

FOCUS40

The 2040 Investment Plan for the MBTA

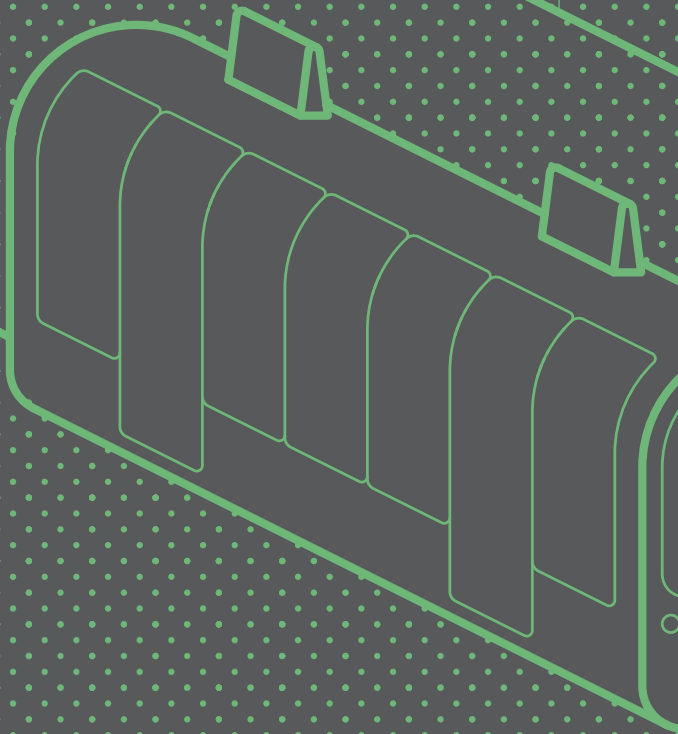
DRAFT

SUMMER 2018

*Positioning the MBTA to meet
the needs of the region in 2040*



massDOT
Massachusetts Department of Transportation



The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

This report was funded in part through grant[s] from the Federal Highway Administration [and Federal Transit Administration], U.S. Department of Transportation. The views and opinions of the authors [or agency] expressed herein do not necessarily state or reflect those of the U. S. Department of Transportation.

TABLE OF CONTENTS

Section 1 INTRODUCTION

Rebuilding the MBTA to Serve a Changing Region	2
Focus40 Background and Overview.....	3
Focus40 and the MBTA Strategic Plan.....	5

Section 2 FOCUS40 PROCESS

A Different Kind of Planning	6
Leveraging Data	6
Engaging Our Customers	7
Goals.....	9
Using Scenario Planning	10

Section 3 PLACES & PROGRAMS

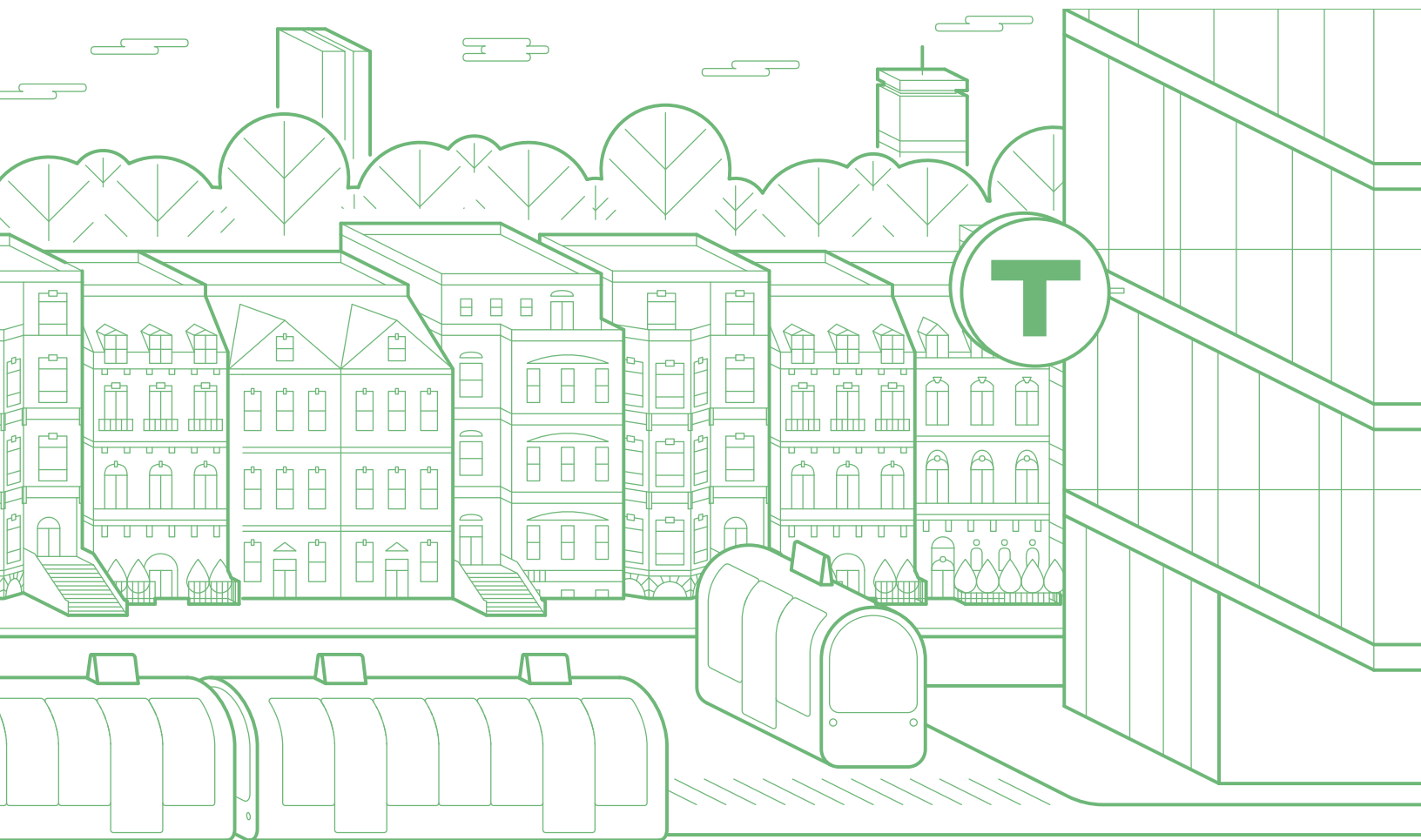
Priority Places	13
Major Employment Districts.....	14
Inner Core Communities Lacking Rapid Transit	16
Urban Gateways.....	18
From Places to Programs to Projects.....	20
Programs.....	21
Investment Classification	22
Program Objectives.....	23
Individual Program Descriptions	24

Section 4 MOVING FORWARD

What's Next	63
How to Engage.....	65

REBUILDING THE MBTA TO SERVE A CHANGING REGION

The Massachusetts Bay Transportation Authority (MBTA) has been changing over the past three years – but the region it serves is changing even faster. Following the disastrous winter of 2015 and the creation of the Fiscal and Management and Control Board (FMCB), the MBTA has focused on accelerating strategic investments to eliminate its State of Good Repair backlog and modernize the system to meet the needs of current and future riders, all within a 15-year time span. While the MBTA still has much work to do before today’s riders fully experience the better and more reliable service they deserve, investments have been put in place to procure new fleets of trains and buses and implement a transformative new system for collecting fares. With total capital outlays now approaching \$1 billion annually, the MBTA is capable of addressing the system’s maintenance and modernization needs while also investing in service expansions such as the Green Line Extension and South Coast Rail.



So Focus40 comes at a critical time, the time to ask how the MBTA can continue and complete necessary investments in maintenance and modernization while also positioning itself to meet the needs of a changing region over the next several decades. Between now and 2040, the MBTA's service region will experience disruptive changes in transportation technology and business models, tectonic shifts in demography and the economy, changes in where and how people will be living and working, and a growing need to address the impacts of a changing climate.

Focus40 is a different kind of plan for what will undoubtedly be a different region and future. This draft was produced using innovative engagement processes and builds on extensive data collection and analysis. Rather than ignore the ways in which 2040 will be different from 2018—or select a single future to plan toward—Focus40 utilized a new approach called scenario planning to think strategically about how to best meet the current and anticipated needs of the region, regardless of which direction key trends take.

The focus of Focus40 is not so much on the MBTA but on the region, communities, people and businesses that it serves. Focus40 therefore reflects what the region will need to be sustainable, livable, equitable, and economically competitive. To support those needs, however, the MBTA transit system itself must change to become reliable, robust, and resilient:

- *Reliable*: Providing service that is safe, on-time, and high quality for customers of all ages and abilities
- *Robust*: Providing service that has the capacity to take people where they want to go as demand for transit increases
- *Resilient*: Providing service that is built to last through extreme weather and other disruptions

Focus40: Positioning the MBTA to Meet the Needs of the Region in 2040 is a playbook for how the MBTA can make investments that will make it the reliable, robust, and resilient transit system this region will require in the future. At the heart of this document is the identification of Priority Places that may warrant new or improved transit service and a menu of investment priorities and more transformative “Big Ideas” organized into Programs. With the publication of this draft, we look forward to getting your feedback both on the process and ideas underlying Focus40 and on the specifics of the Priority Places and Programs presented in the pages that follow and on the website at www.mbtafocus40.com.

FOCUS40 BACKGROUND AND OVERVIEW

Recent MBTA investments have focused on immediate maintenance and modernization needs, such as purchasing new vehicles and replacing signals and track. Such critical investments in system reliability and performance remain essential and will continue—but the

Focus40: Positioning the MBTA to Meet the Needs of the Region in 2040 is a playbook for how the T can make investments that will make it the reliable, robust, and resilient transit system this region will require in the future.

MBTA also needs to ensure that the well-maintained and modernized MBTA of the future can meet the region's changing needs for service.

In order to think more strategically about positioning the MBTA to meet these needs of the region, Focus40 has two building blocks: Priority Places and Programs. The two are related, but Focus40 is trying to shift the conversation about how the MBTA addresses capital expansion projects. Instead of starting with expansion project ideas, Focus40 is about identifying places that need and can support higher quality transit—Priority Places—and then developing projects to serve those places. Projects can then be reflected in one of the dozen investment programs.

Priority Places. Focus40 identifies priority areas for new or improved service based on where investments have the greatest likelihood to deliver ridership and other benefits to the region. These are places where improved service addresses a demonstrated transportation need today that is likely to grow, places that can support higher quality transit, and places where transit and accompanying transit-oriented development could help support broader goals for the region.

Programs. Focus40 is comprised of 12 programs around MBTA services and systemwide priorities that enable the MBTA system to best serve the region over the long term.

The programs – comprised of investments that range from fully planned and designed projects to conceptual ideas that require further study – are organized into three tiers:

- **We're Doing (Commitments through 2023):** Investments that are programmed in the five-year Capital Investment Plan. Impacts of these investments will be felt within the next five years.
- **We're Planning (Next Priorities through 2040):** Investment options that are important to meet the needs of the region in 2040. These are the core pieces of the Focus40 investment strategy. Investments in this category will be prioritized for planning/design work and phased in through the existing, rolling five-year capital planning process.
- **We're Imagining (Big Ideas):** Potentially transformative investment options the feasibility, benefits, and costs of which must be better understood before the MBTA can make a decision about how to move forward. Many of these big ideas may be important investments for the region, depending on which future we expect or want. These ideas may be considered for planning work as the MBTA makes progress on implementing the investments in “We're Doing” and “We're Planning.”



Focus40, informed by the MBTA Strategic Plan, serves as a comprehensive playbook for all MBTA capital investments for the next two decades. It connects current and future modal, project-specific, and systemwide plans to feed the rolling five-year financially constrained Capital Investment Plan.

The Programs presented in this document are, by intent, financially unconstrained and not presented in order of priority. While the programs that “We’re Planning” are intended to be financially reasonable and implementable, their costs have yet to be determined. Focus40 does not identify which programs are most important or urgent, but instead reflects a comprehensive portfolio of potential investments that will make the T reliable, robust, and resilient enough to meet the region’s needs.

FOCUS40 AND THE MBTA STRATEGIC PLAN

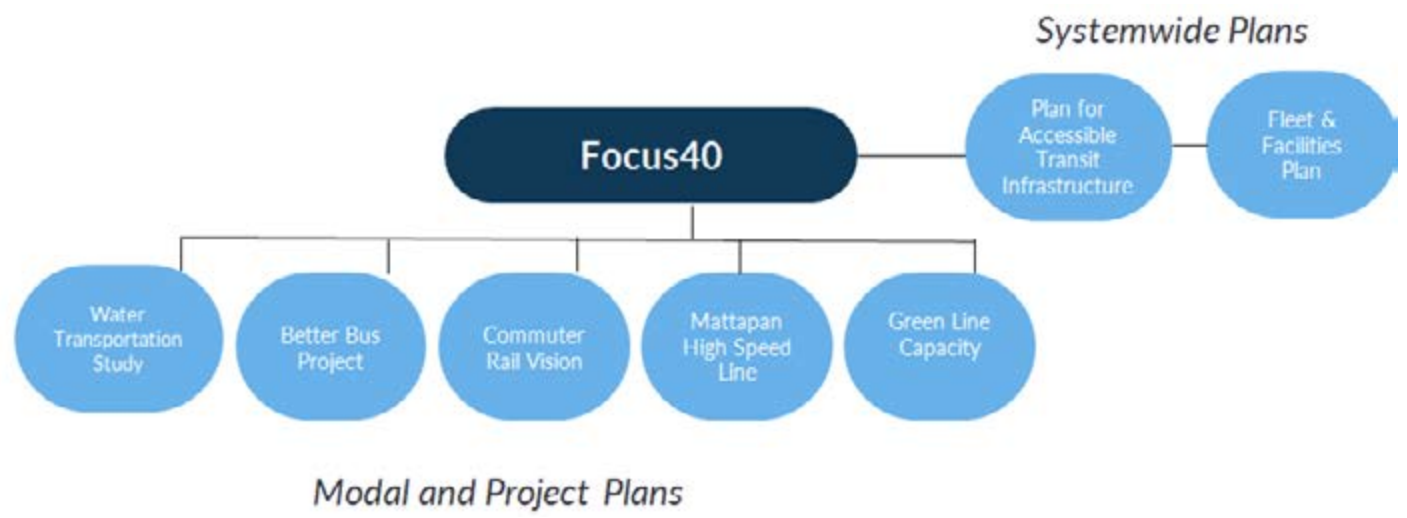
Focus40 is guided by the MBTA Strategic Plan and built upon both internal and external policy and planning efforts, like the MBTA’s *Plan for Accessible Transit Infrastructure* and the City of Boston’s *Go Boston 2030 Vision and Action Plan*. Focus40 will serve as a comprehensive playbook to guide all capital planning initiatives at the MBTA, such as the *Rail Vision* (more information at: www.mbta.com/projects/rail-vision), and will inform outside efforts like the Baker-Polito Administration’s Commission on the Future of Transportation in the Commonwealth. The Focus40 process is already influencing how work is done at the MBTA, including informing ongoing and future planning efforts, helping to prioritize capital projects, and identifying places best suited for new investment.

