

PROGRAMS

In addition to identifying the communities and areas where transit investment would have the most impact, Focus40 also considers the systemwide needs for a reliable, robust, and resilient transit network. Following the framework set by the Capital Investment Plan and Strategic Plan processes, Focus40 identifies 12 distinct programs, each with a stated objective (see page 23).

Of the 12 programs:

- Eight programs focus on existing MBTA modes and services (Red Line, bus, commuter rail, etc.)
- Three focus on systemwide characteristics (customer experience, resiliency, accessibility, paratransit)
- One program focuses on possible future expansion projects and services, with an emphasis on Priority Places

The first set of programs addresses future needs of *specific* MBTA services (Red, Blue, Orange, Green, Commuter Rail, Bus, Silver Line, and Water Transportation). These programs focus on building up a high-functioning, high-capacity core system. They reflect Focus40's baseline premise that a reliable, high-capacity network is critical to *any* potential future to sustain the growth of the region.

The second set of programs (Red Line, Blue Line) does not specify a type of service, but identifies projects that help achieve critical *systemwide* goals, including resiliency, customer experience, and accessibility.

The final program—for investments that are identified for Priority Places—is about advancing the goals for sustainability, livability, equity, and prosperity in those places that can benefit the most from improved or new transit.

Following the framework set by the Capital Investment Plan and Strategic Plan processes, Focus40 identifies 12 distinct programs, each with a stated objective.

INVESTMENT CLASSIFICATION

Using the scenario planning framework (see table below), investments in each program are prioritized based on how well they achieve the Focus40 goals in the face of uncertainty.

Focus40 highlights those investments in “We’re Doing” that are addressing near-term needs and are commitments in the 2019-2023 Capital Investment Plan, and that demonstrate the progress that the MBTA is already making.

Investment concepts are categorized into “We’re Planning” or “We’re Imagining” based on their scale and likelihood of achieving the Focus40 goals across all potential futures. The “We’re Planning” investments (along with “We’re Doing” commitments) form the foundation of the Focus40 investment strategy. “We’re Imagining” investments may be important to pursue after the MBTA makes progress on these foundational investments, depending on how today’s trends evolve.

The “We’re Doing” and the “We’re Planning” investments form the foundation of the Focus40 investment strategy.

IMPLEMENTATION

The two mechanisms for implementing Focus40 are called out in (1) policy statements and (2) project-specific next steps tied to the capital planning process (these are referred to as “What’s Next”). Policy statements describe how the MBTA and MassDOT plan to address implementation for certain key topics. In addition, across all Programs, every “We’re Doing” and “We’re Planning” includes a “What’s Next.” In the efforts “We’re Doing,” these next steps provide details on construction or implementation of funded activities. For investments “We’re Planning,” they provide information on what needs to happen in order to for the concept to be developed and considered for inclusion in the rolling 5-year capital plan.

INVESTMENT CLASSIFICATION	Lower Risk	Higher Risk
	Important in all/most futures	We’re Doing: Commitments Underway <i>(current or near-term need)</i>
	We’re Planning: Next Priorities <i>(needed in all/most futures)</i>	
Could be important in some futures	Deferred, while tracking drivers of future needs	We’re Imagining: Big Idea-Hedging <i>(might not be necessary given future context)</i>
		We’re Imagining: Big Idea-Shaping <i>(may influence the future context)</i>
Not important in any future	Not included	

	Program	2040 Objectives
Systemwide	ACCESSIBILITY & PARATRANSIT	Ensure that the vast majority of customers can use the MBTA’s increasingly accessible fixed-route system, while those who still need The RIDE have more and better service options.
	CUSTOMER EXPERIENCE	Provide regular and occasional riders alike with high-quality services that are easy to navigate and pay for and a pleasure to use.
	RESILIENCY	Retrofit priority MBTA assets to withstand severe weather and sea level rise and ensure all new construction meets strict resiliency standards.
Modes and Services	BUS 2040	Achieve a better, faster, lower-emissions service, supported by all-door boarding and exclusive busways, that is more aligned with where riders live, work, and travel.
	SILVER LINE 2040	Add capacity and connectivity with an expanded and cleaner fleet that serves not only the Seaport but also an expanded Silver Line network extending beyond Chelsea.
	BLUE LINE 2040	Accommodate growth at Logan Airport and development sites in East Boston and Revere and ensure resiliency to severe weather and sea level rise.
	GREEN LINE 2040	Increase capacity by at least 50% on the nation’s busiest light rail line with redesigned, larger vehicles and modernized infrastructure.
	ORANGE LINE 2040	Increase peak-hour service to every 4.5 minutes (three minutes if development warrants) to meet the needs of homes and businesses throughout the growing corridor, serving additional riders from the Lower Mystic region.
	RED LINE 2040	Enable a modernized line with peak trains every three minutes to connect residents of transit-oriented housing to growing job centers—all connected to a reimagined Mattapan Line.
	COMMUTER RAIL 2040	Serve more riders and non-commuting trips by providing better connections to more destinations and potentially by implementing one or more new service models (urban rail/regional rail), pending results of the <i>Rail Vision</i> study.
	WATER TRANSPORTATION 2040	Support a financially sustainable multi-provider Boston Harbor water transportation system, connecting more passengers to major destinations with excellent multi-modal access.
	PLACE-BASED SERVICE ADDITIONS	Focus new services and expansion projects on providing high frequency, reliable service to better meet the needs of those who live and work in and travel to Priority Places that can support high-quality transit service.

ACCESSIBILITY & PARATRANSIT



Program Objective

Ensure that the vast majority of customers can use the MBTA's increasingly accessible fixed-route system, while those who still need The RIDE have more and better service options.

We're Doing (Commitments through 2023)

Plan for Accessible Transit Infrastructure (PATI) Plan Completion

PATI is an MBTA planning process to identify and prioritize the removal of all accessibility barriers—at all MBTA stops and stations—in order chart a path to achieve full systemwide accessibility. As part of this process, all bus stops and accessible stations have been surveyed. Barriers were catalogued and a draft set of priorities have been developed based on the stop's ridership, nearby senior/disability populations, nearby paratransit usage, minority/low-income status, and proximity of alternatives. Other factors such as the opportunity to coordinate with other station work, cost, and feasibility were also considered.

What's Next: The plan will be released in early 2019. As part of this effort, the MBTA is developing a municipal guidebook to enable communities to help make transit more accessible, for release in 2020.

PATI Early Action Bus Improvements

Of the 7,685 bus stops surveyed through the PATI process, 272 were identified as having critical barriers to access that the MBTA committed to addressing. An additional 870 were coded as being high priority for improvements and the MBTA will

work with municipalities to address the barriers at each stop. Specific improvements vary, but may include longer bus stops, new landing pads, reconstructed sidewalks, curb ramps, crosswalks, pedestrian crossing signals, and signage. The planning and design process includes coordination with over 50 municipalities, as almost all of the stops are not located on MBTA property.

What's Next: The MBTA will be making improvements to 80 of the 272 critical bus stops in 2019. The MBTA will address the remaining critical bus stops by 2020. The MBTA is targeting to work with municipalities to address all high priority bus stops by 2023.

PATI Early Action Rapid Transit and Commuter Rail Improvements

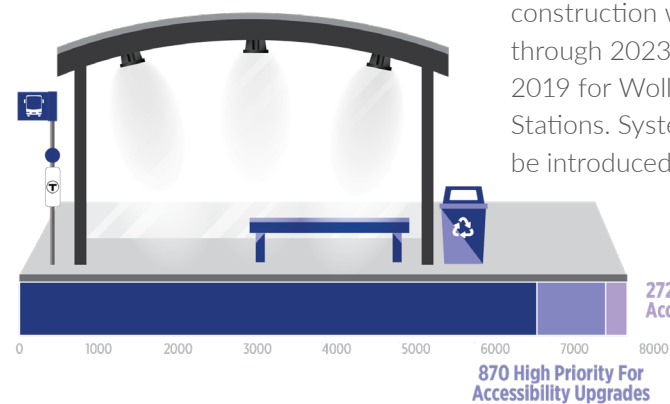
- Wollaston Station (Red Line)—currently under construction
- Symphony—currently in design

- Hynes—currently in design
- BU West, St. Paul, Babcock, Pleasant Street Station (B Line, Green Line)—currently in design
- Newton Highlands (D Line, Green Line)
- Oak Grove (Orange Line)—currently in design
- Chelsea Commuter Rail Station—currently under construction
- Natick Center Commuter Rail Station—currently in design
- Mansfield Commuter Rail Station—currently under construction

In addition to these major station upgrades, the T is pursuing systemwide upgrades to key aspects of stations, starting with:

- Automatic door openers at all Rapid Transit Stations
- Additional detectable warnings throughout Commuter Rail platforms
- Sidewalk/curb ramp repairs at select stations

What's Next: Projects funded for construction will be completed through 2023 and as early as 2019 for Wollaston and Mansfield Stations. Systemwide upgrades will be introduced beginning in 2019.



Source: MassDOT

We're Planning (Next Priorities through 2040)

PATI Improvements at Surface Green Line Stops

Accessibility on the surface Green Line is worse than the other rapid transit lines due to the fact that many improvements would require complex changes to city streets. However, in partnership with the City of Boston, the MBTA can achieve significant improvements in accessibility that will also reduce boarding times by allowing for level-boarding for all passengers.

What's Next: Stop consolidation and accessibility will be incorporated into the Green Line Transformation Program, which will leverage the need for system upgrades with the need for accessibility improvements, in order to minimize customer impacts and maximize benefits.

PATI Accessibility Improvements for Commuter Rail

As part of the PATI analysis, the MBTA ranked all inaccessible Commuter Rail stations. While some critical locations are being addressed today, widespread station upgrades will be conducted on

a rolling basis in coordination with the system improvements recommended by the Rail Vision.

What's Next: The MBTA will advance designs for Commuter Rail stations based on PATI prioritization criteria.

Vertical Transportation Program

Systemwide, MBTA escalators and elevators are estimated to transport more than 70,000 people a day. In addition to PATI, which is focused on meeting ADA standards, the MBTA is seeking to develop a strategy to replace the 150 escalators and elevators that are approaching the end of their useful life. As part of this work, the MBTA is exploring opportunities for redundant escalators/elevators..... at key stations. These types of improvements are often done in combination with other station needs.

What's Next: The MBTA is advancing approximately 10 redundant and replacement escalator/elevator projects through design and is working on a plan to address vertical transportation needs on a rolling basis.

We're Imagining (Big Ideas)

Autonomous all-electric paratransit vehicles for those who are not able to transition to the more accessible fixed route system

Leveraging Emerging Technologies

From the ways we receive service alerts to the future potential of autonomous vehicles, technology is changing the way we travel. New technology has the ability to make transit more inclusive. Autonomous vehicles could transport customers from their homes to fixed route transit. Integrated real time applications can show users accessible paths of travel to transit. Ensuring that the needs of all customers are factored in the design and implementation of new technologies is essential to ensuring an inclusive and sustainable future.

RIDE Service Reimagining

The RIDE is the MBTA's paratransit service, which provides transit access to persons who cannot use the fixed route system for all or some of their trips. While accessibility improvements can enable more riders to transition from the RIDE to the fixed route system, it will be important to continue to invest strategically in The RIDE, particularly as the population ages. The RIDE will continue to conduct pilot programs, as it did with Uber, Lyft and taxi companies, to better understand how to improve service efficiency and quality. Testing and implementing successful new operational structures, vehicle types, software, and technology will provide the MBTA key insight into future capital investments and allow for improved customer experience.

CUSTOMER EXPERIENCE



Program Objective

Provide regular and occasional riders alike with high-quality services that are easy to navigate and pay for and a pleasure to use.

We're Doing (Commitments through 2023)

Automated Fare Collection (AFC 2.0)

The MBTA's new fare payment system (AFC 2.0) will make paying for transit on the entire system easier and more convenient. The new fare payment system will create a seamless transportation experience by allowing customers to tap and board on all modes of transit, including commuter rail, with the same application – either with a fare card, smartphone, or contactless credit card. It will also allow for reduced boarding times, which will especially help buses and Green Line trains move more quickly. AFC 2.0 will help the MBTA better capture ridership numbers from each station, which will enable the MBTA to be more responsive to capacity needs on the system. AFC 2.0 also has the potential to facilitate more seamless multi-modal integration with Regional Transit Authorities, ride hailing companies, and other microtransit systems.

