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Comprehensive Regional Transit Plan Update 2020

Montachusett Regional Transit Authority

MART
MONTACHUSETT REGIONAL TRANSIT AUTHORITY

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Acronyms

ACS	American Community Survey
ADA	Americans with Disabilities Act
APC	Automated Passenger Counter
APTA	American Public Transportation Association
AVL	Automatic Vehicle Location
CARES	Coronavirus Aid, Relief, and Economic Security
CCRTA	Cape Cod Regional Transit Authority
COA	Council on Aging
COVID-19	Novel Coronavirus Disease of 2019
DAR	Dial-a-Ride
F/L	Fitchburg/Leominster
FSU	Fitchburg State University
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas
GWSA	Global Warming Solutions Act
HST	Human Service Transportation
ITC	Intermodal Transportation Center
JARC	Job Access/Reverse Commute
LEHD	Longitudinal Employer-Households Dataset
LRTA	Lowell Regional Transit Authority
MART	Montachusett Regional Transit Authority
MassDOT	Massachusetts Department of Transportation
MBTA	Massachusetts Bay Transportation Authority
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MRPC	Montachusett Regional Planning Commission
MTS	Management of Transportation Services
MWCC	Mount Wachusett Community College
NTD	National Transit Database
RTA	Regional Transit Authority

TAM	Transit Asset Management
TCI	Transportation & Climate Initiative
TERM	Transit Economic Requirements Model
ULB	Useful Life Benchmark
UPT	Unlinked Passenger Trip
VA	Veterans Administration
VRH	Vehicle per Revenue Hour
VRM	Vehicle per Revenue Mile
WRTA	Worcester Regional Transit Authority

Glossary

Access: The opportunity to reach a given destination within a certain timeframe or without significant physical, social, or economic barriers.

Accessible Vehicle: A public transportation vehicle that does not restrict access, is usable, and provides allocated space and/or priority seating for individuals who use mobility devices.

Americans with Disabilities Act (ADA): The Americans with Disabilities Act, passed in July 1991, gave direction to local transit agencies to ensure full access to transportation for persons with disabilities.

Boardings: The total number of passengers getting on a transit vehicle during a specified period of time. See also Ridership and Passenger Trip.

Capital Cost: The cost of equipment and facilities required to support transportation systems, including vehicles, radios, shelters, software, etc.

Central Transfer Point: A central meeting place where routes or zonal demand response buses intersect so that passengers may transfer. Routes are often timed to facilitate transferring and depart once passengers have had time to transfer. When all routes arrive and depart at the same time, the system is called a pulse system. The central transfer point simplifies transfers when there are many routes (particularly radial routes), several different modes, and/or paratransit zones. A downtown retail area is often an appropriate site for a central transfer point, as it is likely to be a popular destination, a place of traffic congestion and limited parking, and a place where riders are likely to feel safe waiting for the next bus. Strategic placement of the transfer point can attract riders to the system and may provide an opportunity for joint marketing promotions with local merchants.

Circulator: A bus that makes frequent trips around a small geographic area with numerous stops around the route. It is typically operated in a downtown area or area attracting tourists, where parking is limited, roads are congested, and trip generators are spread around the area. It may be operated all-day or only at times of peak demand, such as rush hour or lunchtime.

Commuter Bus Service: Transportation designed for daily, round-trip service, which accommodates a typical 8-hour, daytime work shift (e.g., an outbound trip arriving at an employment center by 8 AM, with the return trip departing after 5 PM).

Coordination: Coordination means pooling the transportation resources and activities of several agencies. The owners of transportation assets talk to each other to find ways to mutually benefit their agencies and their customers. Coordination models can range in scope from sharing information, to sharing equipment and facilities, to integrated scheduling and dispatching of services, to the provision of services by only one transportation provider (with other former providers now purchasing services). Coordination may involve human service agencies working with each other or with public transit operations.

Cost per Boarding: The total operating expenditures of a route or service divided by the number of total boardings.

Cost per Revenue Mile or Hour: The total operating expenditures of a route or service divided by the number of revenue miles or revenue hours.

Demand Response Service: Service to individuals that is activated based on passenger requests. Usually passengers call the scheduler or dispatcher and request rides for dates and times. A trip is scheduled for that passenger, which may be canceled by the passenger. Usually involves curb-to-curb or door-to-door service. Trips may be scheduled on an advanced reservation basis or in “real-time.” Usually smaller vehicles are used to provide demand response service. This type of service usually provides the highest level of service to the

passenger but is the most expensive for the transit system to operate in terms of cost per trip. In rural areas with relatively high populations of elderly persons and persons with disabilities, demand response service is sometimes the most appropriate type of service. Sub-options within this service type are discussed in order of least structured to most structured, in terms of routing and scheduling.

- **Pure Demand Response Service**: Drivers pick up and drop off passengers at any point in the service area, based on instructions from the dispatcher. In pure demand response systems, the dispatcher combines immediate requests, reservations, and subscription service for the most efficient use of each driver's time.
- **Zonal Demand Response Service**: The service area is divided into zones. Buses pick up and drop off passengers only within the assigned zone. When the drop off is in another zone, the dispatcher chooses a meeting point at the zone boundary for passenger transfer or a central transfer is used. This system ensures that a vehicle will always be within each zone when rides are requested.
- **Flexibly Routed and Scheduled Services**: Flexibly routed and scheduled services have some characteristics of both fixed route and demand response services. In areas where demand for travel follows certain patterns routinely, but the demand for these patterns is not high enough to warrant a fixed route, service options such as checkpoint service, point deviation, route deviation, service routes, or subscription service might be the answer. These are all examples of flexible routing and schedules, and each may help the transit system make its demand response services more efficient while still maintaining much of the flexibility of demand responsiveness.
- **Microtransit**: A form of demand response service, open to the general public, that requires some type of "reservation," typically made via an app-based system. Typically, microtransit uses software algorithms to completely automate the scheduling of the trip, the fare collection (if any), and the route the driver will utilize (communicating with the driver via some type of mobile data terminals).

Deviated Fixed Route Service: Transit buses travel along a predetermined alignment or path with scheduled time points at each terminal point and in some instances at key intermediate locations. Route deviation service is different than conventional fixed route bus service in that the vehicle may leave the route upon requests of passengers to be picked up or returned to destinations near the route. Following an off-route deviation, the vehicle typically returns to the point at which it left the route. Passengers may call in advance for route deviation or may access the system at predetermined route stops. The limited geographic area within which the vehicle may travel off the route is known as the route deviation corridor.

Dial-A-Ride Service: A name that is commonly used for demand response service. It is helpful in marketing the service to the community, as the meaning of "dial-a-ride" may be more self-explanatory than "demand response" to someone unfamiliar with transportation terms.

Environmental Justice: Executive Order 12898, issued in 1994, requires agencies receiving federal funds to determine whether their programs, policies, and activities will have disproportionately high and adverse human health or environmental effects on minority or low-income populations.

Express Bus Service: Express bus service characteristics include direct service from a limited number of origins to a limited number of destinations with no intermediate stops. Typically, express bus service is fixed route/fixed schedule and is used for longer distance commuter trips. The term may also refer to a bus that makes a limited number of stops, while a local bus makes many stops along the same route but as a result takes much longer.

Farebox Recovery Ratio: The percentage of operating costs covered by revenue from fares and contract revenue (total fare revenue and total contract revenue divided by the total operating cost).

Fares: Revenue from cash, tickets, and pass receipts given by passengers as payment for public transit rides.

Federal Transit Administration (FTA): An operating administration within the United States Department of Transportation that administers federal programs and provides financial assistance to public transit.

Feeder Service: Local transportation service that provides passengers with connections to a longer-distance transportation service. Like connector service, feeder service is service in which a transfer to or from another transit system, such as an intercity bus route, is the focal point or primary destination.

Fixed Route: Transportation service operated over a set route or network of routes on a regular time schedule.

Headway: The length of time between vehicles moving in the same direction on a route. Headways are called short if the time between vehicles is short and long if the time between them is long. When headways are short, the service is said to be operating at a high frequency; if headways are long, service is operating at a low frequency.

Intercity Bus Service: Regularly scheduled bus service for the public that operates with limited stops over fixed routes connecting two or more urban areas not near, that has the capacity for transporting baggage carried by passengers, and that makes meaningful connections with scheduled intercity bus service to more distant points, if such service is available. Intercity bus service may include local and regional feeder services, if those services are designed expressly to connect to the broader intercity bus network.

Interlined Routes: When fixed routes are routed through a transfer center or some other terminal location and become another route, with passengers typically allowed to ride through from one route to another without an additional fare and/or transfer fee. The “interline” is typically identified on public materials.

Operating Expenditures: The recurring costs of providing transit service (wages, salaries, fuel, oil, taxes, maintenance, insurance, marketing, etc.).

Operating Revenue: The total revenue earned by a transit agency through its transit operations. It includes passenger fares, advertising, and other revenues.

Paratransit Service: "Paratransit" means the transportation of passengers by motor vehicle or other means of conveyance by persons operating on a regular and continuing basis and the transportation or delivery of packages in conjunction with an operation having the transportation of passengers as its primary and predominant purpose and activity but excluding regular route transit. "Paratransit" includes transportation by carpool and commuter van, point deviation and route deviation services, shared-ride taxi service, dial-a-ride service, and other similar services.

Boardings per Mile or Hour: Productivity measure that takes the total boardings and divides by the miles and/or hours operated. The hours and/or miles may be presented as either total vehicle miles or hours or as revenue miles or hours.

Passenger Trip (Unlinked): Typically, one passenger trip is recorded any time a passenger boards a transportation vehicle or other conveyance used to provide transportation. “Unlinked” means that one trip is recorded each time a passenger boards a vehicle, no matter how many vehicles that passenger uses to travel from their origin to their destination.

Performance Indicator: An indicator is a metric that provides meaningful information about the condition or performance of the transportation system but is neither managed nor used to evaluate the effectiveness of policies, strategies, or investments.

Performance Measure: A performance measure is a metric that measures progress toward a goal, outcome, or objective. This definition covers metrics used to make decisions or evaluate the effectiveness or adequacy of a policy, strategy, or investment.

Performance Target: A target is a specific performance level representing the achievement of a goal, outcome, or objective.