Focus40, which also serves as the long-range investment plan for the MBTA known officially as the Program for Mass Transportation, promotes a strategic, robust, and incremental approach to investment: prioritizing the least costly solution to address an identified need and only increasing investment when the data demonstrate it is necessary.

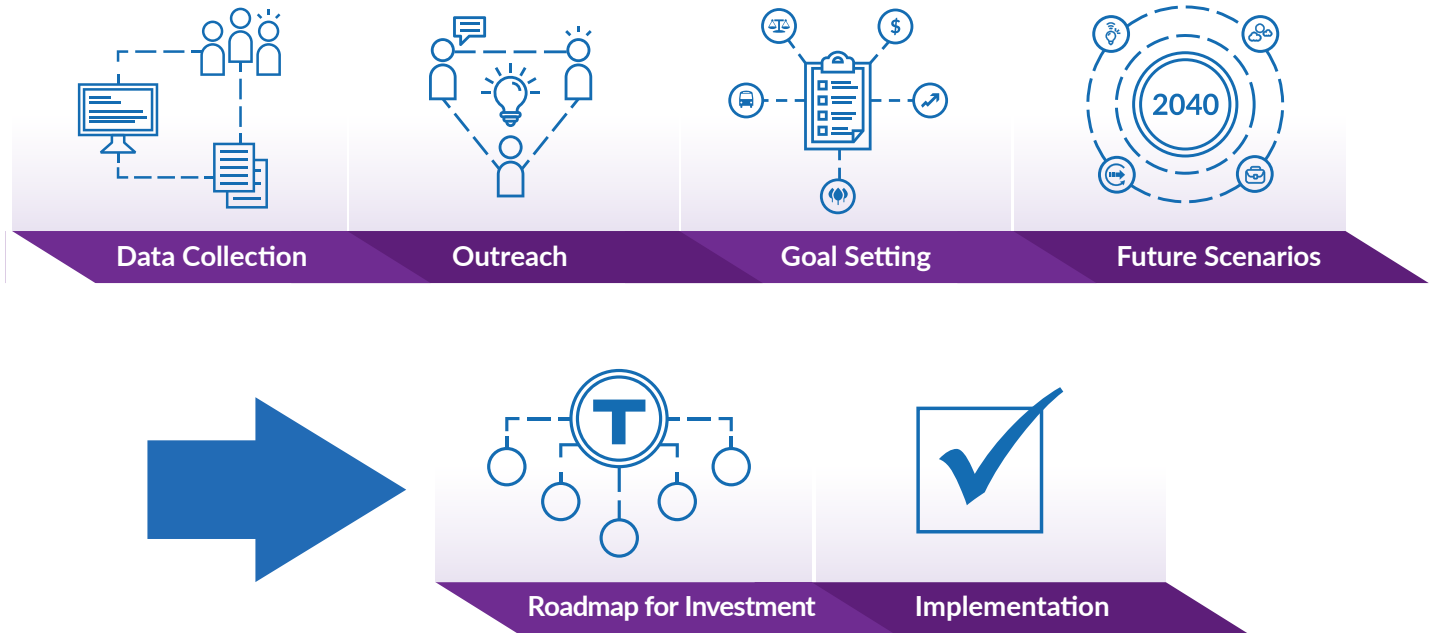
Due to the work of the Fiscal and Management Control Board, MBTA leadership, and the T’s dedicated workforce, the foundation has been laid for the kind of transit system the region needs. Building on these efforts, Focus40 will help position the T to not only maintain its current progress, but to establish a sustainable MBTA better prepared for whatever uncertainty the future might present.

Most importantly, Focus40 creates a living framework for moving the T forward. As with any proposed solutions or strategies, the assumptions and investment possibilities identified here should be regularly revisited and re-evaluated to be sure that they remain the best solutions to the region’s evolving needs.

Find additional information about these studies and others on the Additional Resources page at www.mbtafocus40.com



A DIFFERENT KIND OF PLANNING



LEVERAGING DATA

The development of Focus40 started with establishing a clear understanding of the conditions at the MBTA. The Focus40 team worked closely with dozens of staff members across numerous departments, as well as with senior leaders throughout MassDOT and the MBTA, to develop a comprehensive assessment of the existing system. This process produced the first of the Focus40 planning materials, a series of ‘State of the System’ reports, which provide a mode-by-mode snapshot of the asset condition and service performance of the MBTA bus, rapid transit, paratransit, commuter rail, and ferry systems.

While understanding existing conditions is a necessary first step, a broad awareness of the key trends shaping the region over the next several decades is essential in order to truly grasp how the MBTA needs to invest

for the long-term. The Focus40 team engaged a range of subject matter experts and data sources in order to better identify key emerging trends—including changes in population, climate, technology, and new and potentially disruptive mobility options—and consider how the MBTA could both respond to and shape them.

The Focus40 website: www.mbtafocus40.com has the State of the System Reports and a range of resources that were used in the development of the plan.

Throughout this draft, there will be call out boxes requesting feedback on different elements of the plan. You can respond to these calls for feedback at www.mbtafocus40.com

ENGAGING OUR CUSTOMERS

Just as Focus40 takes a different approach to how the T should plan for the future, it also looks beyond the “usual suspects” and methods to understand the current needs and future aspirations of our riders and stakeholders. Focus40 specifically sought out insights and expertise from customers—such as bus riders—who have often been underrepresented in MBTA planning processes, even though they can be especially dependent on the T and face some of the system’s lengthiest commutes.

In addition to direct outreach to MBTA customers on buses and at stations, staff worked with high school students from Boston, Brookline, and Chelsea, and held large public events with interactive exhibits and organized workshops with stakeholders ranging from business leaders to grassroots community groups. Members of the public contributed more than 3,000 ideas for how the MBTA could better serve the Greater Boston region in the next decades.

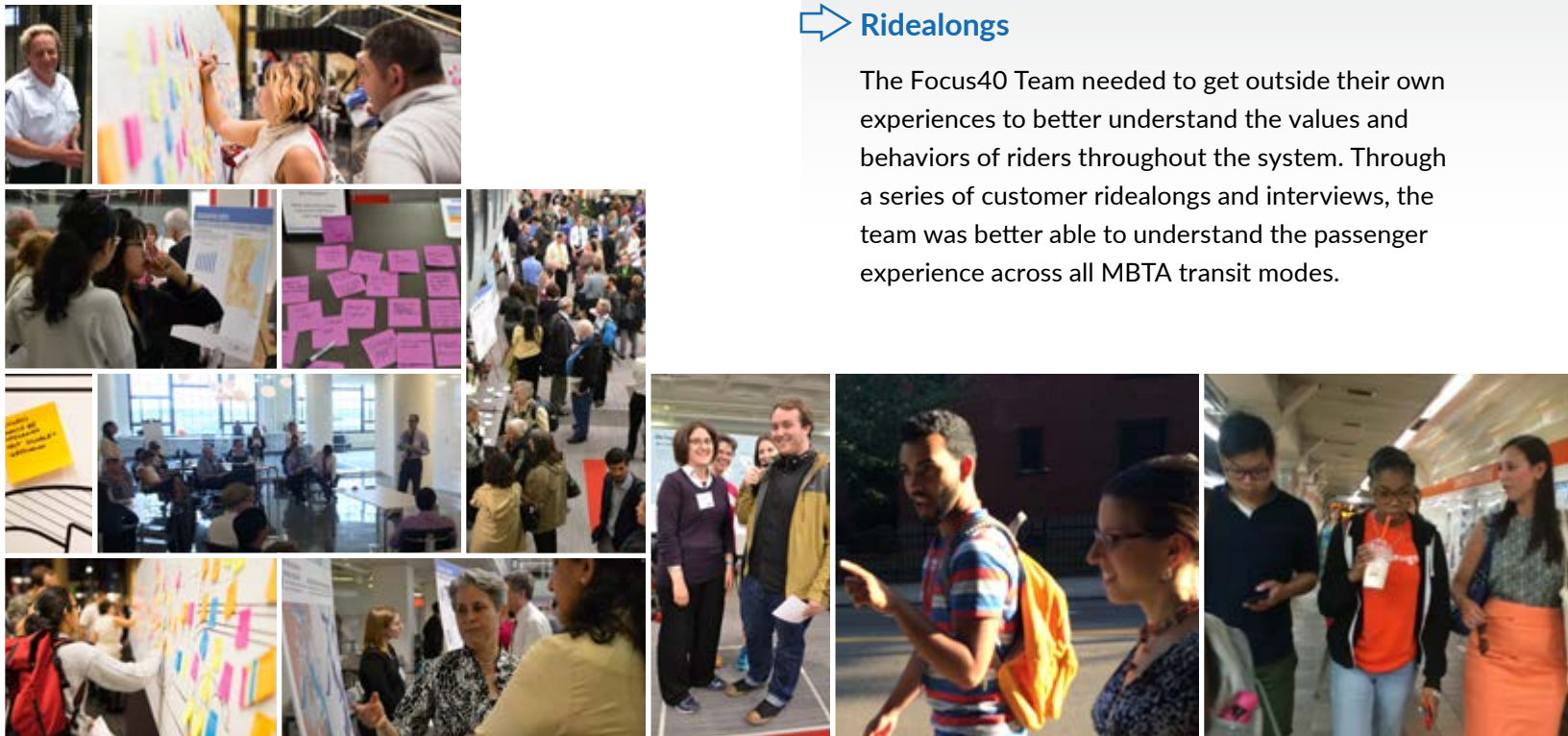


➔ Focus40 Street Team

The project team, supported by a 14-member Focus40 Street Team, spent 100 hours talking to customers at bus stops or in rapid transit and commuter rail stations as they used the system. The Street Team was a partnership with Nuestra Comunidad, Greenroots Chelsea, and Northeastern University. Outreach was designed to correspond with overall MBTA ridership by mode and to reflect the geographic diversity of the MBTA service area.

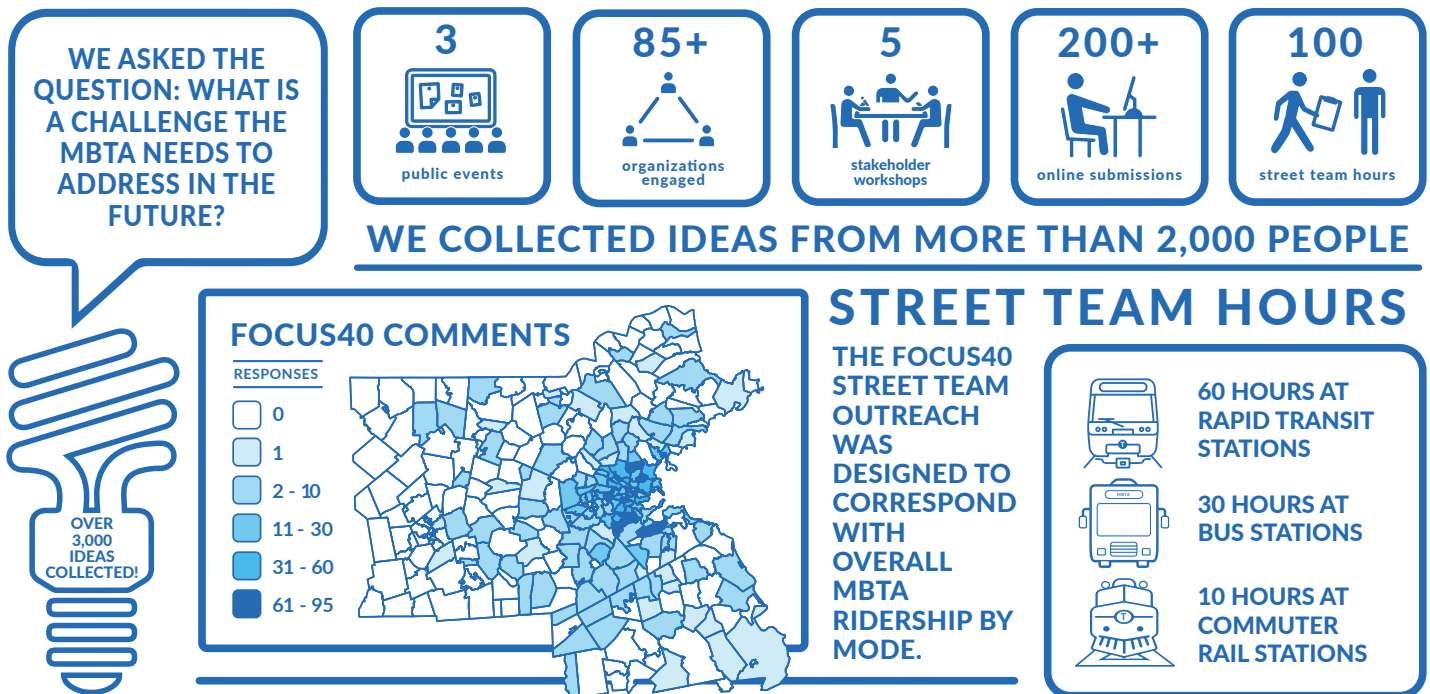
➔ Ridealongs

The Focus40 Team needed to get outside their own experiences to better understand the values and behaviors of riders throughout the system. Through a series of customer ridealongs and interviews, the team was better able to understand the passenger experience across all MBTA transit modes.



➔ Student Partnership with 826 Boston

While many Boston-area high school students and their families rely on the MBTA every day, they are typically underrepresented in planning processes. Seeking new ways to engage with area youth, Focus40 developed a partnership with 826 Boston, an afterschool writing program. This partnership involved students from the Burke High School in Dorchester and the O'Bryant High School in Roxbury. Working side-by-side with 826 Boston staff and volunteer tutors, students wrote short creative pieces related to their experiences with the MBTA. Students from the O'Bryant High School were from the engineering club and examined investment ideas such as bus rapid transit. Students from the Burke High School examined shifting demographics and surveyed members within their community about the future of transportation in Boston. The book that resulted from this creative writing process, *85 Cents Might Not Sound Like a Lot*, was presented in the summer of 2017.



