# SHARED TRAVEL NETWORK STUDY

May 2022

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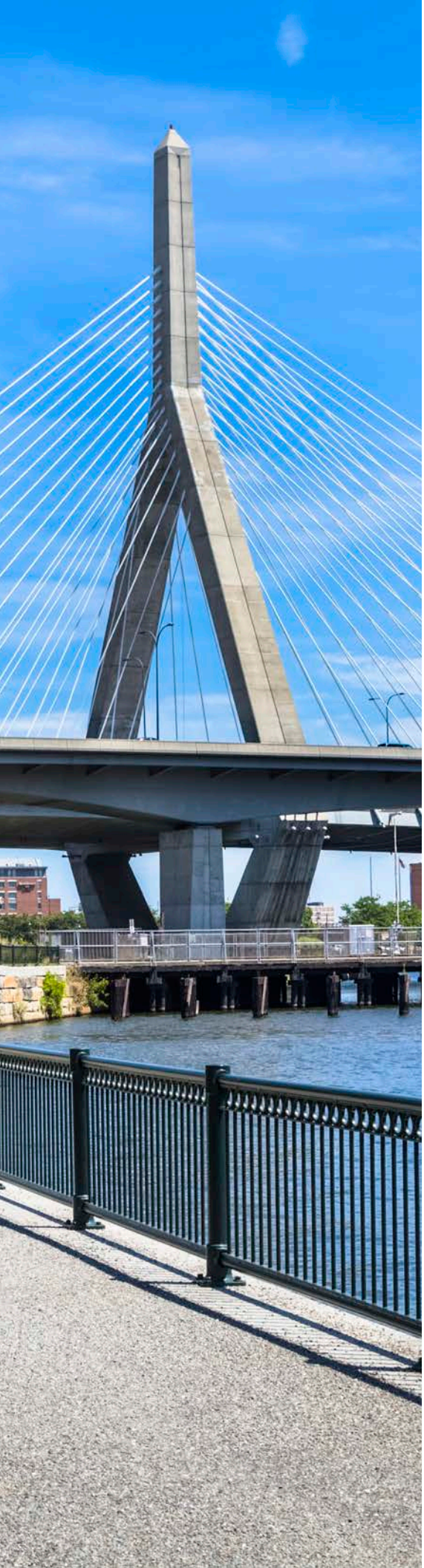


# LIST OF COMPANION MEMOS AND APPENDICES

## Technical Memo 1

- **Best Practices/Case Studies.** The objective of this memorandum is to describe, illustrate, and evaluate strategies for park-and-ride and shared travel design, operation, enhancement, and marketing by reviewing success stories across the United States. The document also seeks to highlight answers to key questions that framed this research: what is a shared travel network and what does it look like?

## Technical Memo 2

- **Existing Conditions.** The objective of this memorandum is to evaluate the landscape for shared travel in Greater Boston by cataloging existing shared travel infrastructure and service models; identifying significant origin/destination markets; analyzing the potential of different shared travel service models to serve these top markets; and assessing the potential of different infrastructure improvements to make shared travel services in top markets competitive with single-occupancy vehicles (SOV).

## Appendices

- **Appendix A:** Glossary
- **Appendix B:** Analysis and Inventory of MassDOT Park-and-ride Lots in Greater Boston
- **Appendix C:** Detailed Methodology for Origin/Destination Analysis
- **Appendix D:** Menu of Shared Travel Service Models and Vehicles
- **Appendix E:** Detailed Methodology for Competitiveness Assessment
- **Appendix F:** Summary of Competitiveness Findings for Largest O/D Markets

# 1 THE OPPORTUNITY

## Background

Greater Boston has long held a reputation for being one of the most congested regions of the country. Although a reflection of strong economic and quality-of-life conditions, the distinction is one that frustrates residents, workers, and visitors on a near-daily basis, regardless of how they choose to travel.

In 2018, Governor Baker signed HB4833, which included language that directed Massachusetts Department of Transportation (MassDOT) to conduct a study of vehicular congestion in the Commonwealth. Specifically, the mandate called for MassDOT to "design and execute a study that provides a detailed analysis of practical pathways by which the Commonwealth could reduce motor vehicle congestion and make appropriate recommendations for further study or pilot programs." This report, *Congestion in the Commonwealth 2019*, was released on August 8, 2019.[1]

One of the several recommendations included in *Congestion in the Commonwealth 2019* specifies that MassDOT should investigate opportunities to serve commuters who might otherwise utilize single-occupancy vehicles (SOVs) though park-and-ride lots and bus or shuttle services. This final report, as well as the Technical Memos that serve as companion documents, represent the fulfillment of that recommendation.

The Shared Travel Network Study assesses the potential for new or enhanced services to connect origins (e.g., park-and-ride lots and the areas that can access them) with destinations in Greater Boston via physical and operational improvements on roadways. Specifically, the project studies how MassDOT can serve:

- Trips that can be routed through a park-and-ride facility along the Route 128/I-95 or I-495 belts to a destination hub outside of the urban core (i.e., along or between those beltways), and
- Trips that can be routed through park-and-ride facilities inside of the suburban core. The Shared Travel Network Study makes recommendations to "fill gaps' in the existing transit network, so preference will be given to routes not currently served by the Massachusetts Bay Transportation Authority (MBTA) bus or commuter rail.

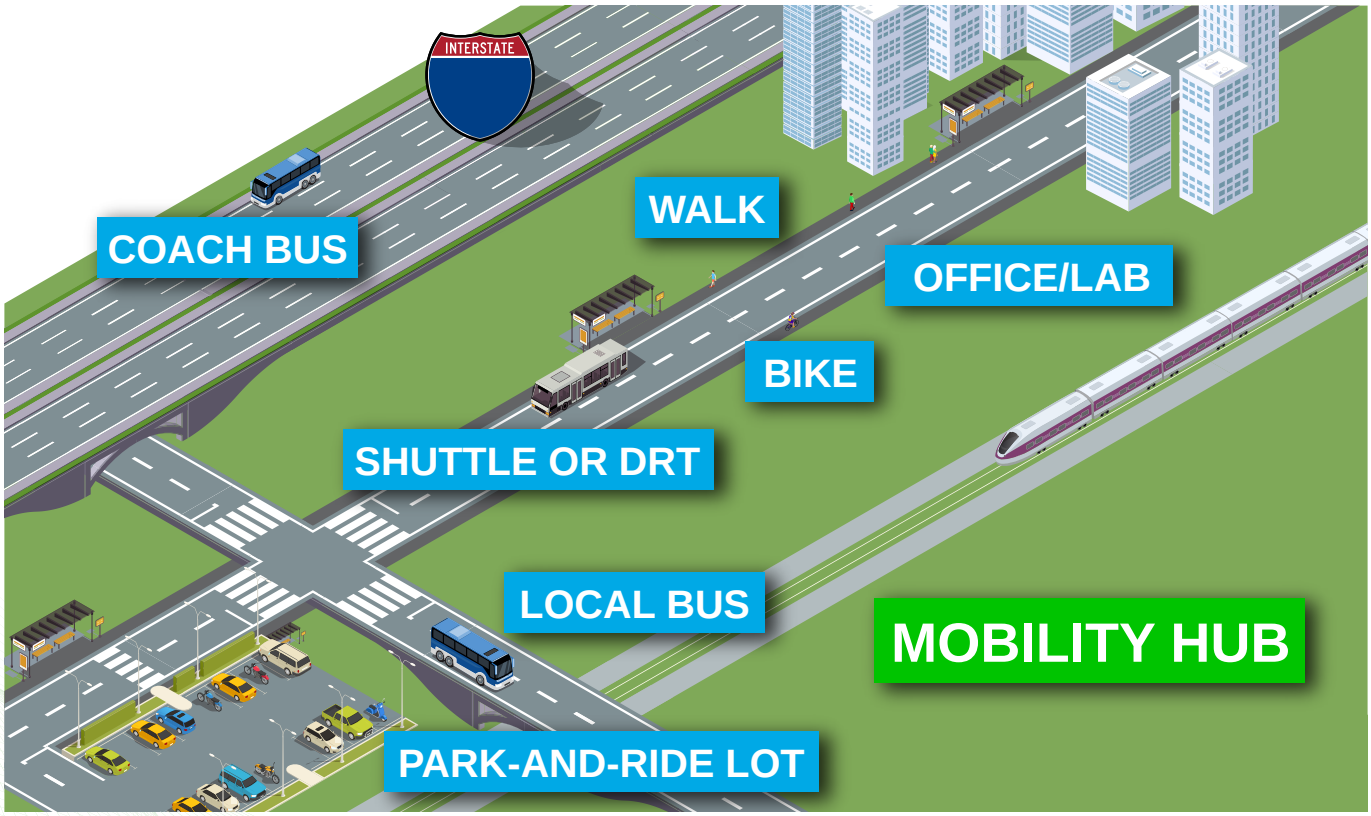
This Final Report reviews various components and elements of shared travel networks; identifies existing facilities, assets, and other infrastructure elements in Massachusetts that could lend themselves to a delineated shared travel network; and offers suggestions and recommendations to expand and formalize shared travel network opportunities across the Commonwealth. As noted, this report is accompanied by memos and appendices that provide more detailed information about shared travel networks generally, describe case studies of shared travel networks elsewhere, and detail supportive elements that can be found in Massachusetts, such as profiles of park-and-ride lots.