Point Deviation Service: A type of flexible route transit service in which fixed scheduled stops (points) are established but the vehicle may follow any route needed to pick up individuals along the way if the vehicle can make it to the fixed points on schedule. This type of service usually provides access to a broader geographic area than does fixed route service but is not as flexible in scheduling options as demand response service. It is appropriate when riders change from day to day, but the same few destinations are consistently in demand. Also sometimes called checkpoint service.

Public Transportation: Transportation service that is available to any person upon payment of the fare either directly, subsidized by public policy, or through some contractual arrangement, and that cannot be reserved for the private or exclusive use of one individual or group. “Public” in this sense refers to the access to the service, not to the ownership of the system that provides the service.

Revenue Hours: The number of transit vehicle hours when passengers are being transported. Calculated by taking the total time when a vehicle is available to the public with the expectation of carrying passengers. Excludes deadhead hours, when buses are positioning but not carrying passengers, but includes recovery/layover time.

Revenue Miles: The number of transit vehicle miles when passengers are being transported. Calculated by taking the total mileage operated when a vehicle is available to the public with the expectation of carrying passengers. Excludes deadhead mileage, when buses are moving but not carrying passengers.

Ridership: The total of all unlinked passenger trips, including transfers. One trip that includes a transfer would be counted as two unlinked passenger trips.

Ridesharing: A form of transportation, other than public transit, in which more than one person shares the use of a vehicle, such as a van or car, to make a trip. Variations include carpooling or vanpooling.

Section 5304 (State Transportation and Planning Program): The section of the Federal Transit Act of 1991, as amended, that provides financial assistance to the states for purposes of planning, technical studies and assistance, demonstrations, management training, and cooperative research activities.

Section 5307 (Urbanized Area Formula Program): The section of the Federal Transit Act of 1991, as amended, that authorizes grants to public transit systems in urban areas with populations of more than 50,000 for both capital and operating projects. Based on population and density figures, these funds are distributed directly to the transit agency from the FTA.

Section 5310 (Enhanced Mobility for Seniors and Persons with Disability): The section of the Federal Transit Act of 1991, as amended, that provides grant funds for the purchase of accessible vehicles and related support equipment for private non-profit organizations to serve elderly and/or people with disabilities, public bodies that coordinate services for elderly and people with disabilities, or any public body that certifies to the state that non-profits in the area are not readily available to carry out the services.

Section 5311 (Non-urbanized Area Formula Program): The section of the Federal Transit Act of 1991, as amended, that authorizes grants to public transit systems in non-urbanized areas (fewer than 50,000 population). The funds initially go to the governor of each state.

Section 5339 (Bus and Bus Facilities): The section of the Federal Transit Act of 1991, as amended, that makes federal resources available to states and designated recipients to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities, including technological changes or innovations to modify low or no emission vehicles or facilities. Funding is provided through formula allocations and competitive grants. A sub-program provides competitive grants for bus and bus facility projects that support low and zero-emission vehicles.

Service Area: The geographic area that coincides with a transit system's legal operating limits (city limits, county boundary, etc.).

Service Gaps: When certain geographic segments cannot be covered by transportation services. This term can also refer to instances where service delivery is not available to a certain group of riders, or at a specific time.

Service Span: The duration of time that service is made available or operated during the service day (e.g., 6 AM to 10 PM on weekdays).

Spare Ratio: The percentage/number of vehicles that an operator purchases in excess of the number of vehicles required to provide the maximum level of service. The spares are required so that some vehicles may cycle through a preventive maintenance regimen while the full level of planned service can still be provided.

Standard: A recommendation that leads or directs a course of action to achieve a certain goal. A standard is the expected outcome for the measure that will allow a service to be evaluated. There are two sets of transit standards.

- **Service design and operating standards**: Guidelines for the design of new and improved services and the operation of the transit system.
- **Service performance standards**: The evaluation of the performance of the existing transit system and of alternative service improvements using performance measures.

State Contract Assistance: The program through which the RTAs receive state operating funding for transit at the discretion of the Massachusetts Legislature via the state budget process annually. The total amount of state contract assistance funding provided in the state budget is allocated to the RTAs via a formula developed with RTA input.

Through Routes: When fixed routes are routed through a transfer center or some other terminal location and become another route, but – unlike interlining – passengers are not typically allowed to ride through from one route to another, as a "through-route" is typically only visible/presented on the operating schedule for bus operators and is not identified on public materials.

Title VI: Title VI of the Civil Rights Act of 1964 requires that "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."

Transportation Network Companies: Private sector companies that provide software routing, scheduling, and payment services to independent contractor drivers for a fee; these drivers then utilize their own vehicles to provide a (typically) curb-to-curb transportation service, sometimes to sole riders and sometimes to pooled groups.

Total Operating Cost: The total of all operating costs incurred during the transit system calendar year, excluding expenses associated with capital grants.

Transfer: Passengers arrive on one bus and leave on another (totally separate) bus to continue their trip. The boarding of the second vehicle is counted as an unlinked passenger trip.

Transit Dependent: A description for a population or person who does not have immediate access to a private vehicle, or because of age or health reasons cannot drive and must rely on others for transportation.

Transit Subsidy: The operating costs not covered by revenue from fares or contracts.

Trip Denial: Occurs when a trip is requested by a passenger, but the transportation provider cannot provide the service. Trip denial may happen because capacity is not available at the requested time. For ADA paratransit, a capacity denial is specifically defined as occurring if a trip cannot be accommodated within the negotiated pick-up window. Even if a trip is provided, if it is scheduled outside the +60/-60-minute window, it is considered a denial. If the passenger refused to accept a trip offered within the +60/-60-minute pick-up window, it is considered a refusal, not a capacity denial.

Volunteers: Persons who offer services to others but do not accept monetary or material compensation for the services that they provide. In some volunteer programs, the volunteers are reimbursed for their out-of-pocket expenses; for example, volunteers who drive their own cars may receive reimbursement based on miles driven for the expenses that they are assumed to have incurred, such as gasoline, repair, and insurance expenses.

1. Executive Summary

1.1 Introduction

This 5-Year Comprehensive Regional Transit Plan (CRTP) update builds on the work of the Montachusett Regional Transit Authority's (MART) 2015 Regional Transit Plan (RTP). This plan was recommended by the Task Force on Regional Transit Authority Performance and Funding in its final report issued April 2019.[1]

The Task Force Report included 24 recommendations in 5 categories: Investment and Performance, Accountability, Service Decisions, Quality of Service, and Environmental Sustainability. The CRTP update (Recommendation #7) was included in the service decisions grouping. Specifically, Recommendation #7 advised that "RTAs will continue to succeed by understanding their markets and by aiming to have their service networks meet the current and future mobility needs of their region as well as support connectivity to other regions where possible. This effort will be guided by the completion or updating of Comprehensive Regional Transit Plans (CRTPs) every 5 years…"[2]

Following publication of the Task Force Report, a commitment to complete the CRTP update was included in MART's 2-year Memorandum of Understanding (MOU) with the Massachusetts Department of Transportation (MassDOT), executed in August 2019.

The primary goals of this CRTP are to (1) provide an agency and service overview including fare structure; (2) identify essential markets, gaps in service, and ridership growth opportunities given demographic, socioeconomic, and employment data and the impacts of the novel coronavirus (COVID-19) pandemic; (3) evaluate the results of performance indicators and assess performance monitoring systems; and (4) provide recommendations for a strategic 5-year vision that will prioritize the development and implementation of a decision-making framework driven by data analysis and focused on performance.

The MART CRTP update started in December 2019 but took a profound and unexpected turn mid-way through the project. Following the kick-off meeting in January 2020, the process proceeded with data collection, goal development, and planning for community and rider engagement. However, by the middle of March 2020, when the engagement activities were scheduled to commence, the world experienced a historic pause due to the COVID-19 pandemic.

In response to the pandemic, on March 10, 2020, Massachusetts Governor Charlie Baker declared a state of emergency and subsequently a stay-at-home order, closing all non-essential businesses. These safety measures, issued in the face of an unprecedented threat to public health, had serious, sweeping impacts, including on the development of this plan and transit operations writ large. MART, along with the other regional transit authorities (RTAs), suspended fare payment and reduced service levels, encouraging non-essential riders to temporarily discontinue travel.

"MART wants to assure our passengers that we are monitoring the situation and are basing our response on guidance from Governor Baker's emergency actions, the Centers for Disease Control (CDC) and the Massachusetts Department of Public Health." – MART website

[1] Task Force on Regional Transit Authority Performance and Funding, *A Vision for the Future of Massachusetts' Regional Transit Authorities*, April 2019, https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf.
[2] Task Force on Regional Transit Authority Performance and Funding, *A Vision for the Future of Massachusetts' Regional Transit Authorities*, April 2019, page 4. https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf.

While MART continues its return to normal service in accordance with public health guidelines, ridership is still depressed due to pandemic impacts such as distance learning, business closures, remote work, furloughs, layoffs, and reluctance to use public transportation due to health and safety concerns. In response to the continued ridership volatility, this CRTP acknowledges the unpredictability over the coming months and years and equips MART with data-driven and performance-focused recommendations so that the Authority will be able to quickly and successfully adapt to a changing transit market.

1.2 Overview of MART Services

MART serves a large geographic area that stretches from the west through rural and small urban north-central Massachusetts to the east into the northwestern portion of the Boston metropolitan area and is the western terminus of the Fitchburg Line of the Massachusetts Bay Transportation Authority (MBTA) Commuter Rail system. MART is one of the 15 RTAs that, along with MBTA, operates public transportation in the Commonwealth and one of 6 Human Service Transportation (HST) brokers. Because of the Fitchburg Line's presence in the MART service area, several MART services are designed to meet with and coordinate with the MBTA Commuter Rail line at key locations.

MART's transit services include fixed route services (both local and regional services, some of which are oriented to serving MBTA Commuter Rail stations), Boston and Worcester shuttles, Americans with Disabilities Act (ADA)/Dial-a-Ride (DAR) services, and subscription services.