What's Next: The transition to the new fare collection system is anticipated to be completed by May 2020, with new fare gates by Spring 2021.

Partnerships for Improved First-Mile/Last-Mile Connections

Particularly in suburban areas, one of the biggest challenges facing existing and potential transit users is the segment of the journey from the

transit station to the desired origin or destination—often called the “first-mile/last-mile problem.”

Addressing the problem may require improved pedestrian and bicycle paths or additional mobility options, such as shuttles, bike-share, bike parking, car share, ride share, or local bus service. Key transit stations can become mobility hubs to support these options. Many potential stations were identified in GoBoston 2030 with input from the MBTA. The MBTA will explore opportunities to partner with Boston and other municipalities and other entities to make services more useful to more people and encourage greater ridership.

What's Next: The MBTA is actively pursuing an improved bicycle parking program and bike-sharing partnerships. Once the new fare collection system (AFC 2.0) is implemented in 2021, the MBTA will be able to accommodate fare payment integration with micro-mobility providers and will explore mechanisms for doing so.

Stop and Station Improvements (Wayfinding, Communications, and Lighting) Phase 1

Navigating the MBTA system can be challenging for both visitors and everyday riders who are taking new routes. The MBTA has embarked

on an initiative to improve signage and information in stops, stations, and vehicles, which can help both new users to the system as well as those who are taking trips to new destinations. Lighting and other station improvements are also a part of this effort.

What's Next: The MBTA is making improvements to 10 major downtown stations, starting with Park Street in Spring of 2019.

Digital MBTA (Travel Planning and Performance Improvements) Phase 1

The MBTA currently provides real-time arrival information for buses, subways, and trains. Efforts are underway to improve the technology to provide better data for real-time applications such as smartphone apps, the MBTA website, and physical signboards. The MBTA is also looking to expand the availability of real-time arrival information at high-impact locations. A related effort is working to use improved Computer Aided Dispatch / Automatic Vehicle Location technology to reduce bus bunching and improve overall bus reliability.

What's Next: Real-time accuracy improvements are underway and a plan to allocate digital screens throughout the network is currently under development.

We're Planning (Next Priorities through 2040)

Digital MBTA (Travel Planning and Performance Improvements) Phase 2

The MBTA will continue to explore opportunities to leverage technology to improve the customer experience. In addition to more traditional signage and maps, the MBTA is exploring a digital map of the system with real-time information that would allow for a more interactive and dynamic understanding of how to access final destinations.

What's Next: The MBTA is continuing to monitor best practices and explore opportunities to pilot new technology.

Stop and Station Improvements (Wayfinding, Communications, and Lighting) Phase 2

After the top 10 high ridership downtown stations are updated with improved wayfinding, communications, lighting, and other station specific improvements, the MBTA will make improvements to the next tier of stations. These improvements will primarily be done in conjunction with state of good repair and accessibility improvements. The MBTA may explore partnership opportunities to accelerate improvements.

What's Next: The MBTA will develop a strategic framework for addressing customer experience needs at stations.

Platform Barriers and Doors Pilot Program

As the MBTA explores opportunities to update stations and implement PATI recommendations, it will consider the installation of platform barriers and doors, a feature of airport people movers and newer subway systems around the world. Providing a more organized experience for customers moving on or off trains will allow for faster boarding, increased rider and operator safety, and reduced delays.

Platform doors require a uniform fleet that can stop at the exact same place each time—so that the subway doors open into the platform screen doors. All three heavy rail subway lines should have this capability after the new Red and Orange Line fleets are in service although other needs will require further study.

What's Next: The MBTA will study the requirements and options for platform doors before proceeding with a pilot program.

Multi-Modal System Access and Parking Improvements

Many park and ride lots for commuter rail, rapid transit, and express buses are at capacity early in the morning, while others are underutilized. Parking is expensive to build and changing mobility options may increase the need for drop-off access to stations

We're Imagining (Big Ideas)

A “Digital MBTA” that is at the cutting edge of using technology to enhance the transit experience and encourage transit use.

into the future and potentially reduce the need for parking. The MBTA will study the future parking and multi-modal access needs of stations to develop a more comprehensive strategy of where and how much parking to provide throughout the system. Investments will leverage partnerships and parking facility state of good repair needs to make strategic improvements.

What's Next: Within the next year, the MBTA will begin a strategic plan for the future parking and multi-modal access needs of stations.

RESILIENCY



Program Objective

Retrofit priority MBTA assets to withstand severe weather and sea level rise and ensure all new construction meets strict resiliency standards.

We're Doing (Commitments through 2023)

Systemwide *Climate Change Vulnerability Assessments*

The foundation of the MBTA's resiliency efforts will be a series of *Climate Change Vulnerability Assessments* to understand the extent and nature of vulnerabilities related to severe weather and sea level rise for all MBTA-owned assets. Based on the findings, the MBTA will identify solutions to address the most critical assets. Going forward, the MBTA will work to address vulnerabilities and incorporate resiliency measures into all new projects and all regular state of good repair work. The MBTA used the Blue Line as a pilot program for these assessments.

What's Next: The MBTA will begin the systemwide power and Red Line vulnerability assessments in 2019, followed by the Orange Line, Green Line, and Commuter Rail. Upon completion of these assessments in 2020, the MBTA will develop a prioritization of resiliency needs across the system.

Blue Line Resiliency and Adaptation

The MBTA conducted a pilot program called *Climate Change Vulnerability Assessment* for the Blue Line in 2017, which explored exposure, sensitivities, and adaptive capacity of the Blue Line to sea level rise, storm surge, precipitation, extreme high temperature events, wind, snow, and ice. The assessment identified the Orient Heights Maintenance Facility as a high priority vulnerability. The MBTA is now working to develop early action resiliency measures for the facility for implementation through the course of asset management activities. In addition, the MBTA is advancing work on another high priority—the tunnel between Maverick and Aquarium.

What's Next: A project has begun to repair the Long Wharf and Maverick emergency egress and vent shafts to prevent water infiltration. This project should be complete in 2020. A comprehensive analysis of power, signals track, and facilities will be performed for the Maverick-Aquarium segment in the coming year.

Green Line Portal Protection at Fenway

The Green Line's Fenway portal into Kenmore is vulnerable during heavy precipitation events. This project will involve the construction of flood control measures at the entrance to the Green Line subway tunnel adjacent to Fenway station. Large steel doors will be installed at the entrance to the Green Line tunnel to protect the subway from potential future flooding.

What's Next: The MBTA is currently planning and designing a portal protection system for this location. Construction will be completed in 2019.

Charlestown Seawall

The MBTA has received federal funding for a coastal resiliency project to help stabilize the shoreline and protect the Charlestown Yard facility during coastal flooding. The new wall will hold up to bigger storms, bigger tides, and larger storm surges, protecting the yard and everything near it. An added benefit of the project is a 500-yard bicycle and pedestrian path on top of the new seawall, which will connect Charlestown to the proposed Mystic River bridge running from the Wynn casino in Everett to Assembly Square Station.

What's Next: The stabilization project will be completed in 2019.

Adaptation Strategies for Priority Infrastructure, in Collaboration with Municipalities

Many municipalities in the region are working to address climate change, resiliency and adaptation. Partnering to better understand vulnerabilities and plan collective action will benefit all parties. Through the City of Boston's Climate Ready Boston Initiative, the Metropolitan Area Planning Council (MAPC), the Executive Office of Energy and Environmental Affairs (EEA), and MassDOT / MBTA will participate in data collection efforts and develop common solutions to problems. The MBTA will also explore partnerships to address vulnerabilities that have broader impacts.

What's Next: The MBTA will continue ongoing participation in regional climate efforts.

RESILIENCY

T

We're Planning (Next Priorities through 2040)

Resilient Power Supply

The entire MBTA rapid transit network is dependent on its power supply, which is vulnerable to both severe weather and aging components. The Lincoln Switching Station, which is the interconnection point for the rapid transit power substations and the South Boston Power Complex, is vital to the operation of rapid transit systemwide. A complete system shutdown would occur if it were to fail due to age or severe weather. In addition, power source cables throughout the rail and rapid transit network are deteriorating due to age, conduit/duct bank deterioration, and water

infiltration. Lack of redundancy in the cable network and cable decay reduce reliability with infrequent, but serious delays. Addressing state of good repair needs and making the power supply more resilient will be an important component of the MBTA's broader state of good repair and resiliency efforts.

What's Next: The MBTA will be replacing key generators and duct banks as the agency pursues a vulnerability assessment for systemwide power needs in 2019. The MBTA will pursue larger scale investment needs that come out of the study.

Incremental Implementation of the Systemwide Climate Change Vulnerability Assessments

Expanding vulnerability assessments beyond the Blue Line and studying the impacts of sea level rise and extreme weather on the T's infrastructure will identify critical areas of concern and assets that require additional investment and protection. The MBTA will develop solutions for the most pressing vulnerabilities in the system, while addressing additional problems through regular asset management activities.

What's Next: Based on the prioritization of needs developed under We're Doing, the MBTA will proceed to design and construct high priority resiliency measures.

POLICY FOR DEVELOPMENT: RESILIENCY

Purpose: Formally establish an Authority-wide commitment to meet the requirements set forth in Executive Order (EO) 569, Establishing an Integrated Climate Change Strategy for the Commonwealth, as well as build on resiliency efforts already in-progress at the MBTA in fulfillment of Focus40 goals.

Guiding Principles:

- All new projects and projects under 30% design will incorporate an evaluation of future projections for severe weather and sea level rise into their design and construction.
- Resiliency will be incorporated into all activities – from developing construction timelines to asset management.
- The MBTA will actively engage in partnership opportunities to address broader resiliency issues.
- Climate change vulnerability assessments for each rapid transit line, sub-critical infrastructure (power, signals, communications), bus maintenance facilities, and commuter rail facilities and layovers will be completed by 2020, enabling a comprehensive prioritization of resiliency needs.

We're Imagining (Big Ideas)

An MBTA fully resilient in even the most dire climate scenarios and that provides essential mobility for the Boston Region amid severe weather and sea-level rise.

BUS 2040



Program Objective

Achieve a better, faster, lower-emissions service, supported by all-door boarding and exclusive busways, that is more aligned with where riders live, work, and travel.

We're Doing (Commitments through 2023)

Better Bus Project: Current Route Network Improvements

The MBTA is pursuing route changes to improve existing service, additional resources to increase service, and opportunities to work with municipalities on bus priority treatments. Priority corridors for treatment include those with high ridership, substantial delays, and a significant proportion of people on the corridor on buses. These priority corridors are identified in the Focus40-sponsored Prioritization of Dedicated Bus Lanes Report (CTPS 2016). This work will set the stage for the Bus Network Redesign process.

What's Next: Implementation of route change recommendations will begin in 2019.

Bus Network Redesign Process

Over time, changes in land use, increasing traffic congestion, and changing demographics across the Boston region have resulted in travel needs that the MBTA's current bus network does not serve well – or, in some cases, needs that the network does not serve at all. The Bus Network Redesign will build upon the Better Bus Project's route-by-route analysis and take a holistic look at the entire bus network in order to develop recommendations to better serve the region's changing travel needs—

including routes, frequency, span of service, and coverage changes. The Network Redesign process will also include early action pilot programs and implementation steps within the first year of the study, including potential build-out of more comprehensive bus rapid transit service.

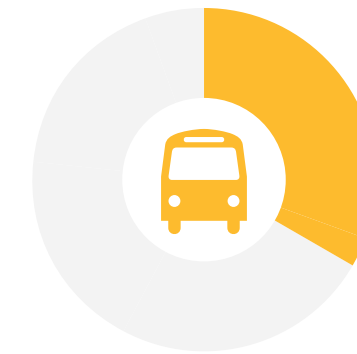
What's Next: MassDOT/MBTA will develop network-level goals and metrics to assess the strengths and weaknesses of the current network, as well as to compare the benefits and outcomes of the network alternatives developed throughout this process. A public process to inform the future of the bus network will begin in 2019. Early action pilot programs will be implemented in early 2020.