[1] "Congestion in the Commonwealth". Massachusetts Department of Transportation, 2019. https://www.mass.gov/service-details/congestion-in-the-commonwealth

## An Integrated Shared Travel Network

An ideal **shared travel network** consists of:

- Designated locations that serve as easy and comfortable transfer points between modes at several places in the city or region.
- A portfolio of modal options for travelers to choose from, including (but not limited to):
  - Buses (coach buses, "standard" transit buses, or "cutaway" shuttle buses).
  - Demand-Responsive Transit (DRT), meaning the transit that you "call" using a phone or app, including taxis, ride-hailing companies, and public dial-a-ride.
  - Carpools, whether informal or organized through apps, corporate efforts, or networks.
  - Rail services including rapid transit and commuter rail.
- A simple network with a clear structure that is easy to learn and remember.
- A variety of infrastructure improvements to support the mobility of shared travel modes, such as dedicated lanes, lanes to jump queues, or signal priority.
- Direct routes that operate at the fastest possible speed and highest possible reliability.
- High frequency services when and where the demand is reasonably high.
- Effective supporting measures such as fare structure, ticketing systems, information, and marketing.



## This study found that successful shared travel networks around the country have many things in common:

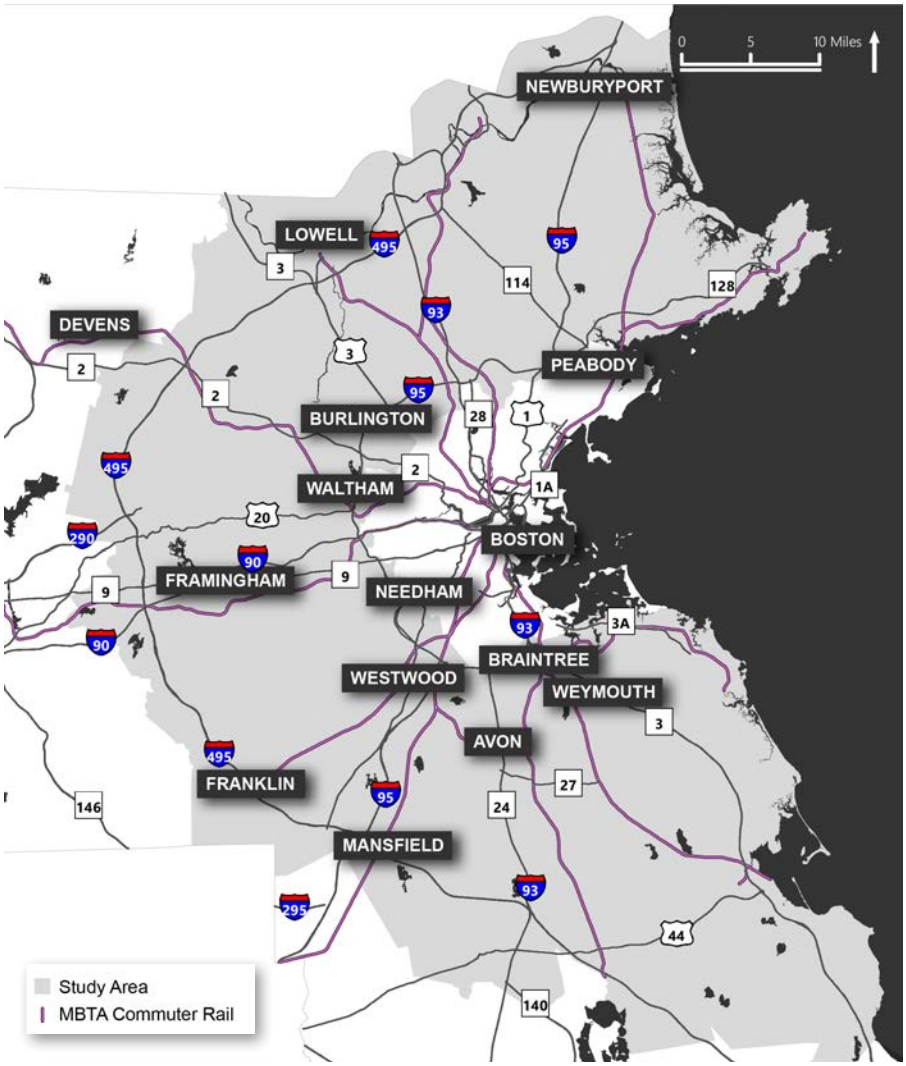
- *A shared systemwide marketing strategy, logo, or brand.*
- *Cooperation among multiple transit providers, including coordinated schedules and co-located stops.*
- *Networks designed for unique regional destinations that are responsive to their unique needs.*
- *A focus on reliability to build confidence among potential riders.*
- *Systems are designed and executed with people in mind, including that service is geographically equitable, available to people on non-traditional work schedules, and accessible to all riders, including those with limited physical abilities.*
- *Prioritization of performance (such as on-time performance) that is tracked publicly.*
- *Pricing that is competitive with driving.*

The transportation network in Greater Boston already features many of the elements of this ideal. Rapid transit and commuter rail lines are clearly delineated and culturally potent, and transit routes are often direct and are relatively reliable. However, the network outside of Route 128/I-95 exhibits fewer of these characteristics.

A full description of the best practices and case studies reviewed is available in Technical Memorandum 1: Best Practices/Case Studies, and a menu of shared travel service models and vehicles is included as Appendix D: Menu of Shared Travel Service Models and Vehicles.

## Travel and Demand in Boston's Suburbs

The Shared Travel Network Study focuses on travel to, from, and within the suburbs of Greater Boston, an area that we have roughly defined as extending from Route 128/I-95 to I-495 with a southern boundary at approximately US-44.

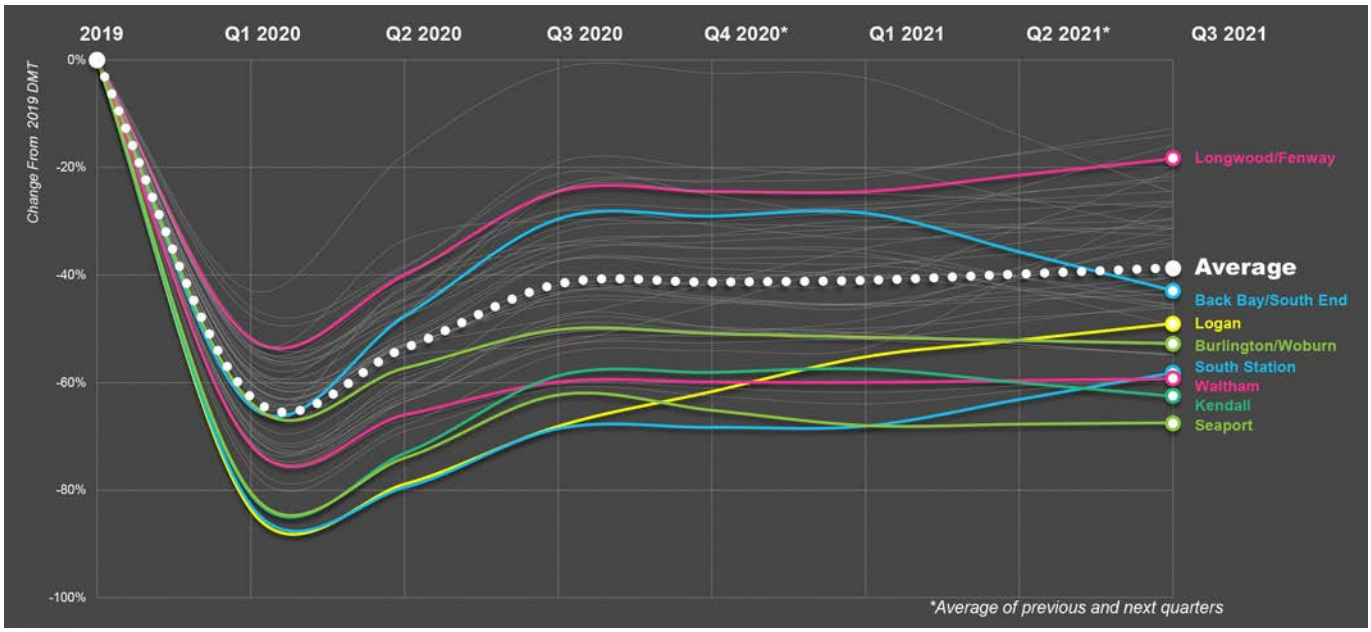


Our analysis identified high-demand origin-destination markets within our study area. To do this, we used a database that anonymously collects location "pings" from GPS-enabled devices such as smartphones several times per minute and turns them into estimates of point-to-point travel. We gave greater weight to trips that traveled a longer distance, reflecting our study's focus on suburban travel. *[For more information about our approach to estimating travel demand and desire lines in the study area, please refer to Technical Memorandum 2: Existing Conditions, and Appendix C: Detailed Methodology for Origin/Destination Analysis.]*