GOALS

Through this process of broad public engagement and focused stakeholder input, and with direction from the Fiscal and Management Control Board and its 2017 Strategic Plan, the Focus40 team developed a set of goals for how the MBTA can meet the needs of the region:

- **Sustainability:** Contributing to greenhouse gas reduction goals
- **Livability:** Improving quality of life with more customer-focused transit options
- **Equity and Affordable Housing:** Improving mobility options for all – regardless of income or ability, and supporting more affordable housing near high-quality transit

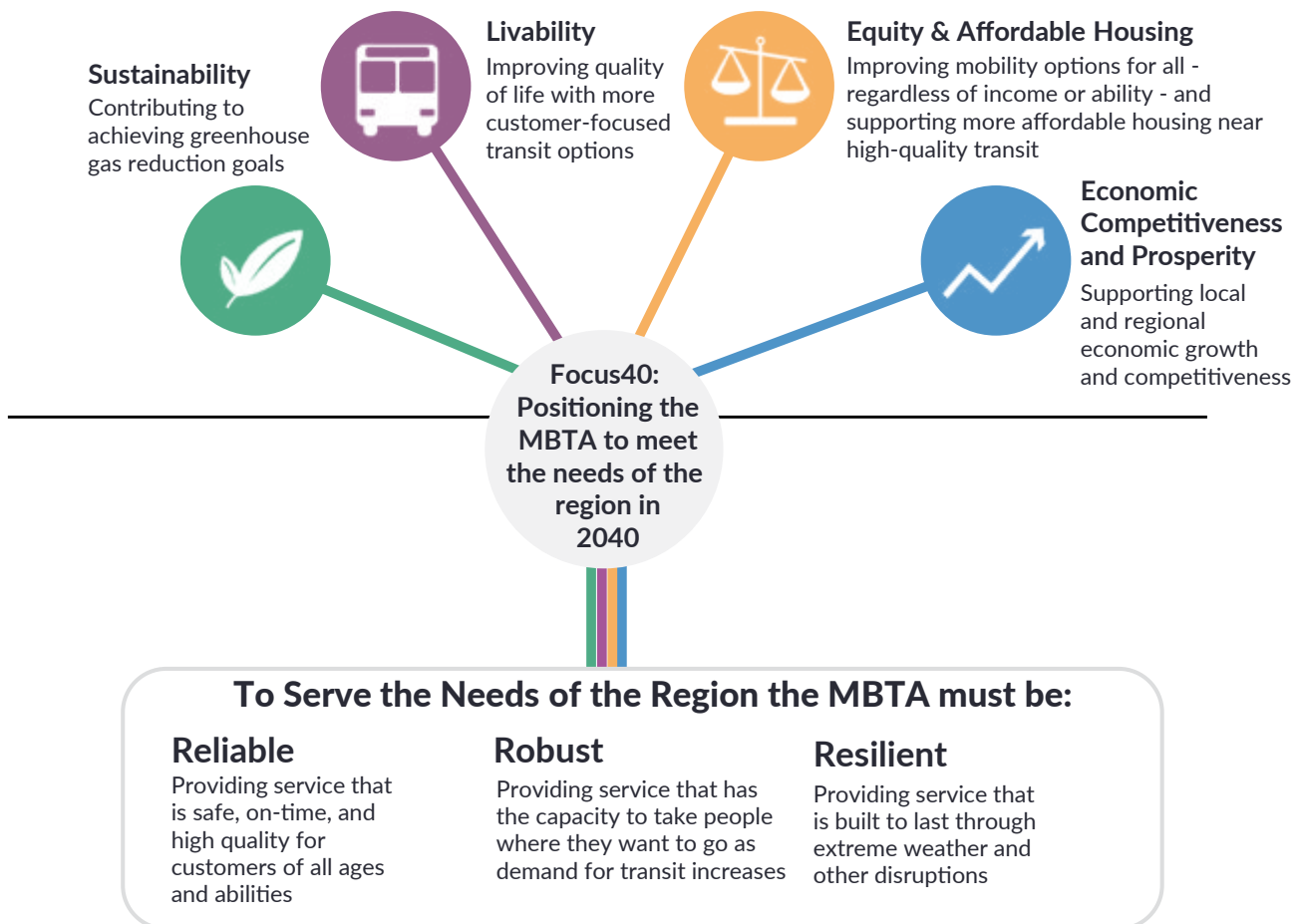
- **Economic Competitiveness and Prosperity:** Supporting local and regional economic growth and competitiveness

With a reliable, robust, and resilient system, the MBTA can play an important role in reducing the region’s greenhouse gas emissions, improving quality of life, advancing equity, and growing the economy. Focus40’s entire portfolio of recommendations, including the priority investments and the places strategy, are designed to be able to support these goals across a range of potential futures.



Are there other goals for the region that the MBTA can help support?

Take the Focus40 Draft Plan Survey at www.mbtafocus40.com



USING SCENARIO PLANNING

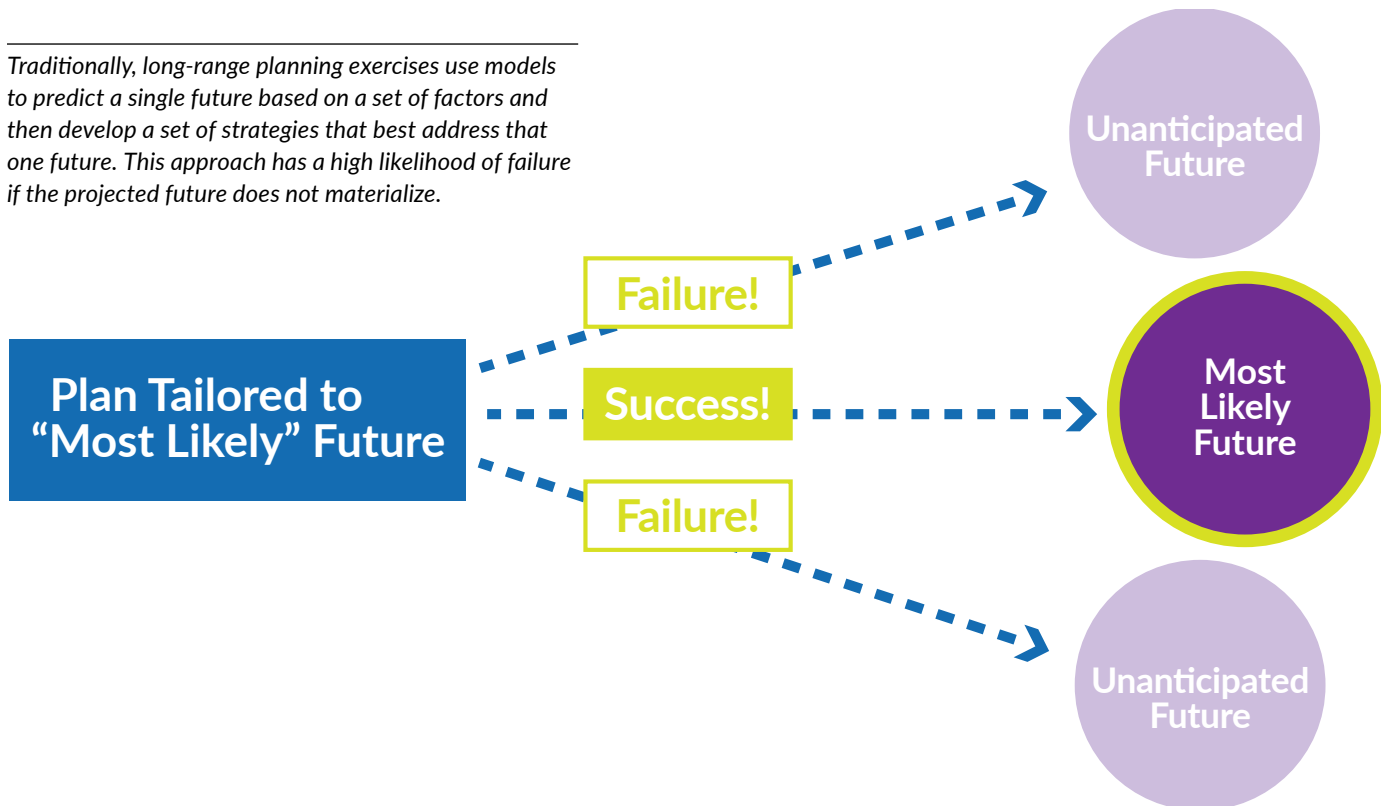
Various trends have emerged over the last five to ten years that could have significant implications for the region and for the role the MBTA will need to play to achieve the goals laid out in this plan. While these trends may seem to be going in one direction, the trajectory of these trends is not necessarily fixed. The rate of urbanization has been accelerating, but where the majority of Millennials—the largest population cohort—choose to live when they start to raise families is still unclear. Housing prices have been increasing dramatically—particularly near transit—but housing construction has also started accelerating, which could help to stabilize prices. Technology is changing at a rapid pace—with autonomous vehicle technology having the potential to transform the mobility landscape. Already we are seeing impacts of rideshare, bike share, and other mobility options that did not exist five to ten years ago. Climate

change will also play a role in determining the needs of the region through 2040—but to what extent policies change to foster collective action remain to be seen.

Traditionally, long-range planning exercises use models to predict a single future based on a set of factors and then develop a set of strategies that best address that one future. But if that single model is wrong, an entire plan may be ineffective and resources that may have been beneficial for that presumed future may now have only limited effect. To plan in the face of uncertainty, Focus40 looked at a range of possible futures in order to develop an investment strategy that can be successful regardless of how current trends evolve.

The Focus40 Team worked with a diverse group of stakeholders and subject matter experts to develop and refine four different potential futures for the Boston

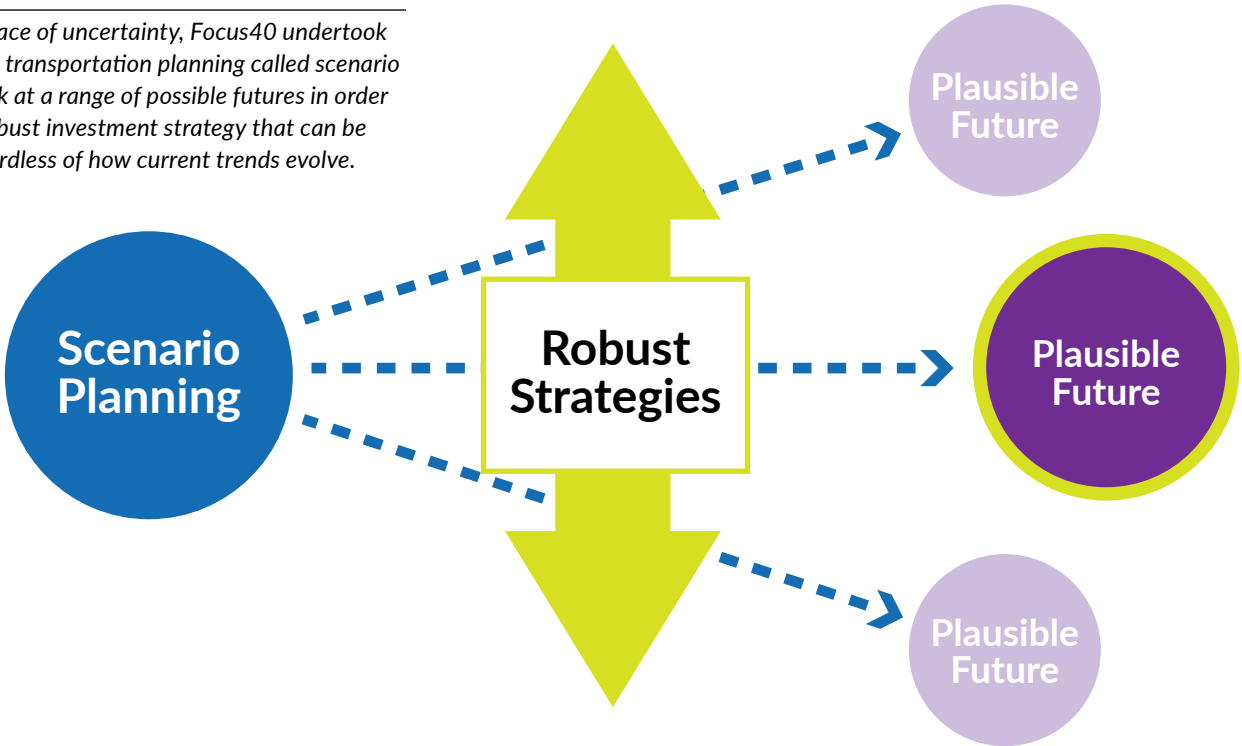
Traditionally, long-range planning exercises use models to predict a single future based on a set of factors and then develop a set of strategies that best address that one future. This approach has a high likelihood of failure if the projected future does not materialize.



region ('planning scenarios') based on the four trends that would have the largest impact on the MBTA's investment strategy: the rate of urbanization; the locational decisions of low-income households; the rate of technology adoption; and the policies and behaviors around climate change. Each scenario is mapped against each of the four trends in order to develop a picture of what each of the futures could look like. The Focus40 Team worked with stakeholders to think about which investments make the most sense in which potential future. Understanding the needs of each scenario helped to underscore the importance in all potential futures of making the existing system more reliable, robust, and resilient.

Focus40 utilized a scenario planning framework to prioritize the most strategic investments – those that make sense in a range of plausible futures.

To plan in the face of uncertainty, Focus40 undertook an approach to transportation planning called scenario planning to look at a range of possible futures in order to develop a robust investment strategy that can be successful regardless of how current trends evolve.



PLAUSIBLE FUTURES

DRIVING TRENDS

Urbanization

Affordability

Technology

Climate Action

MetroFuture

Greater Boston's visioning document for compact, sustainable growth

Suburbanization

Low Affordability
Near Transit

Gradual Evolution

Low Collective Action



Urbanization

High Affordability
Near Transit

Disruptive Change

High Collective Action

Business as Usual

Low-and-moderate-income households are choosing to live in more affordable suburbs and Gateway Cities

Suburbanization

Low Affordability
Near Transit

Gradual Evolution

Low Collective Action



Urbanization

High Affordability
Near Transit

Disruptive Change

High Collective Action

Innovation Acceleration

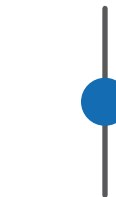
Technology changes are adopted quickly and radically change the transportation landscape

Suburbanization

Low Affordability
Near Transit

Gradual Evolution

Low Collective Action



Urbanization

High Affordability
Near Transit

Disruptive Change

High Collective Action

Climate Responsive

Enhanced commitment by the Commonwealth to invest in greenhouse gas reduction and resiliency measures

Suburbanization

Low Affordability
Near Transit

Gradual Evolution

Low Collective Action



Urbanization

High Affordability
Near Transit

Disruptive Change

High Collective Action



What trends impacting the long-term investment strategy for the T are we missing?

More information on key trends and scenarios can be found at www.mbtafocus40.com

PRIORITY PLACES

To ensure that the MBTA can be proactive about meeting the needs of the region in an uncertain future, Focus40 is attempting to shift the conversation around system expansion. Instead of starting with expansion project ideas, Focus40 seeks to identify places that need and can support higher quality transit – Priority Places – and then develop projects to serve those places.