Within Fitchburg and Leominster, MART operates ADA/DAR, subscription service, a job access/reverse commute (JARC) service, 10 local fixed routes, plus supplemental services. In Gardner, services include ADA/DAR, subscription service, and two fixed routes. In Athol, MART operates ADA service and one regular fixed route between Athol and Orange. Six additional regional routes operate during peak hours. Additionally, MART operates ADA service in Westminster, Lunenburg, Lancaster, Templeton, and Winchendon.

MART's "JARC" service was named in connection to the now discontinued federal program that provided operating funds for transit routes offering critical job access for workers with later shift times or reverse commutes. Although the federal funding program has expired, MART's evening demand response service continues to serve this essential purpose and has retained the "JARC" name. The service is available in Fitchburg, Leominster, and Gardner to accommodate trips between 9:00 PM and 11:30 PM Trips must be scheduled one business day in advance through MART and are generally delivered by a private taxi company contractor.

Two veterans' shuttles to Boston and three to Worcester operate from the MART Intermodal Transportation Center (ITC) where riders can transfer from other services, including ADA paratransit.

1.3 Planning Process

The impacts and limitations imposed by the COVID-19 pandemic required flexibility in the approach for developing this 5-year plan. While some elements of the original process developed pre-pandemic remained viable, many had to be adapted to respond to the new realities of COVID-19. From public outreach to fare policy analysis to the structure of the recommendations, this planning process incorporates considerations relating to uncertainty around how the future might unfold.

1.3.1 Review of Transit Services and Market Conditions

A review of service from the last 5 years and market demand analysis were conducted to identify performance issues as well as gaps and needs in MART's service area. The analysis

"Develop connections that cross RTA boundaries..." – Stakeholder Comment

overall indicated that MART's service is generally provided to areas where demographic data indicate the highest potential for demand. However, safety measures like remote learning and teleworking, along with furloughed workers and layoffs, greatly disrupted MART's existing ridership patterns, particularly in terms of the academic community ridership. This has prompted the CRTP to describe future needs and recommendations around potential transit demand scenarios. This planning process brought to light the importance of harnessing new technology to conduct ongoing analysis of real-time data rather than focusing primarily on historical trends.

1.3.2 Scenario Planning

The project team used scenario planning exercises to imagine what the next 5 years might hold in terms of ridership and market demand. After the state of emergency was issued, MART leadership participated in a brainstorming session centered around establishing key uncertainties in the face of the COVID-19 pandemic. Subsequent to that workshop, a high-ridership scenario, medium-ridership scenario, and low-ridership scenario (see Chapter 7) were developed to inform the development of needs and recommendations. These scenarios formed the framework of the recommendations in this plan. Other Commonwealth RTAs and MBTA are using a similar approach in their recent and ongoing planning studies.

1.3.3 Public Outreach

Due to social distancing guidelines and other safety protocols resulting from the COVID-19 pandemic, no in-person outreach could be conducted. The bulk of the outreach for this CRTP was undertaken through an online community outreach survey conducted in the summer of 2020. Additionally, MART held several online focus groups with key regional stakeholders, including local leaders and community members. Finally, a survey of MART's bus operators was also conducted to solicit their input.

Over 220 survey responses were collected using the online survey, though it should be noted that the findings are not a statistically valid sample of MART riders or the region's residents[3] – rather, they allowed the study team to identify key issues and themes. They should be used as a guide in the context of other public outreach and data analysis. Nonetheless, key takeaways that comport with other planning efforts include:

- Most survey respondents indicated that they use MART for travel to and from employment opportunities.
- Stakeholders are supportive of MART and several value MART as a key component of the "first mile/last mile" trip connecting MBTA Commuter Rail stations with employment centers.
- Focus group participants also expressed the need for interconnections between the MART service area and various other RTA service areas, in addition to connections with central Boston.

1.4 Core Needs and Recommendations

MART identified six core needs to include in this plan. Core needs are defined (see Chapter 8) as those that can be implemented regardless of ridership recovery scenario, although timing of

[3] 32 percent of survey respondents were riders and 68 percent were non-riding members of the general public. Other demographic information needed to statistically weight the sample was not collected.

implementation may still be dependent on availability of funding sources. Table 1 lists the associated core recommendations that MART will pursue in the next 5 years, regardless of ridership levels. The full list of needs and recommendations can be found in Chapters 7 and 8, respectively.

Table 1. Core Needs and Recommendations

Need	Recommendation(s)
Reduced gap in early evening service between fixed route and JARC service	Extend JARC service span by 1 hour to begin at 8:00 PM
Fleet replacement, including better customer recognition of fixed route vehicles.	Continue to replace aging vehicles as they exceed useful life benchmarks, following Transit Asset Management (TAM) Plan schedule. Vehicle replacement should include transition to cutaway fleet.
Automated passenger counters (APCs)	Install APC on large bus routes. Transition smaller bus routes to APC in conjunction with vehicle replacement.
More targeted performance metrics by route type/Enhanced performance management system	Develop different service benchmarks for regional route level reporting as well as thresholds and corrective actions for under-performing routes.
	Identify technology-driven data tools and key performance metrics to establish an improved enterprise-wide data-driven management and decision-making framework. Implement a public-facing and transparent performance reporting mechanism.
Coordinated transit and land use planning	Designate a MART staff liaison who can provide planning assistance/coordination to/with other stakeholders.
Marketing	Develop targeted marketing of new and under-performing services.
	Pursue collaborative marketing initiative for MART and Twin Cities Rail Trail.

2. Background and 2020 Context

The 15 RTAs[4] provide vital mobility options and lifeline services to the millions of people across the Commonwealth outside of the Greater Boston region. The 2020 CRTP process for the RTAs, funded by MassDOT, came out of Commonwealth-wide initiatives in 2018 and 2019, which prompted this plan update, most of which were last developed in 2015. The CRTPs are both a result of and a contributor to the ongoing discussions on regional transportation. Recent and ongoing initiatives include the following:

- Governor's Commission on the Future of Transportation[5]
- A Vision for the Future of Massachusetts' Regional Transit Authorities[6] (RTA Task Force)
- Transportation & Climate Initiative[7]
- MBTA Fare Transformation[8]

The RTA Task Force Final Report Recommendation No. 7 was the primary initiative driving the development of this CRTP.[9] The CRTP is carried as a commitment in the 2-year MOUs with MassDOT, signed in August 2019. In addition to the CRTP, the MOU also contained commitments on performance metrics and targets, maintaining an up-to-date asset inventory, submitting a fare policy by December 2020, submitting a balanced budget annually, and reporting timelines. The MART MOU is discussed in more detail in Chapter 6.

The MART CRTP update process began in December 2019 but took a profound and unexpected turn mid-way through the project. Following the kick-off meeting in January 2020, the process proceeded with data collection, goal development, and planning for community and rider engagement. However, by the middle of March 2020, when the engagement activities were scheduled to commence, the world experienced a historic pause due to the COVID-19 pandemic.

In response to the pandemic on March 10, 2020, Governor Baker declared a state of emergency and subsequently issued a stay-at-home order on March 23. The stay-at-home order, originally intended to last 2 weeks, ended up lasting until May 18, 2020. As of the finalization of this plan in early 2021, the pandemic continues to disrupt services and negatively impact transit ridership. Given the unprecedented nature of this disruption and unknown long-term economic, social, and public health implications, the next few years will likely see continued widespread societal change. Therefore, transit agencies especially will need to continue to build a data-driven and performance-focused decision-making framework to respond to these uncertain demographic and industry trends.

This chapter provides background and current context around the CRTP update process for all RTAs. MART-specific contextual information is included in Sections 2.2 and 2.3.

2.1 Background

Commonwealth-wide initiatives, organized generally around the themes of climate change, new technology, and providing affordable and convenient transportation options for all people, set

[4] Commonwealth of Massachusetts, "General Laws Chapter 161B: Transportation Facilities, Highway Systems, and Urban Development Plans," https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXXII/Chapter161B.
[5] Commission on the Future of Transportation, *Choices for Stewardship: Recommendations to Meet the Transportation Future*, 2018, https://www.mass.gov/orgs/commission-on-the-future-of-transportation.
[6] Task Force on Regional Transit Authority Performance and Funding, *A Vision for the Future of Massachusetts' Regional Transit Authorities*, April 2019, https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf.
[7] Transportation and Climate Initiative, accessed 2020, https://www.transportationandclimate.org/.
[8] Massachusetts Bay Transportation Authority, accessed 2020, https://www.mbta.com/projects/fare-transformation.
[9] Task Force on Regional Transit Authority Performance and Funding, *A Vision for the Future of Massachusetts' Regional Transit Authorities*, April 2019, https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf.

the stage for the CRTP update process. The RTAs play an important role in getting people across the diverse regions of the Commonwealth to work, to school, and to essential services. Because of this role, the RTAs are pivotal in improving the public's mobility options as explored through the Commonwealth-wide initiatives described in this section.

2.1.1 Governor's Commission on the Future of Transportation

Established by Executive Order in January 2018, the Governor's Commission on the Future of Transportation (the Commission) was convened to explore the following topics across the Commonwealth and their impact on transportation between 2020 and 2040:

- Climate and Resiliency.
- Transportation Electrification.
- Autonomous and Connected Vehicles.
- Transit and Mobility Services.
- Land Use and Demographics.

The Commission completed its work and released findings in December 2018 in a report entitled *Choices for Stewardship: Recommendations to Meet the Transportation Future*.[10] Findings from the report included:

- The Commonwealth is expected to grow by 600,000 residents by 2040 and job growth is also expected to continue.
- Commonwealth residents are on average older than in many other US states, and older adults are expected to comprise a larger portion of the population in the future.
- Transit ridership has followed national trends and been declining in recent years.
- Use of transportation network companies has increased dramatically in recent years.
- Connected and autonomous vehicles are expected to radically change transportation and mobility in the future.
- The impacts of climate change are happening sooner and more intensely than originally projected with significant implications by 2040.
- Transportation accounts for 40 percent of all greenhouse gas (GHG) emissions in the Commonwealth.
- Electric vehicles could be part of the solution to reducing transportation emissions but would require significant infrastructure to implement.