In the most recent analysis (based on data collected in September and October 2021), the highest-demand destinations in Greater Boston – inclusive of destinations of Boston itself – are in fact suburban centers of business such as Salem/Beverly/Peabody; Braintree/Weymouth; Burlington/Woburn; Newton/Needham/Wellesley; and Framingham/Natick. Several areas in the hub of the region are also large destinations, including the areas around South and North Station; Back Bay; the Longwood Medical Area; and Kendall Square.

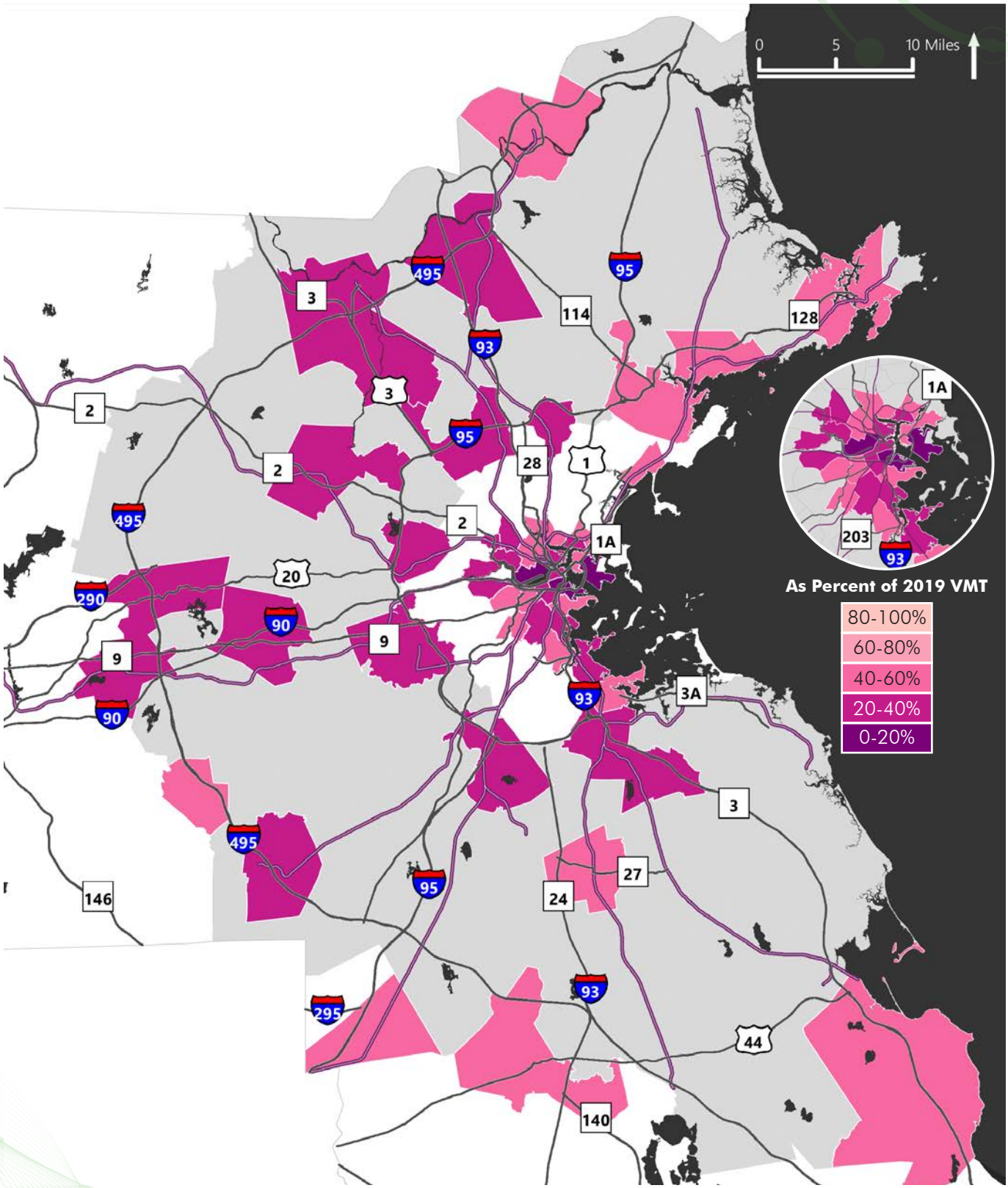
The COVID-19 pandemic has reduced demand to every destination in Greater Boston, but unevenly. For instance, the Longwood Medical Area is currently seeing 84% of its 2019 demand, compared to between 30% and 40% in Waltham, Kendall Square, and the Seaport.

**Destination Change in Demand (% of 2019)**

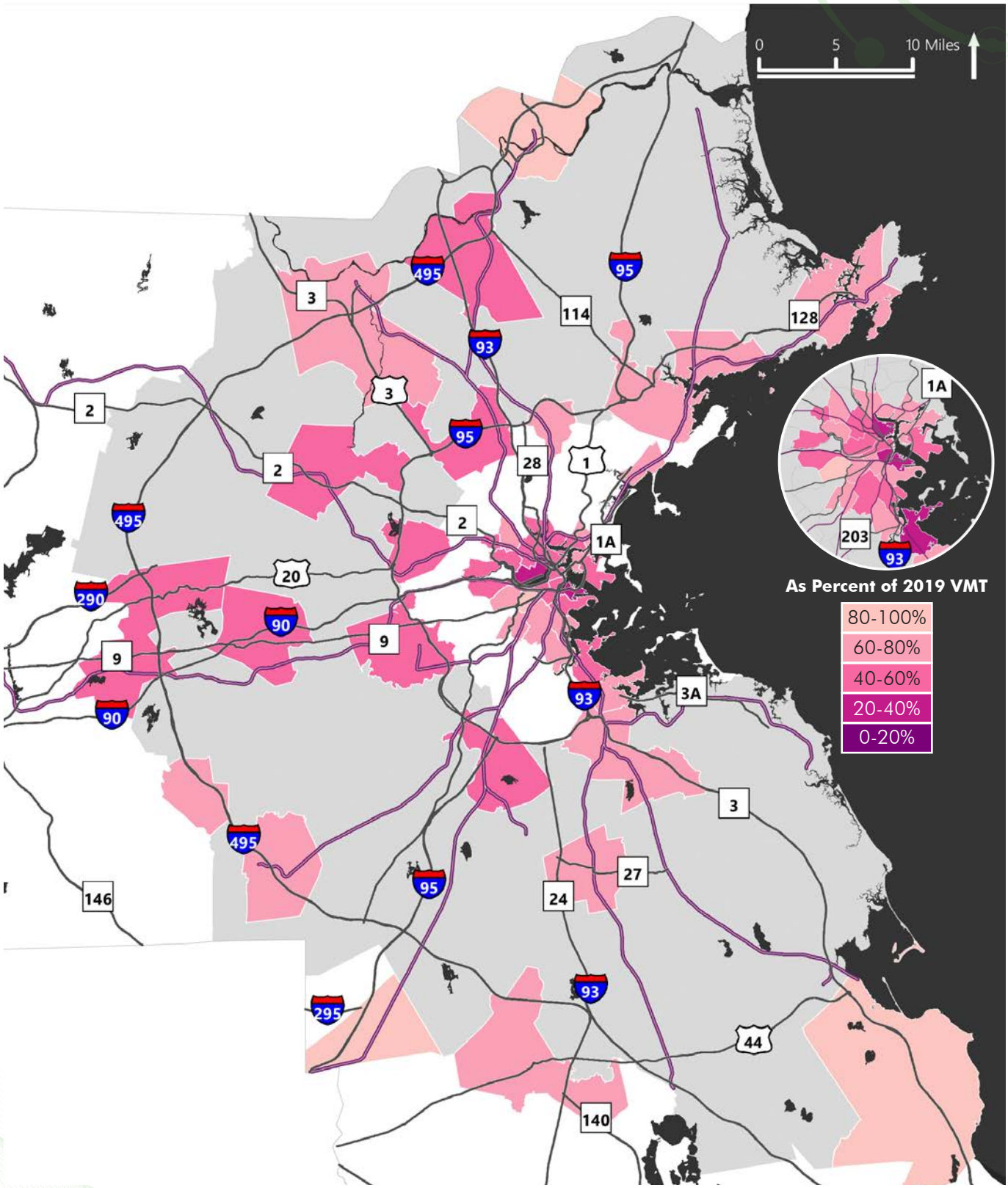



The maps on the next pages show the recovery of demand to destinations over the course of the Pandemic – areas shaded darker have less demand relative to 2019.

