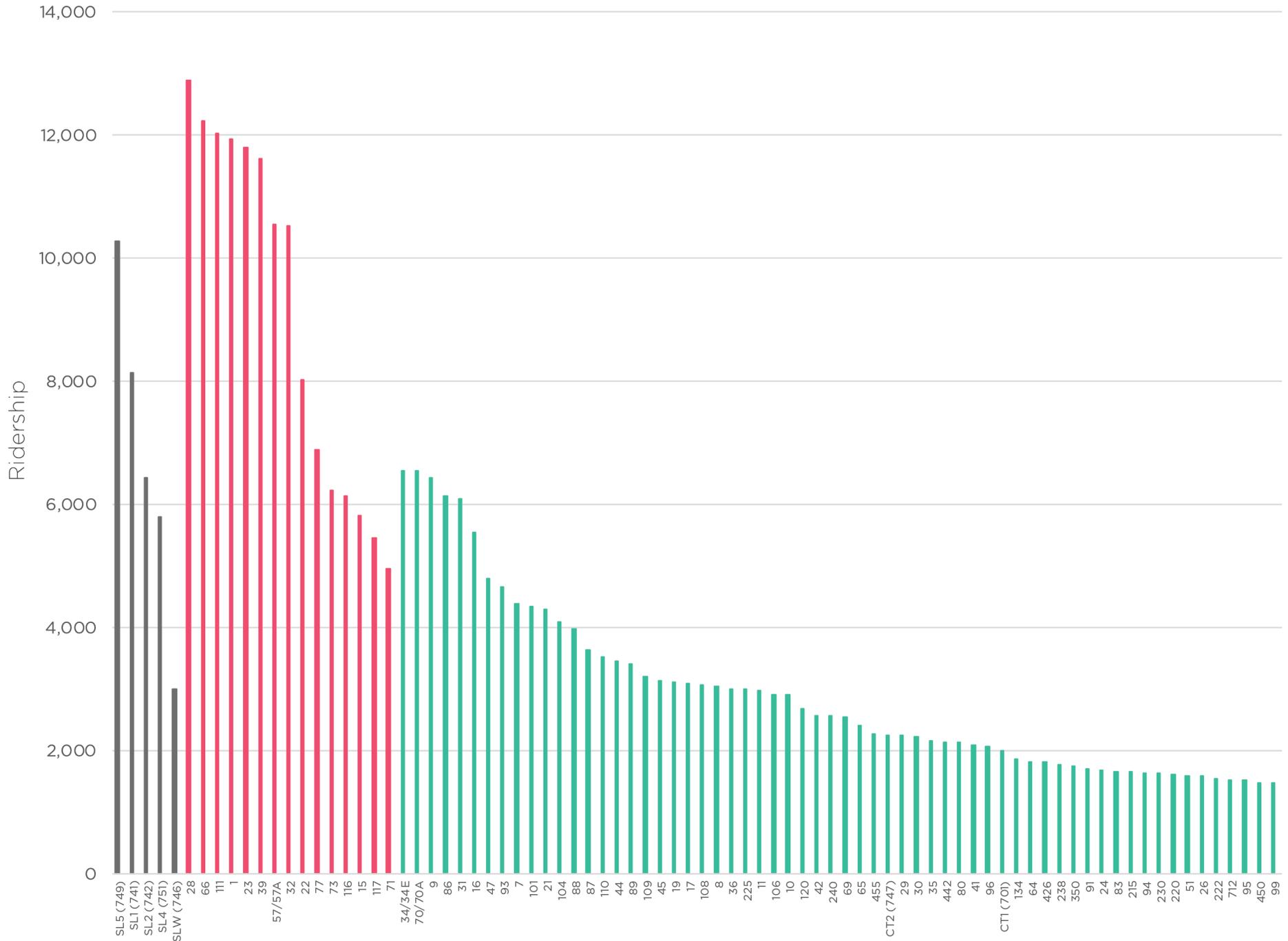
- 9 City Point - Copley Square via Broadway Station
- 16 Forest Hills Station - U Mass or Andrew Station
- 31 Mattapan Station - Forest Hills
- 34/34E - Walpole Center or Dedham Line - Forest Hills Station
- 70/70A Cedarwood - Central Square Cambridge
- 93 Sullivan Station - Downtown via Bunker Hill

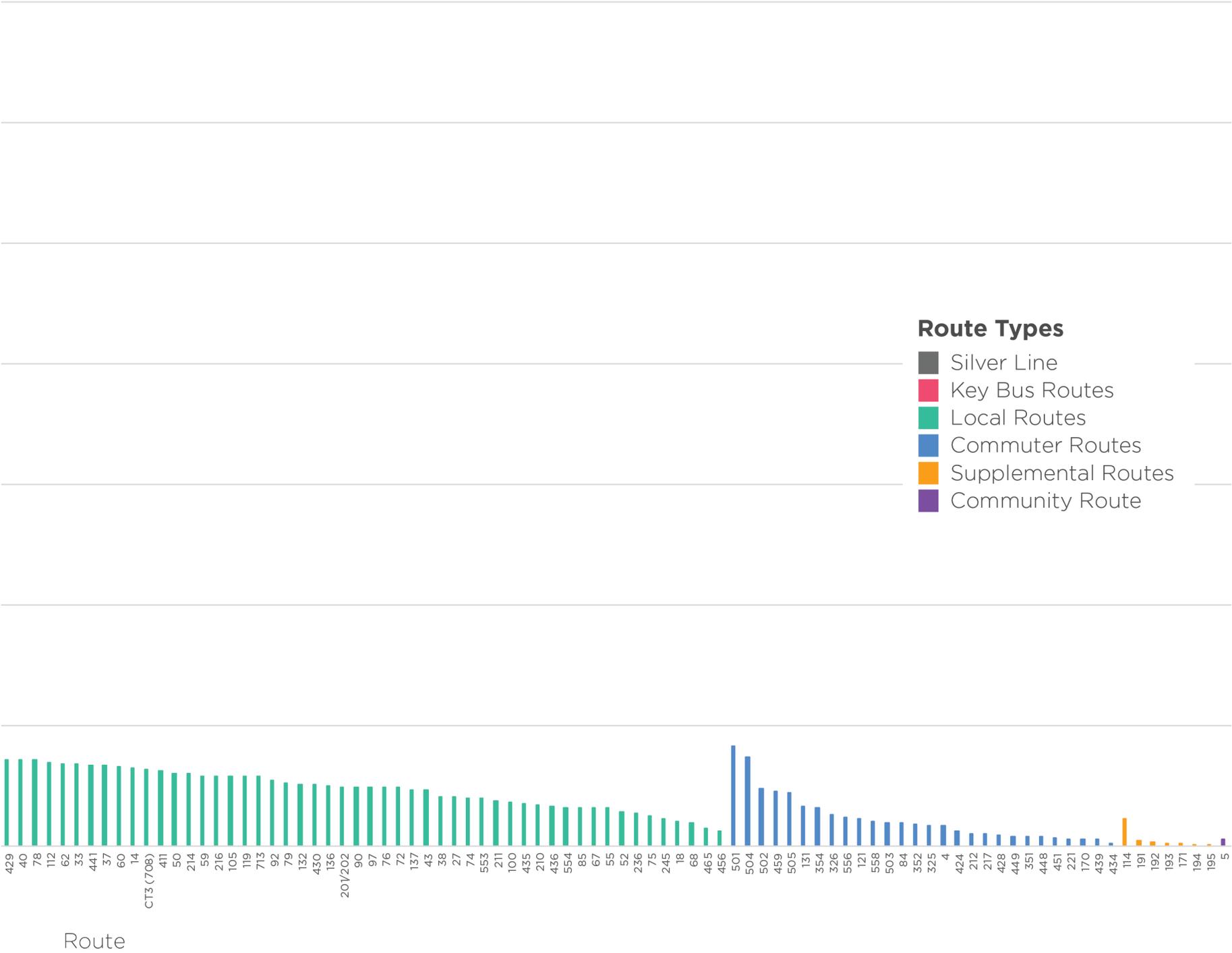
However, average daily ridership on Local routes varies widely, ranging from 250 riders (456 Salem Depot - Central Square Lynn) to 6,540 riders (34/34E Walpole Center or Dedham Line - Forest Hills Station), demonstrating a wide range of service quality and market encompassed by the Local route category.