The Focus40 vision emphasizes building the capacity of the current physical assets and infrastructure of the MBTA. However, the MBTA still needs to keep one eye on other types of potential investments, including those that bring new services or facilities to areas of the region that have a demonstrated demand for new transit investment of the types that the MBTA is well-positioned to provide. There are areas within the MBTA service district in which demand for public transportation far outstrips current service levels, in which buses are the primary service and are routinely overcrowded. These are the places where more robust MBTA service could link lower-cost housing with employment markets across the region, and where additional investment would be beneficial in any potential future scenario.

To shed light on those places and to be proactive in the discussion around transit expansion, the Focus40 Team developed a set of typologies that describe and define what makes a place suitable for a higher level of transit service. Rather than beginning with a project concept, the Focus40 process establishes that planning begins with honing in on the types of places where transit is most likely to succeed, and subsequently work from the ground up to develop action plans and identify and implement incremental levels of enhanced transit service.

Demand for public transit is greater than supply in some parts of the Greater Boston region. These places tend to have similar characteristics: they have high population density; they are walkable, often having grown around historic transit lines; and many host significant job

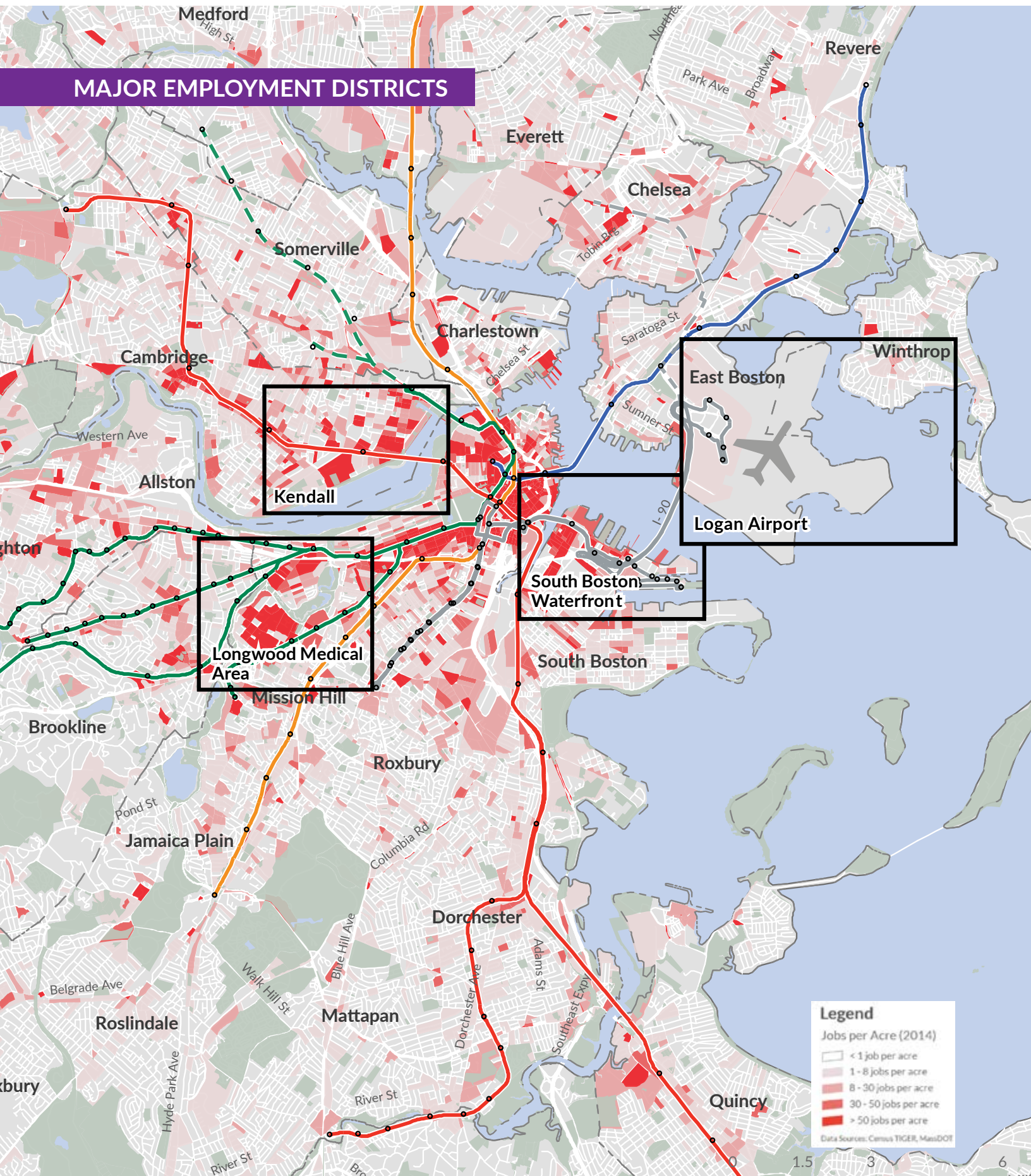
clusters or are home to communities with below average rates of car ownership. Such characteristics mark places where transit is likely to be successful. Focus40 identifies places that would benefit most immediately from a range of possible actions and investment from the MBTA. These places are those where investments have the greatest likelihood to deliver real benefits to the region, under any of the future scenarios, because data shows they:

- Lack rapid transit service, but bus usage exceeds available capacity
- Face traffic congestion that compromises the performance of MBTA buses in mixed traffic
- Host major centers of activity or dense residential populations, but lack efficient public transit access
- Feature population or employment densities that support higher frequency transit
- Have higher concentrations of lower-income residents for whom MBTA service can represent the best and sometimes only path to accessing opportunity

The three priority place types identified through Focus40 are:

- 1) Major Employment Districts
- 2) Inner Core Communities Lacking Rapid Transit
- 3) Urban Gateways

MAJOR EMPLOYMENT DISTRICTS



CHARACTERIZED BY:

- Growing business districts just beyond the densest part of the rapid transit network
- Longer than average transit commute times, often requiring one or more transfers
- The overloading of existing road networks and MBTA services
- The presence of multiple shuttle providers to compensate for insufficient MBTA service

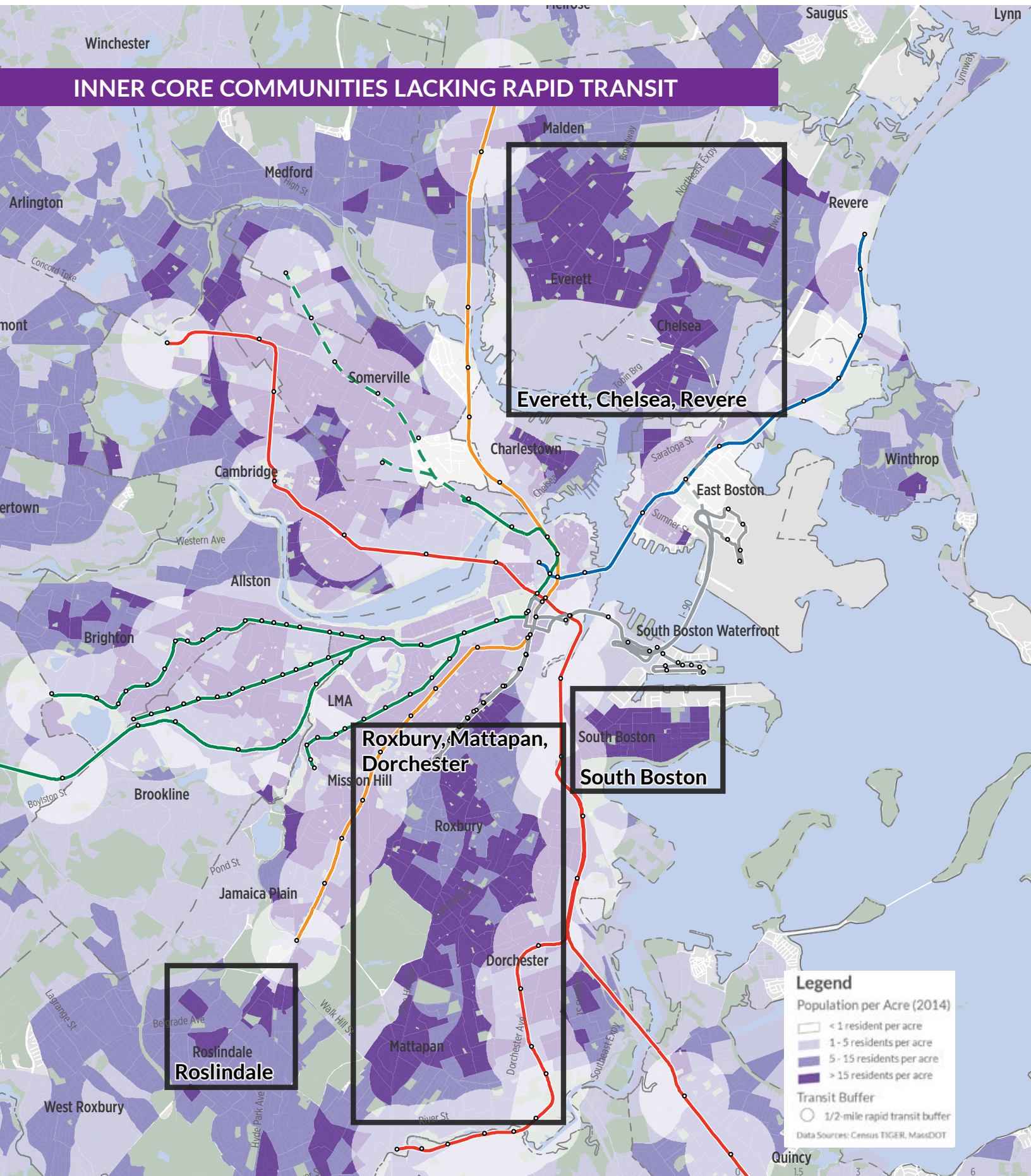
MAJOR EMPLOYMENT DISTRICTS

Over the past few decades, the traditional boundary of Boston's central business district has changed and expanded alongside the city itself. While these newer growth areas like the South Boston Waterfront, Kendall Square, and Longwood Medical Area are already connected to Downtown Boston by one or more MBTA services, direct access to some of these emerging job hubs from other parts of the region is limited. Capacity on existing services is increasingly strained by unanticipated and rising demand. Improving transit access to these districts will be an important factor in their ability to reach their full economic potential and will help them to continue to drive growth in the Boston region.



Are there any other factors the MBTA should be considering in the identification of Priority Places for new transit investment?

INNER CORE COMMUNITIES LACKING RAPID TRANSIT



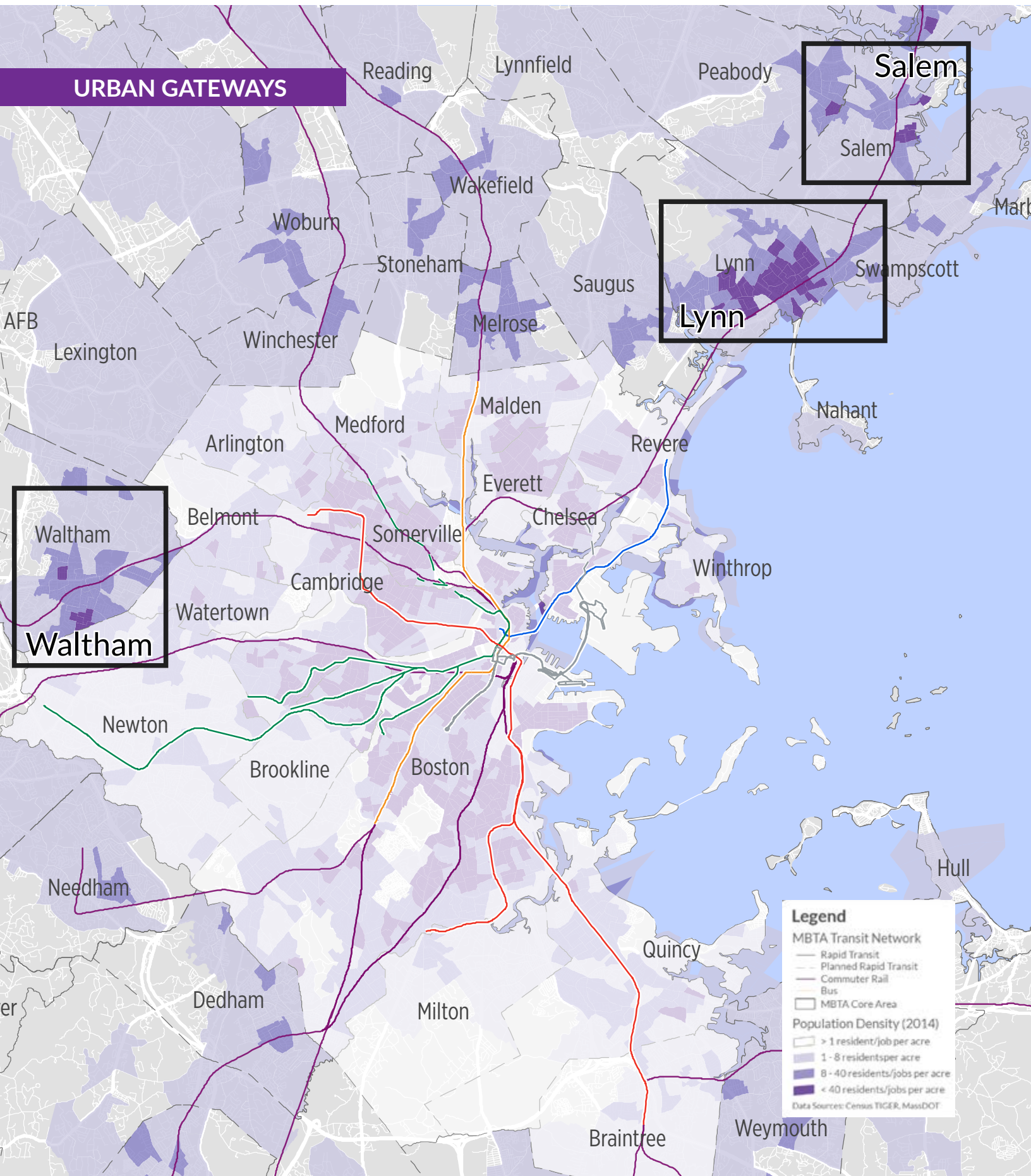
CHARACTERIZED BY:

- Residential areas between the rapid transit network that are only served by bus or commuter rail
- Commuter rail access that does not fully serve the needs of the community
- A large population of low-income and/or transit dependent residents

INNER CORE COMMUNITIES LACKING RAPID TRANSIT

Much of the area within several miles of Downtown Boston is densely developed and well served by either the MBTA's rapid transit system, bus network, or both.¹ Indeed, the density of our region is largely a byproduct of the comprehensive spider web of subway and trolley routes that were designed more than a century ago, with many of today's bus routes replicating the original streetcar network. Over time, however, as trolleys were replaced with buses, those buses were forced to contend with the vagaries of weather, varying municipal policies on curb and sidewalk space, and increasing automobile congestion. The bus became a less reliable, and thus less desirable, mode of travel than the emerging rapid transit network. In addition, bus routes evolved, shifting from traveling all the way to Downtown Boston to linking to the outer reaches of the rapid transit network, providing good connectivity but forcing transfers and long trips on customers. The challenges of providing high-quality bus service in Greater Boston caused, in part, the evolution of mobility disparity. Bus-only neighborhoods and communities experience much longer and more difficult commutes—and thus poorer and more indirect access to opportunity—than do communities with easy access to rapid transit service.