We're Doing (Commitments through 2023)

Partnerships for Bus Priority

Many criticisms of bus service - too slow, too unreliable – are rooted in the fact that buses must share crowded city streets with many other users. As part of the foundational analysis for the Focus40 process, streets were pinpointed (1) with the highest volume of bus passengers during the peak period, (2) that experience the highest levels of traffic delay, and (3) where bus riders make up a significant portion of roadway users. Using that work, MassDOT/MBTA have been collaborating with the City of Boston, City of Everett, City of Cambridge, City of Watertown, Town of Brookline, and Town of Arlington, as well as other municipalities, to advance improvements such as dedicated bus lanes, transit signal priority, consolidating and optimizing bus stop spacing, and other bus-oriented enhancements to local roadways. This work is targeted to those corridors where such improvements can have the biggest beneficial impact on the greatest number of MBTA customers.

What's Next: The MBTA will continue to work with partners to make pilot programs permanent and expand bus priority treatments to additional major bus corridors.



More than a third of MBTA trips are taken on buses

Source: www.mbtatabackontrack.com 2017 ridership data

Accessible Bus Stops

The MBTA is working to improve bus stops that were deemed high priority by the PATI audits based on access challenges, ridership, and safety concerns. Improvements include longer bus stops, reconstructed sidewalks, new curb ramps and crosswalks, pedestrian crossing signals, better signage, and pavement markings. Where warranted, curb extensions will be constructed and, where feasible, new shelters and benches will also be installed.

What's Next: The MBTA will be making improvements to 80 of the 272 critical bus stops in 2019. The MBTA will address the remaining critical bus stops by 2020. The MBTA is targeting to work with municipalities to address all high priority bus stops by 2023.

Modern Bus Stops and Amenities

The MBTA is listening to its customers and municipal partners in initiatives to elevate the customer and community experience at bus stops. The MBTA is exploring a menu of enhanced amenities focused on customer information, comfort, safety, and technology. Improved bus stops could boost ridership, make journeys more comfortable for passengers, provide better neighborhood access, and spur economic activity across the region.

What's Next: The MBTA will work closely with municipalities and key partners over the course of 2019 in the development of a street furniture program to meet operational, customer, municipal, and other stakeholder needs.

POLICY FOR DEVELOPMENT: ON-STREET INFRASTRUCTURE

Purpose: While the MBTA and municipalities own different aspects of bus-supporting infrastructure, many elements of bus and light rail service require partnerships with municipalities in order to be effective. A comprehensive on-street infrastructure policy is necessary to clearly define roles and responsibilities for constructing and maintaining infrastructure on municipal rights-of-way to ensure reliable, convenient, safe, and consistent service across the region.

Guiding Principles:

- For improved services or amenities on local streets and sidewalks, municipalities will need to do their part in order to ensure that the improvement is efficient, effective, and sustainable:
 - Transit Priority Treatments – to minimize the impact of traffic congestion on MBTA bus speed and reliability for existing and any potential additional service
 - Bus Stop Accessibility – to ensure that all riders enjoy safe and easy access to the bus network through crosswalks, curb cuts, and sufficient sidewalk space
 - Amenities – to be full, participating partners in the MBTA's amenities program
- The MBTA can support design and/or construction for on-street infrastructure improvements in the areas and stops where intervention will have the greatest impact on the MBTA's service, but even in those places which will benefit the most, the MBTA needs municipalities' support for ongoing maintenance.

BUS 2040



We're Doing (Commitments through 2023)

Bus Fleet Replacement and Expansion (Procurement and Maintenance Facility Reconfiguration)

The MBTA's 2017 *Integrated Fleet and Facilities Plan* (IFFP) is a 15-year plan for modernizing the MBTA fleet and upgrading and expanding maintenance facilities for all MBTA modes. The IFFP calls for replacing the entire current 40- and 60-foot bus fleet, with 460 40-foot buses scheduled for delivery between 2021 and 2025. One hundred ninety four new diesel-electric hybrid buses will enter service in 2019/2020.

The MBTA is working towards acquiring the same number of buses each year in order to optimize fleet age and maintenance needs. At the same time, the MBTA plans to expand the percent of the bus fleet available daily. The largest obstacle to expanding the fleet is a lack of storage capacity. New or expanded bus maintenance facilities are necessary to grow the fleet to meet service standards and supply better service. Ten facilities within Greater Boston maintain MBTA buses. Four of the MBTA's maintenance facilities are over 70 years old. Six facilities are in need of major upgrades, rehabilitation, or replacement. These 10 facilities, in peak condition, were designed to be able to serve a total of 1,011 buses at

any given time. With 1,050 currently active vehicles, maintenance capacity is insufficient both for current and potential future needs.

What's Next: The MBTA is working to implement a strategy for 21st-century vehicle maintenance and storage facilities. Initial funding for upgrading and expanding maintenance facilities is provided in the 2019 -2023 CIP.

Zero-Emission Bus In-Service Testing

The MBTA is working to identify a zero-emissions vehicle for the bus fleet that can operate in cold weather and snow, and for sufficient distances to match the operational flexibility of the current bus fleet. Supported by a federal grant, the MBTA has ordered five 60-foot, no-emission, battery-powered models that will be used both to develop specifications for the Silver Line and to inform future purchasing strategy for the rest of the fleet. Another study is evaluating the requirements for and implications of 40-foot battery-electric buses.

What's Next: Upon completion of the electric bus research study, expected in early 2019, the MBTA plans to pilot the technology and determine next steps and needs for converting the entire fleet and upgrading facilities.

We're Planning (Next Priorities through 2040)

COMMITMENT TO GHG REDUCTION

- The MBTA will no longer purchase any additional buses powered only by diesel
- All new and upgraded facilities will be able to accommodate a zero-emission fleet
- Once successful electric bus pilot programs are complete and a capital plan for the facilities has been developed, the MBTA will commit to a target date for transitioning the fleet

Phased Conversion to Zero-Emissions Fleet and Facilities (Maintenance Facilities and Fleet Procurement)

The MBTA will build a transformed network of maintenance facilities able to accommodate an expanded, zero-emissions fleet as part of the effort started in Phase I to upgrade and expand storage and maintenance facilities. This effort will allow the MBTA to begin replacing diesel, clean natural gas, and hybrid buses with zero-emissions vehicles as these technologies demonstrate their ability to meet MBTA performance standards. The MBTA seeks to purchase approximately 100 new buses annually, which will allow for the phase-in of zero-emissions vehicles as part of regular bus replacement and phased fleet expansion.

What's Next: The MBTA will establish a detailed plan for a phased conversion of the fleet after successful completion of the pilot programs described in We're Doing.

Implementation of Network Redesign (New or Enhanced Services and Expanded Fleet)

During this period, the MBTA will continue to build out the redesigned bus network. Implementation could include new buses to serve new routes and provide greater capacity on existing services.

What's Next: The MBTA will seek to incrementally build out a redesigned bus network based on the success of the pilot program implemented in the near term. New vehicles will be incorporated into the fleet pending the build out of expanded storage capacity.

Priority Bus Rapid Transit Corridors

The MBTA will seek to incrementally upgrade bus priority treatments in high demand, high delay corridors to more comprehensive bus rapid transit. Bus rapid transit provides faster, more convenient, and more comfortable bus service through greater-capacity vehicles, higher frequencies, exclusive bus lanes, transit signal priority, and amenity-rich stations with level, all-door boarding. Additionally, service is fast because stations are spaced farther apart than with local bus service—typically every ¼ to ½ mile. Priority corridors include those highlighted in the Focus40 sponsored *Prioritization of Dedicated Bus Lanes*

Report (see map on next page), those recommended in GoBoston 2030, the Lower Mystic Regional Work Group, and the Kendall Square Mobility Task Force and opportunities identified in upcoming planning work focused on Priority Places.

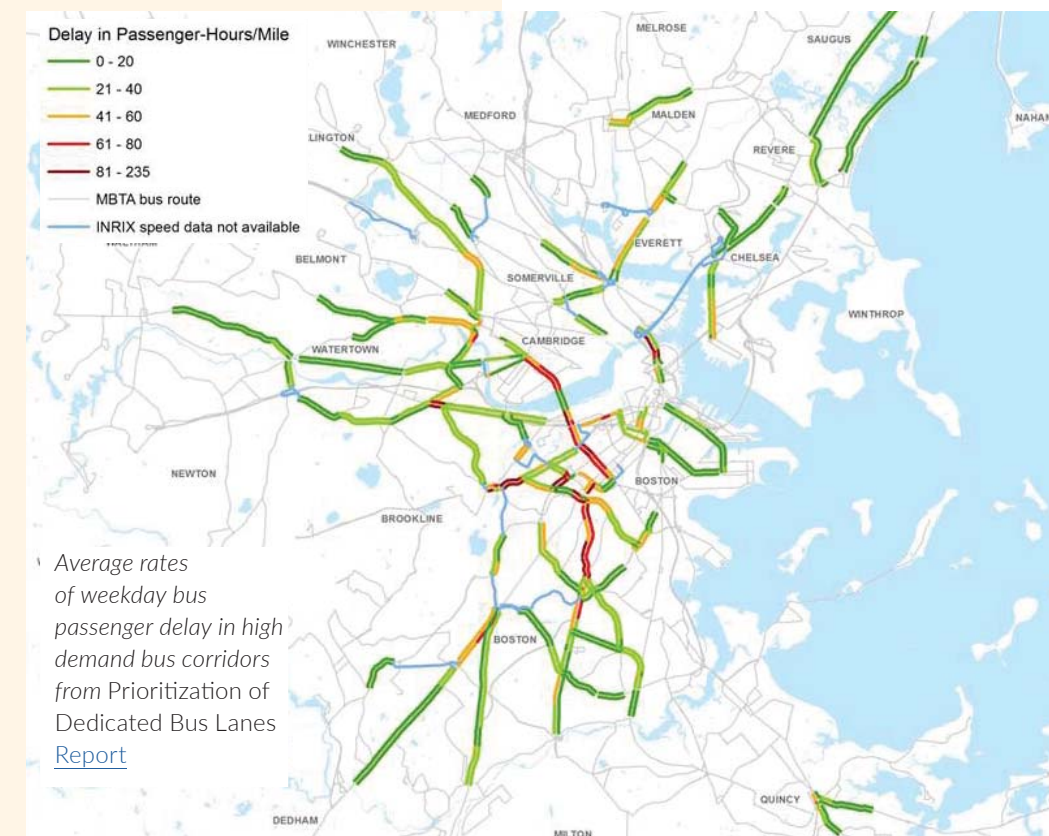
What's Next: Through the Bus Network Redesign and evaluation of incremental bus priority treatments, the MBTA will identify corridors where upgrades to more complete bus rapid transit will be necessary, and work with municipalities to advance them through the design process.

We're Imagining (Big Ideas)

Autonomous bus shuttles that can serve new routes and deliver first-mile/last-mile connections for passengers to commuter rail and rapid transit.

Autonomous Bus Shuttles

Autonomous buses are currently being tested in several cities around the world. In dedicated right-of-way, they can avoid many of the challenges facing autonomous car technology. They may be able to address first/last mile problems or serve new routes.



SILVER LINE 2040



Program Objective

Add capacity and connectivity with an expanded and cleaner fleet that serves not only the Seaport, but an expanded Silver Line network extending beyond Chelsea.

We're Doing (Commitments through 2023)

Silver Line Fleet Replacement (Procurement and Maintenance Facility Reconfiguration)

A pilot program is now underway to test a prototype, extended-range, hybrid bus that can be used in the Transitway Tunnel as well as the potential use of zero-emission vehicles. The current Silver Line vehicles that can operate in the Transitway Tunnel are no longer in production, inhibiting an expansion of the fleet. Both vehicle types will eliminate any delays associated with the current power changeover, present the opportunity to expand fleets, and can address Transitway service overcrowding in the Seaport and to Logan Airport.