Ridership on Supplemental routes is low, ranging from 16 to 440 daily riders. The system's single Community route serves 110 daily riders.

**Average daily ridership on Local routes varies widely, from 250 riders to over 6,000 riders.**







Route

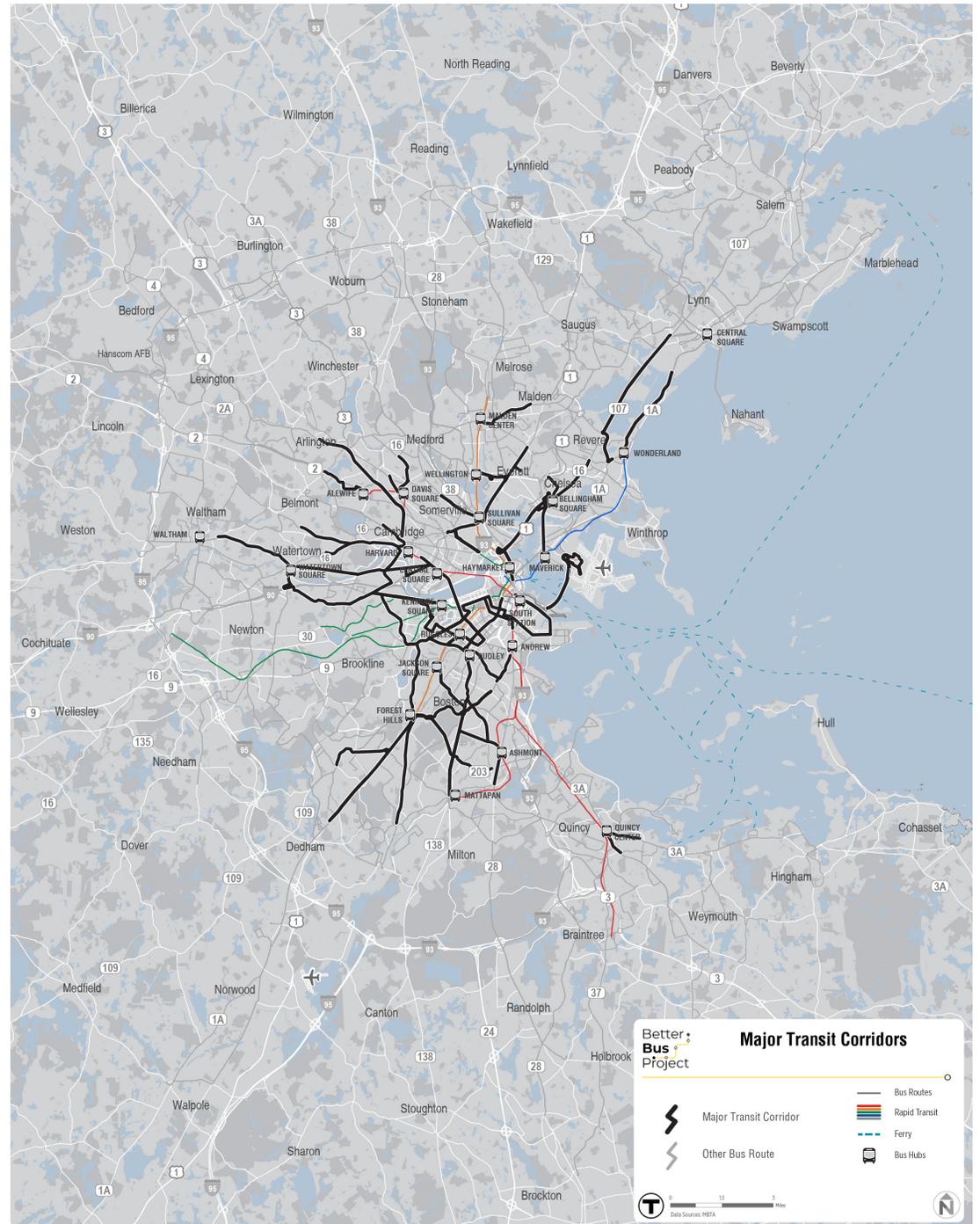
## Major Transit Corridors

Major transit corridors include roadways that carry at least 1,500 daily bus passengers in one direction on an average weekday. The MBTA service area includes 20 major transit corridors in 18 municipalities, all of which are within Route 128.

The percentage of motorized roadway users that travel along these transit corridors by bus can exceed 50% during AM and PM peak travel periods. For example, on Washington Street between Forest Hills Station and Roslindale Village, over 58% of people who travel northbound during the AM peak are bus riders.

Ten of these corridors, in addition to carrying a high proportion of bus riders, experience a relatively high rate of passenger delay, as buses are slowed by vehicle traffic competing for space on the corridor:

- North Washington Street between the Route 1 off-ramp and Valenti Way
- Massachusetts Avenue between Storrow Drive and Albany Street
- Massachusetts Avenue between Western Avenue and Memorial Drive
- Washington Street between Warren Street and Melnea Cass Boulevard
- Ruggles Street, Washington Street, and Dudley Street between Ruggles Station and Warren Street
- Warren Street and Blue Hill Avenue between Dudley Street and Geneva Avenue
- Blue Hill Avenue between Columbia Road and Talbot Avenue
- Washington Street between Forest Hills Station and Cummins Highway
- Huntington Avenue between South Huntington Avenue and Tremont Street
- Brighton Avenue between Cambridge Street and Harvard Avenue