¹ The 2016 population density of all municipalities in Boston's Inner Core was over 9,800 residents per square mile, or 15.5 people per square acre.



CHARACTERIZED BY:

- Located beyond the rapid transit network and served by commuter rail that often functions as a hub for local MBTA or regional transit authority bus service
- A large population of low-income and/or transit dependent residents
- A moderate-intensity balance of residential and commercial development either built or permitted

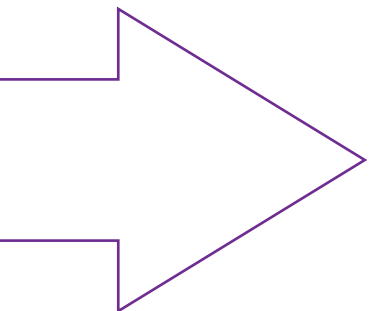
URBAN GATEWAYS

Boston is far from the only city within the MBTA service area. Several smaller cities have many of the characteristics that make Boston so amenable to transit service, such as population and employment density and walkable streets. These cities are home to a disproportionate share of the region's immigrant and lower-income workforce and those dependent on public transportation. Housing in these communities is also more affordable than in Boston and its immediate suburbs. In a region where many municipalities can be reluctant to build dense, mixed-use development, these Urban Gateways are often eager to attract new residents and jobs.² Collectively, the Urban Gateways represent enormous potential to support the region's economic, environmental, and equity goals. More and better transit could be the key to unlock the potential of these communities and better connect their residents to the regional economy.

² There are several projects in Urban Gateways that demonstrate the importance of dense, mixed-use development as a foundational component of transit-oriented development. For example, the multi-project plan in downtown Haverhill, anchored by the commuter rail station, exemplifies adaptive reuse and infill in Urban Gateway station districts. Similar efforts have been undertaken in Brockton, Attleboro, Beverly, and other historic rail downtowns (MBTA Transit-Oriented Development Policy, 2017).

FROM PLACES TO PROGRAMS TO PROJECTS

One outcome of the Focus40 process will be intensified collaboration between the MBTA and those municipalities that share the characteristics described above, with the goal of improving transit service using a wide spectrum of tools and approaches. Follow-on efforts to Focus40 will include a series of transit action plans and early action pilots, such as the one completed in 2016 for the City of Everett that culminated in the piloting and the permanent installation of a dedicated bus lane. Additional concepts that come out of the transit action plans will be incorporated into the Focus40 Programs for further planning, design, and prioritization through the annual Capital Investment Plan process.



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.

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 investments 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.

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



Are these the right program objectives?

Program

Objective

PARATRANSIT & ACCESSIBILITY

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.

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.

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.

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.

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.

BUS 2040

Achieve a better, faster, lower-emissions service, supported by off-board fare collection and exclusive busways, that is more aligned with where riders live, work, and travel.

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 *Rail Vision* study.

WATER TRANSPORTATION 2040

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

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.

PARATRANSIT & ACCESSIBILITY



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)

RIDE Vehicle Replacement Program

The MBTA is contractually obligated to provide RIDE vehicles to vendors and must maintain compliance to Federal Transit Administration (FTA) and Americans with Disabilities Act (ADA) regulations. To maintain compliance, the MBTA will replace vans prior to 7.25 years and sedans 6.25 years post acquisition, which means 35.3% of the current fleet will be replaced over the next year and 84.5% of the current fleet will need to be replaced by FY23. Currently, many vehicles are approaching the end of their useful life, which has an impact on reliability. Replacement vehicles will be lower-emission and eventually zero-emission as charging infrastructure is built out.

Dispatch Process Redesign to Provide RIDE Customers with Additional Options

The MBTA is seeking a new software solution for the RIDE that can effectively match a customer's abilities with the correct mode of transportation at the right time and in the right location. The new software would allow the MBTA to choose the right solution for our customers, including non-dedicated

service providers (such as Uber, Lyft, & Taxi) or a first/last mile solution utilizing fixed-route, in an easy to use, single software solution. Software that can incorporate the use of real-time traffic data, instead of antiquated speed settings, would also provide additional benefits to scheduling accuracy and on-time performance.

Plan for Accessible Transit Infrastructure (PATI) Phase 1: Plan Completion and Early Actions

PATI is an MBTA planning process to identify and prioritize accessibility improvements at all MBTA stops and stations in order chart a path to achieve full systemwide accessibility. Due to the age of the MBTA system, many stops, stations, and vehicles are not accessible to people with disabilities. Of the 7,685 bus stops surveyed through the PATI process, 272 were identified as having critical barriers to access and 870 were coded as being high priority for improvements. The MBTA is currently addressing all critical stops as early-action implementation of PATI and will work with municipalities to address high priority stops. Specific improvements vary, but include bus

stop lengthening, new landing pads, reconstructed sidewalks, curb ramps and crosswalks, pedestrian crossing signals, and signage and pavement markings. The planning and design process includes coordination with over 20 municipalities, as the majority of stops are not located on MBTA property.

Priority Rail Station and Bus Accessibility Improvements (Including Accessibility Improvements at Symphony & Hynes Stations)

Through the PATI process, Symphony and Hynes stations have been prioritized for accessibility improvements, and the following rapid transit and commuter rail stations were identified as having critical barriers to access. The MBTA is examining how to renovate the following stations to address accessibility issues.

- Natick Center Commuter Rail Station
- Mansfield Commuter Rail Station
- Wollaston Station (Red Line)
- BU West, St. Paul, Babcock, Pleasant Street Station (B Line, Green Line)
- Newton Highlands (D Line, Green Line)
- Oak Grove (Orange Line)

We're Planning (Next Priorities through 2040)

Plan for Accessible Transit Infrastructure Phase 2: Implementation of Mid-Term Recommendations

The MBTA will be issuing a plan to prioritize accessibility improvements across the system. PATI has established criteria that include the extent of the accessibility barrier, ridership, nearby senior populations, nearby paratransit usage, minority/low-income status, and proximity of alternatives. Improvements will include upgrading amenities at bus stops, constructing high-level platforms at commuter rail stations, and addressing remaining rapid transit stops and stations. As a parallel effort, aging elevators and escalators are currently being assessed and prioritized for upgrades to ensure that they do not become accessibility barriers.

Accessibility Improvements at Surface Green Line Stops

Accessibility on the 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 and allow trains to take advantage of transit

signal priority to bypass red lights if stops are consolidated at the far side of intersections. The planning and design for this work will begin within the next year.

RIDE Service Reimagining

The MBTA will continue to invest in industry and academic research to identify ways to reimagine and more efficiently deliver paratransit services. Making use of The RIDE's significant volume of trip data to build predictive models should yield both capital and operational savings. The RIDE will also continue to develop and run pilots to generate new data and test hypotheses on how to improve service efficiency and quality. Testing new operational structures, vehicle types, software, and in-vehicle and consumer technology will provide the MBTA key insight into future capital investments. Research and pilots include partnerships with UMASS, MIT, and Northeastern to maximize the use of non-dedicated service providers and develop multimodal dispatch optimization tools and pilots with Lyft, Uber, and local taxi companies to test the integration of these new service providers into The RIDE's fleet mix.

We're Imagining (Big Ideas)

Ridership growth from development around bus and commuter rail stops that supports investment to make them fully accessible.

Full Systemwide Accessibility

Many bus and commuter rail stops serve a small number of riders and would require significant investment to achieve full accessibility. If development around stations increases and ridership increases accordingly, the MBTA may need to accelerate the modernization of commuter rail and bus stops beyond PATI priorities. With higher ridership, these improvements would also reduce boarding times and make trips faster.

The RIDE covers over **700 square miles** including **58 cities and towns** and in FY17 provided approximately **1.83m** trips to registered customers



1.83m

trips to registered customers

Source: www.mbtackontrack.com 2017 ridership data

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 multimodal integration with Regional Transit Authorities, ride hailing companies, and other microtransit systems. The transition to the new fare collection system is anticipated to be completed by May 2020, with new fare gates by Spring 2021.

Station Improvements (Wayfinding, Communications, and Lighting)

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 small-scale station improvements are also a part of this effort.

Digital MBTA (Real-Time Information for Travel Planning and Performance Improvements)

The MBTA currently provides real-time information on arrival status for the entire system. Efforts are underway to improve the technology to provide better data for real-time applications. The MBTA is also looking to expand the usage

of real-time arrival information at high-ridership bus stops and at other locations that can help with travel planning. In addition to more traditional signage and maps, the MBTA is currently exploring using 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. The MBTA is also exploring outfitting the new Red Line and Orange Line vehicles with additional digital screens to improve the in-vehicle experience, and better utilizing the existing screens on buses. Using real-time information at station elevators is another area that is being examined. A related effort is working to use improved Computer Aided Dispatch / Automatic Vehicle Location technology to reduce bus bunching and improve overall bus reliability.



Platform screen doors of Ookayama Station, Tokyo Meguro Line

We're Planning (Next Priorities through 2040)

Station Modernization, including Implementation of Platform Barriers and Doors

As the MBTA explores opportunities to modernize 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 requirements will require further study.

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, transportation network companies, or local bus service. Key transit stations can become mobility

hubs to support ride share, bike share, and other mobility services. To improve ridership, the MBTA will explore opportunities to partner with municipalities and other entities to make services more useful to more people and encourage greater ridership.

System Access Improvements (Parking and Other)

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 into the future. The MBTA will study the future parking and multimodal access needs of stations and prioritize improvements. Due to state of good repair issues that require a full rebuild of the parking facility, Alewife will serve as an early action case study prior to a systemwide analysis.

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.

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 for these assessments. The Red Line and systemwide power will be next.

Blue Line Resiliency and Adaptation

The MBTA conducted a pilot *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. A project is about to begin to repair the Long Wharf and Maverick emergency egress and vent shafts to address water infiltration. A complete analysis of power, signals, track, and facilities will be performed for the Maverick–Aquarium segment in the coming year to prioritize and identify strategies for upgrading these assets and making them more resilient.

Green Line Portal Protection at Fenway

The Green Line's Fenway portal into Kenmore is vulnerable during heavy precipitation events. The MBTA is currently planning and designing a portal protection system for this location.

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.

We're Planning (Next Priorities through 2040)

Resilient Power Supply

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 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. The MBTA is pursuing a vulnerability assessment for systemwide power and will then begin to develop a strategy to address the needs outlined in the assessment. Addressing state of good repair needs and making the power supply more resilient will be an important component of the MBTA's broader resiliency efforts.

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 issues through regular asset management activities.

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.

Full Systemwide *Climate Resilience*

Focus40 identifies near and medium-term investment strategies to address the MBTA's most critical vulnerabilities. Given the scale of the system, this resiliency program is by necessity incremental. A more ambitious goal, but one that could become paramount in the Climate Responsive scenario, is a fully resilient MBTA. In a future where the impacts of climate change and severe weather take an ever increasing toll on the reliability and availability of transit, the MBTA must be able to provide essential mobility to the Boston Region. This would represent a considerable level of investment – whether investing in the existing system's resilience, or abandoning certain assets and rebuilding in less vulnerable locations when that is the more cost-effective solution.

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 Phase 1: Planning and Early Actions

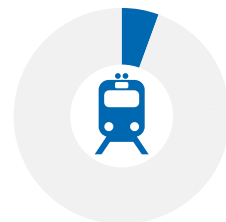
The MBTA conducted a pilot *Climate Change Vulnerability Assessment* for the Blue Line in 2017, which explored exposure, sensitivities, and adaptive capacity of the Blue Line to sea level rise, storm surge, precipitation, extreme high temperature events, wind, snow, and ice. The assessment identified 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. A project is about to begin to repair the Long Wharf and Maverick emergency egress and vent shafts to address water infiltration. A complete analysis of power, signals, track, and facilities will be performed for the Maverick-Aquarium segment in the coming year to prioritize and identify strategies for upgrading these assets and making them more resilient.

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. A light overhaul of Blue Line vehicles is planned for 2019-2021.

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.mbtackontrack.com 2017 ridership data

We're Planning (Next Priorities through 2040)

Downtown Pedestrian Connection Between the Red and Blue Lines

A pedestrian connection between State and Downtown Crossing stations offers the potential to connect the Red and Blue Lines much sooner and at significantly lower cost than the “Big Idea” of a Red-Blue rail connection. While a pedestrian connection could create a near-term transfer option, its technical feasibility has not yet been thoroughly evaluated.

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 nature of development, 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. A study to determine the best replacement is currently planned. In addition, eliminating the current third rail/pantograph hybrid power arrangement and converting the entire system to third rail could have significant operational benefits.

Resiliency Phase 2: 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 (e.g. gates) at the entrance to the Blue Line portal will safeguard the sensitive equipment in the event of storm surges and high tides. The MBTA will build off Resiliency Phase 1: Planning and Early Actions to more fully develop and implement needed larger scale solutions to address these priority assets.

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

Prior plans to connect the Red and Blue Lines envisioned a connection at Charles/MGH, and a high-level reassessment of such a connection is underway. Another "Big Idea" could be to extend the Blue Line past Downtown 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.