What's Next: The MBTA is currently identifying options for upgrading, expanding, or replacing the Southamptton garage to accommodate a new and expanded fleet.

Silver Line Washington Street Improvements

The MBTA and the City of Boston will continue to work together to prioritize the enforcement of designated bus lanes and explore improved delineation of bus lanes from general traffic, where feasible. The MBTA is pursuing additional improvements on the corridor as well, such as transit signal priority.

What's Next: The City of Boston and the MBTA will collaborate on on-street improvements for the Silver Line through regular coordination meetings.

Transit Priority Infrastructure in the Seaport

The MBTA is looking at several opportunities to make travel faster and more reliable through the Seaport including improved signalization and adjusted routing. First, the MBTA is seeking to reduce the severity of the conflict at the

D Street intersection by adjusting traffic signals to make buses faster. Second, in order to save 3-5 minutes of travel time to Logan Airport and Chelsea, MassDOT and the MBTA are examining adjusting the Silver Line routes to use the emergency access ramp on to I-90 at certain times when it could be safe to do so. Physical modifications to the geometry of the merge between this ramp, the HOV lane, and the mainline of I-90 may be necessary. All changes will require preserving emergency access for State Police, Boston Fire Department, and Boston Emergency Medical Services.

What's Next: MassDOT and the MBTA are assessing the safety of using the ramp prior to convening additional stakeholders and developing designs for a solution that will allow for safe ramp access for Silver Line vehicles.

We're Planning (Next Priorities through 2040)

Expanded Silver Line Fleet

The MBTA is conducting the necessary vehicle planning work to upgrade and expand the fleet with more modern, fuel efficient vehicles under the *Silver Line Fleet Planning and Procurement* in "We're Doing."

Fleet expansion would improve Silver Line service during peak periods, a service period that currently has heavy delays and overcrowding. In addition to identifying a new vehicle type, an expanded Southamptton garage or additional new storage space will be required to accommodate a larger fleet. Once achieved, the MBTA can deliver more service with more efficient vehicles.

What's Next: Massport's Silver Line Capacity Study, currently underway, will recommend future fleet sizes to accommodate growing demand.

Bus Rapid Transit through Everett

A large proportion of residents from Everett (and neighboring cities Malden and Revere) commute to and from Boston daily. Extending the Silver Line beyond Chelsea to and from Boston daily. Extending the Silver Line beyond Chelsea could lessen crowding on existing bus routes and provide service at near-rapid-transit levels for those living just beyond the reach of the Orange and Blue lines. An extension of the

Silver Line would require additional vehicles and a facility to store them. However, local bus routes could also use the Chelsea Busway to provide similar connections.

What's Next: As resources allow, the MBTA will work with the City of Everett to advance a design for an expanded busway and potential vehicle storage facility.

Infrastructure Upgrade in Silver Line Tunnel

The Silver Line tunnel has leakage and drainage problems as well as a degraded roadway surface that impacts ride quality. Unaddressed, this deterioration will worsen and ultimately affect service.

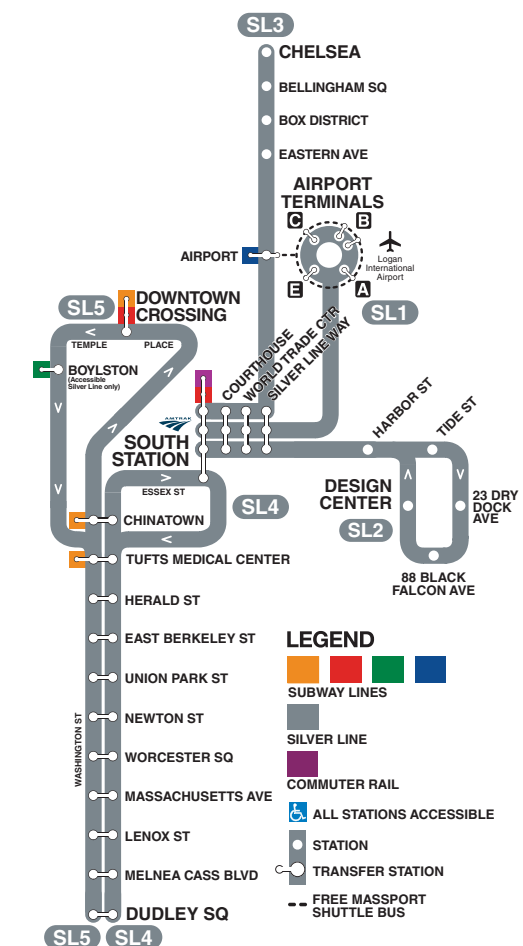
What's Next: The MBTA will initiate a project to address the problems in the tunnel.

We're Imagining (Big Ideas)

Faster service by eliminating the Transitway's at-grade crossing of D Street.

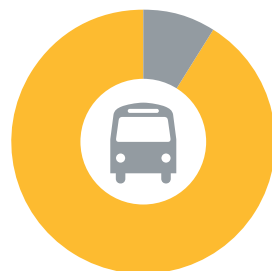
Silver Line Tunnel Extension Under D Street in the Seaport

If Transit Signal Priority and other improvements prove ineffective, a tunnel under D Street could save several minutes of travel time and improve reliability.



The Silver Line includes five routes: South Station to the Airport via the Seaport (SL1), South Station to the Seaport (SL2), the newly opened South Station to Chelsea via Airport Station (SL3), Dudley to South Station (SL4), and Dudley to Downtown Crossing via South Station (SL5). Dedicated street space exists on Washington Street in the South End and on Essex Street Downtown as well as in the Transitway Tunnel from South Station to D Street in the Seaport.

The Silver Line accounts for



9.2% of MBTA bus ridership

Source: www.mbtackontrack.com 2017 ridership data

BLUE LINE 2040



Program Objective

Accommodate growth at Logan International Airport and development sites in East Boston and Revere and ensure resiliency to severe weather and sea level rise.

We're Doing (Commitments through 2023)

Resiliency: Planning and Early Actions

The MBTA conducted a pilot program called Climate Change Vulnerability Assessment for the Blue Line in 2017, which explored exposure, sensitivities, and adaptive capacity of the Blue Line to sea level rise, storm surge, precipitation, extreme high temperature events, wind, snow, and ice. The assessment identified the Orient Heights Maintenance Facility as a high priority vulnerability. The MBTA is now working to develop early action resiliency measures for the facility for implementation through the course of asset management activities.

What's Next: A project has begun to repair the Long Wharf and Maverick emergency egress and vent shafts to prevent water infiltration. The project should be complete in 2020. A comprehensive analysis of power, signals track, and facilities will be performed for the Maverick-Aquarium segment in the coming year.

Reliability Centered Vehicle Maintenance Program

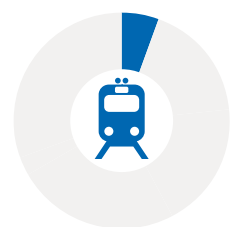
The Blue Line has the newest fleet at ten years old. To maintain the fleet, a Reliability Centered Maintenance (RCM) Program has been deployed since 2014. The RCM program contains continuous investment with predictive component replacement in order to increase reliability.

This program has the potential to eliminate out-of-service time for a mid-life overhaul.

What's Next: This program is ongoing until the Blue Line vehicles reach the end of their useful life in the 2030s.

Since implementation in 2014, the Reliability Centered Maintenance program has resulted in a 68% increase in reliability, and failures in service have been reduced by 40%.

With **69,500** average weekday trips



5%

of total system ridership is on the Blue Line

Source: www.mbtabackontrack.com 2017 ridership data

We're Planning (Next Priorities through 2040)

Blue Line Capacity and Reliability Improvements

Blue Line trains between Maverick Station and Downtown are near capacity and ridership is expected to exceed capacity over the next two decades, leading to passenger overcrowding. Current operations at 4.5-minute headways provide room for 10% capacity growth with the existing fleet. Capacity could be expanded by another 15% using the existing fleet but also expanding trainsets. Depending on the pace of development and the type of the demand it generates, the MBTA may pursue the acquisition of additional trainsets.

Modernizing the signal system is a necessary component of improving capacity and reliability. The Blue Line's outdated trip stop signal system requires manual resetting when a signal is violated, resulting in longer than necessary delays and a significant amount of manual labor. New signal technology could be applied throughout the Blue Line to improve reliability and add capacity.

In addition, the current hybrid power arrangement could be converted fully to third rail power to improve reliability and decrease maintenance costs.

What's Next: The MBTA will advance a study in 2019 to determine a replacement signal system and other potential reliability and capacity improvements on the Blue Line.

Resiliency: Further Implementation

Several resiliency priorities have been identified on the Blue Line, including the portal between Airport and Maverick, Aquarium Station, and the Orient Heights Maintenance Facility. Aquarium Station and the portal between the Maverick and Airport Stations are currently at risk of flooding and the risk will continue to increase over time. Exposure to seawater causes corrosion of pumps, rails, switches, signals, and communications cables.

Adding protection that can be closed with little notice (such as gates) at the entrance to the Blue Line portal will safeguard the sensitive equipment in the event of storm surges and high tides.

What's Next: The MBTA is currently working to identify and design potential solutions to address the Blue Line's most critical assets.

Red-Blue Connector

The most studied concept for connecting the Red and Blue lines is an extension of the Blue Line from Bowdoin to Charles/MGH. A 2018 reassessment found that a cut and cover construction approach would be less expensive than the bored tunnel approach studied in the 2010 draft environmental impact report. A Red-Blue Connector would provide more direct transit service between fast-growing employment hubs and residential areas, including communities with concentrations of low-income households. It would also enhance access to the Blue Line connection to Logan Airport, which will be increasingly important as the Silver Line faces worsening highway congestion and projections point to continued growth in air travel to and from Boston.

What's Next: The MBTA will score the Red-Blue Connector for potential inclusion in the next CIP revision.

BLUE LINE 2040



We're Imagining (Big Ideas)

Connecting the Blue Line to the Red Line, creating a Downtown Superstation, and extending the Blue Line to support transformational development and Priority Places.

Blue Line Connection to Red Line and Beyond

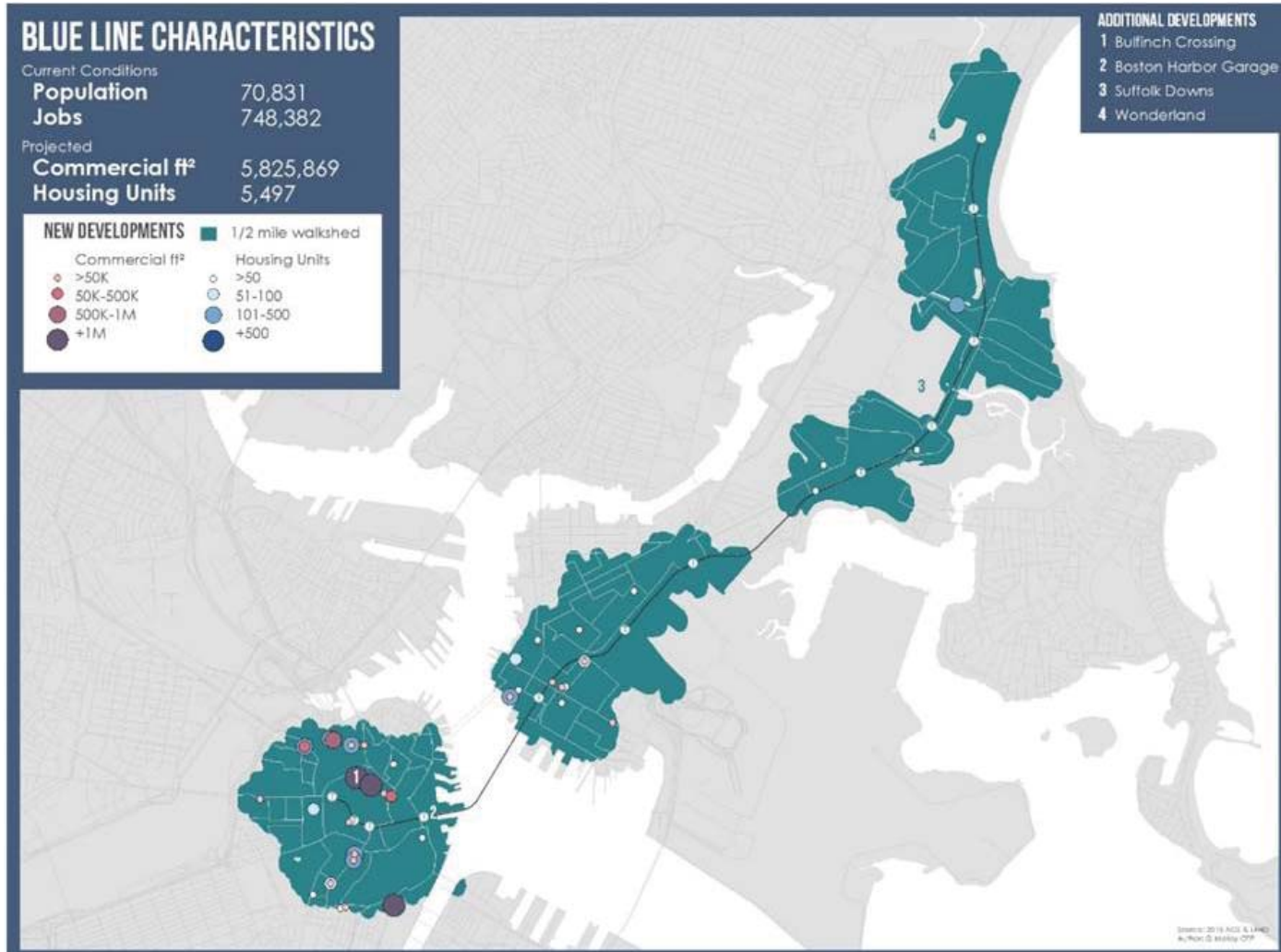
While a connection between the Red and Blue Lines will be assessed under We're Planning, one Big Idea that could be studied as part of that work is to extend the Blue Line west to Longwood with a connection to the Red Line at