## Change in Demand: *Spring/Fall 2019 vs. March/April 2020*

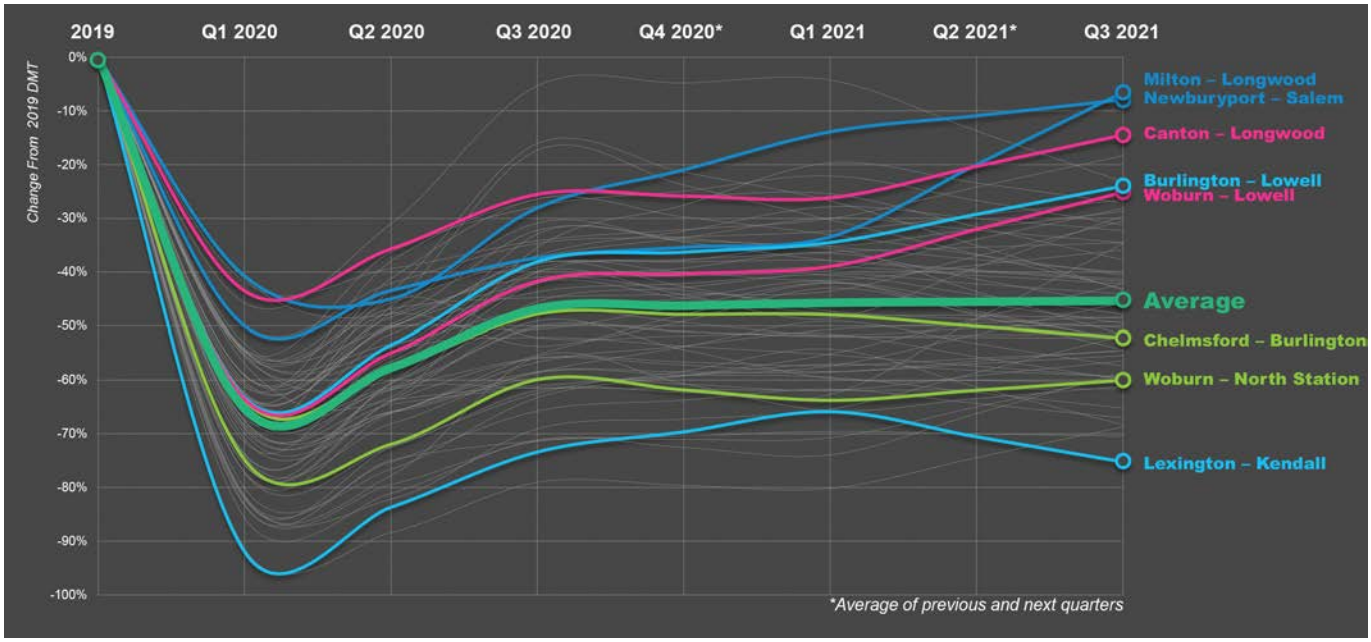


## Change in Demand: *Spring/Fall 2019 vs. Q3 2021*



Our analysis also identified markets that see high demand for travel between specific origins and destinations. Throughout the pandemic, the highest-demand origin-destination market exists between Lowell, Andover, and Lawrence on I-495, and Burlington and Woburn on Route 128/I-95. As with data reflecting destination-based travel, demand is lower in 2021 than in 2019 for all origin-destination analysis of markets, but the reduction is similarly inconsistent. For example, the Milton-Longwood Medical Area and the Newburyport-Salem/Beverly/Peabody travel markets have each recovered more than 80% of their 2019 demand, while almost all markets ending in Kendall Square have recovered 40% or less of their 2019 demand.

**Market Change in Demand (% of 2019)**




## CAN TELEWORK SAVE US FROM CONGESTION?

*The Congestion in the Commonwealth 2019 comprehensive study found that congestion in Massachusetts at the time was severe and pervasive in Greater Boston, worsening at that time, and driven by a variety of factors. One of the recommendations of that study was to increase remote work and telecommuting, with a recognition that this will not be possible in all industries and for all workers. Within a year of the release of that report, the COVID-19 pandemic sent workers in many industries to work-from-home conditions. At the height of stay-at-home orders in April 2020, Massachusetts saw a 60% drop in vehicle-miles traveled (VMT) compared to the prior month, raising the question of whether the spread of telework could by itself address congestion.*

*By June 2020, however, VMT had recovered to 80% of its pre-pandemic peak, and has remained in that range through both the Delta and Omicron surges. As of early 2022, travel times on major highways in the afternoon peak are approaching their 2019 levels.*

*Should demand to some major destinations (e.g., Downtown Boston, the Seaport, and Kendall Square) recover in the coming months and years, Greater Boston can expect 2019-era traffic conditions even despite the potential for many major employers to transition to hybrid or fully remote work environments. It is important to note that at the time of this report's publication, MBTA remains at about 50% of pre-pandemic levels system-wide. Shifting trips from cars to trains, buses, bicycles, and feet is one potentially powerful tool to address the congestion challenges Greater Boston is likely to again face in the near future.*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# THE EXISTING NETWORK

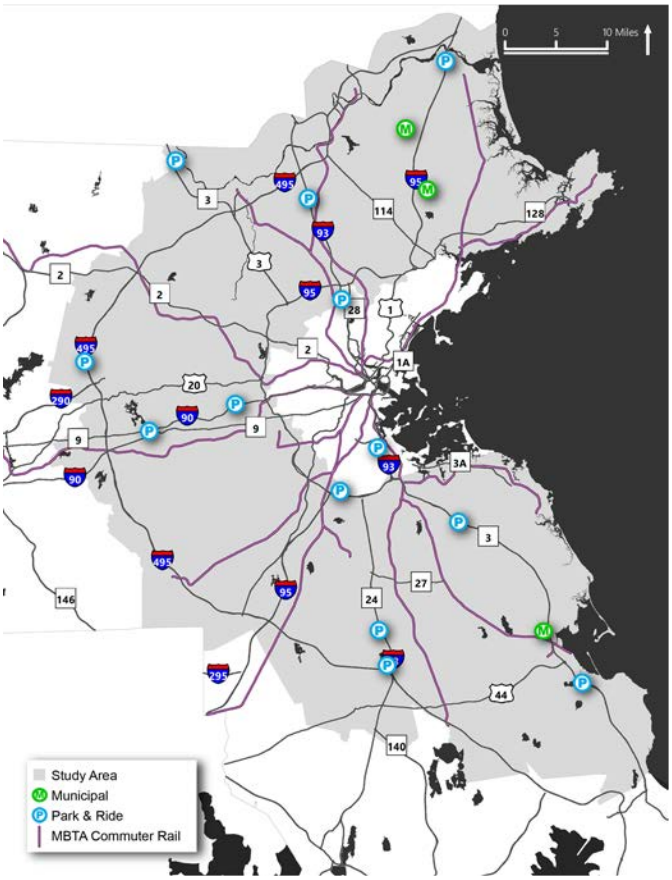
A shared travel network relies on transportation facilities and services that are integrated in logical, convenient ways to connect high-demand origin and destination markets. These should be built in a way that incentivizes their use, and encourages drivers of single-occupancy vehicles to shift to a shared vehicle at some point in their journey. One version of a shared travel network that takes advantage of existing facilities in Massachusetts would draw upon park-and-ride lots; managed lanes, including Bus on Shoulder (BOS) facilities; and shared transportation services, such as Transportation Management Association (TMA) shuttles, transit vehicles, or private bus service.

This second section summarizes existing assets and infrastructure that could be leveraged or expanded to formalize a shared travel network in Greater Boston, including park-and-ride lots, shared travel services, and surface network elements. More detailed information about different variations of shared travel networks and existing facilities in the region that could be leveraged to accommodate building out such a network are included in Technical Memo 2: Existing Conditions and in Appendix B: Analysis and Inventory of MassDOT Park-and-ride Lots in Greater Boston.