The Commission used a scenario planning approach to itemize recommendations to prepare the Commonwealth's transportation system for the future. While many trends were evaluated for use in the scenario planning exercise, technology adoption as well as jobs and housing distribution were chosen as the two major trends that will most likely shape people's mobility options and needs. Based on the scenario planning trend analysis, the Commission then identified key challenges facing the Commonwealth's transportation system and developed recommendations across five categories to prioritize improvements over the next 20 years:

[10] Commission on the Future of Transportation, *Choices for Stewardship: Recommendations to Meet the Transportation Future*, 2018, https://www.mass.gov/orgs/commission-on-the-future-of-transportation.

- Modernize existing state and municipal transit and transportation assets to more effectively and sustainably move more people throughout a growing Commonwealth.
- Create a 21st century "mobility infrastructure" that will prepare the Commonwealth and its municipalities to capitalize on emerging changes in transportation technology and behavior.
- Substantially reduce GHG emissions from the transportation sector in order to meet the Commonwealth's Global Warming Solutions Act (GWSA) commitments, while also accelerating efforts to make transportation infrastructure resilient to a changing climate.
- Coordinate and modernize land use, economic development, housing, and transportation policies and investment in order to support resilient and dynamic regions and communities throughout the Commonwealth.
- Make changes to current transportation governance and financial structures in order to better position Massachusetts for the transportation system that it needs in the coming years and decades.

Within these five categories are a total of 18 recommendations on how to best prepare the Commonwealth's transportation network for challenges and opportunities through 2040. The recommendations will guide Commonwealth-wide systems, specific solutions, and transportation investments, and will have a profound impact on the RTAs over the next 20 years.

2.1.2 A Vision for the Future of Massachusetts' Regional Transit Authorities

Resulting from the Governor's Commission on the Future of Transportation initiative and directed by Outside Section 72 of the FY 2019 Massachusetts State Budget,[11] a Task Force on Regional Transit Authority Performance and Funding was established in the fall of 2018. The Task Force produced a report entitled *A Vision for the Future of Massachusetts' Regional Transit Authorities: Report of the Task Force on Regional Transit Authority Performance and Funding* in April 2019.[12]

The report built on the first recommendation from the Commission, "Prioritize investment in public transit as the foundation of a robust, reliable, clean, and efficient transportation system." It set forth a path to stabilize, modernize, and improve the RTAs through five categories of action: Investment and Performance, Accountability, Service Decisions, Quality of Service, and Environmental Sustainability.

From those five categories, several goals related to the CRTP emerged:

- Sign a mutually negotiated MOU with MassDOT on a plan for performance monitoring and development of performance targets.
- Complete the CRTP and update every 5 years.
- Identify a demonstrated community need for evening and seven-day service.
- Identify appropriate transit services and potential partnerships based on level of demand.
- Develop pilot programs for innovative delivery models.
- Increase regional collaboration, including cross-RTA services.

[11] Commonwealth of Massachusetts, "Budget Summary FY2019," https://budget.digital.mass.gov/bb/gaa/fy2019/os_19/houtexp.htm.
[12] Task Force on Regional Transit Authority Performance and Funding, *A Vision for the Future of Massachusetts' Regional Transit Authorities*, April 2019, https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf.

- Collaborate with municipalities to provide safe walking and bicycle access to transit and comfortable, safe bus stops.
- Conduct a fare equity analysis every 3 years.
- Collaborate with the MBTA Fare Transformation process and adopt the proposed system.
- Participate in the Massachusetts Environmental Policy Act process.
- Maximize multimodal connectivity.
- Maintain an easily accessible website and robust social media presence.
- Collaborate with MassDOT and MBTA to integrate information services.
- Employ intentional outreach strategies.
- Purchase all zero-emission public buses by 2035.

Many of these goals are addressed and/or discussed as part of this CRTP.

2.1.3 Transportation & Climate Initiative

Massachusetts is a participating state in the Transportation & Climate Initiative of the Northeast and Mid-Atlantic States:

> *The Transportation and Climate Initiative (TCI) is a regional collaboration of 12 Northeast and Mid-Atlantic States and the District of Columbia that seeks to improve transportation, develop the clean energy economy and reduce carbon emissions from the transportation sector. The participating states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia, as well as the District of Columbia.*
>
> *The initiative builds on the region's strong leadership and commitment to energy efficiency and clean energy issues, and its programs to reduce carbon emissions in the power sector, which have resulted in the region becoming one of the most energy efficient areas in the nation. At the same time, the effort underscores the sense of urgency shared by all 12 jurisdictions, and their collective aspirations to become the leading region for sustainability and clean energy deployment in the country.*

While the COVID-19 pandemic temporarily reduced congestion and associated pollution in the short-term, it has likely altered commuting patterns and housing choices in the long-term, which has environmental and sustainability implications. As such, the need to reduce carbon emissions from the transportation sector is just as important as it was before the COVID-19 pandemic. Additionally, the COVID-19 pandemic highlighted racial disparities in exposure to air pollution and disproportionate impacts of threats to public health. To that end, the TCI jurisdictions are collaborating to develop a low-carbon transportation program that advances equity.

The TCI jurisdictions are collaborating to develop a regional agreement to cap pollution from transportation fuels and invest in solutions that result in reduced emissions, cleaner transportation, healthier communities, and more resilient infrastructure. Massachusetts TCI participation will likely impact the RTAs in several ways, including vehicles, infrastructure, technology, and funding.

In December 2020, Massachusetts joined with Connecticut, Rhode Island, and the District of Columbia to be the first jurisdictions to launch a multi-state program to reduce pollution and invest $300 million per year in cleaner transportation choices and healthier communities.[13]

2.1.4 MBTA Fare Transformation

Several RTAs are located adjacent to MBTA and/or connect to MBTA commuter rail service. As such, some RTAs use MBTA's CharlieCard/CharlieTicket fare media, while other RTAs are considering it. Therefore, fare interoperability and the impact the MBTA Fare Transformation project will have on RTA fare media and fare collection will substantially impact the RTAs.

2.2 2020 Context

The year 2020 unfolded in a radically different manner than was anticipated. Because of the COVID-19 pandemic and the as-yet-unknown ways that the pandemic and its aftermath will permanently alter how, when, and where people travel, this CRTP update process had to be flexible and RTAs will need to be nimble, data-driven, and performance-focused in responding to an uncertain future. To that end, it will be critical for MART to continue building a data-driven and performance-focused management and decision-making framework to lean into and respond to the rapid changes that are expected to continue to impact the future of the transit industry. This approach will position MART for continued success.

2.2.1 COVID-19 Pandemic

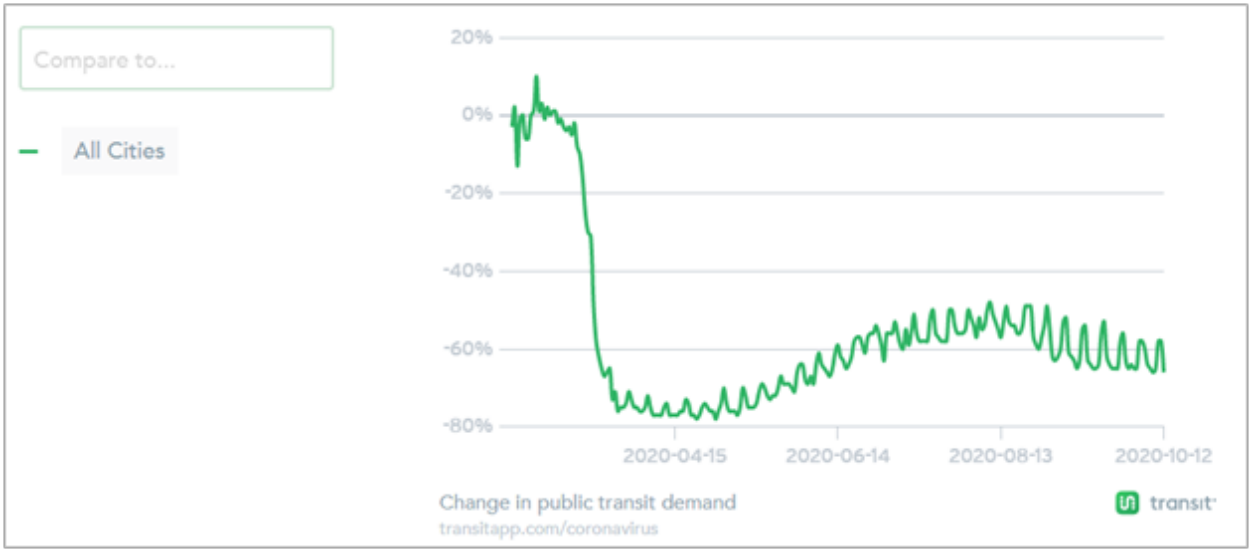
Impacts to the transit industry from the COVID-19 pandemic included the following:

- Reduction of service due to diminished driver availability, social distancing requirements that can impose capacity constraints on transit vehicles, and reduced demand
- Loss of ridership due to business closures/disruptions, remote working and learning, increased popularity of online shopping, telemedicine due to safety concerns, and stay-at-home orders and advisories, which have depressed demand for discretionary, student, and work trips
- Temporary suspension of fare collection or fare collection enforcement along with rear-door boarding
- Implementation of employee protection measures, such as Plexiglas shields and distribution of personal protective equipment
- New rigorous public space cleaning protocols and the removal of seats and tables from transit facilities to discourage congregation

As a result of these impacts, ridership on systems around the country initially declined by up to 80 percent and has been slow to rebound (Figure 1).

[13] Transportation and Climate Initiative, "Massachusetts, Connecticut, Rhode Island, D.C. are First to Launch Groundbreaking Program to Cut Transportation Pollution, Invest in Communities," December 2020, https://www.transportationandclimate.org/final-mou-122020.

Figure 1. Change in National Transit Ridership (April 15, 2020–October 12, 2020)



Source: Transit App

Locally, at the beginning of the pandemic, MART took the following actions to protect the workforce and riders while continuing to provide essential transit services:

- Face coverings are required on transit vehicles.
- Fare collection policies were temporarily suspended.
- Service levels were temporarily reduced.
- Passengers are encouraged to maintain social distancing when possible.
- Additional vehicle and facility sanitation procedures include:
  - All vehicles are being thoroughly cleaned two to three times a day with disinfectants that are approved by the Centers for Disease Control to kill the virus.
  - The ITC is cleaned twice a day. All doors, door handles, benches, etc., are wiped down with approved disinfectants.