Park Street Station. This connection could ease pressures on the Green and Orange Lines and improve rapid transit access to several major employers, academic institutions and healthcare providers—including to major potential developments at Suffolk Downs and Wonderland—and to Logan Airport.

We're Imagining (Big Ideas)

Blue Line Extension to Lynn

New fast and frequent rail connections to Downtown Boston would support economic development and job creation in Lynn, which has an unemployment rate higher than the Commonwealth average. Advancing this investment in conjunction with strong local support for transit-oriented housing creation would give the region's workforce another option to live within reach of Boston's jobs and dramatically improve access for Lynn's existing transit-dependent population. A Transit Action Plan focused on Lynn will help identify and prioritize the best potential solutions for improving transit to and from Lynn.



GREEN LINE 2040



Program Objective

Increase capacity by at least 50% of the nation's busiest light rail line with redesigned, larger vehicles and modernized infrastructure.

We're Doing (Commitments through 2023)

Green Line Transformation: State of Good Repair (SGR) Projects

The Green Line Transformation is a multi-phase, multi-faceted effort to make the Green Line more reliable, robust, and resilient, centered around the next generation of Green Line vehicles. In order to improve reliability and accommodate modern vehicles, the Green Line track, signals, and power need to be upgraded.

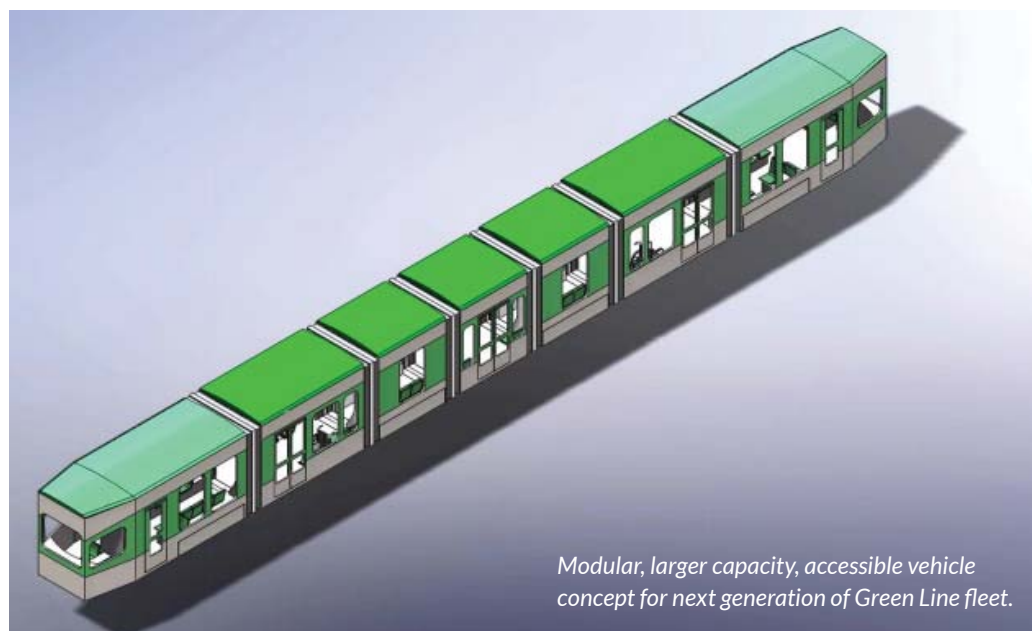
Many portions of the Green Line are operating under speed restrictions due to track wear and tear. The last time the MBTA substantially replaced Green Line track was in the 1970s and 1980s. Significant short-term track work has been conducted throughout the Green Line since 2016. However, new, full-depth reconstruction of tracks is needed to eliminate speed restrictions and should be built to last 20-25 years.

Additionally, Green Line signals are obsolete and need to be replaced with contemporary equipment. Newer upgraded signals would substantially reduce signal component failure rates, which would decrease operating and maintenance costs and significantly improve reliability on the Green Line. To limit disruptions during construction, the track and signals programs have been combined where appropriate.

What's Next: The first phase of this program is being conducted on the D branch in 2018-2019 and will continue to other branches over the next several years.

Green Line Transformation: Fleet Planning

While 24 new Type 9 vehicles have begun arriving for the Green Line Extension, the remaining 110 Type 7 and 94 Type 8 vehicles on the Green Line, some dating back as far as 1986, will need to be replaced within the next 10-15 years. A uniform fleet of Type 10, higher capacity, low-floor vehicles and associated infrastructure improvements will improve accessibility, increase capacity and fleet reliability, improve customer experience, and reduce dwell times and lifecycle maintenance costs.



Modular, larger capacity, accessible vehicle concept for next generation of Green Line fleet.

What's Next: Work is currently underway to develop the specifications for the new vehicle type in order to begin the procurement process in 2021.

Green Line Extension to Somerville and Medford

Extending the Green Line 4.7 miles to College Avenue in Medford and Union Square in Somerville will meet the commitment of the MBTA's final remaining obligation to Central Artery/Tunnel mitigation. The project's six new stations will put 80 percent of all Somerville residents within walking distance of rapid transit.

What's Next: The Green Line Extension will be completed by the end of 2021.

We're Doing (Commitments through 2023)

Surface Green Line Stop Consolidation

Many Green Line surface stops are closely spaced and require trains to stop often. Consolidating stops speeds up travel times and improves the customer experience for users. The consolidation of four B branch stops along Commonwealth Avenue will begin in 2019. The project is coordinated with MassDOT's Commonwealth Avenue Phase 2A project. This work will consolidate St. Paul and BU West stations and Babcock and Pleasant Street stations. The new stops will be accessible, have wider platforms for passengers, allow for level boarding, and accommodate longer train sets. There will also be improved traffic and pedestrian safety, updated fare collection machines, and other reliability upgrades.

What's Next: The MBTA will initiate construction in 2019 and it is anticipated to be completed by 2021.

Surface Green Line Transit Signal Priority

The Green Line passes through more than 40 signalized intersections with general traffic. Allowing trains to request extra green-signal time to clear intersections will improve travel time for passengers. The MBTA piloted the technology in 2017 and will implement transit signal priority at all appropriate intersections on the B, C, and E branches.

What's Next: Full implementation has begun and is anticipated to be completed in 2019.

Green Line Train Protection

Collision avoidance systems alert operators when they are too close to another train and automatically deploy the brakes if they aren't deployed manually.

What's Next: The MBTA is procuring a collision avoidance system on the Green Line.

Green Line Extension to Mystic Valley Parkway Final Environmental Impact Report

The Green Line Extension, set to be completed in 2021, will go from Lechmere to College Avenue in Medford. However, the original project contemplated a terminus one mile north of the College Avenue Station at Mystic Valley Parkway. MassDOT/MBTA have committed to advancing this portion of the project with an updated environmental review.

What's Next: MassDOT/MBTA will complete the Massachusetts Environmental Policy Act (MEPA) process that was initiated as part of the commitment of MPO funding to the Green Line Extension and, upon completion, score the project for potential inclusion in the CIP and/or the Boston Region MPO Regional Transportation Plan.

Accessibility Upgrades at Hynes and Symphony Stations

Green Line stations at Symphony, Hynes, and Boylston are the last three Green Line subway stations that are not accessible. Significant space constraints and impacts to historic properties are a challenge at Boylston, but Hynes and Symphony stations are currently fully funded for design and construction with support from private developers at those stations. Addressing ADA accessibility problems at these stations will improve the customer experience for everyone.

What's Next: Hynes construction is anticipated to be completed in 2021, pending successful negotiations with the developer. Symphony Station construction is anticipated for late 2020-late 2022.

With more than **200,000** passenger trips each weekday, the Green



Line is the nation's highest ridership light rail system

Source: www.mbtabackontrack.com 2017 ridership data

GREEN LINE 2040



We're Planning (Next Priorities through 2040)

Green Line Transformation Phase 2: New Fleet, Upgraded Infrastructure and Maintenance Facilities

The aim of this phase is to increase the number of weekday peak trains from 73 to 94 and accommodate single-car trains of the new vehicle type to achieve a 15% increase in capacity. This will require several infrastructure-related investments:

- The Lake Street, Reservoir, and Riverside maintenance facilities are in marginal condition and must be upgraded to accommodate the new fleet. The Green Line is the only service for which the MBTA performs all vehicle maintenance in-house. The current Riverside facility has had few upgrades since it was constructed in the 1970s. Now at over 40 years old, the roof leaks, hoists and cranes are out-of-service, and there is a lack of working platforms and storage.
- In order to accommodate the new vehicles, certain track sections will be updated to accommodate the new vehicles. Necessary projects include: completing Phase 1, vehicle procurement, reconditioning the Lechmere viaduct to accommodate more weight, installing a Park Street loop crossover to provide for more

flexible boarding, and reconfiguring Lake Street, Reservoir, and Boston College stations to accommodate the length of vehicles.

What's Next: The new Green Line Transformation Program Office is working to sequence all the necessary work to upgrade infrastructure and facilities and introduce a new Green Line fleet into service.

Green Line Transformation Phase 3: Expanded Capacity on D and E Branches (2-Car Trains)

The aim of this phase is to operate new trains as single cars on the B and C branches, and as two-car sets on the D and E branches to achieve a Green Line capacity gain of 50+%. Necessary projects include completing Phase 1 and 2, reconfiguring Heath Street Station, extending Brookline Hills eastbound platform, clearing an obstruction to increase platform length at Boylston Station eastbound, upgrading power distribution, and retiring the Type 7 and 8 Cars.

What's Next: Green Line Transformation Phases 1 and 2 will inform the timing and development of Phase 3 projects.

Surface Green Line Optimization

Green Line surface operations are slower than subway service due largely to conflicts with cars, as the E branch operates in fully mixed traffic between Brigham Circle and Heath Street, and the B, C, and E branches face through-traffic and cars making turns through the Green Line right of way. Minimizing conflicts with vehicles is important for speed and reliability today, and may be necessary to fully accommodate two-car trains on the branches in the future.

What's Next: Before proceeding with any changes, MassDOT/MBTA will coordinate with Boston and Brookline and initiate a study and public process to develop options and consider changes required for improving Green Line surface operations.