## Bus-to-Bus Transfers

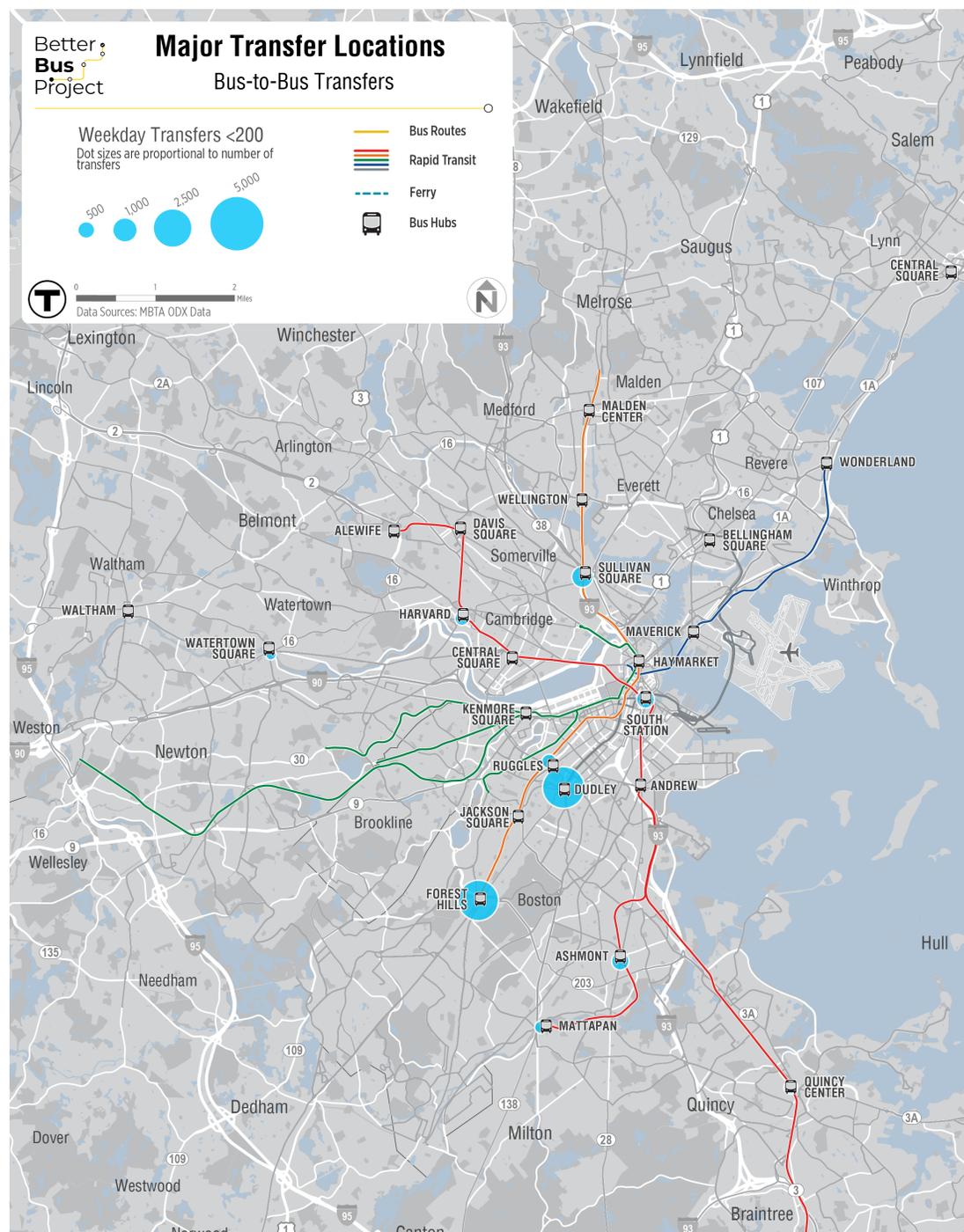
The MBTA bus network operates primarily along corridors connecting into downtown or connecting to and from rapid transit stations. As a result of the radial design of the network, in order to make a cross-town trip or to cross the Charles or Mystic Rivers, at least one transfer is likely.

Transfers between bus routes occur at 1,220 of the more than 8,000 bus stops in the MBTA network. Transfers occur more often at rapid transit stations, where multiple buses stop to feed passengers to the Red, Orange, Blue, Green, or Silver Lines.

The highest number of bus-to-bus transfers are made at Dudley Station, which averages close to 4,700 transfers between bus routes per weekday. The second-highest location is Forest Hills Station, with more than 2,700 transfers, but the next most active transfer location, Sullivan Square Station, has approximately 770 bus-to-bus transfers daily.

Twelve stops have more than 200 transfers per day:

- Dudley Station
- Forest Hills Station
- Sullivan Square Station
- Ashmont Station
- South Station
- Ruggles Station
- Harvard Station
- Quincy Center Station
- Mattapan Station
- Malden Center Station
- Wonderland Station
- Watertown Square



## All Transfers (Between Rapid Transit and Bus)

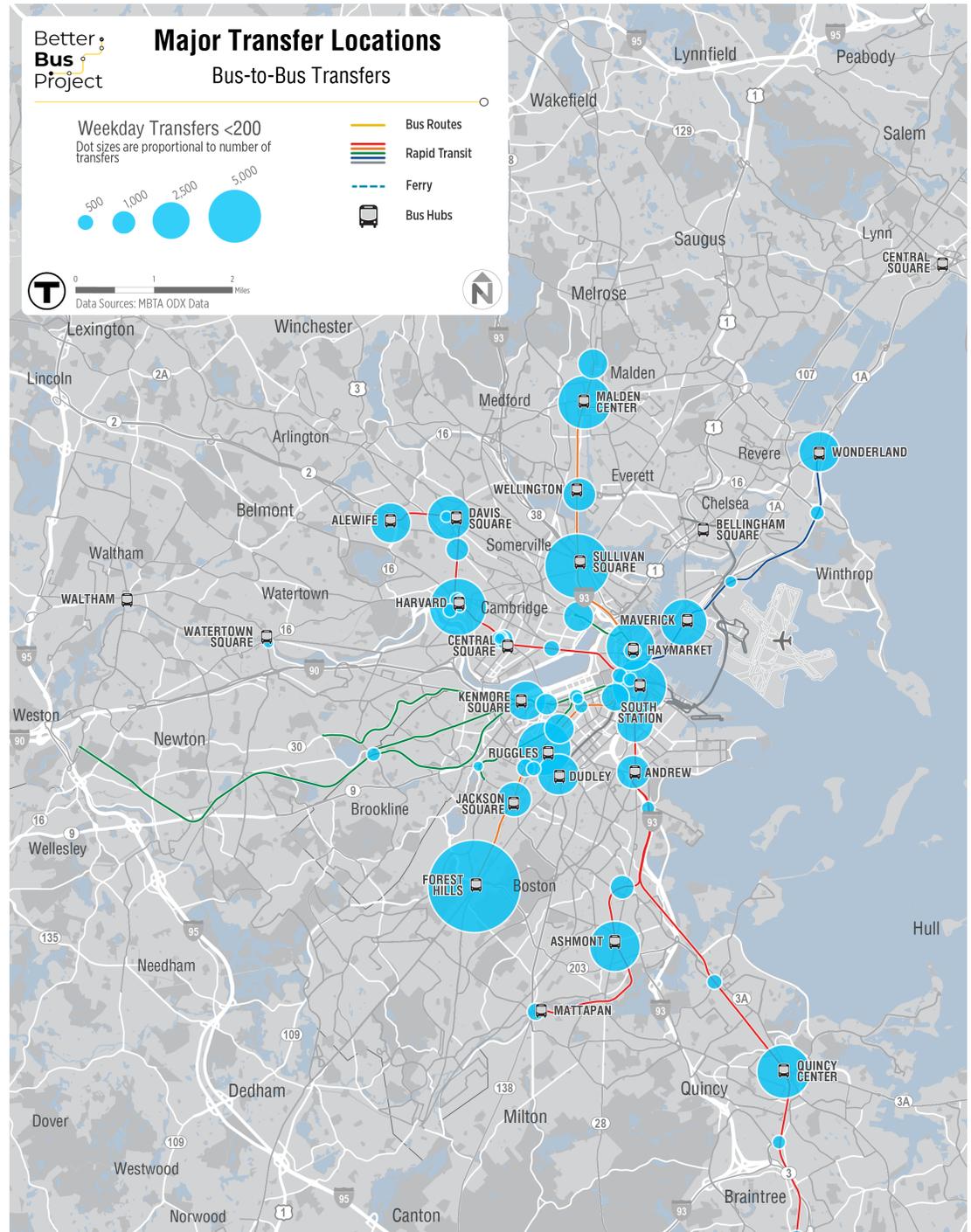
As previously discussed, the MBTA's bus network is largely designed to provide connections with the rapid transit system. As a result, when considering all bus transfers, including transfers between bus and rapid transit, there are 56 stops that serve over 200 riders. At many rapid transit stations, the majority of these transfers are made between bus and rapid transit.