## Park-and-Ride Lots

MassDOT owns and maintains more than a dozen park-and-ride lots in eastern Massachusetts. These lots vary in size from small (a couple of dozen parking spaces, such as Berlin) to very large (hundreds of parking spaces, such as Andover).

MassDOT operates these lots as a service to residents and visitors to the Commonwealth to park a vehicle and connect with regional transit, meet up with others for a carpool, or in some instances to access recreational trails on foot or bicycle.




Most of the park-and-ride lots are paved and striped for parking, have directional signage from the regional roadway network, and have some illumination. The park-and-ride lots are typically available 24/7, parking is free, and lots are

easily accessible by car. In most cases, accessing the park-and-ride lots by walking or riding a bike is more challenging due to a lack of pedestrian and bicycle infrastructure and environments that are more oriented to automobile travel.

In order to assess the siting and condition of park-and-ride lots to determine their feasibility as part of a shared travel network, this study conducted two surveys of the park-and-ride lots themselves: one that assessed the physical condition of facilities, and one that asked for feedback from park-and-ride users.

- The **physical inventory** collected information about location pavement and striping condition; the number of spaces being used, left open, and that were obstructed; amenities including lighting, bus shelters, and trash receptacles; and connections to transit and bike/pedestrian pathways.

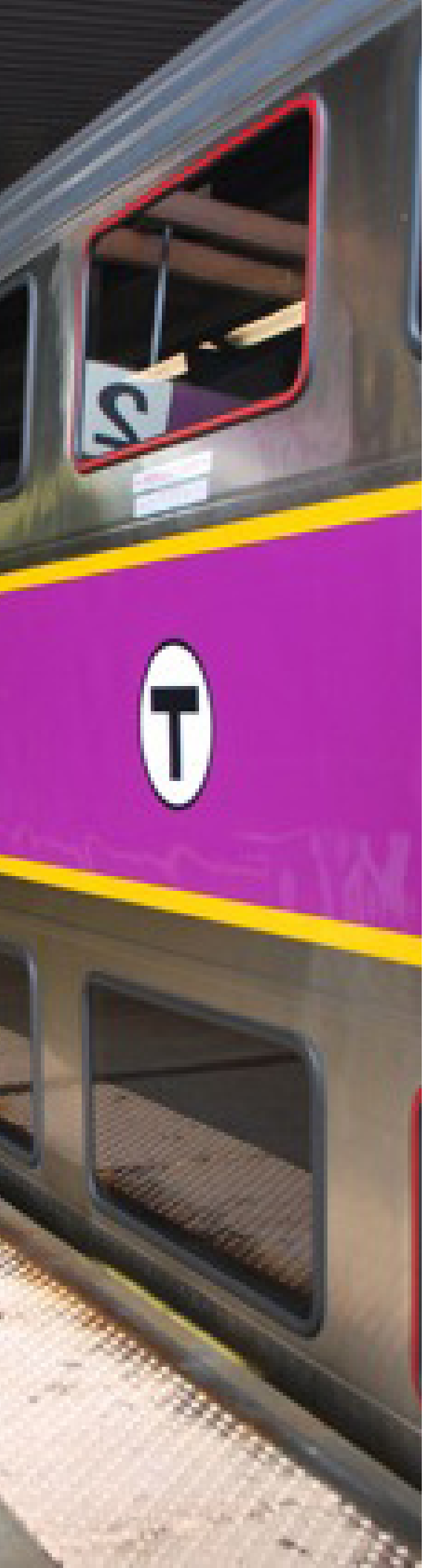
- The **user survey** was conducted across the full month of November 2021. The survey was accessible via a web-based form (marketed via yard signs at park-and-ride lots as well as windshield flyers) and asked users about their purpose and frequency in using the lot. This study found that a majority (54%) of respondents were carpooling, with 35% connecting to coach services or transit. Approximately half of the respondents use the lot daily, and approximately another half park there for the entire working day. Approximately 60% of respondents were traveling to Downtown Boston, while 29% were headed to Logan Airport using a coach service.

Results of the physical inventory and user survey found that in general, if a shared travel service is provided at a lot, a user base exists, even if there are lot assets that need maintenance or enhancement. Three primary takeaways based on results of the inventory and survey are:

1. **If bus service is provided, people will take it.** This is especially true if the bus goes to Logan or downtown Boston – there are people who see this as a more convenient alternative to driving or passenger rail options. This is true for Boston Express service to Logan and Downtown Boston from Tyngsboro; MBTA route 354 service from Woburn; or P&B service from Plymouth. The old adage, "if you offer it, people will use it" seems to apply. Bus service is also tied to maintenance of the lot – regarding the departure of C&J from the Newburyport Park-and-Ride, one respondent commented "Super bummed the bus no longer runs here. The lot is looking neglected. Seems to have lots of potential."

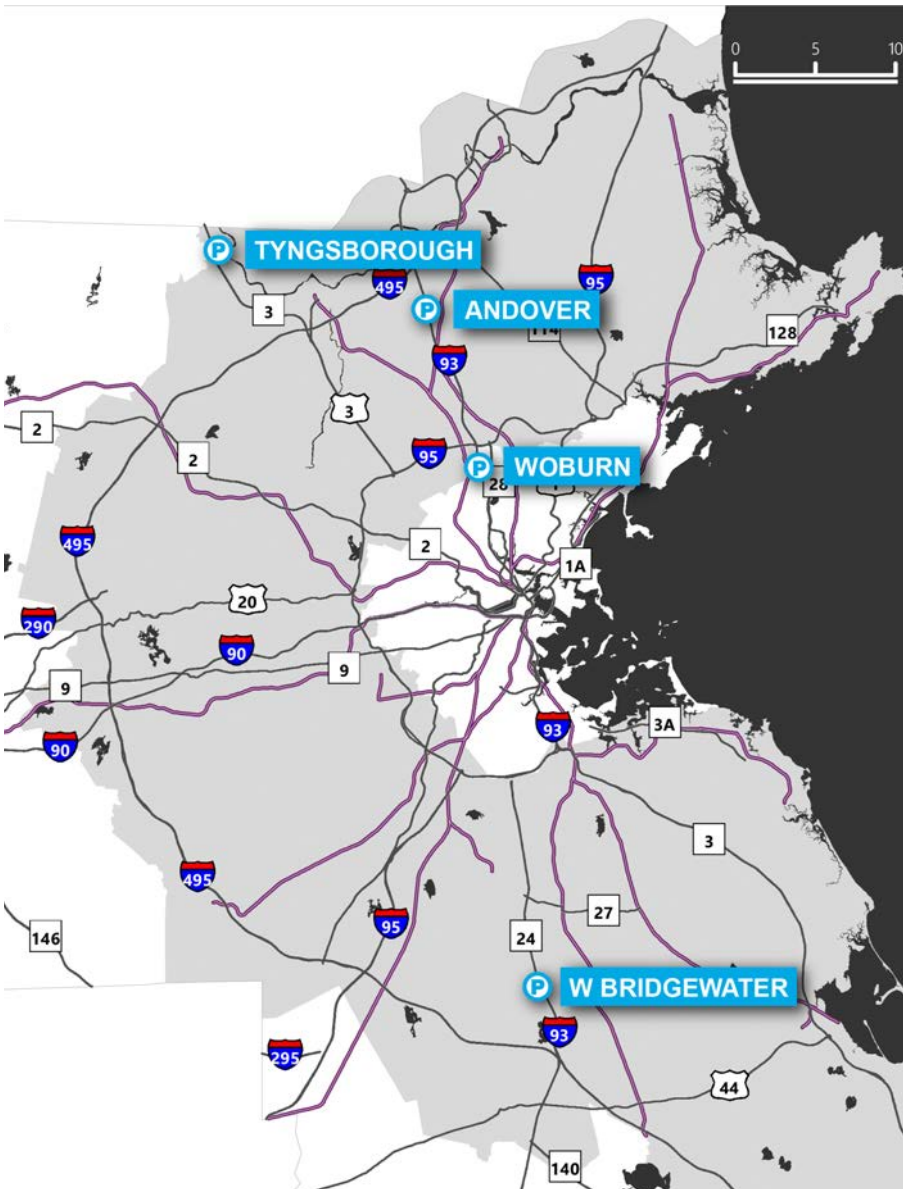
2. **Many park-and-ride users rely on the lots as part of their daily routine, even if it is not travel-related.** Out of 78 valid responses, 53% of survey respondents indicated that they use the lots every day, indicating that these facilities play a large role in 'everyday travel' for many. Of those that indicate daily PNR use, 10 out of 41 respondents are connecting to bus service, while 29 are meeting others to carpool. Of the survey respondents using the lots for daily use, 8 refer to Andover, 8 refer to Tyngsboro, 7 refer to Woburn, 5 refer to Rockland, and 4 refer to Newburyport (others include Framingham, Milton, West Bridgewater, Berlin, and Canton). However, not all daily users are 'parking and riding' – many respondents citing the Canton lot indicate they use the lot for Blue Hills hiking purposes and one respondent indicated that the Weston Park-and-Ride is also used for 'overfill parking from 680 South Avenue condo townhomes.'