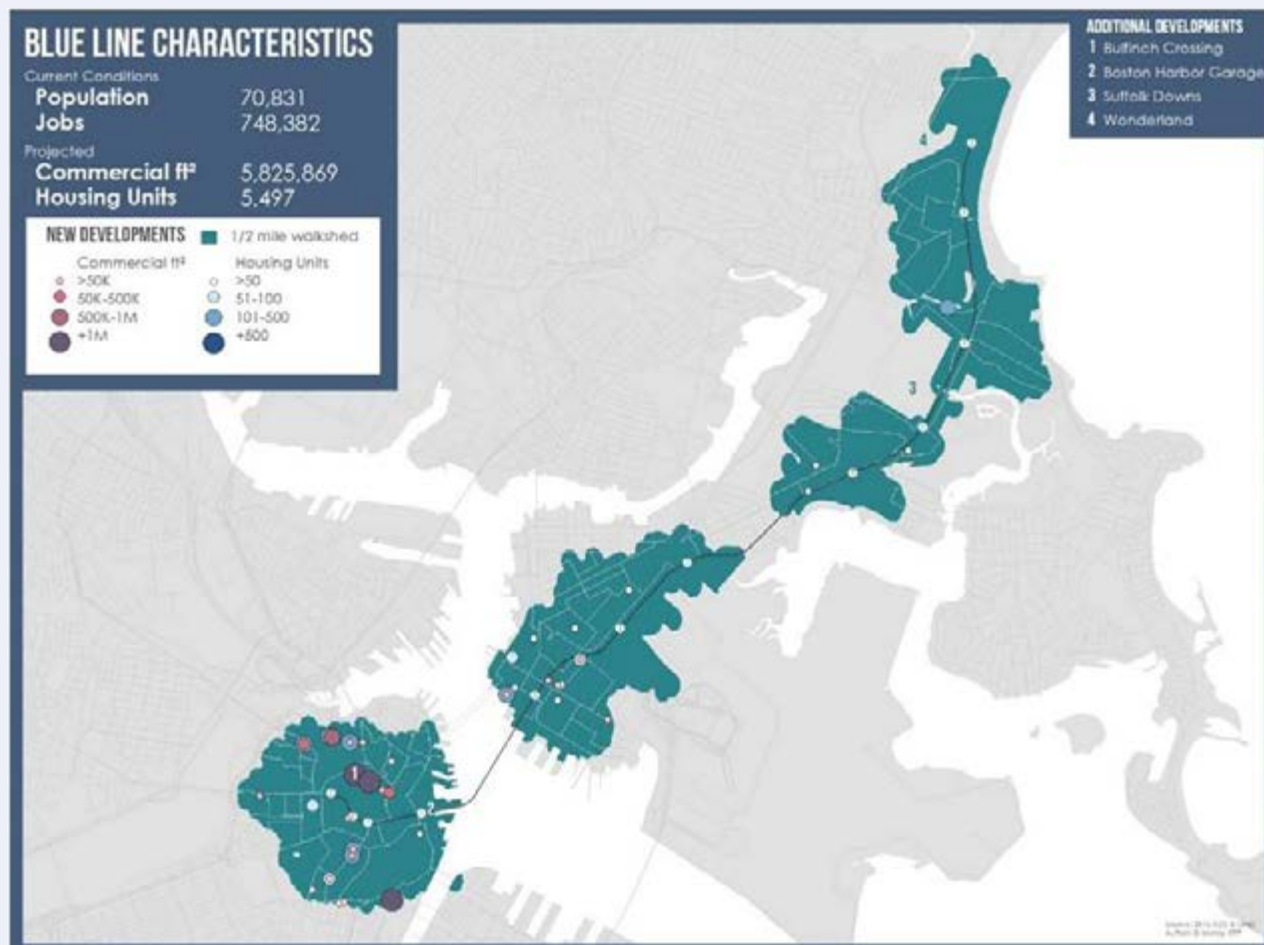
We're Imagining (Big Ideas)

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. Lynn's parking garage, with its ample available capacity, could help to take hundreds of cars off the road. And Lynn's historic Downtown would be positioned to attract jobs and companies priced out of Boston's core but desiring to retain transit access to Boston's talent pool. While this could be a Blue Line extension, it could also be part of rethinking how we use our commuter rail system. A Transit Action Plan focused on Lynn would help identify and prioritize the best potential solutions for improving Lynn's transit.

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 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 Phase 1: State of Good Repair (SGR) Projects

In order to accommodate new vehicles, the Green Line track, signals and power need to be upgraded. Significant short-term track work has been conducted throughout the Green Line since 2016. Last time the MBTA substantially replaced Green Line track was in the 1970s and 1980s. New, full-depth reconstruction of tracks should last 20-25 years. Many portions of the Green Line are operating under speed restrictions due to track wear and tear. In addition, 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. The first phase of this program will be conducted on the D branch in 2018-2019 and will continue to other branches over the next several years. A power study is anticipated to begin in 2018 as well.

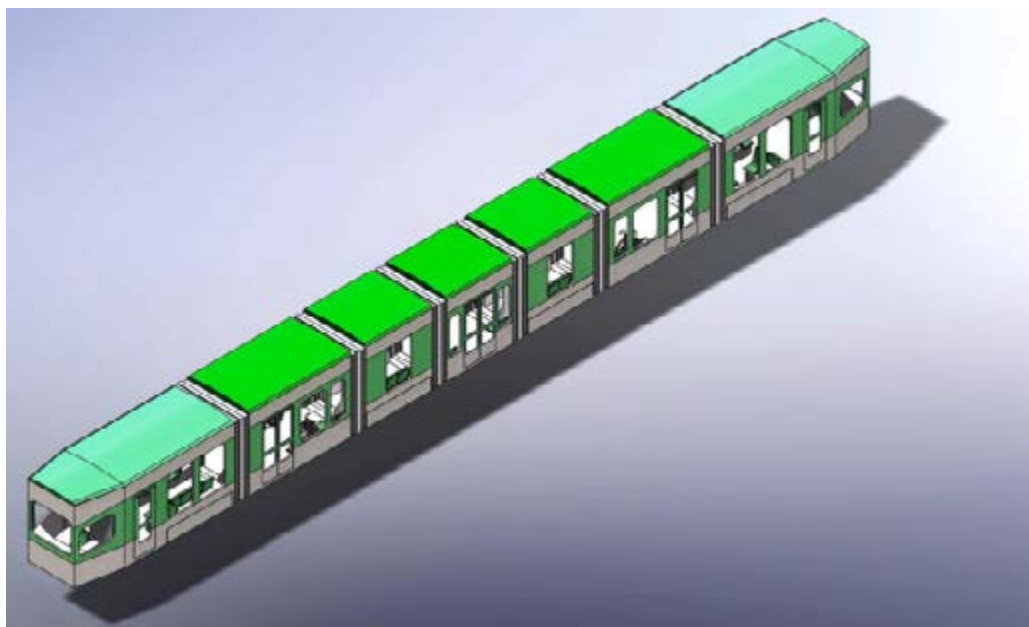
Green Line Transformation Phase 2 Planning and Early Actions: Fleet Procurement

While 24 new Type 9 vehicles will be arriving soon 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. Work is currently underway to develop the specifications for the new vehicle type in order to begin the procurement process.

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 address 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. The Green Line Extension project also includes procurement of 24 Type 9 cars to operate on the extension and add capacity between Lechmere and Park Street. The Extension will be completed by the end of 2021.

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



We're Doing (Commitments through 2023)

Surface Green Line Stop Consolidation

Many Green Line surface stops are very closely spaced, resulting in slower service. The consolidation of four B branch stops along Commonwealth Avenue will begin in 2019. The project is coordinating with MassDOT's Commonwealth Avenue Phase 2A project and the Commonwealth Avenue Bridge project. This work will consolidate St. Paul and BU West stations and Babcock and Pleasant Street stations. The new stops will be accessible, allow for level boarding, and accommodate longer train sets. Additional planning and design work will explore stop consolidation at other locations.

Transit Signal Priority Infrastructure for Surface Green Line

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 Priority Signal at appropriate intersections

throughout the B, C, and E branches of the Green Line in 2018. The MBTA is also advancing a \$30 million program to improve grade crossings at 60 intersections along these lines.

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. The MBTA is currently in the procurement process for such a system on the Green Line.

Accessibility Upgrades at Hynes and Symphony Stations

Green Line stations at Symphony, Hynes, and Boylston are the last three subway stations that are not accessible. Significant space constraints and historical impacts are a challenge at Boylston, but Symphony and Hynes have been prioritized for accessibility upgrades. Addressing ADA accessibility issues at these stations will improve the customer experience for everyone.

With more than
200,000
passenger trips each
weekday, the Green Line
 is the nation's
highest ridership
light rail system

Source: www.mbtackontrack.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: the completion of Phase 1 Investments, vehicle procurement,

reconditioning of the Lechmere viaduct to accommodate more weight, installation of a Park Street loop crossover to provide for more flexible boarding, and reconfiguration of Lake Street, Reservoir, and Boston College Station to accommodate the length of vehicles.

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 operate new trains as two-car sets on the D and E branches to achieve a Green Line capacity gain of 50+%. Necessary projects will include: completion of Phase 1 and 2 Investments, reconfiguration of Heath Street Station, extension of Brookline Hills eastbound platform, clearing of obstruction on Boylston Station eastbound, power distribution upgrades, and retirement of the Type 7 and 8 Cars.

Reservation and Right-of-Way Expansion for Surface Green Line

In order for the Green Line surface operations to be most effective – and in particular to achieve the full benefits of the new fleet – reducing conflicts with cars will be important. The extension of the trolley reservation along Huntington Avenue beyond Brigham Circle on the E branch would improve the speed and reliability of the E Line, which could have ripple effects systemwide. Reducing the frequency of grade crossings along the inner sections of Huntington, as well as along Beacon Street and Commonwealth Avenue, would also increase safety, speed up operations, and make the Green Line more reliable.

We're Imagining (Big Ideas)

Extensions to Mystic Valley Parkway in Somerville/ Medford, and Hyde Square in Jamaica Plain.

Park Street-Downtown Crossing Superstation.

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

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

Accommodating two-car trains of the new vehicle type on the B and C branches to double capacity will require significant investment in extending or reconfiguring up to 27 stops, the procurement of additional Type 10 vehicles, and the expansion of vehicle storage to accommodate a larger fleet. A better understanding of future demand in these corridors is a necessary first step to moving forward with the investment to allow for two-car trains on these branches.

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.

Green Line Extension to Mystic Valley Parkway, Somerville/Medford

A future extension of the Green Line that 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.

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



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.

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 issues. 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.

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.

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.

We're Doing (Commitments through 2023)

Mattapan High-Speed Line Phase 1: 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 is currently underway to develop a long-term solution.

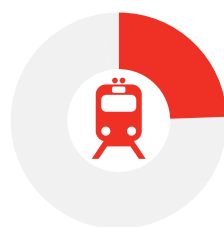


Six of the top 10 rapid transit stations* service the Red Line

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

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

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



accounting for **22%** of all MBTA ridership

Source: www.mbtackontrack.com 2017 ridership data



RED LINE 2040



We're Planning (Next Priorities through 2040)

Downtown Pedestrian Connection Between the Red and Blue Lines

A pedestrian connection between State and Downtown Crossing stations offers the potential to connect the Red and Blue Lines much sooner and at significantly lower cost than the “Big Idea” of a Red-Blue rail connection. While a pedestrian connection could create a near-term transfer option, its technical feasibility has not yet been thoroughly evaluated.

Strategic Track Reconfiguration to Address Bottlenecks

Operations through many Red Line stations are inefficient, hampered by slow switches, aging infrastructure, and sub-optimally designed track configurations. Major bottlenecks include the Columbia Junction, JFK Station, and Park Street. Improving these bottlenecks may further reduce travel times and improve reliability.

Mattapan High-Speed Line Phase 2: Implementation of Reimagining

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 re-imagining the line as an accessible, reliable service, respecting the unique historic nature of the line.

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

Prior plans to connect the Red and Blue Lines envisioned a connection at Charles/MGH, and a high-level reassessment of such a connection is underway. Another Big Idea could be to extend the Blue Line past Downtown 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.

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 Red Line station. This could remove one of the constraints to increasing frequencies beyond the three-minute headways resulting from the Red Line System-wide Improvement Program.

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. The fleet will be introduced into service in stages, beginning in December of 2018 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. This work 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, investments in additional vehicles, signals, power, and expanded storage and maintenance facilities to enable three-minute frequencies and increase capacity could be warranted.

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.

Full fleet of new Orange Line cars will arrive by 2022



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 Planning and Procurement (Vehicle Type, Fleet Size)

A pilot 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.

SL2 and SL4 On-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 improvements to Transit Signal Priority on the corridor as well.

Transit Priority Infrastructure in the Seaport

Efforts are underway to reduce the severity of the conflict at the D Street intersection using Transit Signal Priority. The use of the emergency access ramp in the Seaport could also save three to five minutes on trips to Boston Logan Airport and Chelsea. In order to do this safely, MassDOT would need to make physical modifications to the geometry of the merge between this ramp, the HOV lane, and the mainline of Interstate 90. The State Police, Boston Fire Department, and Boston Emergency Medical Services would also need to identify and implement procedures that would ensure MBTA use did not conflict with the need to preserve emergency access. Other alternatives for roadway modifications to improve Silver Line Seaport service are also being considered.

We're Planning (Next Priorities through 2040)

Silver Line Next Generation Vehicles and Maintenance Facility

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 service during peak periods, a service period that currently has heavy delays and overcrowding. In addition to identifying a new vehicle type, a larger Southamptton garage or other new storage space will be required to expand the fleet. Once achieved, the MBTA can deliver more service with more efficient vehicles.

Infrastructure Upgrade in Silver Line Tunnel

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

We're Imagining (Big Ideas)

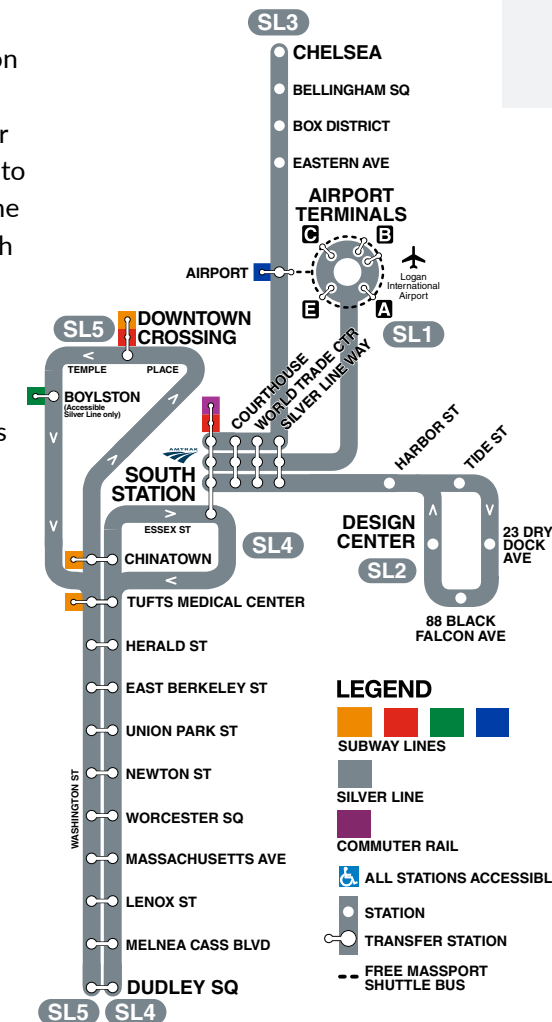
Faster service by eliminating the Transitway's at-grade crossing of D Street.