Passengers transfer most frequently at Forest Hills Station, which averages 11,670 transfers between bus routes and the rapid transit network. Sullivan Square Station experiences over 4,800 weekday transfers, the majority of which are between bus routes and rapid transit service.

Fifteen stops experiences more than 2,000 transfers per day between bus and rapid transit services:

- Forest Hills Station
- Sullivan Square Station
- Harvard Station
- Malden Center Station
- Quincy Center Station
- Ruggles Station
- South Station
- Haymarket Station
- Maverick Station
- Ashmont Station
- Davis Station
- Alewife Station
- Wonderland Station
- Kenmore Station
- Broadway Station

Of these, only Forest Hills Station, Sullivan Square Station, South Station, and Ashmont Station serve more than 500 bus-to-rapid transit transfers.



## Ridership and Service Levels

Service standards, including the MBTA's SDP, are designed to set minimum service levels, with more service provided based on demand and other factors. Examples include the MBTA's new early morning and late night service, which go well beyond the service span standards to provide better access to jobs. Another common reason is to provide more frequent service to high ridership markets to make it more attractive. This approach was the centerpiece of Houston's recent network redesign. It is also a key component of the transit networks of many other major systems. For example, Minneapolis/Saint Paul's MetroTransit Frequent Transit Network promises frequent service "every 15 minutes or better on weekdays from 6 AM to 7 PM and on Saturdays from 9 AM to 6 PM."

At present, there are many mismatches between the amount of service provided on individual routes and ridership levels. In general, due to its financial constraints, the MBTA has attempted to meet, but not go beyond, the SDP minimum standards on its higher ridership routes. At the same time, and mostly for historical reasons, other routes provide more service than is needed to meet demand and as required by the SDP. This indicates that there are opportunities to shift service from underutilized routes to overcrowded routes. Using the number of weekday bus trips as a surrogate for convenience, since more trips make service more convenient, examples include:

Route	Weekday Ridership	Weekday Bus Trips	Ridership Rank	Bus Trips Rank
28 Mattapan Station-Ruggles Station	12,880	233	1	12
66 Harvard Square- Dudley Station	12,240	205	2	15
31 Mattapan Station-Forest Hills Station	6,100	295	20	3
73 Waverly Square-Harvard Station	6,240	251	17	9
1 Harvard Square-Dudley Square	11,930	223	4	13
71 Watertown Square-Harvard Station	4,960	210	25	14
201/202 Fields Corner Station-Fields Corner Station	990	125	109	29
86 Sullivan Station-Reservoir Station	6,150	111	18	47
104 Malden Station-Sullivan Station	4,090	91	31	54
72 Huron Avenue-Harvard Station	970	91	113	54

Beyond the total number of trips provided, there are also instances of very high ridership routes that provide infrequent service during some periods. Examples include:

- **Route 86 Sullivan Station-Reservoir Station**, which carries 6,150 passengers per weekday (more than four Key Bus routes), but some midday trips are 40 minutes apart.
- **Route 16 Forest Hills Station-Andrew Station or UMass**, which carries 5,540 passengers per weekday (more than two Key Bus routes), but much midday service operates every 30 minutes.
- **Route 89 Clarendon Hill or Davis Square-Sullivan Station**, which carries 3,400 passengers per weekday. Even though approximately 900 passengers travel to and from Davis Square and it is the second-highest ridership stop on the route (after Sullivan Station), because service is split between Clarendon Hill and Davis Square, weekday service to Davis Square operates only every 60 minutes during the midday and evening.

  
BEATH

**8**

**351 EXPRESS**  
Oak Park,  
Bedford  
Woods, &  
Burlington  
Mall Road





## Service Issues

Existing Service Issues

## Existing Service Issues

The MBTA's bus service has not been comprehensively updated in over a decade, and while minor to moderate improvements and changes have been made, the bus network still looks very much like it did when the MBTA assumed operation. Over the same time period, travel patterns, passenger demands, congestion, and people's expectations of transit have changed dramatically. There are now significant mismatches between how the region moves and how the MBTA's bus network serves those needs.

In spite of these differences and recent declines in ridership, the demand for bus service remains very high. However, relatively few passengers are satisfied with the services they receive. Dissatisfaction with existing bus services – in large part – is justified and has many causes:

1. Service is unreliable
2. Buses are overcrowded
3. Too many routes compete with each other
4. Service is too complex
5. Too few routes provide frequent service
6. Service is slow and getting slower
7. Schedules are irregular
8. Many routes start too late
9. Some routes end too early



### Service is Unreliable

One of the most pressing service problems is that the MBTA's bus service is unreliable. The MBTA sets overall on-time performance minimums and targets. The target standard for reliability ranges from 75% to 80% depending upon the route type. Only 50% of Silver Line and Key Bus routes, and just 9% of other bus routes, meet the reliability targets. Put another way, 86% of the MBTA's bus routes have below standard reliability.

Route Type	Target Reliability Level <sup>1</sup>	% of Routes Meeting Target <sup>2</sup>
Silver Line/Key Bus Routes	75%	50%
Other Routes	80%	9%

<sup>1</sup>Target Reliability Level based on 2017 MBTA Service Delivery Policy

<sup>2</sup>Proportion of routes meeting target based on analysis of Fall 2017 data.

Poor reliability is due to a number of factors. These include external factors that the MBTA cannot easily control such as day-to-day differences in traffic congestion. However, two important causes are directly under the MBTA's control:

- **Many trips are dropped.** Due to unscheduled operator absences, the MBTA often does not have enough drivers to meet its daily schedule. To deal with this, dispatchers must identify trips that are not run, and usually pull trips from the routes with the most frequent service. This is done based on the philosophy that dropped trips will minimize impacts on passengers as wait times to the next bus will be shortest. However, the routes with the most frequent service are also the most crowded, and dropped trips delay the following buses when more and more passengers try to crowd on (and are often left behind). Corrective measures, including hiring additional operators, began in 2017-2018 to address dropped trips.
- **Bus schedules are outdated.** Actual running times are longer than scheduled running times, often by up to 10 minutes. On many routes, often the most important routes, bus drivers cannot stay on-time and delays on one trip lead to delays on subsequent trips and bus bunching. This is the biggest cause of poor reliability and can be addressed by rescheduling service based on current actual running times and coordinating schedules along shared corridors to ensure consistent headways. In many cases, this will require additional buses to be deployed to maintain service frequencies.

Increasing traffic congestion has also led to more variable operating conditions. This exacerbates the problems caused by outdated schedules and dropped trips and highlights the need for more extensive bus priority measures, especially in the highest ridership corridors.