In the early stages of the pandemic, mirroring national results, MART experienced approximately 40 to 50 percent year over year ridership loss, with ridership reaching its lowest point in April 2020. By September 2020, ridership began to rebound, though still below 2019 levels. The collection of fares also resumed in early September 2020, but health and hygiene protocols remain in effect.

2.2.2 Federal Coronavirus Aid, Relief, and Economic Security Act

MART has been able to continue to mitigate the financial impacts of the pandemic through funding from the federal Coronavirus Aid, Relief, and Economic Security (CARES) Act. The CARES Act apportioned operating and capital funds for public transportation to mitigate lost revenue due to extreme ridership decline, the suspension of fare collection, the implementation of cleaning and protection protocols, and other related costs. The funds have been provided through the Federal Transit Administration (FTA) Section 5337 (capital – state of good repair), Section 5307 (urbanized area), and Section 5311 (rural areas) funding programs. For Massachusetts RTAs, a total of $213.4 million was apportioned through the CARES Act, including $10.3 million for MART.

2.3 Plan Considerations

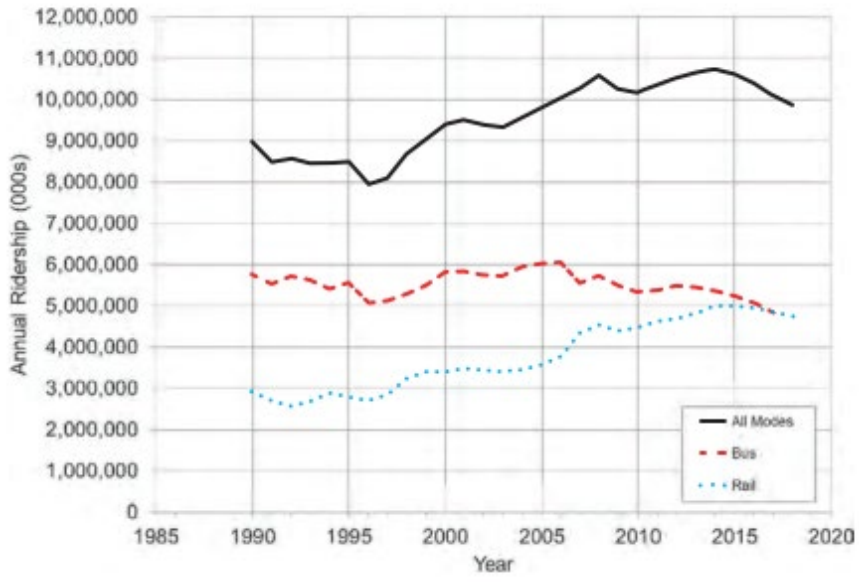
Given all the previous work that led to the development of the CRTPs and the unprecedented, transformational conditions during which the CRTPs were developed, the CRTP update process necessarily evolved through 2020. Considerations for all RTAs include the following:

- The 5-year period prior to the 2020 pandemic year, fiscal year (FY) 2015 to FY 2019, was considered for recent historical trend analysis to understand how the systems were operating prior to the pandemic and to provide a baseline for understanding the market for transit service in each community.
- Rider, community, public, and stakeholder outreach was primarily conducted online. As with all transit planning processes, outreach is one component of many that go into the identification of needs, solutions, and recommendations.

2.3.1 Transit Demand and Economic Uncertainties

Notwithstanding pandemic-related disruptions, for many years transit ridership has been stagnant or declining nationally (Figure 2).[14]. This trend has accelerated in the past few years, with most systems – and bus transit in particular – experiencing steady declines in ridership. The American Public Transportation Association (APTA) attributes the decline to four broad categories: erosion of time competitiveness, reduced affinity, erosion of cost competitiveness, and external factors.[15] The erosion of time competitiveness is related to increasing traffic congestion and competing uses of street and curb space. Reduction in affinity refers to more competition for customer loyalty and the erosion of cost competitiveness has to do with increasing costs without corresponding increase in demand for the service. And, finally, external factors are both the most challenging to define and to mitigate and include such things as policy changes that could improve transit usage but are too far-reaching for a transit agency alone to tackle.

Figure 2. Change in Annual Ridership by Year for Bus, Rail, and All Modes (1985–2020)



Source: TCRP Research Report 209, Analysis of Recent Public Transit Ridership Trends

[14] National Academy of Science, Transportation Research Board, Transportation Cooperative Research Program, "TCRP Research Report 209: Analysis of Recent Public Transit Ridership Trends," http://www.trb.org/TCRP/Blurbs/179912.aspx.
[15] American Public Transportation Association (APTA), "Understanding Recent Ridership Changes," https://www.apta.com/research-technical-resources/research-reports/understanding-recent-ridership-changes/.

It is uncertain whether the pre-pandemic downward trends in transit ridership in recent years combined with the pandemic's negative impact on transit ridership will become a longer term pattern that will continue to depress transit usage. Pandemic trends potentially most impactful to MART include the increase in remote work and distance learning. Those trends could significantly impact the workforce and student ridership markets for commuter and express services as well as local routes that serve colleges and universities. In addition, long-term economic impacts and sustained levels of unemployment may or may not change the landscape of where population with limited transportation options reside.

For all transit systems, including MART, public concern about the health impacts of shared ride services will remain a challenge. While public transit has instituted facial covering requirements, cleaning protocols, social distancing, and other mitigation measures, systems will also have to continue to reassure riders about the public health and safety of their services.

To monitor and lean into these trends and position the Authority for success, it will be critical for MART to use data tools to routinely analyze key system performance metrics and make service and financial decisions within the context of a performance-focused framework.

3. Agency Overview

3.1 Transit Agency Background

MART was established in 1978 pursuant to Massachusetts General Laws, Chapter 161B to provide public transportation services to northern Worcester and western Middlesex Counties. The MART service area, illustrated on Figure 3, includes the cities of Fitchburg, Gardner, and Leominster and the towns of Ashburnham, Ashby, Athol, Ayer, Bolton, Boxborough, Hardwick, Harvard, Hubbardston, Lancaster, Littleton, Lunenburg, Royalston, Shirley, Sterling, Stow, Templeton, Westminster, and Winchendon.

MART is governed by an advisory board. The board acts through a majority vote of its members and is responsible for approving fare changes, substantial service changes, and MART's annual budget. There are 23 board positions, including one for the chief elected official or a designee from each member city or town as well as one ADA rider representative. The 21 Board members named on MART's website include those that have been designated by a member city; however, any member of the board of selectmen may attend MART board meetings or be designated to vote on behalf of the city or town. For approval items requiring a vote, each member city or town has one vote plus a vote fraction based on local assessments. Voting shares are determined by formula within 30 days from receipt of assessments from the State Treasurer. The advisory board appoints an administrator to oversee day-to-day functions of the organization. MART's organizational structure is shown on Figure 4.

MART operates 12 local fixed bus routes Monday through Saturday in the Fitchburg, Leominster, and Gardner areas and 7 regional routes on weekdays that provide connections to Mount Wachusett Community College (MWCC), area employers, and MBTA commuter rail. MART operates and maintains four park-and-ride facilities along the MBTA Fitchburg Commuter Rail line, including the Fitchburg ITC, the North Leominster Station, the Wachusett Station, and a new garage (opened in January 2020) across the street from the Ayer Station.

MART offers Council on Aging (COA) Service for senior and disabled residents in each of its 22 member communities except Royalston, which is not assessed for transit service. In Fitchburg, Leominster, Gardner, Athol, and Ashby, MART's operating company provides rides for all COA trips booked. In other parts of the service area, MART provides the COA with a van, and the COA provides the trips with cost reimbursement through MART. MART also provides shuttle services to veterans' centers and hospitals in Boston and Worcester. Fixed route and demand response services are delivered through a contract with Management of Transportation Services (MTS). MART brokers HST for four of the nine HST regions established by MassHealth.[16]

MART receives funding from several sources to finance the operation of transit service, including FTA, MassDOT, local assessments from member communities, farebox revenue, and other revenue sources such as advertising, partnership, and contracts with other operating agencies.

[16] https://www.mass.gov/service-details/providing-rides-through-the-hst-brokerage