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.

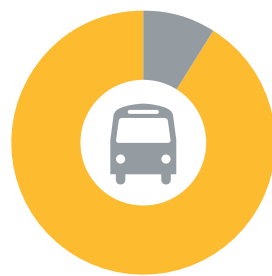
Bus Rapid Transit to Everett

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 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.



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

BUS 2040



Program Objective

Achieve a better, faster, lower-emissions service, supported by off-board fare collection and exclusive busways, that is more aligned with where riders live, work, and travel.

We're Doing (Commitments through 2023)

Better Bus Project Phase 1: Current Route Network Improvements (To Meet Service Standards)

The MBTA is pursuing route, frequency, and stop changes, as well as opportunities to work with municipalities on bus priority treatments. Potential treatments include: Transit Signal Priority, queue jumps, bus lanes, and optimal stop spacing. 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). Implementation of Phase 1 recommendations will begin in 2019.

Better Bus Project Phase 2: Bus Network Redesign Process and Bus Rapid Transit Planning

The existing MBTA bus network is a legacy system that has never been reviewed comprehensively. The second phase of the Better Bus Project will look to reshape the entire bus network so that it better serves existing and projected demand, and maximizes bus priority. The planning part of this phase will overlap efforts in Phase 1 to

advance improvements on current high priority routes. This phase will also include initial implementation of more comprehensive changes to the bus network based on the redesign effort, including build-out of more comprehensive bus rapid transit service.

Priority Bus Facilities and 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 bus stop lengthening, 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. The MBTA is making improvements at over 200 high-priority bus stops through 2019. In addition, the MBTA is seeking municipal partners to improve access to bus stops.

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 the replacement of the entire current 40- and 60-foot bus fleet, with 460 40-foot buses scheduled for delivery between 2021 and 2025, as well as an option order procurement of 194 New Flyer Hybrid 40-foot buses. 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.

We're Doing (Commitments through 2023)

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 1011 buses at any given time. With 1050 currently active vehicles, there exists a clear disconnect between maintenance capacity and current and potential future need. The MBTA is working to advance planning for 21st-century vehicle maintenance and storage facilities. Initial funding for upgrading and expanding maintenance facilities is provided in the 2019-2023 Capital Investment Plan.

Zero-Emission Bus In-Service Testing

The MBTA is working to identify a zero-emissions vehicle for the bus fleet that can operate at scale, in cold weather and snow, and for sufficient distances to be able 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, which will be followed by a comprehensive pilot.



More than a third of MBTA trips are taken on buses

Source: www.mbtackontrack.com 2017 ridership data

BUS 2040



We're Planning (Next Priorities through 2040)

Fleet Expansion to Serve Bus and Bus Rapid Transit Network

One of the major complaints about bus service is that buses are overcrowded and uncomfortable. A larger fleet and/or a greater use of articulated buses will address overcrowding and allow the MBTA to provide more service to more places during peak periods. An expansion of both the 40-foot or 60-foot bus fleets will require expanded maintenance facilities. Articulated buses, or 60-foot buses, have a maximum seated and standing capacity of 105 passengers. 75 passengers is the maximum seated and standing capacity on 40-foot non-articulated buses, which comprise the majority of the MBTA fleet. Expanding the use of articulated buses will require improvements in technology and accommodations in new or upgraded maintenance facilities. The MBTA's existing articulated fleet is often pulled out of service during snowy conditions, so expanding their use will depend on the domestic availability of articulated buses with power for a second axle.

Better Bus Project Phase 3: Implementation of Network Redesign

During this period, the MBTA will continue to build out the redesigned bus network and make the investments necessary to ensure that service is reliable and that high-priority, high-frequency bus routes operate in bus lanes with Transit Signal Priority and off-board fare collection. New and modified routes will be piloted to serve Priority Places that have been identified as needing higher-frequency bus service.

Phased Conversion to Zero-Emissions Fleet

The MBTA will build a transformed network of maintenance facilities to accommodate zero-emissions vehicles and necessary charging and maintenance infrastructure. This will allow the MBTA to begin replacing diesel, clean natural gas, and hybrid buses with zero-emissions vehicles as soon as zero-emissions buses can meet in-service performance standards. As called for in the IFFP, the MBTA will be regularly purchasing 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.

Priority Bus Rapid Transit Corridors

The Better Bus Project will be starting the build out of bus priority corridors. The MBTA will seek to incrementally upgrade these 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*, and opportunities identified in upcoming planning work focused on Priority Places.



Delay in Passenger-Hours/Mile

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 235
- MBTA bus route
- INRIX speed data not available

Average rates of weekday bus passenger delay in high demand bus corridors from *Prioritization of Dedicated Bus Lanes Report*

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 issues or serve new routes.

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. This work will be complete in 2019 in order to inform the development of the next operating contract for the MBTA's rail system.

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. This project will start in 2019.

Phase 1: South Coast Rail

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. The Commonwealth is planning for the introduction of service by 2022.

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.

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.

We're Doing (Commitments through 2023)

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.

Positive Train Control

Under a 2008 federal mandate, the MBTA is installing Positive Train Control (PTC) technology across all commuter rail lines. The goal is to have all hardware installed by December 2018 and the PTC system fully operational by the end of 2020. 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.

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

 **14** commuter rail lines
serving **50** communities

COMMUTER RAIL 2040

We're Planning (Next Priorities through 2040)

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. 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 must be considered as infill stations are explored.

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.

Regional Multimodal West Station and Midday 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 multimodal transit hub. A relocated midday train layover will be a part of this investment.

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. The MBTA is currently examining triple tracking for the Worcester Line. The preferred service model from the *Rail Vision* may influence needs and priorities related to expanding track capacity.

Phase 2: South Coast Rail

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.

We're Imagining (Big Ideas)

Electrification of some or all of the 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)

Landside Infrastructure Improvements

The dock, ramps, and floats at Hewitt's Cove in Hingham have the greatest need for improvements. The MBTA was awarded a federal grant to improve these facilities. New infrastructure will accommodate people with disabilities at all tide levels and make it easier for passengers to board and disembark smoothly.

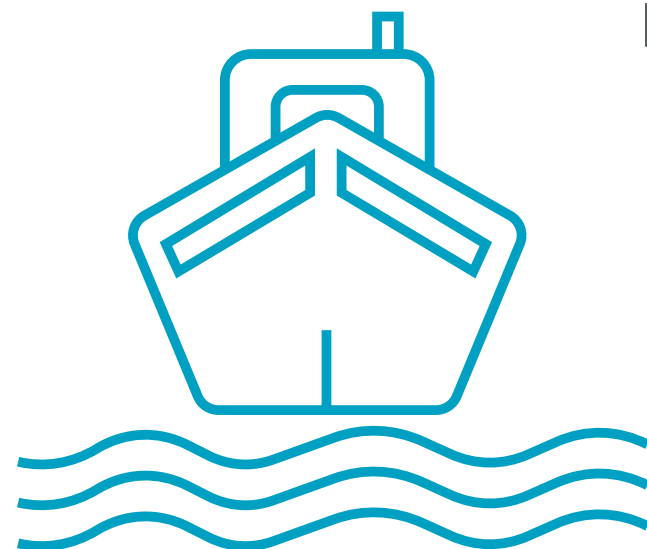
Fleet Expansion to Four Ferries

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. When they are brought back into service, opportunities to expand MBTA service may be available. The remaining vessels are owned by the MBTA's water transportation operator, Boston Harbor Cruises.

Every year, approximately

1.34 million

people ride the ferries



Source: www.mbtackontrack.com 2017 ridership data

We're Planning (Next Priorities through 2040)

Phase 1: Expanded and Better Integrated Multi-Operator Water Transportation Network

A more robust ferry system could provide a valuable transit option for waterfront communities that are becoming increasingly dense and have limited direct transit options. MassDOT and other state agencies will be working with municipalities to develop financially sustainable service around the region through the current comprehensive *Water Transportation Study*.

The study is also 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 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.

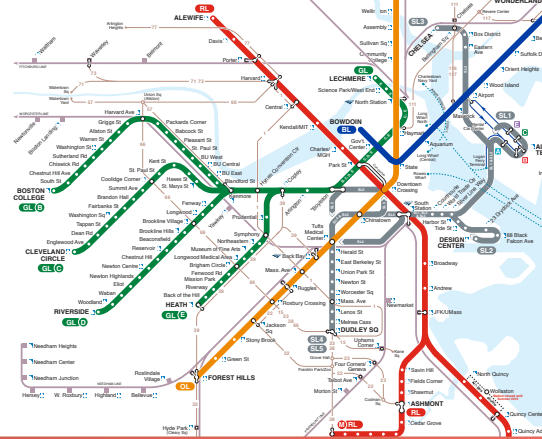
We're Imagining (Big Ideas)

A built-out, comprehensive, resilient, multi-operator network with purpose-built ferries serving thousands more commuters and travelers every day.

Phase 2: Full Implementation of an Expanded, Comprehensive, Multi-Operator Network

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

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 pilots, 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.

We're Planning (Next Priorities through 2040)

Place-Based Service Expansions Based on Pilots and Transit Action Plans

Based on the results of the Transit Action Plans and any related pilots, 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:

- Better Bus Project Phase 3: Implementation of Network Redesign
- Station Investments
- Regional Multimodal West Station
- Bus Rapid Transit to Everett
- South Coast Rail Phase 2

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:

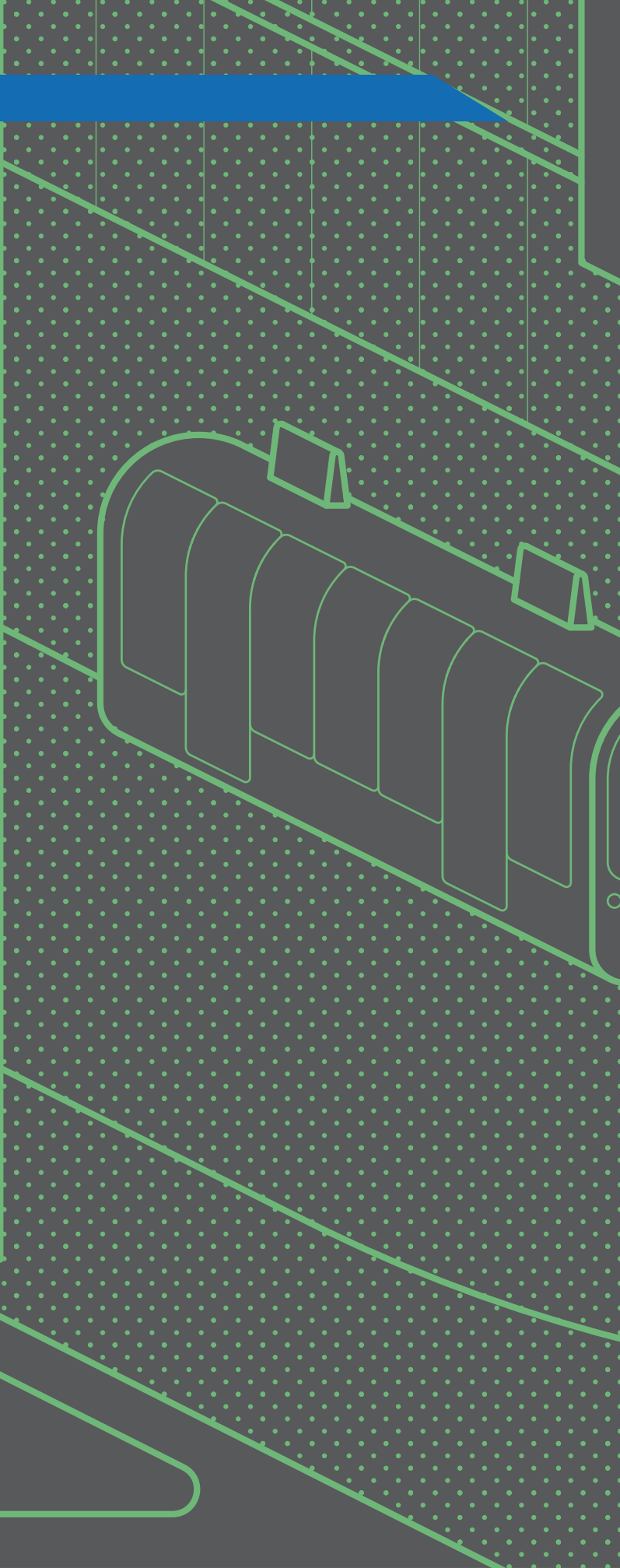
- Green Line Extension to Mystic Valley Parkway
- Green Line Extension to Hyde Square
- Orange Line Extension to Roslindale
- Orange Line Spur to Everett
- Blue Line Extension to Lynn
- Blue Line Connection to Red Line and Beyond

FOCUS40 PROGRAMS

Service	We're Doing (Commitments through 2023)	We're Planning (Next Priorities through 2040)	We're Imagining (Big Ideas)
Blue Line 2040	<ul style="list-style-type: none"> Resiliency Phase 1: Planning and Early Actions Reliability Centered Vehicle Maintenance Program 	<ul style="list-style-type: none"> Downtown Pedestrian Connection between the Red and Blue Lines Blue Line Capacity and Reliability Improvements Resiliency Phase 2: Further Implementation 	<ul style="list-style-type: none"> Blue Line Connection to Red Line and Beyond Blue Line Extension to Lynn Downtown Superstation
Green Line 2040	<ul style="list-style-type: none"> Green Line Transformation Phase 1: State of Good Repair (SRG) Projects Green Line Transformation Phase 2 Planning and Early Actions: Fleet Procurement Green Line Extension to Somerville and Medford Surface Green Line Stop Consolidation Transit Signal Priority Infrastructure for Surface Green Line Green Line Train Protection Accessibility Upgrades at Hynes and Symphony Stations 	<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) Reservation and Right-of-Way Expansion for Surface Green Line 	<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 Green Line Extension to Mystic Valley Parkway, Somerville/Medford 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 Phase 1: Reimagining and Short-Term Improvements 	<ul style="list-style-type: none"> Downtown Pedestrian Connection between the Red and Blue Lines Strategic Track Reconfiguration to Address Bottlenecks Mattapan High-Speed Line Phase 2: Implementation of Reimagining 	<ul style="list-style-type: none"> Blue Line Connection to Red Line and Beyond Downtown Superstation
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) 	<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
Silver Line 2040	<ul style="list-style-type: none"> Silver Line Fleet Planning and Procurement (Vehicle Type, Fleet Size) SL2 and SL4 On-Street Improvements Transit Priority Infrastructure in the Seaport 	<ul style="list-style-type: none"> Silver Line Next Generation Vehicles and Maintenance Facility Bus Rapid Transit to Everett Infrastructure Upgrades in Silver Line Tunnel 	<ul style="list-style-type: none"> Silver Line Tunnel Extension Under D Street in the Seaport
Bus 2040	<ul style="list-style-type: none"> Better Bus Project Phase 1: Current Route Network Improvements (to Meet Service Standards) Better Bus Project Phase 2: Bus Network Redesign Process and Bus Rapid Transit Planning Priority Bus Facilities and Stops Bus Fleet Replacement and Expansion (Procurement and Maintenance Facility Reconfiguration) Zero-Emission Bus In-Service Testing 	<ul style="list-style-type: none"> Fleet Expansion to Serve Bus and Bus Rapid Transit Network Better Bus Project Phase 3: Implementation of Network Redesign Phased Conversion to Zero-Emissions Fleet Priority Bus Rapid Transit Corridors 	<ul style="list-style-type: none"> Autonomous Bus Shuttles
Commuter Rail 2040	<ul style="list-style-type: none"> <i>Rail Vision</i> (Study and Decision on Service Alternatives) North Station Drawbridge Phase 1: South Coast Rail Bi-Level Coach Procurement Locomotive Upgrades and Replacement Ruggles Station Upgrades Positive Train Control and Automatic Train Control 	<ul style="list-style-type: none"> Station Investments (Infill Stations, Connections to Rapid Transit) Regional Multimodal West Station and Midday Train Layover Double and Triple Tracking to Add Capacity Phase 2: South Coast Rail 	<p>As part of the MBTA's <i>Rail Vision</i> process now underway, MassDOT and the MBTA are 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.</p>
Water Transportation 2040	<ul style="list-style-type: none"> Landside Infrastructure Improvements Fleet Expansion to Four Ferries 	<ul style="list-style-type: none"> Phase 1: Expanded and Better Integrated Multi-Operator Water Transportation Network 	<ul style="list-style-type: none"> Phase 2: Full Implementation of an Expanded Comprehensive, Multi-Operator Network