### Major Causes of Poor On-Time Performance

	Dropped Trips	Outdated Schedules	Increasing Traffic Congestion
Silver Line & Key Bus Routes	High	High	High
Other Routes	Low	High	Moderate

### Buses are Overcrowded

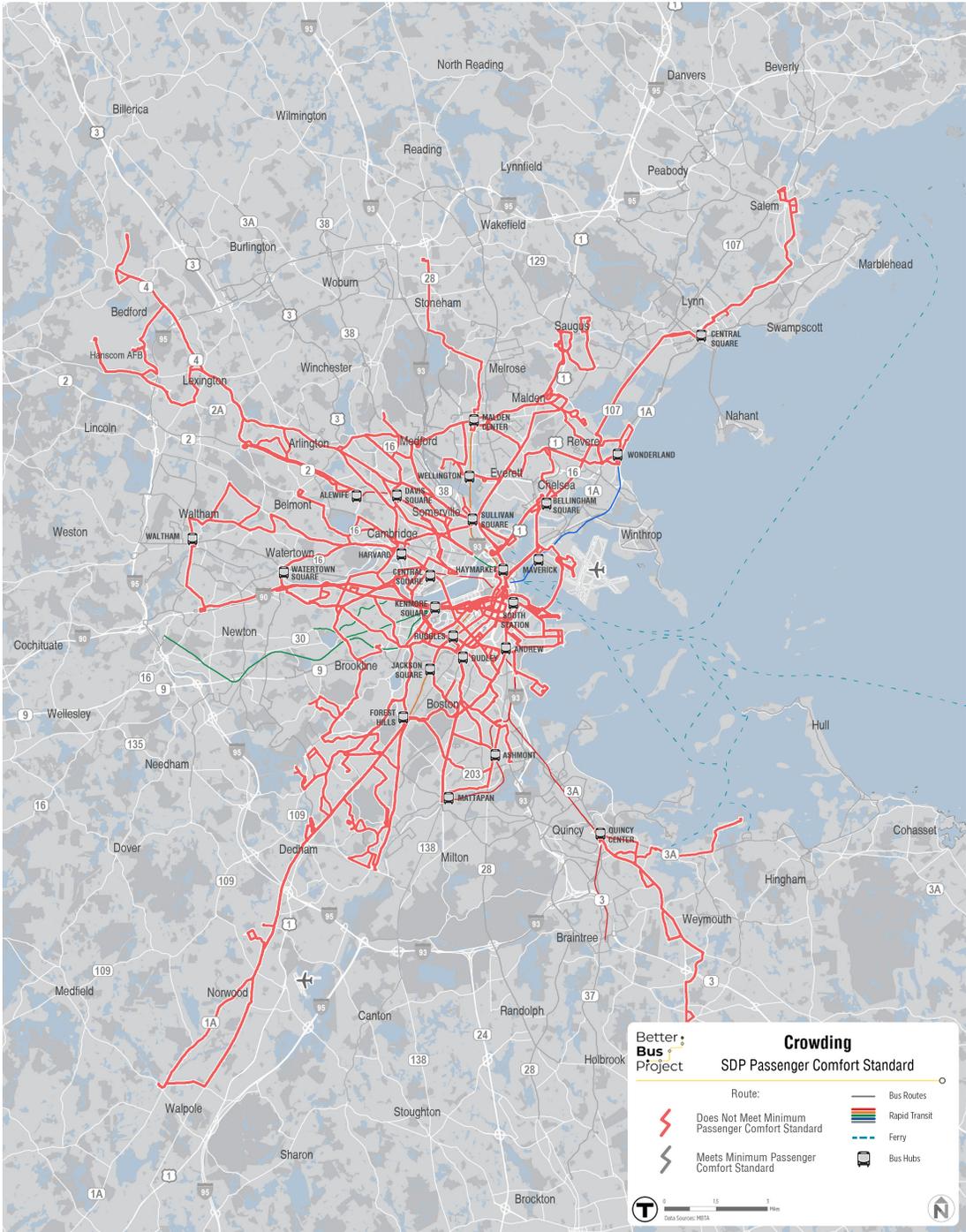
Many buses are overcrowded, sometimes to the extent that passengers are denied boarding. Given the MBTA's operating environment and high demand, it is acceptable that buses be crowded, but not overcrowded. In general, the MBTA strives to provide sufficient service so that people are reasonably comfortable. Specifically, it sets a target that 96% of minutes should be spent in "comfortable conditions", with comfortable conditions defined as 140% of seated capacity during weekday peak periods and 120% of capacity during other periods. At present, only 21% of Silver Line and Key Bus routes, and 73% of other routes, meet the comfort standards.

Route Type	Target Comfort Level <sup>1</sup>	% of Routes Meeting Target <sup>2</sup>
Silver Line/Key Bus Routes	96%	21%
Other Routes	96%	73%

<sup>1</sup> Target Comfort Level based on 2017 MBTA Service Delivery Policy  
<sup>2</sup> Proportion of routes meeting target based on analysis of Fall 2017 data.

Most of the routes that don't meet the target comfort standards are the highest ridership routes:

- Two of the five Silver Line routes (SL1 and SL2)
- All Key Bus routes
- 14 of the 15 Local routes that carry over 3,500 passengers per weekday (including Routes 34/34E, 70/70A, 9, and 86).



On Silver Line and Key Bus routes, the major causes of overcrowding are dropped trips and poor on-time performance. Dropped trips mean that the following buses carry approximately twice their normal loads, which in most cases is more than the bus can accommodate. Bus bunching due to poor on-time performance means that delayed buses carry many of the passengers who would normally be on the next bus, which overloads that bus.

With only a few exceptions, enough service is scheduled to accommodate loads when service is on-time and no trips are dropped. Thus, better on-time performance and fewer dropped trips would significantly reduce overcrowding. To the extent that this cannot be accomplished, then service will need to be added to accommodate off-schedule service and dropped trips.

### Major Causes of Overcrowding

	Dropped Trips	Poor On-Time Performance	Not Enough Service
Silver Line & Key Bus Routes	High	High	Low
Other Routes	Low	High	Low

### Bus Bunching on Route 1



### Too Many Routes Compete with Each Other

As described in the first chapter, almost every major arterial in Greater Boston's core is served by multiple bus routes. While each route provides at least slightly different service, many compete with rather than complement each other.

The main reason for the duplication is to provide service from the same areas to multiple locations in order to reduce the number of transfers that passengers make. This approach comes with several trade-offs:

- The splitting of passengers between routes necessarily means that service is also split between routes. This, in turn, means that fewer routes operate frequently and more operate infrequently. This is the major reason that so many MBTA routes operate infrequently.
- Transfers between infrequent routes often require very long waits and increase travel times and thus make those trips very inconvenient.
- The benefits of one-seat service for some riders are offset by the much more inconvenient service to those who do not get one-seat service.
- While all passengers would prefer not to transfer – and as use of the rapid transit system shows – passengers are much more receptive to transfers when transfer times are short.

All major bus system redesigns over the past decade have focused on providing more frequent service and less duplication. In some cases, these types of changes have increased the number of trips taken. The provision of more frequent service on more routes through a reduction in duplication presents a major opportunity to provide better service with existing resources.

In addition, the splitting of service among infrequent routes is a major reason that many routes do not meet SDP service frequency and span of service standards. For example:

- Two routes – 74 Belmont Center-Harvard Station and 75 Belmont Center-Harvard Station – operate between Belmont Center and Harvard Station. Both operate along Concord Avenue at their two ends but differ in that one operates along the north side of Fresh Pond and the other operates along the south side.