We're Imagining (Big Ideas)

Green Line Transformation Phase 4: Expanded Capacity on B and C Branches (2-Car Trains)

Accommodating two-car trains of the longer Type 10 vehicles on the B and C branches to double capacity will require significant investment to extend or reconfigure up to 27 stops, procure additional Type 10 vehicles, and expand vehicle storage to accommodate a larger fleet.

Green Line Extension to Hyde Square

GoBoston 2030 recommends a Green Line extension of the E branch to Hyde Square in Jamaica Plain to better connect an environmental justice community with employment, health, and educational destinations. This concept can be explored further as the E branch is upgraded to accommodate higher capacity two-car trains.

Dedicated right-of-way on Huntington Avenue for the E branch and the 39 and 66 bus routes between Brigham Circle and South Huntington Avenue would be a prerequisite to an extension.

Downtown Superstation

Connecting stations at State and Downtown Crossing (see Downtown Pedestrian Connection between Red and Blue Lines), and thus Park Street, through underground pedestrian

walkways could make trips easier and faster by eliminating a transfer while freeing up needed capacity on rapid transit lines passing through Downtown. The proximity of Park Street to Downtown Crossing creates an opportunity to consolidate their functions (Downtown access plus Red Line connections to Green and Orange, respectively) into one station.

Green Line Extension to Mystic Valley Parkway, Somerville/Medford

A future extension of the Green Line would terminate a mile north of the College Avenue Station at Mystic Valley Parkway. This extension could create new opportunities for transit-oriented development while bringing rapid transit closer to the West Medford neighborhood.

Reconfiguring 27 B and C branch stops to allow for two Type 10 cars, doubling capacity.

Extensions to Hyde Square in Jamaica Plain and Medford.

Park Street-Downtown Crossing Superstation.

ORANGE LINE 2040



Program Objective

Increase peak-hour service to every 4.5 minutes (three minutes if development warrants) to meet the needs of homes and businesses throughout the growing corridor, serving additional riders from the Lower Mystic region.

We're Doing (Commitments through 2023)

Orange Line Systemwide Improvement Program: Fleet Replacement and Maintenance Facility Upgrades

The Orange Line trains reached their design life in 2004-2005, and their advanced age has resulted in a 25% reduction in capacity during peak travel times because of a lack of functioning equipment. The 120 replacement cars and 32 new cars will increase capacity on the line with higher capacity vehicles and improve frequencies to every 4.5 minutes during peak periods.

As part of this program, the Wellington Car House will be expanded in order to house and operate the new fleet. Additional infrastructure improvements include a new maintenance bay and shop improvements to help maintain the new fleet.

Full fleet of new Orange Line cars will arrive by 2022

What's Next: The fleet will be introduced into service in stages, beginning in 2019 through 2021. The maintenance facility upgrades will be completed by 2020.

Orange Line Systemwide Improvement Program: Capacity and Reliability Improvement (4.5-Minute Headways)

To cost effectively further increase the capacity on the Orange Line, the vehicle procurement included 32 vehicles beyond the existing fleet size to accommodate growth along the corridor and reduce crowding. In order to accommodate the larger fleet and further enhance reliability, several infrastructure improvements are being implemented as part of this program. The current signal system

uses outdated technology from the 1970s, resulting in frequent failures and service delays. Updating the signals to modern digital circuits with contemporary-standard 100Hz equipment will further improve reliability and enable capacity improvements. In addition, upgrades to traction power substations are necessary to provide more power and accommodate increased capacity with the additional vehicles on the line.

What's Next: Infrastructure upgrades will be completed in early 2022.

We're Planning (Next Priorities)

Additional Capacity Improvements (3-Minute Headways)

Further operational improvements may help achieve frequencies greater than every 4.5 minutes as currently planned with the new Orange Line cars. If recent development trends in the Lower Mystic region and in Malden continue or accelerate, this significant increase in capacity could prove inadequate by 2040. In a future where development continues to be drawn to the large, underutilized parcels along this rapid transit corridor, three-minute headways could be warranted.

What's Next: The MBTA will conduct a study to recommend a next generation signal system and the necessary investments in vehicles, power, and storage and maintenance facilities to achieve 3-minute headways on the Orange Line. MassDOT/MBTA will track the pace of development and crowding and will identify appropriate development triggers to advance the design and construction of this work.

We're Imagining (Big Ideas)

Extensions to Roslindale and Downtown Everett via a spur from Sullivan Square to serve high travel demand. Buildout of a Sullivan Square Superstation, and Downtown Crossing/Park Street/State Downtown Superstation.

Sullivan Square Superstation (Commuter Rail/ Orange Line/ Silver Line)

The City of Boston is planning significant redevelopment for Sullivan Square. Depending on the form and intensity of that redevelopment, new connections to the commuter rail system and extension of services like the Silver Line may be warranted.

Orange Line Extensions (Everett, Roslindale)

The Everett Transit Action Plan and the Lower Mystic Regional Working Group effort both explore a concept to create a spur at Sullivan Square to extend the Orange Line into Downtown Everett. GoBoston 2030 recommends an extension of the Orange Line south to Roslindale. These extensions would follow high demand bus corridors, and would allow for the reallocation of some of that bus service. While both of these ideas would bring rapid transit service into areas with the land use

and population density to support it, lower cost speed and reliability improvements to Broadway in Everett and Washington Street in Roslindale should be exhausted before costly rail extensions are considered.

Downtown Superstation

Connecting stations at State and Downtown Crossing (see Downtown Pedestrian Connection between Red and Blue Lines), and thus Park Street, through underground pedestrian walkways could make trips easier and faster by eliminating a transfer while freeing up needed capacity on rapid transit lines passing through Downtown. The proximity of Park Street to Downtown Crossing creates an opportunity to consolidate their functions (Downtown access plus Red Line connections to Green and Orange, respectively) into one station.



RED LINE 2040



We're Doing (Commitments through 2023)

Red Line Systemwide Improvement Program: Fleet Replacement and Maintenance Facility Upgrades

With over 60% of the Red Line fleet beyond its useful life, a new fleet will improve service reliability and frequencies and address congestion problems. As part of this program, the MBTA is replacing all 218 Red Line cars.

This phase included needed upgrades to the Cabot Maintenance Facility. For example, over 50% of lifts are not operational due to their condition, resulting in the facility not being able to support the timely maintenance and repair of the Red Line fleet. Enhancements to the facility will enable the MBTA to keep the new fleet in optimal condition, leading to fewer breakdowns and service interruptions.

What's Next: Delivery of the new fleet will begin in November 2019 and be complete in 2023. The maintenance facility upgrades will be completed in 2022.

The Red Line is the MBTA's busiest rapid transit line.



It accounts for **22%** of all MBTA ridership

Source: www.mbtabackontrack.com 2017 ridership data

Red Line Systemwide Improvement Program: Capacity and Reliability Improvements (3-Minute Headways)

Red Line vehicles are overcrowded during peak hours, causing longer boarding times, uncomfortable passenger conditions, and train delays. The Red Line Systemwide Improvement Program is leveraging necessary vehicle and infrastructure state of good repair improvements to modernize the line and achieve not only more reliable Red Line service, but 50% more frequent service to accommodate growth along the corridor and reduce crowding. The larger fleet will require modernizing the signal system and improving traction power. In addition, improvements to the Alewife Crossover, which enables trains to switch tracks, will alleviate a key bottleneck to support sustained three-minute headways.

What's Next: Infrastructure upgrades should be substantially complete by 2022.

Red Line South Improvements: Wollaston Station, Transit-Oriented Development, Parking Garages

The MBTA is modernizing several station areas on the southern portion of the Red Line with state-of-the-art safety features, major accessibility improvements, and additional parking, while helping to foster transit-oriented development. The MBTA is fully upgrading Wollaston Station, partially demolishing the Quincy Center Garage, and undertaking major overhauls to the parking facilities at Quincy Adams and Braintree Stations. The MBTA is also in partnerships with the City of Quincy and developers to construct transit-oriented development on MBTA property at North Quincy and Quincy Center Stations.

What's Next: Wollaston Station will be reopened in 2019. Quincy Center Garage will be completed by 2020.



We're Doing (Commitments through 2023)

Mattapan High-Speed Line: Reimagining and Short-Term Improvements

A rehabilitation of the Mattapan fleet will allow antique trolley cars to run until transitional technology is available. A future needs assessment for the line will be released in early 2019 to inform a public process to determine a long-term solution.

What's Next: The fleet rehabilitation is underway and will enable the existing vehicles to operate for at least ten years.

Program Objective

Enable a modernized line with peak trains every three minutes to connect residents of transit-oriented housing to growing job centers—all connected to a reimagined Mattapan Line.



Six of the top 10 rapid transit stations* service the Red Line

*measured by passenger volume and recent growth (FY08-15)

Full fleet of new Red Line vehicles will be in place by 2022.



RED LINE 2040



We're Planning (Next Priorities through 2040)

Strategic Improvements to Support Future Capacity Increases

Operations through many Red Line stations are inefficient, hampered by slow switches, aging infrastructure, and sub-optimally designed track configurations. Major bottlenecks include JFK Station, Park Street, and the Alewife crossover. Closely spaced stations in the downtown area may also be slowing down service. Improving these bottlenecks may further reduce travel times and improve reliability and will serve as a down payment on capacity improvements that could be achieved through a next-generation signal system.

What's Next: The MBTA will study potential consolidation of the Red Line at Park Street and Downtown Crossing and potential improvements at JFK Station and Alewife.

Mattapan High-Speed Line: Implementation of Reimagining

The investment in Mattapan vehicles under "We're Doing" is only a temporary solution. Mattapan Line vehicles are more than 70 years old and replacement parts and components are no longer available. Of the 10 vehicles, only eight are in service, and all are inaccessible for people with mobility devices. Of the eight stations, 75% are beyond their mid-life, requiring renovation in the near future, and the Mattapan Yard is in poor condition to serve current or future needs. The MBTA is now studying alternatives for reimagining the line as an accessible, reliable service, respecting the unique historic nature of the line.

What's Next: The study will be released in 2019 followed by a public process to determine next steps.

Red-Blue Connector

The most studied concept for connecting the Red and Blue lines is an extension of the Blue Line from Bowdoin to Charles/MGH. A 2018 reassessment found that a cut and cover construction approach would be less expensive than the bored tunnel approach studied in the 2010 draft environmental impact report. A Red-Blue Connector would provide more direct transit service between fast-growing employment hubs and residential areas, including communities with concentrations of low-income households. It would also enhance access to the Blue Line connection to Logan Airport, which will be increasingly important as the Silver Line faces worsening highway congestion and projections point to continued growth in air travel to and from Boston.

What's Next: The MBTA will score the Red-Blue Connector for potential inclusion in the next CIP revision.

We're Imagining (Big Ideas)

A connection to the Blue Line and a Downtown Superstation to improve the customer experience and reduce travel times.

Blue Line Connection to Red Line and Beyond

Extending the Blue Line past Downtown to Longwood would address multiple weakness of the Blue Line and also ease pressures on other Rapid Transit lines. This extension would improve connectivity for Blue Line and Red Line commuters, improving rapid transit access to several major employers, academic institutions and healthcare providers, while also alleviating congestion on the Green Line by providing additional capacity through the Back Bay.

Downtown Superstation

Nearly 200,000 trips start, end, or transfer at Park Street and Downtown Crossing every day. The proximity between the stations reduces potential speeds on the Red Line. Building a single transfer station could enable faster and more frequent service, improved connections between rapid transit lines, an enhanced customer environment, and new development opportunity. A new station in this location would touch more customers than nearly any other single improvement in this system.

COMMUTER RAIL 2040



Program Objective

Serve more riders and non-commuting trips by providing better connections to more destinations and potentially by implementing one or more new service models (urban rail/regional rail), pending results of the *Rail Vision* study.