Figure 3. Location Map

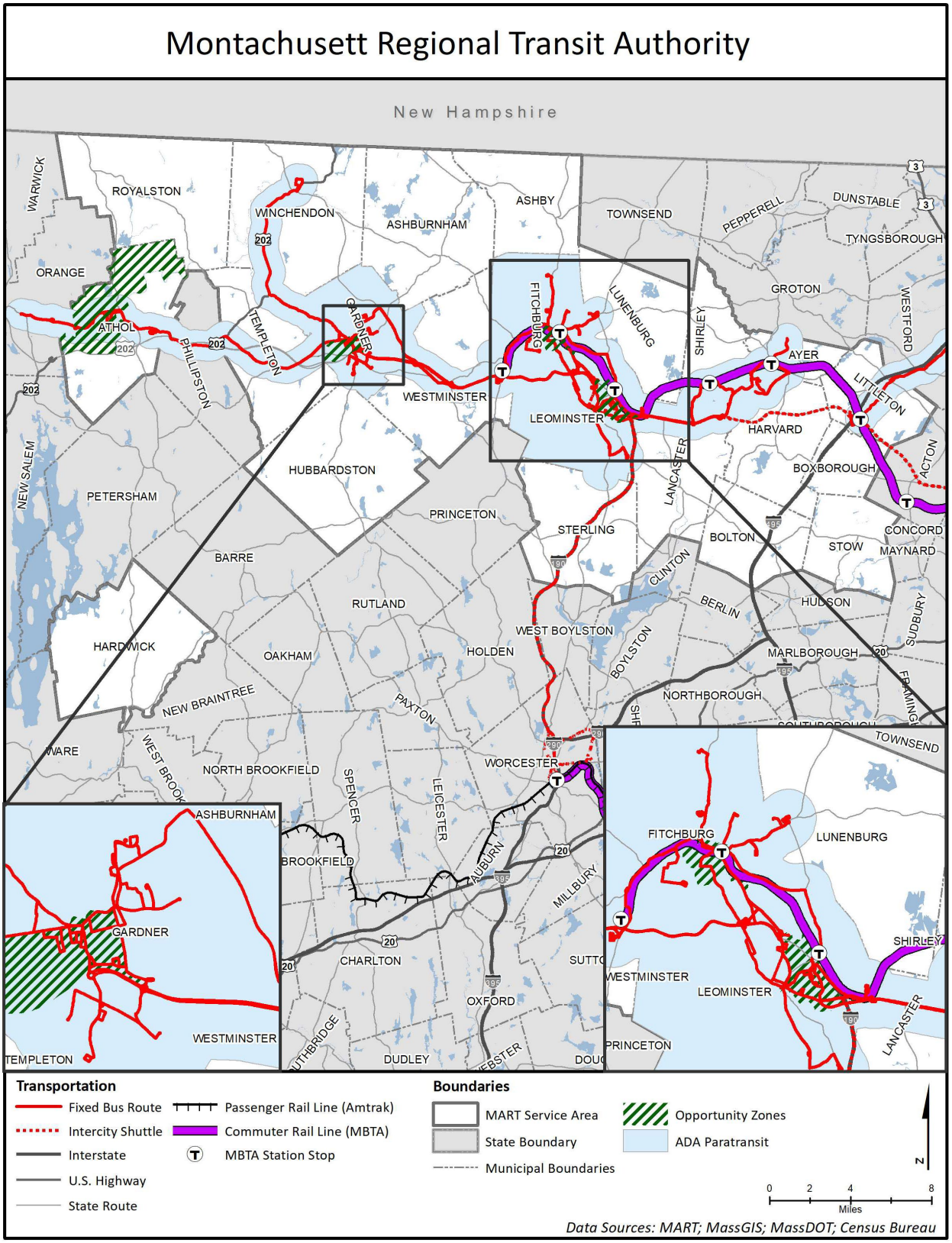
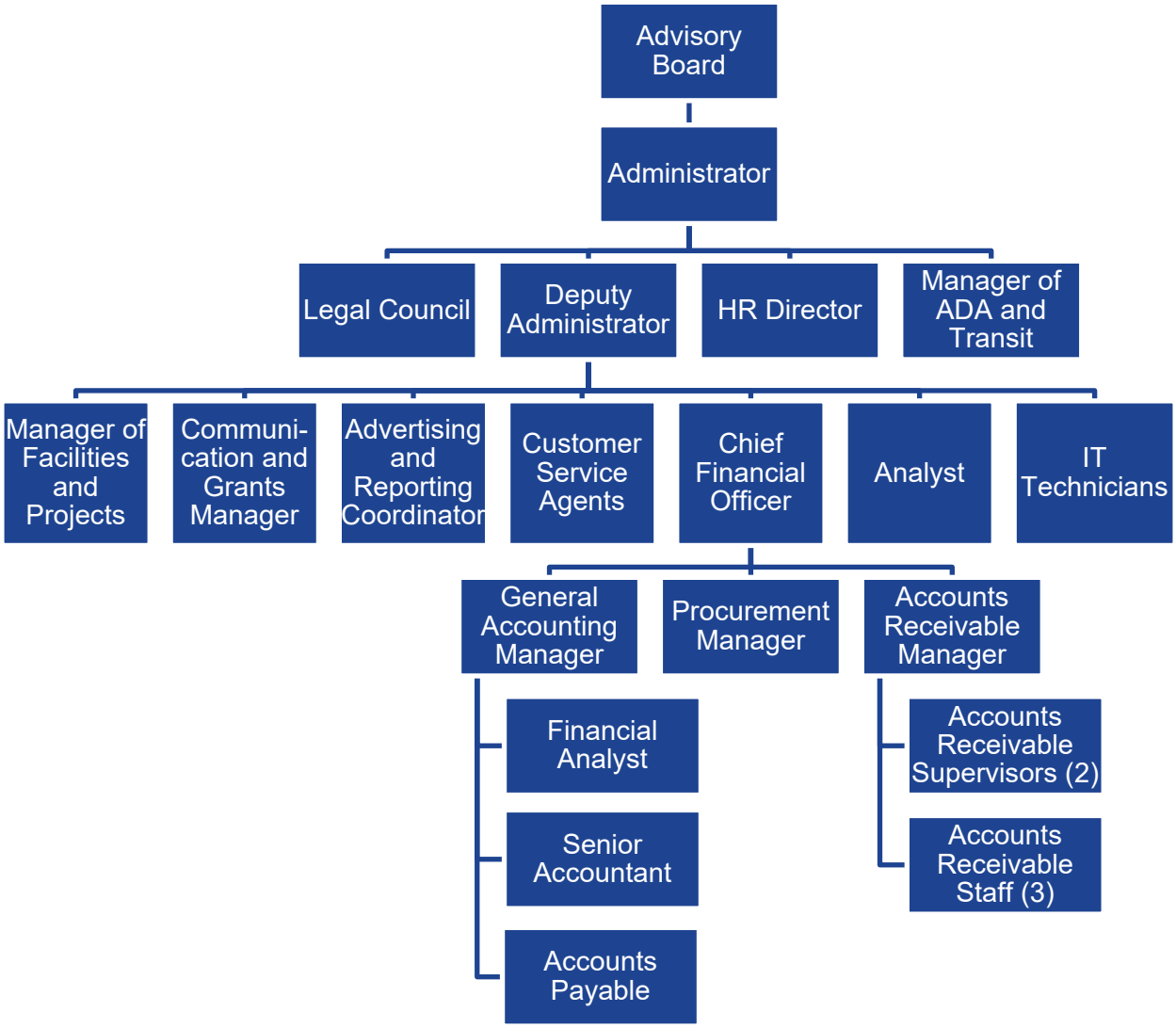


Figure 4. Organizational Chart



3.2 Mission

MART's stated mission is "to provide safe, reliable, efficient, and cost-effective transit, Para-transit, and brokerage services to our customers contributing to the social well-being and economic vitality of the region and the Commonwealth."

3.3 Goals and Objectives

The 2015 RTP identified the following goals:

- Support economic development through better service options.
- Promote mode shift from paratransit to fixed route.
- Enhance public information/educate the public on transit's benefits.

- Improve transit access for the public.
- Enhance the safety and comfort levels of the system to increase ridership.
- Improve the system's efficiency and cost-effectiveness.

The service plans developed for this study will continue to aim to satisfy these goals, and – as part of a subsequent section of this study – will be further refined to reflect efforts to recover from the impacts of the pandemic.

4. Transit Service Overview (FY 2015–FY 2019)

4.1 Description of Existing Services

MART's non-HST transit services, including fixed route, Boston and Worcester shuttles, ADA/DAR, and subscription services, are documented in Table 2. These descriptions reflect MART's typical pre-pandemic service offerings and do not include temporary service changes. As noted in the table, several fixed routes operate as paired single direction routes or are part of an interlined service package. In the sections that follow, service and performance metrics are reported together for paired routes.

Within Fitchburg and Leominster, MART operates ADA/DAR, subscription service, a demand response JARC service, 10 local fixed routes (7 reportable route groups), plus supplemental/unscheduled fixed route service during peak times.

In Gardner, services include ADA/DAR, subscription service, and two fixed routes (one reportable route group). In Athol, MART operates ADA service and one regular fixed route between Athol and Orange. Six additional regional routes operate during peak hours. Additionally, MART operates ADA service in Westminster, Lunenburg, Lancaster, Templeton, and Winchendon.

MART's JARC service is available in Fitchburg, Leominster, and Gardner to accommodate trips between 9:00 PM and 11:30 PM. Trips must be scheduled one business day in advance through MART and are generally delivered by a private taxi company contractor.

Two Boston shuttles and three Worcester Shuttles operate from the MART ITC where riders can transfer from other services, including ADA paratransit. The cost to run this service is supplemented by the cities of Fitchburg and Leominster and is offered at no cost to veterans and at a discount to seniors and those with a disability. The shuttles are also open to the general public, who pay full fare.

Table 2. Service Overview

Route	Service Type	Description
F/L Route 1	Fixed Route Local	Single direction loop service (counterclockwise, pairs with Route 3) between the Fitchburg ITC and Monument Square via South, Mechanic, Main, and North/Summer Streets.
F/L Route 2	Fixed Route Local	Bi-directional service between the Fitchburg ITC, Leominster Hospital, and Monument Square via Water/Main Street. Schedule interlines with Route 9 from Monument Square.
F/L Route 3	Fixed Route Local	Single direction loop service (clockwise, pairs with Route 1) between the Fitchburg ITC and Monument Square via North/Summer, Main, Mechanic, and South Streets.
F/L Route 4	Fixed Route Local	Free Bus funded by Fitchburg State University (FSU). (A supplemental shuttle also runs during college session opposite of the bus.) Bi-directional service between the Fitchburg ITC, FSU, and Wallace Civic Center via North Street.

Route	Service Type	Description
F/L Route 5	Fixed Route Local	Bi-directional service between the Fitchburg ITC, Park Hill Plaza, and Waites Corner via Main Street, River Street, Daniels Street, Oak Hill Road, Franklin Road, and Westminster Street with limited service to Montachusett Industrial Park.
F/L Route 6	Fixed Route Local	Bi-directional service between the Fitchburg ITC and Fitchburg High School via Mechanic Street/Ashby State Road. Schedule interlines with Route 7 from the ITC.
F/L Route 7	Fixed Route Local	Bi-directional service between the Fitchburg ITC, Wallace Plaza, and Lunenburg Crossing via Lunenburg, John Finch Highway, and Massachusetts Avenue. Schedule interlines with Route 6 from the ITC.
F/L Route 8	Fixed Route Local	Bi-directional service between the Leominster Senior Center, Monument Square, Whitney Field, and Orchard Hill Park via West Street/Merriam Avenue, Whitney Street, Mill Street, Sack Boulevard, Commercial Road, Mechanic Street, and Harvard Street.
F/L Route 9	Fixed Route Local	Bi-directional service between Monument Square and Reliant Medical/Walmart via Central Street, Willard Street, and New Lancaster Road. Limited service runs to Jytek Industrial Park and Registry of Motor Vehicles. Schedule interlines with Route 2 from Monument Square.
F/L Route 11	Fixed Route Local	Bi-directional service between the Fitchburg ITC, Wachusett MBTA station, and Great Wolf Lodge via Main Street, River Street, and Princeton Road.
Gardner Route 1	Fixed Route Local	Circulator service from the Gardner ITC (Gardner Route 2 provides similar service in the opposite direction).
Gardner Route 2	Fixed Route Local	Circulator service from the Gardner ITC (Gardner Route 1 provides similar service in the opposite direction).
Athol-Orange Shuttle	Fixed Route Regional	Bi-directional service between downtown Orange, downtown Athol, and North Quabbin Common via Main Street and Templeton Road (overlaps Athol Link for more frequent service between Hannafords and North Quabbin Common).
Littleton-Westford Commuter Shuttle	Fixed Route Regional	Bi-directional service from the Littleton MBTA Station along Foster Street/Littleton Road to Littleton Common, IBM, Red Hat, and Technology Park in Westford.
Intercity/MWCC	Fixed Route Regional	Intercity service with stops in Gardner, Westminster, Leominster, and Fitchburg. Limited service routing varies by run.
Wachusett Shuttle	Fixed Route Regional	Closed-door shuttle service between the Gardner City Hall, Gardner ITC, and Wachusett MBTA Station in Fitchburg.