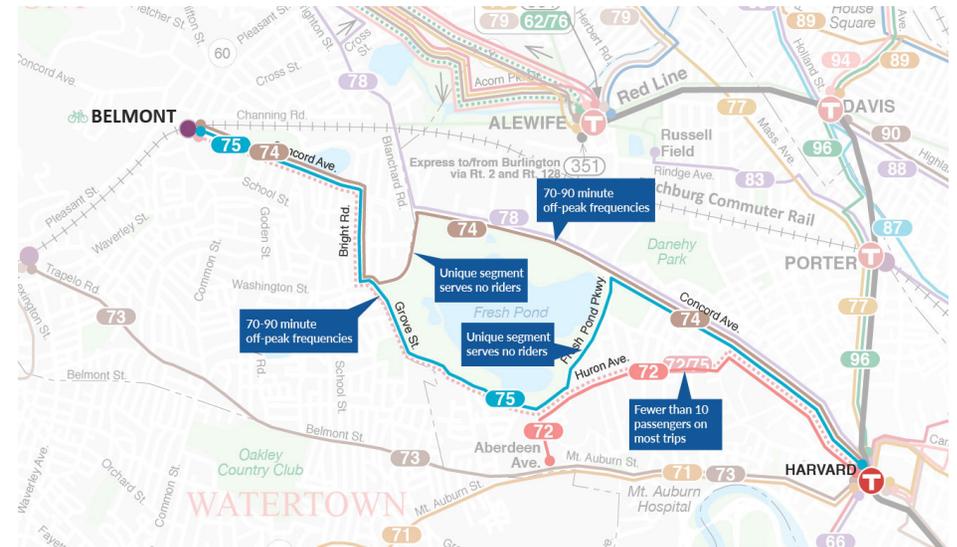
- Two other routes – 72 Huron Avenue-Harvard Station and 78 Arlmont Village-Harvard Station – also serve the same corridor.
- Each route is designed to provide unique service in at least some respects:
  - Route 74 includes a jog at the west end of Fresh Pond down Blanchard Road to Bright Road. This jog was added in 1934 based on a political request; the unique service along Blanchard Road today does not serve any riders.
  - Route 75 uses Fresh Pond Parkway instead of the more direct route along Huron Avenue. The unique service along Fresh Pond Parkway does not serve any riders and contributes to the route's poor on-time performance.
  - Route 72 serves Huron Avenue and is one of the MBTA's most underutilized routes, carrying fewer than 10 passengers per bus trip.
  - Because ridership is split between three routes, only very infrequent off-peak service is provided on Routes 74 and 75 – every 70 to 90 minutes versus the SDP standard of at least every 60 minutes.

With less duplication, simpler and more effective service could be provided to meet SDP standards without increasing costs. There would be more than one way to do this, but one option would be to:

- Consolidate Routes 72 and 75, with all service along Huron Avenue
- Operate Route 74 directly along Concord Avenue

All existing riders would continue to be directly served except for those along Aberdeen Avenue between Huron Avenue and Mount Auburn Street. However, those riders would be within a short walk of consolidated Route 72/75 service and Key Bus route service on Mount Auburn Street. The total amount of service now provided on the three routes could be re-allocated between the two remaining routes to better balance service levels with demand, provide more convenient service, and meet the SDP standards.

## Characteristics of MBTA Routes 72, 74, and 75



## Potential Changes to MBTA Routes 72, 74, and 75



A second example is Route 1 Harvard Station-Dudley Station and Route CT1 Central Square Cambridge-BU Medical Campus:

**MBTA Routes 1 and CT1**



- The unique segment of Route CT1 is within walking distance of Route 1’s alignment.
- Many Route 1 trips are overcrowded, while Route CT1 is underutilized.
- The schedules of the two routes are not coordinated because they operate with different service frequencies.

Route CT1 has outlived its original purpose, and its consolidation with Route 1 would help resolve overcrowding problems on Route 1 and enable service along Massachusetts Avenue with regular schedules. This approach would provide better service to the overwhelming majority of customers and solve crowding problems on one of the MBTA’s most important routes quickly and within existing resources.

There are many other examples of duplication within the MBTA system. While the negative impacts to passengers aren’t always obvious, duplication is a major reason why existing service does not comply with many SDP standards. **Resolving route duplication and combining corridor resources would go a long way toward addressing route span and frequency deficiencies.**



**Service is Too Complex**

Simpler bus networks will attract more riders than complex network, because complex and overly-customized services discourage more people from using transit than the customized services attract. As stated in TCRP’s “Traveler Response to Transportation System Changes” report, transit systems with more complex route structures “put off riders with only a moderate inclination to try transit.”

The MBTA’s bus network is complex. The duplication described above is one major reason. A second reason is that the MBTA operates many “variant” services designed to provide customized service. In some cases, there are strong reasons for the variant services – for example to serve students who would otherwise overload regular trips and to skip shopping centers after they close for the night. However, in many cases the variants are designed to serve small customized markets; sometimes as small as a single rider. One route – Route 134 North Woburn-Wellington Station – operates in 15 different ways.

- Route CT1 was implemented in the mid-1990’s as a limited stop complement to Route 1 and operates along the same alignment as Route 1 for nearly its entire length – all except for Harvard-Central to the north and Dudley-BU Medical Campus to the south.
- In the early 2010s, Route 1 stops were consolidated when that route was upgraded to Key Bus route status, and local stops were added to Route CT1 by request. Today, Route CT1 has only three fewer stops than Route 1.

On weekdays on Route 134:

- There are four outer terminals: (1) North Woburn, (2) Playstead Road and Winthrop Street, which is about five minutes north of Medford Square, (3) Medford High School, and (4) Medford Square.
- Slightly less than half of all trips operate the full length of the route, and slightly more than half operate as short-turns between Medford and Wellington Station. During the day, short-turns mostly, but not always, alternate with full length trips. Most evening service operates between Medford and Wellington Station.
- Many trips also include deviations to very low ridership locations:
  - Four trips deviate to a senior center in Woburn to serve an average of only one person a day
  - 16 trips operate via TradeCenter 128 and Middlesex Superior Court to serve an average of one person per trip
  - 12 trips operate via Commercial Street and Cambridge District Court to serve an average of only one person per trip
  - Three trips operate via a second senior center to serve an average of two people per trip

While Route 134 has an above average number of variants, over 70% of the MBTA's bus routes provide variant services. In total, the MBTA's 176 routes operate in over 500 ways. The variant services, besides making service complex, degrade service for most riders. Most variants amount to a detour that increases travel times for other passengers. The additional time for the detour also puts that bus off-pattern when it returns to the regular route which creates gaps in service. The elimination of very low ridership variant services provides a second opportunity for the MBTA to significantly improve service with existing resources.

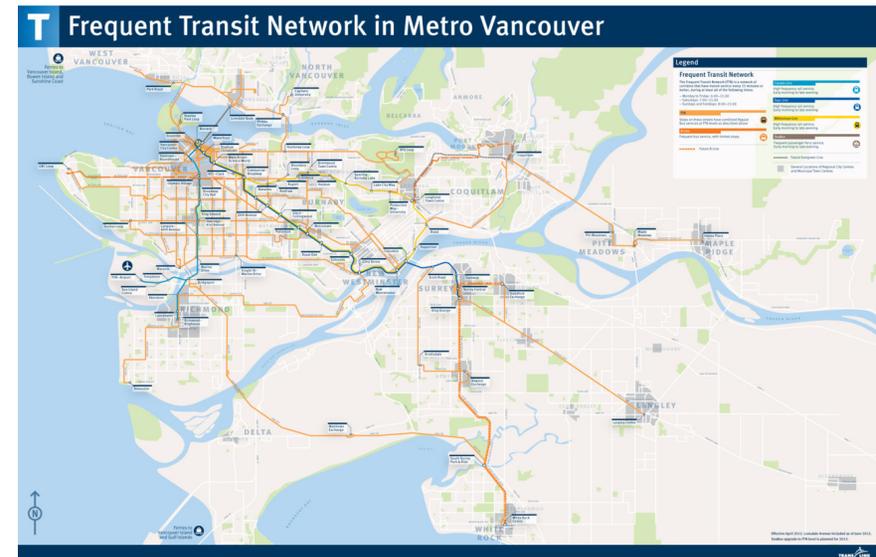


## Too Few Routes Provide Frequent Service

Most major transit networks are built around a foundation of frequent service that ensures that convenient service is provided to, from, and between the places where the highest numbers of people travel. In Greater Boston, that frequent network is the rapid transit system, Key Bus routes, and a few frequent Local routes.