3. **Most respondents indicated they park during the workday, but others leave their vehicles overnight or long-term, despite the lots being unmonitored and unsecured.** Although MassDOT lots are technically closed to the public from dusk until dawn and the degree of lighting varies between them, many drivers who avail themselves of these facilities are comfortable parking and riding for extended periods of time.



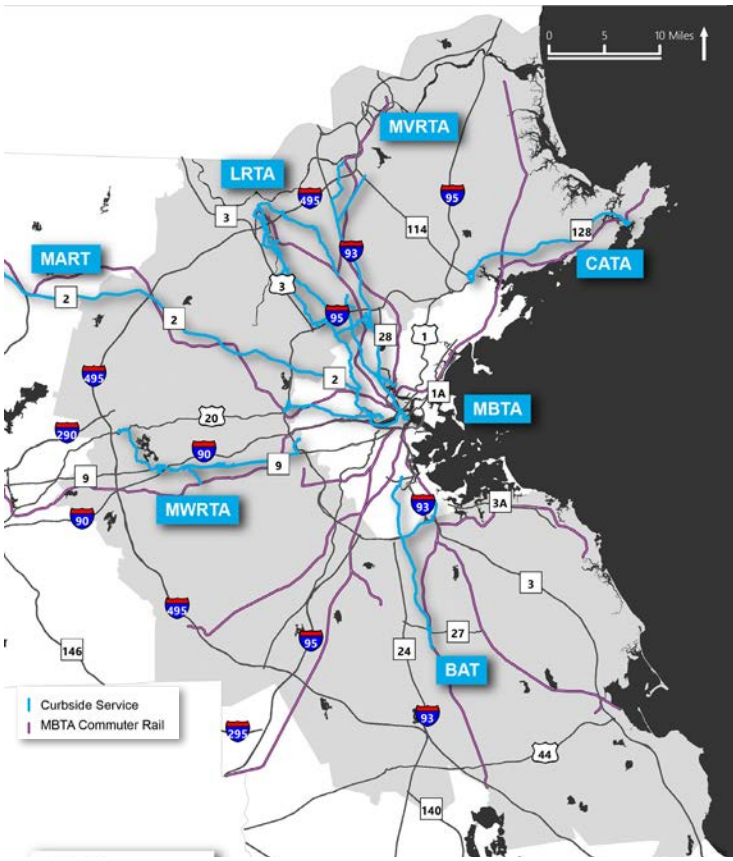


Information gathered from the physical inventory and user survey suggest that in the project's study area, there are four lots that are well-sited and equipped for the introduction or expansion of shared travel services based on demand and maintenance: Andover (Dascomb Road), Tyngsborough (from which Boston Express serves Logan Airport), West Bridgewater (from which Plymouth and Brockton serves Logan Airport), and Woburn.

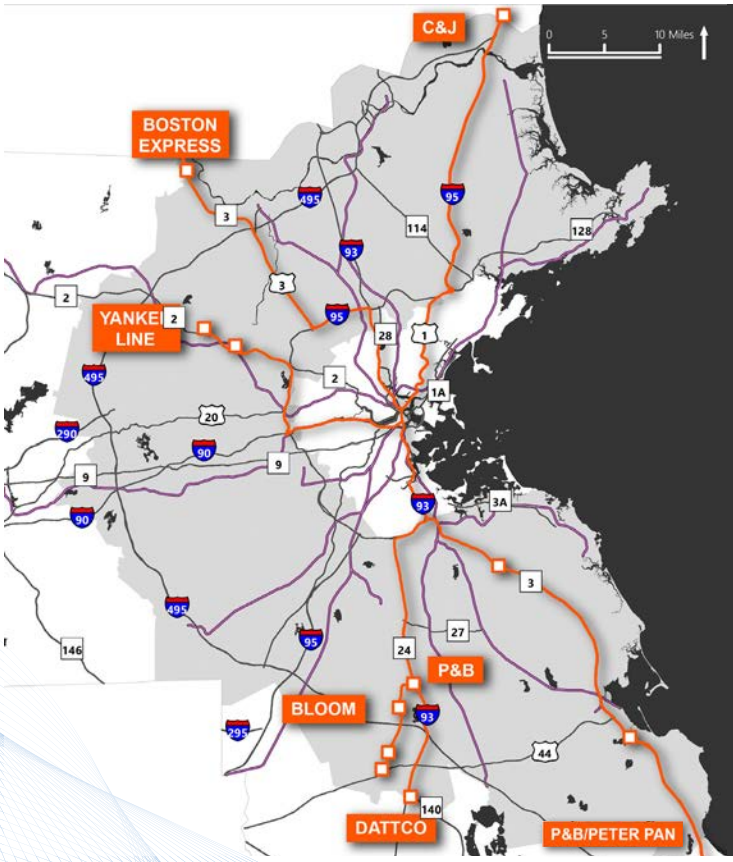



## Shared Travel Services in Greater Boston Today

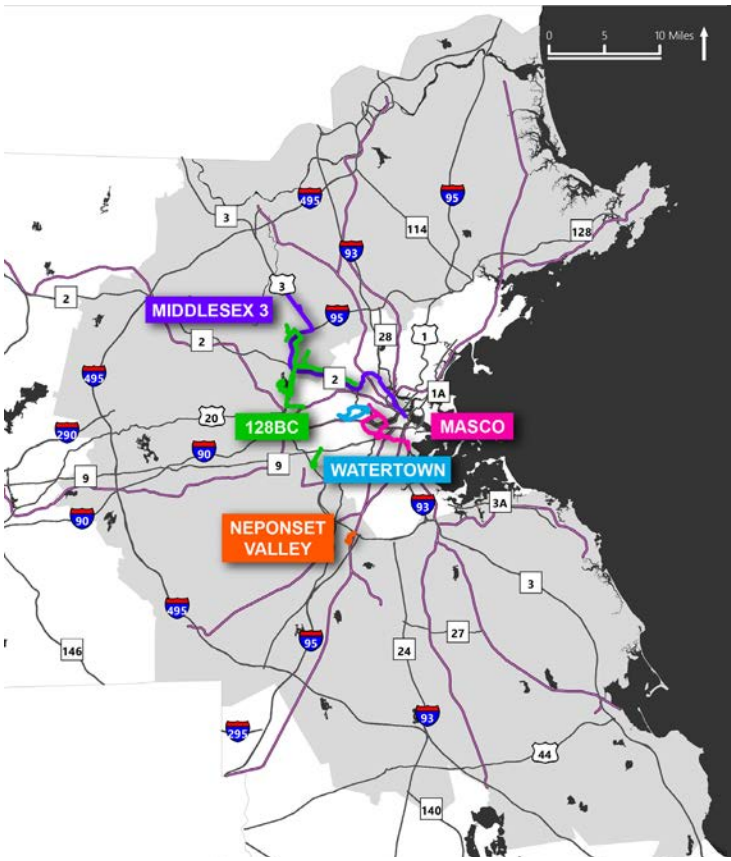
Greater Boston's shared travel network includes the rapid transit and commuter rail services operated by the MBTA; bus services operated by the MBTA and several Regional Transit Authorities (RTAs); "curbside" coach bus services with private operators; and shuttle bus services operated by Transportation Management Areas (TMAs) and corporations. This study does not address MBTA rapid transit and rail services, nor does it directly address MBTA bus services, which are currently being assessed under the Bus Network Redesign Project.




**Public Transit Buses |** The Greater Boston region is served by the MBTA and by seven RTAs. The MBTA serves Boston and its inner suburbs, and the primary service area operates mainly within the Route 128/I-95 corridor. RTAs serve urban and suburban areas associated with Gateway Cities such as Brockton, Framingham, Haverhill, Lawrence, Lowell, Newburyport, and Taunton, and also often provide connections to MBTA rail services. Two RTAs – Merrimack Valley RTA and Montachusett RTA – provide express coach bus services to Downtown Boston: This map shows a subset of RTA and MBTA bus routes that serve the major markets included in this study.




**Private Motor Coaches |** Private motor coach companies serve Greater Boston with scheduled service, largely centered on commuters accessing Downtown Boston and travelers accessing Logan Airport. MassDOT supports these operators by providing them with vehicles through the "BusPlus" program. In the suburbs, these services may operate from MassDOT park-and-ride lots, private parking lots (such as grocery stores), or their own privately-owned terminals. Some also pick up at roadside locations. In Downtown Boston, they may make roadside stops or use a formal terminal such as South Station or Haymarket. At Logan Airport, they stop at the terminal doorways.