Route	Service Type	Description
Devens Regional Shuttle	Fixed Route Regional	Circulates commuters from the Shirley and Ayer MBTA station through Shirley and Ayer (with some limited service routing) plus non-stop service to Whitney Field, and stops in Leominster and Fitchburg.
Athol Link	Fixed Route Regional	Bi-directional service between MWCC, downtown Gardner, Templeton, Phillipston, and Athol via Routes 101 and 2A (overlaps Athol-Orange Shuttle for more frequent service between Hannafords and North Quabbin Common).
Winchendon Link	Fixed Route Regional	Bi-directional service between downtown Gardner, Baldwinville, Lake Dennison, and downtown Winchendon via Routes 68 and 202.
JARC	Demand Response*	Evening service in Fitchburg, Leominster, and Gardner, scheduled at least one day in advance.
Boston Shuttle	Demand Response	Service from the Fitchburg ITC to Boston area Veterans Administration (VA) centers and other hospitals.
Worcester Shuttle	Demand Response	Service from the Fitchburg ITC to Worcester area VA centers and other hospitals.
F/L ADA/DAR	Demand Response	ADA paratransit and general-purpose demand response service within city limits of Fitchburg and Leominster.
F/L Subscription	Demand Response	Pre-paid trips provided on a repeated/recurring basis to general public riders in Fitchburg and Leominster.
Gardner ADA/DAR	Demand Response	ADA paratransit and general-purpose demand response service within city limits of Gardner.
Gardner Subscription	Demand Response	Pre-paid trips provided on a repeated/recurring basis to general public riders in Gardner.
Westminster ADA	Demand Response	Complementary ADA paratransit within ¾ mile of fixed route services.
Athol ADA	Demand Response	Complementary ADA paratransit within ¾ mile of fixed route services.
Winchendon ADA	Demand Response	Complementary ADA paratransit within ¾ mile of fixed route services.
Templeton ADA	Demand Response	Complementary ADA paratransit within ¾ mile of fixed route services.

Source: MART

**MART's JARC service requires advance trip scheduling and for that reason is characterized here as demand response. Depending on the individual trip characteristics, some trips may be delivered using MART vehicles, while others are provided using demand response taxi. In the sections that follow, JARC service characteristics are allocated by mode according to how service was delivered.*

Span of service and fixed route headways are given in Table 3 and Table 4, respectively. Fitchburg/Leominster (F/L) routes operate between 5:15 AM and 7:30 PM on weekdays, with additional late-night service provided by the FSU supplemental shuttle and through MART's JARC on-demand service. Most local routes operate with headways between 50 and 80 minutes, with the exception of the Route 4 FSU shuttle, which provides more frequent service (between 10 and 20 minutes) when school is in session.

In Gardner, the local routes (and complementary paratransit service) operate between 6:00 AM and 6:30 PM on weekdays on 65-minute headways. JARC service is also available in Gardner for trips between 9:00 PM and 11:30 PM. Regional routes operate limited trips during peak travel hours on weekdays only.

Saturdays are characterized by shorter spans of service on local routes, typically starting about 2 to 3 hours later in the morning and ending about 30 minutes earlier in the evening. None of the regional routes are operated on Saturdays.

Table 3. Span of Service Hours

Route Group/Service	Weekday	Saturday	Sunday
F/L Routes 1 and 3	6:05 AM–7:37 PM	9:22 AM–6:27 PM	N/A
F/L Routes 2 and 9	5:15 AM–7:07 PM	9:15 AM–6:37 PM	N/A
F/L Route 4 FSU Supplemental Shuttle	6:30 AM–6:30 PM 6:30 PM–12:00 AM	10:00 AM–5:00 PM N/A	N/A 4:30 PM–12:00 AM
F/L Route 5	5:20 AM–7:27 PM	9:33 AM–6:44 PM	N/A
F/L Routes 6 and 7	6:15 AM–5:50 PM	9:35 AM–5:50 PM	N/A
F/L Route 8	7:20 AM–7:18 PM	9:00 AM–6:23 PM	N/A
F/L Route 11	7:30 AM–9:55 AM 3:00 PM–5:30 PM	7:30 AM–9:55 AM 3:00 PM–5:30 PM	N/A
Gardner Routes 1 and 2	6:04 AM–6:30 PM	8:30 AM–5:20 PM	
Athol-Orange Shuttle	5:40 AM–6:01 PM	N/A*	N/A
Littleton-Westford Commuter Shuttle	7:10 AM–9:12 AM 4:40 PM–6:45 PM	N/A	N/A
Intercity/MWCC	6:05 AM–7:55 AM 8:00 AM–9:57 AM 1:20 PM–5:45 PM	N/A	N/A
Wachusett Shuttle	5:15 AM–11:05 AM 1:00 PM–1:20 PM 2:45 PM–4:20 PM	N/A	N/A
Devens Regional Shuttle**	6:00 AM–7:50 AM 3:05 PM–8:40 PM	N/A	N/A
Athol Link	5:33 AM–7:00 PM	N/A	N/A

Route Group/Service	Weekday	Saturday	Sunday
Winchendon Link	6:00 AM–9:25 AM 11:30 AM–1:25 PM 3:30 PM–4:25 PM	N/A	N/A
JARC Service	9:00 PM–11:30 PM	9:00 PM–11:30 PM	
Veterans Shuttles	7:30 AM–6:30 PM limited departures	N/A	N/A
ADA/DAR Services	Varies by location, reflecting fixed route schedule	Varies by location, reflecting fixed route schedule**	

Source: MART

Schedules reflect pre-pandemic service levels

**Saturday service was added to the Athol-Orange Shuttle as of January 2021.*

***Prior to the pandemic, weekend service in the Devens area was covered by demand response services. During the pandemic, the Devens regional shuttle has been replaced by demand response services on weekdays.*

Table 4. Fixed Route Frequency of Service

Route Group	Weekday	Saturday	Sunday
F/L Routes 1 and 3	60–70 minutes	60–70 minutes	N/A
F/L Routes 2 and 9	45–60 minutes	45 minutes	N/A
F/L Route 4	Schoolyear: 10–20 minutes Summer: 60 minutes	60 minutes	N/A
F/L Route 5	50 minutes	50 minutes	N/A
F/L Routes 6 and 7	60 to 80 minutes	80 minutes	N/A
F/L Route 8	50 minutes	50 minutes	N/A
F/L Route 11	8 trips/day	N/A	N/A
Gardner Routes 1 and 2	65 minutes	65 minutes	N/A
Athol-Orange Shuttle	60 minutes	N/A*	N/A
Littleton-Westford Commuter Shuttle	4 trips/day	N/A	N/A
Intercity/MWCC	6 trips/day	N/A	N/A
Wachusett Shuttle	7 trips/day	N/A	N/A
Devens Regional Shuttle	5 trips/day	N/A**	N/A
Athol Link	90 minutes	N/A	N/A
Winchendon Link	7 trips/day	N/A	N/A

Source: MART

Frequencies reflect pre-pandemic service levels.

**Saturday service was added to the Athol-Orange Shuttle as of January 2021.*

***Prior to the pandemic, weekend service in the Devens area was covered by demand response services. During the pandemic, the Devens regional shuttle has been replaced by demand response services on weekdays.*

Table 5 summarizes operating revenue for FY 2017 through FY 2019. FY 2017 and FY 2018 revenue amounts are as reported to the National Transit Database (NTD), while FY 2019 amounts reflect MART's FY 2019 Audited Financial Statement. As shown, total operating revenues range between $16.1 million and $ 17.3 million. The primary source of operating revenue is the state, which funded about 35 percent to 38 percent of costs. Federal revenue generally comprises 15 percent to 17 percent of funding, 13 percent to 16 percent comes from local sources, 26 to 28 percent comes from fares, and another 6 to 7 percent comes from other directly generated revenue such as advertising and concessions.