Throughout the United States, the de-facto definition of frequent service is every 15 minutes or better from early morning to mid-evening. Using this definition, only 26, or 15% of the MBTA's 176 bus routes provide frequent service.

## Vancouver Frequent Transit Network



## MetroTransit High Frequency Promise (Minneapolis/St. Paul, MN)



### The High Frequency Promise

Service every 15 minutes (or better)

- Weekdays: 6 a.m. to 7 p.m.
- Saturdays: 9 a.m. to 6 p.m.

There are also holes in the network, with a number of key corridors and areas not served by any frequent routes:

- Lynn/North Shore - Boston
- Everett
- Most of Somerville
- South Boston

In addition, nearly all frequent service is radial. Only two circumferential routes – Routes 1 Harvard Station-Dudley Station and 66 Harvard Station-Dudley Station – provide service at least every 15 minutes from early morning until mid-evening. Two other very high ridership crosstown routes carry more riders than some Key Bus routes but provide less than frequent service:

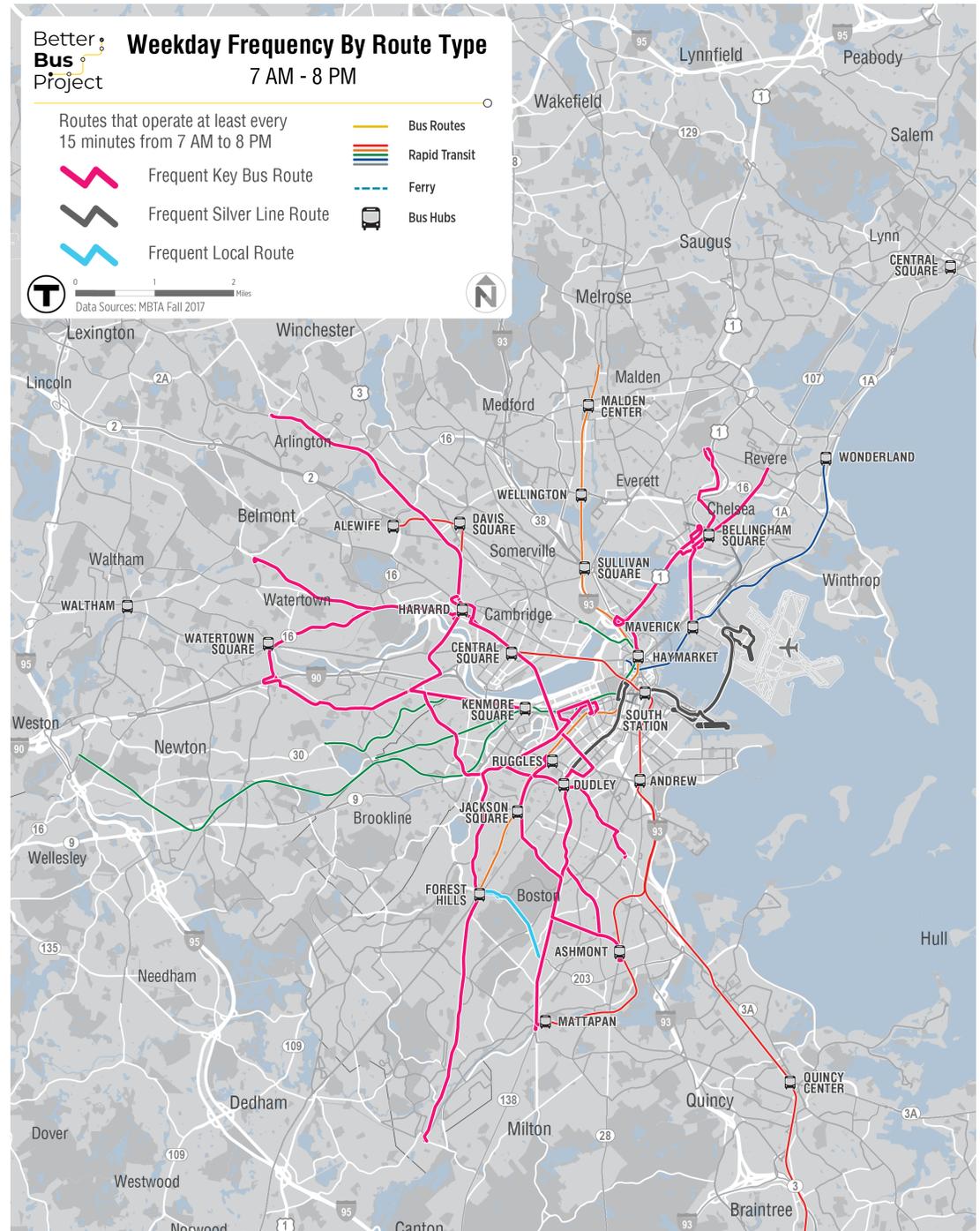
- 47 Central Square, Cambridge – Broadway Station which carries 4,800 passengers per weekday, but with service as infrequent as every 24 minutes midday and every 45 minutes in the evening.
- 86 Sullivan Station-Reservoir Station, which carries 6,150 passengers per weekday, but with service as infrequent as every 40 minutes midday and every 45 minutes in the evening.

In general, the MBTA's frequent transit network is designed to get people to and from downtown Boston instead of more comprehensively throughout the region.

There are a number of locations where ridership is high but no single route provides frequent service. Even in the corridors listed below where multiple routes operate, service is neither coordinated nor advertised to provide consistent frequent service:

- Broadway in South Boston
- Broadway in Everett
- Main Street in Malden and Everett
- Salem Street in Malden
- Nearly all of Somerville

(The Green Line Extension, planned to be operational in 2021, will extend rapid transit service into Somerville.)



## Service is Slow and Getting Slower

In Greater Boston, traffic congestion is bad and getting worse. The MBTA's bus service has been particularly impacted. A combination of worsening traffic congestion and schedules that have not been updated to reflect today's congestion is also a primary cause of poor on-time performance.

Beside traffic congestion, there are three other reasons that bus service is slow:

- **The MBTA could increase utilization of transit priority measures to make service faster.** The MBTA operates close to 1,000 route miles of bus service. Of these, a relatively small portion (8.0 miles) travel on busways, bus tunnels, and bus lanes. Only eight intersections throughout the entire system provide transit signal priority. Although MBTA efforts are accelerating with recent successes with AM peak bus lanes in Everett and Roslindale, these efforts will need to accelerate further to achieve systemwide success.
- **Deviations to low volume destinations increase trip times.** For example, all Route 108 Linden Square-Wellington Station midday trips detour via a community center. The deviation serves only two passengers per day but adds five minutes to the travel times of everyone else on the bus.
- **Many stops are spaced too closely.** More closely spaced stops, especially in areas with lower ridership, mean that bus stopping patterns become more irregular as buses stop at some stops and skip others when no one is waiting. This makes running times more variable and contributes to off-schedule service. The MBTA's guideline for stop spacing in urban areas is four to seven stops per mile, but some routes have up to 10. The consolidation of stops throughout the system – as was done for the Key Bus routes – would improve on-time performance and attract more riders.