**Transportation Management Associations |** As defined by the Middlesex 3 TMA,[2] "A Transportation Management Association is a partnership between businesses, developers, residential locations, and communities. Participants join to reduce traffic congestion and air pollution and improve transportation options in a defined region". Further, as noted by the Central Massachusetts Regional Planning Commission,[3] "TMAs engage in demand management efforts such as ridesharing, coordinated parking management, commute trip reduction (e.g., work-from-home), pedestrian and bicycle improvements, and land use planning." In Greater Boston, five TMAs also provide shuttle bus services connecting groups of employers to MBTA rail stations, as shown in the map.

**Other Shared Transportation |** Other than RTAs, private motor coaches, and TMAs, three towns in Greater Boston – Acton, Lexington, and Maynard – currently provide fixed-route bus service to residents. In addition, Newton, Salem, and Westborough have begun piloting 'demand-responsive transit' in partnership with private firm Via. Greater Boston's many colleges, universities, and other institutions also provide shuttle services for students and employees. All of these are designed to serve "first and last mile" connections or short trips within local areas, and generally provide direct connections to rapid transit stations or other high-demand destinations.

## LOGAN EXPRESS

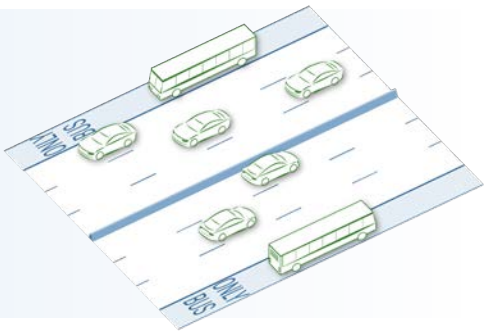
*In addition to private coach operations that serve Logan Airport, the Massachusetts Port Authority (Massport) operates Logan Express from four dedicated parking facilities in Greater Boston. Massport restored services at all suburban locations during the COVID 19 recovery, including recently reopening at a new and more accessible Peabody location. Massport is offering discounted online tickets through June 2022 in order to encourage ridership growth. Air passenger ridership per enplanement on suburban services has since rebounded to approximately pre-pandemic levels. The service is not only for air passengers – historically 40% of Logan Express trips are employees commuting to work at the airport. Massport now offers online ticketing and plans to update Logan Express facilities with live flight schedule boards and other amenities in the years to come. As MassDOT has no jurisdiction over Logan Express, it is beyond the scope of this study's recommendations.*

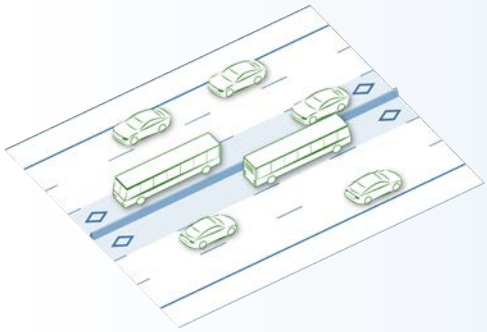
[2] https://www.middlesex3tma.com/
[3] https://www.cmrpc.org/tma

## Surface Network

This study considered several types of physical and operational improvements to the surface transportation network that could make shared travel services more competitive in Greater Boston:

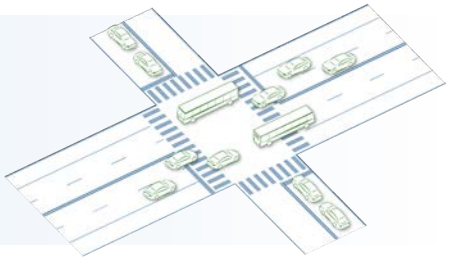
**Bus-on-Shoulder (BOS) |** MassDOT has launched a pilot project for BOS on a segment of I-93 north of Boston, for use by MBTA, MVRTA, and Logan Express buses. MassDOT has also conducted a scoping study to identify other places in Greater Boston where BOS could be implemented. Under stop-and-go conditions, the authorized buses on the shoulder can travel at speeds around 45 mph.

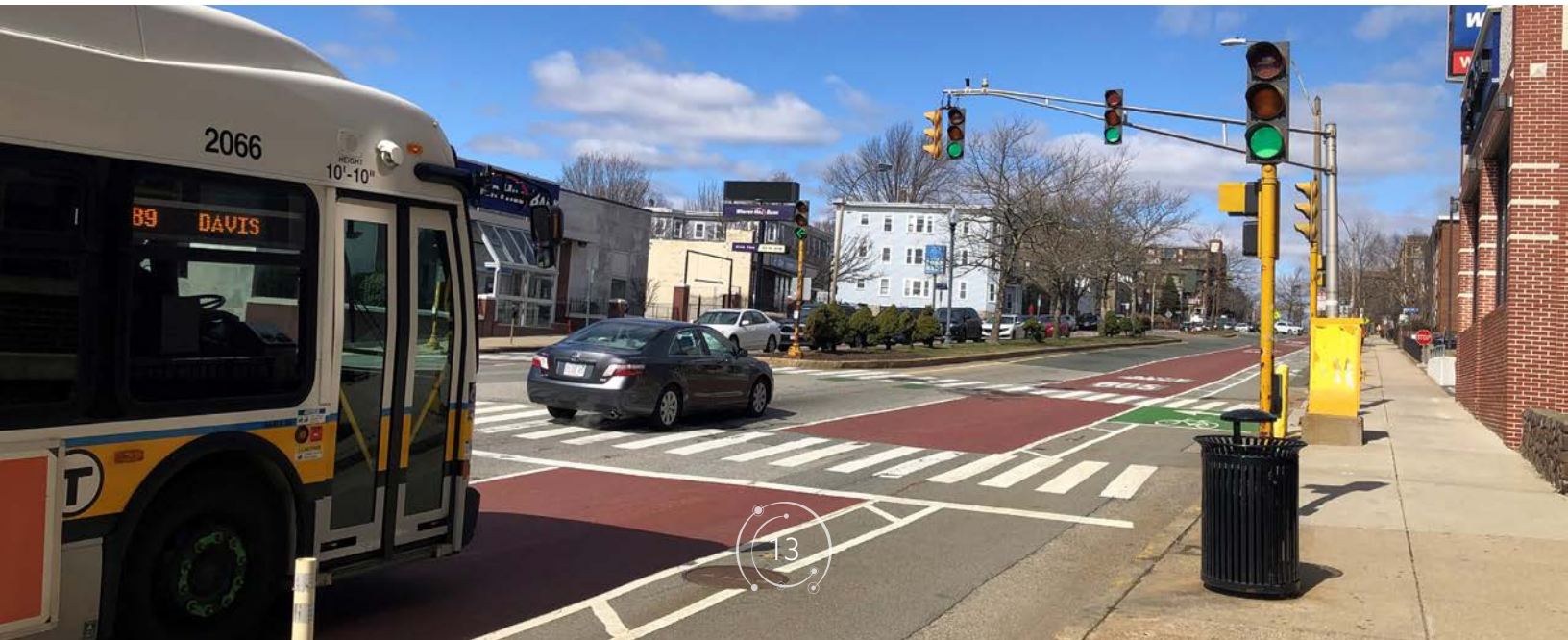


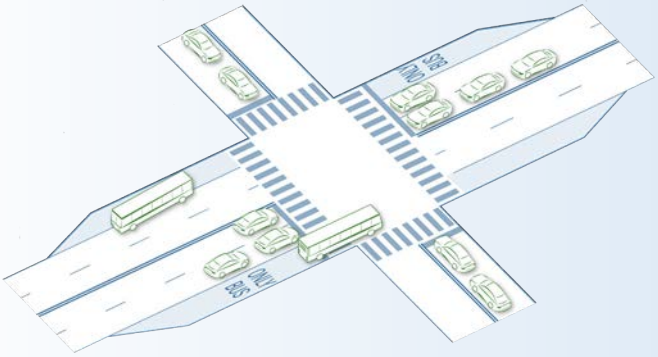
**Managed Lanes |** MassDOT is also exploring the use of Managed Lanes to mitigate congestion on highways and approaches to Boston. These managed lanes could be existing lanes restricted to a high-occupancy vehicles or buses, or new restricted lanes added to a roadway that are only open to drivers willing to pay a higher toll. A recent screening study by MassDOT studied which highways in Greater Boston might have the potential for managed lanes. At the most congested periods, buses can be given dedicated lanes on arterial (non-highway) roads. MassDOT has partnered with 12 municipalities to build 25.6 miles of bus lanes as of 2021.