FOCUS40 PROGRAMS

Systemwide	We're Doing (Commitments through 2023)	We're Planning (Next Priorities through 2040)	We're Imagining (Big Ideas)
Paratransit and Accessibility	<ul style="list-style-type: none"> RIDE Vehicle Replacement Program Dispatch Process Redesign to Provide RIDE Customers with Additional Options <i>Plan for Accessible Transit Infrastructure (PATI) Phase 1: Plan Completion and Early Actions</i> Priority Rail Station Accessibility Improvements (Including Accessibility Improvements at Hynes and Symphony Stations) 	<ul style="list-style-type: none"> <i>Plan for Accessible Transit Infrastructure Phase 2: Implementation of Mid-Term Recommendations</i> Accessibility Improvements at Surface Green Line Stops RIDE Service Reimagining 	<ul style="list-style-type: none"> Full Systemwide Accessibility
Resiliency	<ul style="list-style-type: none"> Systemwide <i>Climate Change Vulnerability Assessments</i> Blue Line Resiliency and Adaptation Green Line Portal Protection at Fenway Adaptation Strategies for Priority Infrastructure, in Collaboration with Municipalities 	<ul style="list-style-type: none"> Resilient Power Supply Incremental Implementation of the Systemwide <i>Climate Change Vulnerability Assessments</i> 	<ul style="list-style-type: none"> Full Systemwide Climate Resilience
Customer Experience	<ul style="list-style-type: none"> Automated Fare Collection (AFC 2.0) Station Improvements (Wayfinding, Communications, Lighting) Digital MBTA (Real-Time Information for Travel Planning and Performance Enhancements) 	<ul style="list-style-type: none"> Station Modernization, Including Implementation of Platform Barriers and Doors Partnerships for Improved First-Mile/Last-Mile Connections System Access Improvements (Parking and Other) 	<ul style="list-style-type: none"> Comprehensive and Cutting Edge Digital MBTA
Place Based Service Additions	<ul style="list-style-type: none"> Studies: Transit Action Plans for Priority Places (Seaport, Allston, Lynn) Service Pilots Green Line Extension to Somerville/Medford Phase 1: South Coast Rail 	<ul style="list-style-type: none"> Place-Based Service Expansions Based on Pilots and Transit Action Plans Better Bus Project Phase 3: Implementation of Network Redesign Station Investments Regional Multimodal West Station Bus Rapid Transit to Everett Phase 2: South Coast Rail 	<ul style="list-style-type: none"> 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



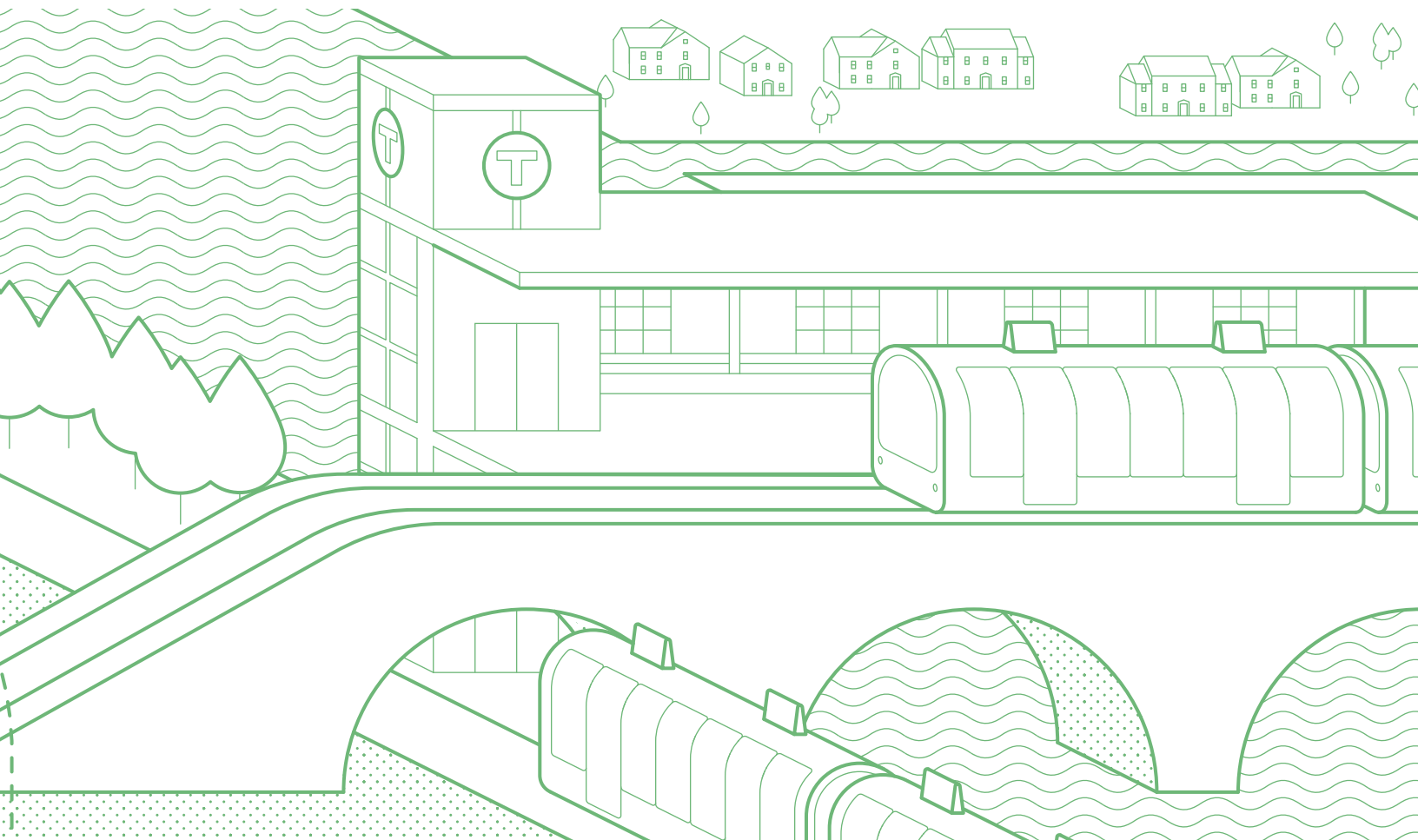
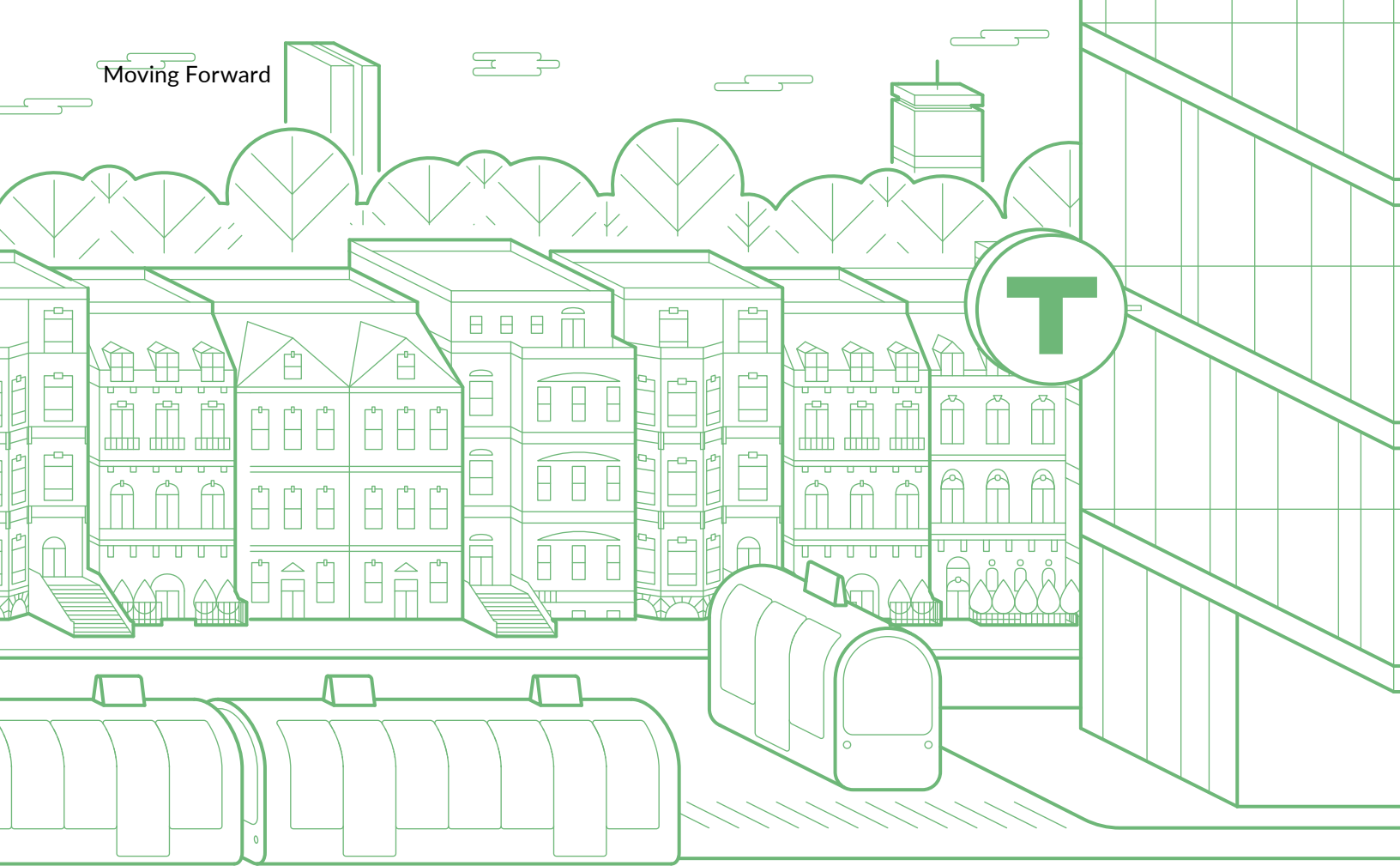
WHAT'S NEXT

Because the Focus40 process is heavily focused on the practical realities of planning, designing, constructing, and operating new MBTA capital investments, one of its outputs is a series of studies that will begin to set the stage for a “next generation” MBTA. This new system will be more modern, more reliable, and ultimately better positioned to serve the needs of a growing and dynamic region. [Some of these efforts are already underway or about to begin, including an analysis of a fundamentally reconfigured Green Line; a complete rethinking of the MBTA's bus network; and development of action plans to address the needs of the City of Lynn and the Allston neighborhood.](#)

Focus40 provides a framework and action plan for meeting long-identified needs at the MBTA and for improving upon existing practices. In addition to planning studies, the Focus40 framework will be integrated into annual capital decision-making processes. Focus40 will be adopted not as a static plan, but as a living document that can stay true to its objectives while regularly incorporating new information about everything from demographic trends to the associated costs and the benefits of investments. Specific investments will be prioritized for each capital plan based on how well they reflect the goals and objectives identified in Focus40.

In the near term, riders will start to see the benefits of the “We’re Doing” investments as they get put into service. “We’re Planning – Next Priorities” projects will be advanced through planning and design – and as the MBTA makes progress on its core goals, the “We’re Imagining – Big Ideas” programs will be studied and either advanced or dismissed pending further investigation.

A strong MBTA is crucial to the success of the region of today and tomorrow. Reliable and equitable public transit supports and facilitates positive, sustainable change. From the outset, the Focus40 team put Greater Boston's future needs first, which required acknowledging that the MBTA—while still a crucial contributor to the life and economy of the region—is struggling to meet the needs and expectations of today's customers. We are stewards of public investments vital to people's daily lives. We help support residents and workers of the Greater Boston region to live their daily lives. As the future is uncertain, the MBTA's long-range investment strategy process must be robust, resilient, and able to respond to change—just as the MBTA itself needs to be. We are confident the MBTA will get there with the help of the decision-making framework that Focus40 establishes.



HOW TO ENGAGE

MassDOT and the MBTA want your feedback on this draft plan before it becomes formally adopted. We want to hear your thoughts with respect to the following questions:

- Do the Focus40 goals reflect the needs of the region and the role the MBTA can play in supporting those needs?
- Are there any trends integral to the long-term success of the MBTA that are not fully captured in the scenario-planning exercise?
- Are there any other factors the MBTA should be considering in the identification of types of places for investment in new or improved services?
- Should anything in “Next Priorities” be moved to “Big Ideas?”
- Are there any “Big Ideas” that should be a “Next Priority?” Why do you think so?
- Are there other ideas that we should be considering to achieve the program objectives or to meet the needs of the region?

The Focus40 Team will be accepting feedback online through our website at www.mbtafocus40.com. There, you will also find additional details about this plan and the factors that helped to shape it. A final plan will be released in the fall incorporating the feedback we receive and the findings from other planning processes that will be concluding this summer.