### Buses Stuck in Traffic on Washington Street Before Bus Lane



Source: Boston Globe

### Buses Bypassing Traffic After Bus Lane



Source: Boston Globe

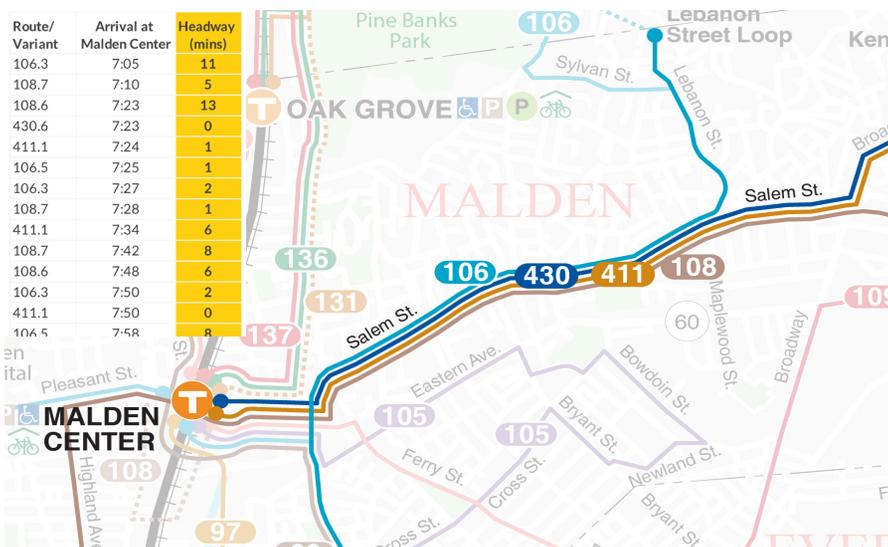
## Schedules are Irregular

Most MBTA schedules are developed independently, with an emphasis on matching service levels with demand to the extent possible given existing resources. However, because most major corridors are served by multiple bus routes, the practice of developing schedules for each route independently means that the schedules of different routes are usually not coordinated. This, in turn, means that service runs irregularly, with closely spaced buses often followed by gaps in service. As a result, passengers do not realize the benefits of the combined service levels.

One example is the Salem Street corridor in Malden, which is served by four routes:

- 106 Lebanon Street, Malden - Wellington Station
- 108 Linden Square - Wellington Station
- 411 Malden Center Station - Revere/Jack Satter House
- 430 Malden Center Station - Saugus Center

In the AM peak, there are 14 inbound trips that operate between 7:00 AM and 8:00 AM. If these trips were spaced evenly, there would be a bus every four minutes. However, due to different service levels and independent scheduling, actual service is scheduled to operate every zero (meaning two buses at the same time) to every 13 minutes.



## Many Routes Start Too Late

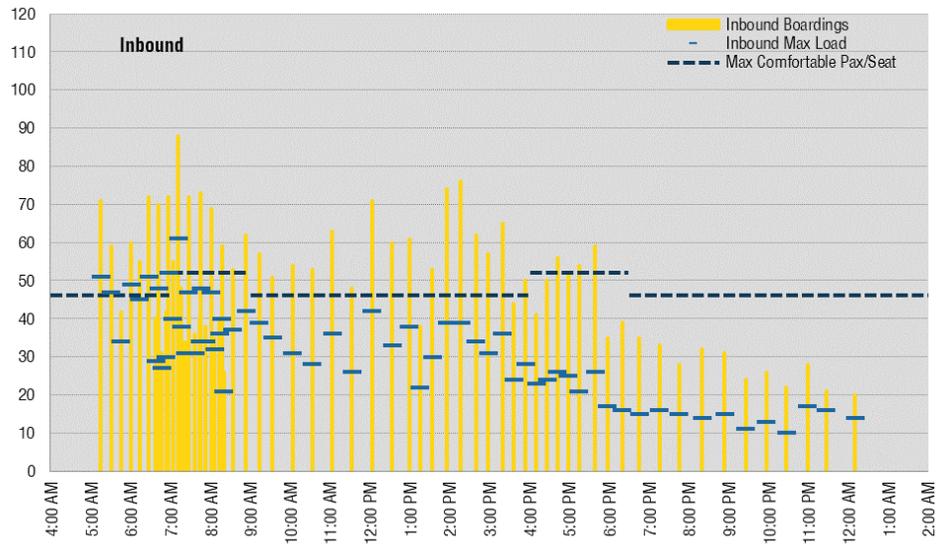
The MBTA classifies its 176 routes into five categories: Silver Line/Key Bus, Local, Community, Commuter, and Supplemental. Most of the MBTA's routes – 117 – are Local routes that carry from 250 to over 6,500 passengers per weekday. The span of service standards are short: 7:00 AM to 7:00 PM on weekdays, 8:00 AM to 6:30 PM on Saturdays, and 10:00 AM to 6:30 PM on Sundays. Because the Local route minimum span of service is short, many routes can start much later than demand starts but still meet the SDP span of service standard. However, when the start of service is compared to when demand starts, it becomes clear that service on many routes starts later than it should.

The simplest way to get an indication of whether service starts early enough is to examine ridership on the first peak-direction trip of the day. Typically, ridership starts low and builds. However, on many routes, ridership on the first trip is already very high. On some routes, ridership on the first trip even exceeds loading standards. The MBTA has begun operating service earlier on 10 routes with the support of the Fiscal and Management Control Board (FMCB). A complete list of routes that have an extended AM service span as a result of this pilot can be found on the MBTA's website.

Some of the unchanged and more important routes where ridership on the first trip exceeds loading standards include:

- 22 Ashmont Station- Ruggles Station with 27 passengers on the first trip at 6:15 AM
- 47 Central Station - Broadway Station with 42 passengers on the first trip at 6:00 AM
- 86 Sullivan Square Station - Reservoir Station with 31 passengers on the first trip at 5:00 AM
- 93 Sullivan Square Station - Downtown Boston with 29 passengers on the first trip at 4:49 AM
- 116 Wonderland Station - Maverick Station with 71 passengers on the first trip at 5:15 AM

## Route 116 Inbound Ridership by Trip



## Some Routes End Too Early

In a similar manner as many routes start service too late, many also end service too early. Six routes end service earlier than specified by the weekday SDP standards, including Routes 18, 97, 202, 214, 456, and 558. Until recently (2018), many routes ended service before demand tailed off. However, on September 2, 2018, through the Late Night service pilot, the hours of 13 major routes were extended until 2:00 AM or 3:00 AM. The MBTA should continue to monitor late-night ridership to identify routes where additional late-night service is needed.



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## Next Steps

Next Steps

Additional Planned MBTA Efforts

## Next Steps

There are a large number of issues with the MBTA's existing bus service. The MBTA bus network has an outdated service design that focuses on one-seat rides to the rapid transit network over frequent service, features poor reliability, and suffers from overcrowding. The State of the System is one of the first steps in understanding the existing conditions in the MBTA service area. The findings of this document and related efforts will be combined 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 State of the System document, together with the accompanying Market Analysis, and the Route Profiles describing each MBTA bus route in detail, 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 Multi-year Investment Strategy and enabled by potential new funding.

For additional information, visit [www.MBTA.com/BetterBus](http://www.MBTA.com/BetterBus).





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