We're Doing (Commitments through 2023)

Rail Vision (Study and Decision on Service Alternatives)

In the winter of 2018, the MBTA and MassDOT began the Rail Vision study, encompassing the full commuter rail system. This process will identify the most cost-effective strategies for leveraging the MBTA's extensive rail network to increase ridership and better meet the transportation and economic growth needs of the Greater Boston region. The Rail Vision will evaluate a range of service alternatives – some that could be advanced with minimal capital investments beyond those necessary to achieve a state of good repair, and others that would require significant investments in order to make them viable. Examples of the capital investments that the Rail Vision is considering include: full or partial system electrification, a change in vehicle technology to lower emitting and more flexible rolling stock, double or triple-tracking including any associated right-of-way acquisition, and new facilities and infill stations, among others.

What's Next: The Rail Vision will be completed in 2019 in order to inform the development of the next operating contract for the MBTA's rail system.

South Coast Rail Phase 1

The South Coast Rail project will restore commuter rail service between Boston and southeastern Massachusetts. The Commonwealth determined it could provide earlier access to the region by extending an existing rail service through Middleborough as Phase 1. MBTA trains will travel on the existing MBTA Old Colony Main Line through Middleborough, where they could connect to other tracks that serve Fall River and New Bedford.

What's Next: Early action construction activities will begin in 2019. Major construction activities will begin in 2020.

North Station Drawbridge

North Station has a total of 12 tracks and six high-level, center platforms, but due to the alignment of the Charles River moveable bridge, only 10 tracks and five platforms are operational, leading to capacity constraints. Modifications to the drawbridge will allow for more operational flexibility and increased capacity.

What's Next: Design work for the drawbridge will begin in 2019 and is anticipated to take two years. The bridge is scheduled to be completed by 2026.

Bi-Level Coach Procurement

The average age of the 471 coaches is 28 years, double the desirable average age with many nearing the end of their useful life. The 2019-2023 Capital Investment Plan provides for the procurement of 181 new coaches in addition to an overhaul of additional coaches. Bi-level coaches can double capacity, while improving reliability.

What's Next: In 2019, the MBTA will begin developing specifications for the next fleet of bi-level coaches.

Locomotive Upgrade and Replacement

The average age of the existing fleet of 104 locomotives is 23 years, double the desirable average age. While new diesel locomotives will be cleaner than the existing fleet, the MBTA is not ready to manage a new fleet type. The Rail Vision will be looking at electrification options, but until then a stopgap measure is being pursued to incorporate upgraded or newer, more reliable locomotives into the fleet.

What's Next: An overhaul of 14 legacy locomotives is currently underway. It should be completed in 2019-2020, with the potential for additional overhauls.

We're Doing

Ruggles Station Upgrades

Ruggles Station is within walking distance of major employment centers and destinations, such as the Longwood Medical Area and Northeastern University. Since there is only one platform for commuter rail, many trains are unable to serve Ruggles. This project constructs a new platform serving Track 2, which creates an opportunity for all trains to stop at the station.

What's Next: Construction is underway and is anticipated to be complete in 2020.

Positive Train Control

Under a 2008 federal mandate, the MBTA is installing Positive Train Control (PTC) technology across all commuter rail lines. PTC can automatically slow or stop a train to avoid a collision or derailment. It will improve safety and reduce human error on the commuter rail. Additional signal improvements in coordination with PTC implementation will improve reliability.

What's Next: Construction is underway. The MBTA anticipates that the system will be fully operational by the end of 2020.

We're Planning (Next Priorities through 2040)

Tower 1 Upgrade

Tower 1 Upgrade is an initiative of MassDOT and the MBTA through the Federal Railroad Administration (FRA) High Speed Intercity Passenger Rail (HSIPR) grant for the expansion of South Station. As part of this project, MassDOT is exploring ways to make early investments to the Tower 1 area that would provide much needed improvements and efficiencies. The Tower 1 Interlocking is located immediately south of the South Station passenger terminal where all MBTA and Amtrak lines converge into South Station. It is

one of a series of interlockings that process train service into and out of South Station. The existing condition and age of the interlocking limits the efficiency and reliability of the terminal area, which impacts both intercity and commuter rail services. The early action improvements to Tower 1 will provide state of good repair upgrades and modernization of the signal and communication systems, resulting in immediate benefits to the MBTA and Amtrak by improving speed, reliability and operational efficiency.

What's Next: MassDOT and the MBTA are currently scheduled to complete the design work under the existing grant schedule by the end of 2019. MassDOT is pursuing an FRA grant to advance the project into construction.

The MBTA's commuter rail system is one of the largest in the nation, with



COMMUTER RAIL 2040

We're Planning (Next Priorities through 2040)

Exploration of Commuter Rail Electrification Pilot Program

As a first step to adding clean locomotives to the MBTA's commuter rail operations, the MBTA could replace diesel locomotives with electric for the commuter rail service from South Station to Providence. While agreements with Amtrak would be necessary, the traction power system required to accomplish this is already in place in South Station yard and along the rail line to Providence as part of Amtrak's Northeast Corridor system.

What's Next: The MBTA is exploring opportunities to lease electric locomotives for this corridor.

Station Investments (Infill Stations, Connections to Rapid Transit)

New infill stations, between existing stations, could be considered on existing rail lines to support dense development patterns and to provide more transit options. Infill stations have the greatest potential where private partners are considering major employment centers and/or residential development, where major highways intersect the commuter rail network, or where there is significant transit-oriented development potential.

The MBTA will consider optimal station distances, wear and tear on

rolling stock, changes in equipment types, and added delay for commuters traveling from points further away from the urban core in determining appropriate infill stations.

While currently more than 90% of inbound commuter rail passengers alight at South Station, Back Bay, or North Station, the future may see employment centers evolve outside of the Downtown Boston core. Developing connections to local transit services so that passengers don't have to travel into the core holds the potential to optimize commuter trips and system capacity, while building redundancy into the overall MBTA system. Opportunities to improve these connections range from schedule modifications, expanding track capacity at existing intermodal stations, and relocating rapid transit/commuter rail connections to more strategic locations. Opportunities exist for such connections in Cambridge, Somerville, and Everett, as well as in emerging development areas. As with potential infill stations, additional delay for current customers must be considered as any additional intermodal stations are explored. The Rail Vision will also recommend service models that may argue for or against certain new stations. Station investments will be subject to the Third Party Contributions Policy due to the local benefits that accrue from these types of investment.

What's Next: The MBTA is currently examining potential station investments as part of the Rail Vision effort. Findings will inform the prioritization and process for next steps.

Regional Multi-Modal West Station and Middyay Train Layover

As the former Beacon Park rail yard undergoes redevelopment, the need to build on existing transit options in the Allston community will increase. The MBTA, informed by the Rail Vision, will partner with adjacent stakeholders, land owners, and municipalities to build West Station on the Worcester Line as a multi-modal transit hub. A relocated midday train layover will be a part of this investment.

What's Next: MassDOT and the MBTA will coordinate with MAPC on their Allston Regional Transportation Scenarios Study, which will identify future transit needs for the Beacon Park Yards area and develop recommendations for the design, service planning, and timing of West Station.

Double and Triple Tracking to Add Capacity

There is potential to restore double track segments on which the MBTA has the available right-of-way

including the Old Colony Line north of Braintree (a feasibility study is the necessary next step) and one-mile segments along the Haverhill and Fitchburg lines including Ballardvale and Waltham Stations, respectively. In order to expand express service during peak periods on the Worcester Line, a triple track will be necessary.

What's Next: On the Worcester Line, all new station accessibility work will be designed to accommodate a third track. The preferred service model from the Rail Vision will influence additional needs and priorities related to expanding track capacity.

South Coast Rail Full Build

The full build of South Coast Rail will provide travel time savings and environmental improvements upon completion of Phase 1 service. For the full build, the route will travel from Boston's South Station to Stoughton using a track portion of the Northeast Corridor. The route continues south along a combination of what is currently inactive right-of-way and freight rail lines before splitting south of Taunton for terminus stations in Fall River and New Bedford.

What's Next: MassDOT will continue to advance the full build through design and permitting as Phase 1 is advanced through construction.

We're Imagining (Big Ideas)

Electrification of the entire rail network with major capital projects supporting a system that is more than "commuter" rail.

As part of the MBTA's Rail Vision process now underway, MassDOT/MBTA is examining various possible service models for rail transportation in the Commonwealth. Topics include the benefits and costs of urban rail and regional rail, of service focused on reverse-commute needs and the needs of Gateway Cities, and of system electrification. Different service models will require different near-, medium-, and long-term capital investments.



WATER TRANSPORTATION 2040



Program Objective

Support a robust, multi-operator Boston Harbor water transportation system, serving more passengers and destinations with excellent connections to landside MBTA service.

We're Doing (Commitments through 2023)

Hingham Infrastructure Improvements

The dock, ramps, and floats at Hewitt's Cove in Hingham are the MBTA ferry facilities in greatest need of improvements. The MBTA was awarded a federal grant from the Department of Transportation's Passenger Ferry Grant Program to improve these facilities.

New infrastructure will better accommodate people with disabilities at all tide levels and make it easier for passengers to board and disembark smoothly.

What's Next: Construction is anticipated to be completed by 2021.

New Ferry Service Pilot Programs

MassDOT and the MBTA have in the past and will continue to use several methods to advance and pilot new ferry service connections, including through partnerships with the private sector and other public entities providing ferry services.

What's Next: The MBTA works closely with the Water Transportation Advisory Council, created in 2016, to coordinate ferry services on the Harbor. Through this body, pilot programs can be identified and advanced by the MBTA or other partner agencies.

Fleet Expansion to Four Ferries

The MBTA recently accepted two new ferries into its fleet, doubling the size of the MBTA-owned fleet. These vessels will allow existing ferries to be taken out-of-service and rehabilitated to extend their useful lives without reducing existing service levels. The remaining vessels in service are owned by the MBTA's water transportation operator, Boston Harbor Cruises.

What's Next: After the existing vessels are rehabilitated and brought back into service, opportunities to expand MBTA service may be available.

We're Planning (Next Priorities through 2040)

Expanded and Better Integrated Multi-Provider Water Transportation Network

Currently, there are multiple providers of ferry service including private, municipal, and the MBTA. A more robust, better integrated ferry system could provide a valuable transit option for waterfront communities that are becoming increasingly dense and have limited direct transit options. Boston Harbor Now is developing a Water Transportation Study that will recommend financially sustainable business plans for new or enhanced service.

The study includes looking at opportunities to better connect the ferry network – both between ferry routes and among other modes.

Current ferry schedules mostly assume that passengers take only a single ferry during their trip. Better aligning schedules will enable easier transfers between both ferries and other transit options near ferry docks. Access to ferry docks in every community will consider the needs of

people arriving on foot, by bike, and using public transit. Complete Streets designs will be considered for the streets and sidewalks leading to each dock. Improved wayfinding can also improve access to the site.

Currently, the ferry network has multiple service providers and operators – going forward, the MBTA will work with partners to make sure all water transportation serving the region has well integrated schedules, payment, and coverage.

What's Next: Boston Harbor Now will release a study in 2019 with potential financially sustainable business plans that could be delivered by the MBTA or other public or private entities.

We're Imagining (Big Ideas)

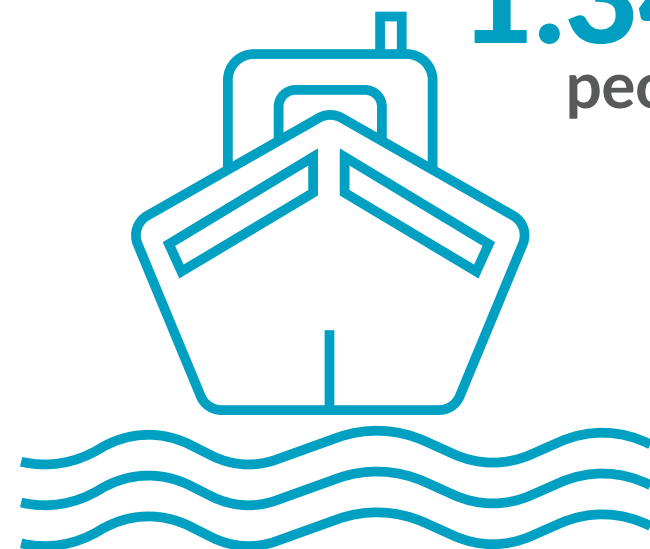
A flexible network of service providers and facility owners that coordinate with drivers of demand (event venues, construction project managers, airports and hotels) to create and market successful temporary ferry connections that help to relieve pressure on roadways and the core transit system.