**Transit Signal Priority (TSP) |** The devices that control many traffic signals already have the capacity to prioritize approaching transit vehicles. Buses can report their location to the signal through use of a GPS locator. In Greater Boston, Brookline has implemented TSP along Beacon Street.





**Queue Jump Lanes |** Queue jump lanes are short lengths of dedicated bus lanes on the approach to an intersection; queue jump lanes are often converted from an existing parking lane and are usually combined with a far-side bus stop and TSP to allow for the transit vehicle to travel through the intersection. Through modified signal phasing, the bus in a queue jump lane is allowed to proceed into an intersection prior to general traffic. In Greater Boston, this approach was tested as part of a pilot project in the Town of Arlington along Massachusetts Avenue.




For shared travel services to be successful, they need to compete effectively with driving alone. This study estimated the competitiveness of implementing the improvements discussed above on the Greater Boston roadway network and found that a shared travel service could be made competitive with driving by implementing one or more of them. A full description of this analysis is included in Appendix E: Detailed Methodology for Competitiveness Assessment and Appendix F: Summary of Competitiveness Findings for Largest O/D Markets.

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# IMPROVING THE NETWORK

This study found that suburban destinations between Route 128/I-95 and I-495 are not well-served by any transit option – a gap that can be filled by a dedicated shared travel network. While private coaches, some transit shuttles, and the MBTA Commuter Rail system serve commuters to Downtown Boston and adjacent areas, the major suburban business districts identified by this study – Braintree, Burlington, Needham, Peabody, Waltham, and Woburn (among others) – lie on the boundary between the area served by the MBTA and RTAs, so neither provides sufficient scheduled bus service to meet demand. While TMA shuttles do serve these areas, service delivery is typically in reverse-commute fashion, geared at workers who keep 9-to-5 schedules and who live in places accessible to the pickup location (MBTA stations at Alewife, Haymarket, Waltham, and Route 128).

This final section reviews recommendations for enhancing the network in ways that incentivize and provide opportunities for developing a true shared travel network in Greater Boston.

## Park-and-Ride Improvements

The two surveys of park-and-ride lots (physical and user) conducted through this study have revealed several opportunities for MassDOT to invest in its assets, better serve a substantial population of customers, and better manage its property. Physical recommendations include:

- **Resurface and Repave Lots |** Several lots have pavement is poor condition, such as Bridgewater, Canton, and Tyngsborough.
- **Restripe Lots |** Several lots have weak or absent striping, leading to an inefficient use of space. Lots which should be re-striped include Berlin, Bridgewater, Canton, and Woburn.
- **Partner with Transit Agencies to Provide Transit Connections |** Services from RTAs and private coaches could induce demand and reduce single-occupancy vehicle use.
- **Improve Lighting and Visibility |** Unlit lots feel unsafe at night. Investing in improved visibility, including lighting, in and throughout the lots is warranted at lots such as Bridgewater, Rockland, Berlin, Plymouth, West Bridgewater, and Woburn. Users suggested removing fencing at West Bridgewater to improve visibility.
- **Improve Waiting Areas |** New or upgraded shelters, seating, lighting, garbage receptacles, and information services will improve customer comfort at many lots, including Milton, Rockland, Tyngsborough, and West Bridgewater.
- **Showcase Active Transportation and Recreation |** MassDOT could advertise the recreational and active transportation opportunities at lots such as Woburn (the Tri-Community Greenway Trail), Canton (the Blue Hill Reservation), Newburyport (the William Lloyd Garrison Trail), and Weston (the Hultman Aqueduct Path) through new signage.

- **Develop Improved Pedestrian Connections from Lots to Nearby Amenities |** Many lots are nearby to food or shopping but lack adequate pedestrian access. The problem is acute at Andover, Framingham, and Plymouth (which is located at a MassDOT service plaza and lacks easy access from the surrounding community.

- **Variable Message Signage |** Variable message signs on the highway can update drivers on lot capacity, amenities and connections. Customers also sought time-to-next-bus signage in lots with service.

## Suburban Transit Initiatives

This study recommends that MassDOT, the MBTA, the RTAs, TMAs, and private coach services collaborate to provide higher-quality transit service along the Route 128 belt and in adjacent towns. The 2020 US Census found that growth has concentrated in small cities and suburban areas – the majority of US residents now live in the suburbs.[4] Greater Boston, however, benefits from a multi-century legacy of unique and defined suburban village centers strung along historic turnpikes, active commuter rail lines, and abandoned rail lines ripe for transformation into mixed-use paths and bikeways. In addition, the past decade has seen the proposal of urbanist developments along the Route 128/I-95 corridor itself, including 1265 Main in Waltham, The District in Burlington, and Northland Newton.

Specific measures to advance suburban transit in Greater Boston might include:

- Completing the ongoing **Route 128/I-95 Land Use and Transportation Study**, which will review existing conditions and establish future land use, housing, and economic development assumptions of the segment of Route 128 between Newton and Lexington. Based on these assumptions, the study will present recommendations intended to address the corridor's current and anticipated future transportation issues. The public can engage with the project at https://www.mass.gov/route-128i-95-study.

- **Unified Planning |** MassDOT, RTAs, TMAs, and private companies could unify their service planning either regionwide or in specific corridors/markets. This could also include unified/integrated tickets and consolidation of services from multiple providers on single sites, whether park-and-ride or curbside.

- **Incentives for Riders |** As Logan Express has demonstrated in Greater Boston with its TSA security passes and free fares, incentives - both monetary and otherwise - can be very effective in driving higher ridership. Drivers should be educated of the social and environmental benefits of using a shared service, and if possible, incentivized to do so.

- **Pricing Automobile Travel |** Massachusetts could levy a congestion tax, limit automobile access to congested areas, or toll existing travel lanes.

- **Land Use Policy |** MassDOT could partner with cities and towns to pursue transit-oriented development opportunities in pursuit of mode shift goals.

- **Marketing |** Shared travel services could be marketed with a compelling and attractive brand, elements of which could be shared across operators. The brand could be promoted and advertised to build awareness and a "cool factor" in the community.

[4] https://www.pewresearch.org/social-trends/2020/07/29/prior-to-covid-19-urban-core-counties-in-the-u-s-were-gaining-vitality-on-key-measures/




## Anticipated Demand for Services

Based on this study's metrics for distance-weighted demand, the Woburn/Burlington origin-destination market is one of very high travel demand. In Fall 2021, the market from Woburn to Lowell placed first, the market from Burlington to Lowell paced second, Lowell to Burlington/Woburn fifth, Andover to Burlington/Woburn sixth in terms of travel demand and 'desire lines'. In 2019, those markets were the top four in terms of demand, and markets from Woburn to Salem and Peabody, Kendall Square, Waltham, and Downtown Boston were also important in this respect.

The shared travel services currently offered in the Burlington/Woburn market is axial, treating the area as a waystation toward central business districts in Boston, Lowell, Lawrence, and Haverhill. For example, MBTA Commuter Rail and bus services connect Woburn with Boston and Medford and Burlington with Boston and Alewife. The Commuter Rail continues to Lowell with approximately hourly service and is supplemented by an hourly LRTA bus line between the Burlington Mall and Lowell. Unlike the 128 Business Council in the Waltham and Lexington markets, the Middlesex 3 TMA does not provide a dense network of shuttles to blanket its service area, instead providing a small number of direct shuttles that are oriented to traveling directly to Boston. Many of these services can take advantage of MassDOT's I-93 BOS pilot project launched in 2021.

The neighborhood of Woburn that surrounds the Anderson RTC and Mishawum MBTA stations has the potential to become even more regionally prominent through redevelopment. In February 2022, Alexandria Real Estate Partners announced a life sciences "mega campus" on the former Raytheon campus just north of Anderson RTC. The City of Woburn and the Metropolitan Area Planning Council convened a series of workshops in 2018[5] to imagine residential and retail redevelopment of the Anderson RTC parking lot and low-density commercial properties near Mishawum, with a longer-term vision of development along the segment of Commerce Way that connects the two.

Further south, Woburn will also host "The Vale", a 107-acre mixed-use campus currently under construction immediately adjacent to MassDOT's Woburn Park-and-Ride, which is often near or over-capacity and regularly used by construction workers to meet and carpool to job sites.

In 2017, the North Suburban Mobility Study[6] recommended that the area be served by better distributor/crosstown shuttles that would allow riders to transfer from Anderson Regional Transportation Center to their home or workplace. It also recommended that transit services coordinate a mobility hub at the Burlington Mall to allow transfers and further access.

[5] https://www.woburnma.gov/wp-content/uploads/2018/03/final-2.26.17_Woburn-eTOD_Forum-Presentation.pdf

[6] https://www.mapc.org/wp-content/uploads/2017/10/NSPC-Mobility-Study-Full-Report-Final-May2017.pdf