Full Implementation of an Expanded, Comprehensive, Multi-Provider Ferry Network

Full implementation of an expanded, comprehensive, multi-provider ferry network will build upon the success of new routes and improved interconnectivity in Phase 1. This effort will help to achieve an expansive, resilient, high ridership network. New ferries could also be purpose-built for the unique conditions in Boston Harbor.

Every year, approximately

1.34 million
people ride the ferries



Growing Ridership

Ridership on the existing ferries serving Hingham and Hull continues to grow. The MBTA is committed to maintaining the quality of these services and to marketing these services in order to grow ridership. Where ridership demand warrants adjustments in schedule and/or vessel capacity, the MBTA will make such adjustments.

Source: www.mbtabackontrack.com 2017 ridership data

PLACE-BASED SERVICE ADDITIONS



Program Objective

Focus new services and expansion projects on providing high frequency, reliable service to better meet the needs of those who live and work in and travel to Priority Places that can support high quality transit service.

We're Doing (Commitments through 2023)

Studies: Transit Action Plans for Priority Places (Seaport, Allston, Lynn)

To identify and accelerate the implementation of transit improvements in communities that can benefit from additional transit capacity, MassDOT and the MBTA will prepare a series of action plans for targeted communities, such as Lynn and the Allston neighborhood of Boston. These plans will inform short-term improvements and service pilot programs, and will provide the foundation for longer-term projects and investments in Priority Place communities.

Other Programs describe projects with important place-based impacts. The ones "We're Doing" include:

- Green Line Extension to Somerville/Medford
- South Coast Rail Phase 1



Everett dedicated bus lanes were made permanent in September 2017. Photo by Transit Center.

POLICY FOR DEVELOPMENT: ADVANCING EXPANSION PROJECTS IN NEXT PRIORITIES

Purpose: Establish a policy and process for advancing Focus40 Next Priority expansion projects that provides improved transparency, fairness, and an efficient use of resources.

Guiding Principles:

- The MBTA will create a funding program in the CIP under the Expansion Priority for project development, which may include a conceptual study, alternatives analysis, up to fifteen percent design, and high level cost estimate.
- When CIP programs are sized on an annual basis, funding may be allocated towards this program.
- To prevent projects from going stale, MassDOT / MBTA will not begin the environmental process without a funding strategy in place.
- Local beneficiaries must contribute to the cost, per the conditions of the Third Party Contributions Policy.

We're Planning (Next Priorities through 2040)

Place-Based Service Expansions Based on Pilot Programs and Transit Action Plans

Based on the results of the Transit Action Plans and any related pilot programs, the MBTA will incrementally introduce improvements in the Priority Places. This process will initially focus on the lowest-cost actions that can produce the desired benefits—for mobility, economic growth, quality of life, and other key indicators for the

region—and will only move to more costly interventions as needed to continue to meet the demonstrated and projected demand for transit service. In practice, this framework will initially lead to bus-based improvements, with increasingly complex supportive roadway infrastructure as services prove successful. This can ultimately lead to a series of bus rapid transit networks.

Other Programs feature projects with important place-based impacts. The ones "We're Planning" include:

- Implementation of Bus Network Redesign
- Commuter Rail Station Investments
- Regional Multi-Modal West Station
- Bus Rapid Transit through Everett
- South Coast Rail Full Build
- Red-Blue Connector

We're Imagining (Big Ideas)

Rail extensions and new bus rapid transit routes better connecting Priority Places.

Full Implementation of Place-Based Transit Expansion Programs

As bus investments in the Priority Places demonstrate success and ridership continues to grow, the most successful bus routes may be replaced with higher capacity rail services, as appropriate and feasible.

Other Programs feature projects with important place-based impacts. The ones "We're Imagining" include:

- Green Line Extension to Mystic Valley Parkway
- Green Line Extension to Hyde Square
- Orange Line Extension to Roslindale
- Orange Line Spur to Everett
- Blue Line Extension to Lynn
- Blue Line Connection to Red Line and Beyond

FOCUS40 PROGRAMS

Service	We're Doing (Commitments through 2023)	We're Planning (Next Priorities through 2040)	We're Imagining (Big Ideas)
Bus 2040	<ul style="list-style-type: none"> Better Bus Project: Current Route Network Improvements Bus Network Redesign Process Partnerships for Bus Priority Accessible Bus Stops Modern Bus Stops and Amenities Bus Fleet Replacement and Expansion (Procurement and Maintenance Facility Reconfiguration) Zero-Emission Bus In-Service Testing <p>Total Programmed Commitment through 2023: \$650 million</p>	<ul style="list-style-type: none"> Phased Conversion to Zero-Emissions Fleet and Facilities (Maintenance Facilities and Fleet Procurement) Implementation of Bus Network Redesign (New or Enhanced Services and Expanded Fleet) Priority Bus Rapid Transit Corridors 	<ul style="list-style-type: none"> Autonomous Bus Shuttles
Silver Line 2040	<ul style="list-style-type: none"> Silver Line Fleet Replacement (Procurement and Maintenance Facility Reconfiguration) Silver Line Washington Street Improvements Transit Priority Infrastructure in the Seaport <p>Total Programmed Commitment through 2023: \$150 million</p>	<ul style="list-style-type: none"> Expanded Silver Line Fleet Bus Rapid Transit through Everett Infrastructure Upgrades in Silver Line Tunnel 	<ul style="list-style-type: none"> Silver Line Tunnel Extension Under D Street in the Seaport
Blue Line 2040	<ul style="list-style-type: none"> Resiliency: Planning and Early Actions Reliability Centered Vehicle Maintenance Program <p>Total Programmed Commitment through 2023: \$47 million</p>	<ul style="list-style-type: none"> Blue Line Capacity and Reliability Improvements Resiliency: Further Implementation Red-Blue Connector 	<ul style="list-style-type: none"> Blue Line Connection to Red Line and Beyond Blue Line Extension to Lynn
Green Line 2040	<ul style="list-style-type: none"> Green Line Transformation: State of Good Repair (SGR) Projects Green Line Transformation: Fleet Planning Green Line Extension to Somerville and Medford Surface Green Line Stop Consolidation Surface Green Line Transit Signal Priority Green Line Train Protection Accessibility Upgrades at Hynes and Symphony Stations Green Line Extension to Mystic Valley Parkway Final Environmental Impact Report <p>Total Programmed Commitment through 2023: \$1.9 billion</p>	<ul style="list-style-type: none"> Green Line Transformation Phase 2: New Fleet, Upgraded Infrastructure and Maintenance Facilities Green Line Transformation Phase 3: Expanded Capacity on D and E Branches (2-Car Trains) Surface Green Line Optimization 	<ul style="list-style-type: none"> Green Line Transformation Phase 4: Expanded Capacity on B and C Branches (2-Car Trains) Green Line Extension to Hyde Square Downtown Superstation Green Line Extension to Mystic Valley Parkway, Somerville/Medford
Orange Line 2040	<ul style="list-style-type: none"> Orange Line Systemwide Improvement Program: Fleet Replacement and Maintenance Facility Upgrades Orange Line Systemwide Improvement Program: Capacity and Reliability Improvements (4.5-Minute Headways) <p>Total Programmed Commitment through 2023: \$613 million</p>	<ul style="list-style-type: none"> Additional Capacity Improvements (3-Minute Headways) 	<ul style="list-style-type: none"> Sullivan Square Superstation (Commuter Rail/Orange Line/Silver Line) Orange Line Extensions (Everett, Roslindale) Downtown Superstation
Red Line 2040	<ul style="list-style-type: none"> Red Line Systemwide Improvement Program: Fleet Replacement and Maintenance Facility Upgrades Red Line Systemwide Improvement Program: Capacity and Reliability Improvements (3-Minute Headways) Red Line South Improvements: Wollaston Station, Transit-Oriented Development, Parking Garages Mattapan High-Speed Line: Reimagining and Short-Term Improvements <p>Total Programmed Commitment through 2023: \$998 million</p>	<ul style="list-style-type: none"> Strategic Improvements to Support Future Capacity Increases Mattapan High-Speed Line: Implementation of Reimagining Red-Blue Connector 	<ul style="list-style-type: none"> Blue Line Connection to Red Line and Beyond Downtown Superstation
Commuter Rail 2040	<ul style="list-style-type: none"> Rail Vision (Study and Decision on Service Alternatives) South Coast Rail Phase 1 North Station Drawbridge Bi-Level Coach Procurement Locomotive Upgrade and Replacement Ruggles Station Upgrades Positive Train Control <p>Total Programmed Commitment through 2023: \$1.9 billion</p>	<ul style="list-style-type: none"> Tower 1 Upgrade Exploration of Commuter Rail Electrification Pilot Programs Station Investments (Infill Stations, Connections to Rapid Transit) Regional Multi-Modal West Station and Midday Train Layover Double and Triple Tracking to Add Capacity 	<ul style="list-style-type: none"> Full Electrification of Commuter Rail
Water Transportation 2040	<ul style="list-style-type: none"> Hingham Infrastructure Improvements New Ferry Service Pilot Programs Fleet Expansion to Four Ferries <p>Total Programmed Commitment through 2023: \$30 million</p>	<ul style="list-style-type: none"> Expanded and Better Integrated Multi-Provider Water Transportation Network 	<ul style="list-style-type: none"> Full Implementation of an Expanded, Comprehensive, Multi-Provider Ferry Network

FOCUS40 PROGRAMS

Systemwide

We're Doing (Commitments through 2023)

Accessibility and Paratransit

- Plan for Accessible Transit Infrastructure (PATI) Completion
- PATI Early Action Bus Improvements
- PATI Early Action Rapid Transit and Commuter Rail Improvements

Total Programmed Commitment through 2023: \$384 million

We're Planning (Next Priorities through 2040)

- PATI Improvements at Surface Green Line Stops
- PATI Accessibility Improvements for Commuter Rail
- Vertical Transportation Program

We're Imagining (Big Ideas)

- Leveraging Emerging Technologies

Resiliency

- Systemwide *Climate Change Vulnerability Assessments*
- Blue Line Resiliency and Adaptation
- Green Line Portal Protection at Fenway
- Charlestown Seawall
- Adaptation Strategies for Priority Infrastructure, in Collaboration with Municipalities

Total Programmed Commitment through 2023: \$58 million

- Resilient Power Supply
- Incremental Implementation of the Systemwide *Climate Change Vulnerability Assessments*

- Full Systemwide Climate Resilience

Customer Experience

- Automated Fare Collection (AFC 2.0)
- Stop and Station Improvements (Wayfinding, Communications, and Lighting) Phase 1
- Digital MBTA (Travel Planning and Performance Enhancements) Phase 1
- Partnerships for Improved First-Mile/Last-Mile Connections

Total Programmed Commitment through 2023: \$250 million

- Digital MBTA (Travel Planning and Performance Improvements) Phase 2
- Stop and Station Improvements (Wayfinding, Communications, and Lighting) Phase 2
- Platform Barriers and Doors Pilot Program
- Multi-Modal System Access and Parking Improvements

- Comprehensive and Cutting Edge Digital MBTA

Place-Based Service Additions

- Studies: Transit Action Plans for Priority Places (Seaport, Allston, Lynn)
- Service Pilot Programs
- Green Line Extension to Somerville/Medford
- South Coast Rail Phase 1

Total Programmed Commitment through 2023: \$1.2 billion

- Place-Based Service Expansions Based on Pilot Programs and Transit Action Plans
- Implementation of Bus Network Redesign
- Commuter Rail Station Investments
- Regional Multi-Modal West Station
- Bus Rapid Transit through Everett
- South Coast Rail Full Build
- Red-Blue Connector

- Full Implementation of Place-Based Transit Expansion Programs
- Green Line Extension to Mystic Valley Parkway
- Green Line Extension to Hyde Square
- Orange Line Extension to Roslindale
- Orange Line Spur to Everett
- Blue Line Extension to Lynn
- Blue Line Connection to Red Line and Beyond