Table 5. Operating Funding Sources (FY 2017–FY 2019)

Funding Source	FY 2015	%	FY 2016	%	FY 2017	%	FY 2018	%	FY 2019	%
Federal	$2,415,057	15%	$2,430,714	15%	$2,468,381	15%	$2,818,034	16%	$2,415,057	15%
State	$6,408,096	40%	$6,043,147	38%	$6,152,060	38%	$6,483,280	37%	$6,408,096	40%
Local	$1,933,794	12%	$2,006,825	12%	$2,156,683	13%	$2,411,268	14%	$1,933,794	12%
Other*	$5,198,494	33%	$5,604,051	35%	$5,481,727	34%	$5,598,194	32%	$5,283,600	25%
TOTAL	$15,955,441	100%	$16,084,737	100%	$16,258,851	100%	$17,310,776	100%	$15,955,441	100%

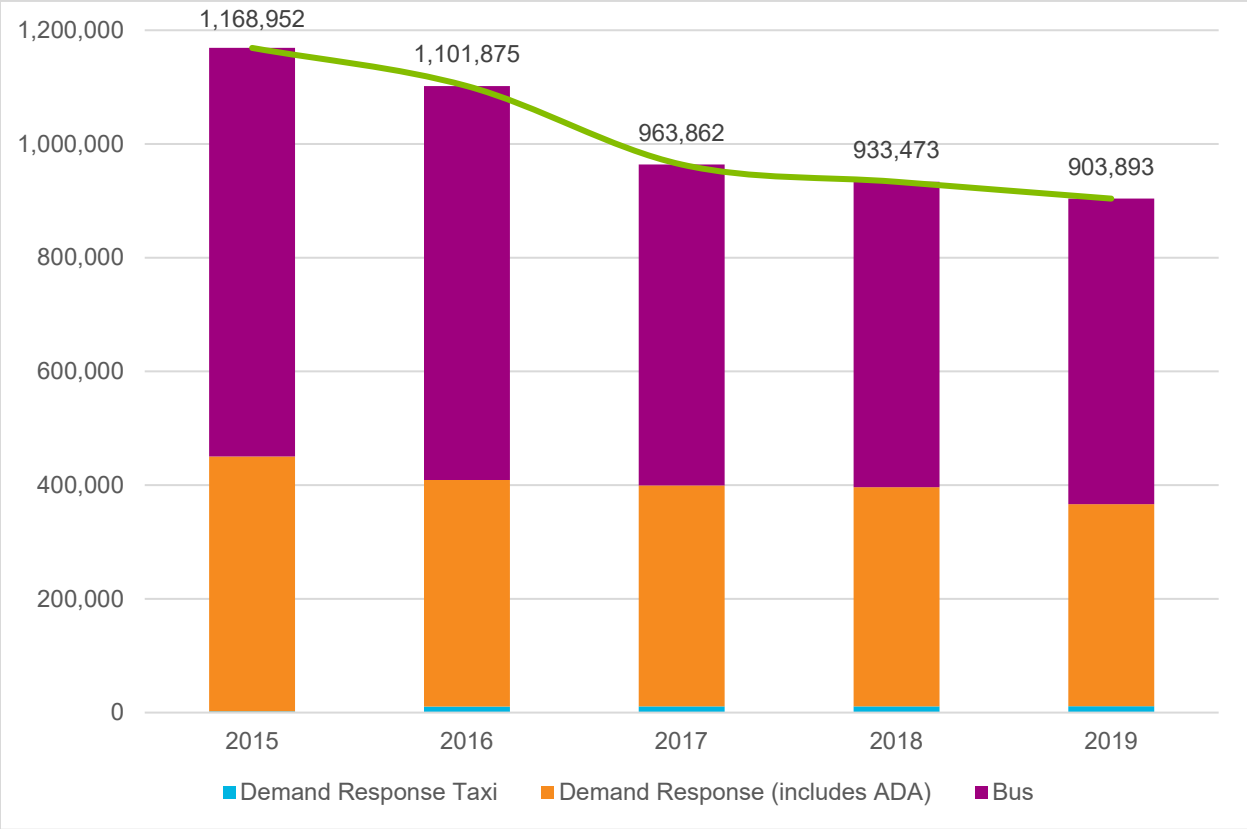
Source: NTD, 2015-2019

**NTD FY 2018 and FY 2019 data combine fares and other directly generated revenue sources. All years combined here for consistency in reporting.*

4.2 Ridership and Service Operations

Figure 5 summarizes historical ridership trends from FY 2015 through FY 2019 by mode. As shown, system-wide ridership declined from approximately 1.2 million trips in FY 2015 to 0.9 million trips in FY 2019 (a 23 percent decline). Bus trips comprise the majority of ridership in any given year but also represented the biggest ridership losses, most notably in FY 2017. Ridership losses over this 5-year period are consistent with national declining ridership trends.

Figure 5. Annual System Ridership Trends (2015–2019)



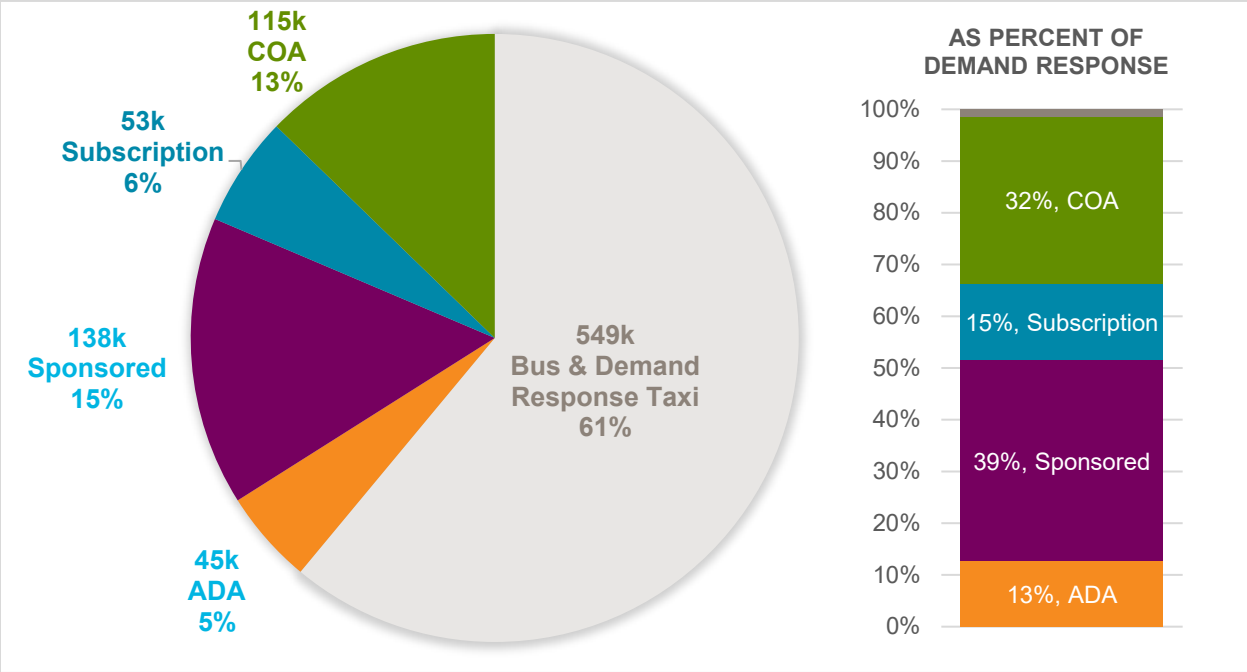
Source: MART

Demand response trips, which represent 38 to 39 percent of system-wide trips, include complementary ADA paratransit services, deviated routes such as the veterans' shuttles to Worcester and Boston,[17] subscription services for recurring trips, sponsored trips such as GVNA Healthcare and Department of Developmental Services (DDS) routes, and COA services. As shown on Figure 6, sponsored trips and COA trips were the highest drivers of demand response service, with approximately 138,000 and 115,000 riders, respectively, in FY 2019.

Demand response taxi trips represent approximately 1 percent or less of system-wide ridership.

[17] Boston and Worcester shuttles are general public deviated fixed routes for trips beginning along the route at designated locations in the MART service area. Clients must call and book their return trips from Boston or Worcester locations as same day demand response. Each route has some fixed stops at fixed times, and therefore carries a mix of fixed route and demand response trips.

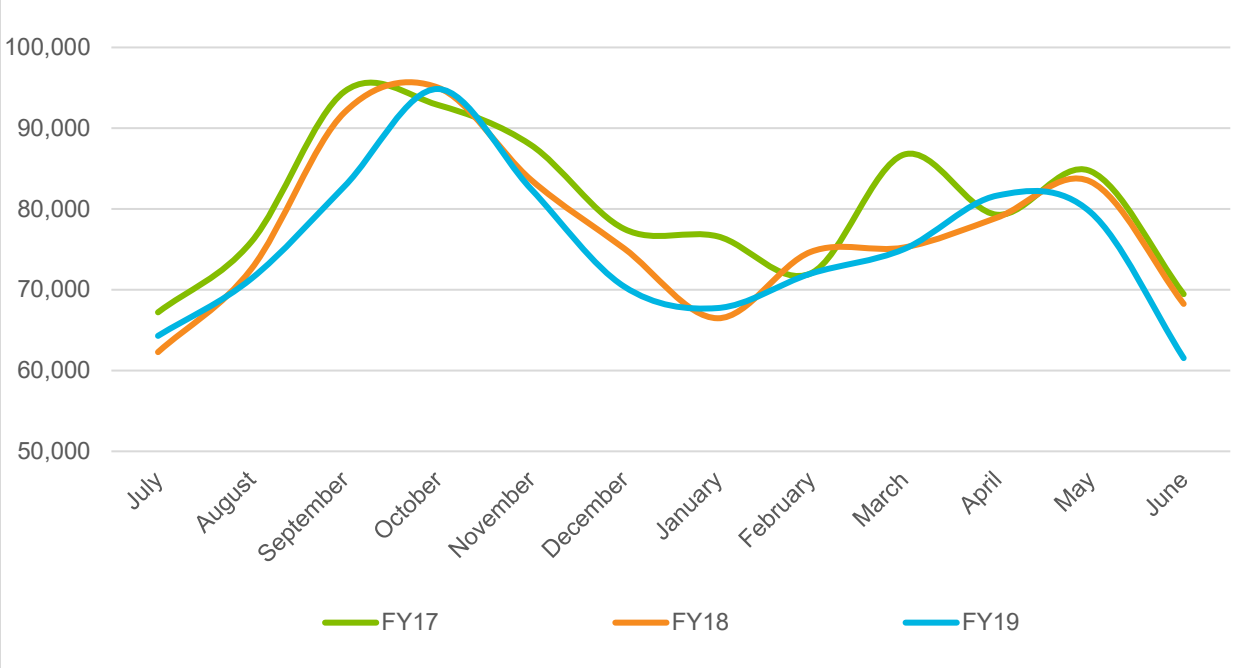
Figure 6. Demand Response Ridership by Service Tier (FY 2019)



Source: MART

Figure 7 highlights the month-to month trends in system-wide ridership for FY 2017 to FY 2019. Similar trends show ridership peaking in the fall with a decline in transit usage during cold months, a smaller peak in the spring, and lowest ridership levels in the summer when school is not in session and Route 4 to FSU operates a more limited schedule. Higher ridership in January through March 2017 corresponds with one of the warmest winters on record in central Massachusetts.

Figure 7. Monthly Ridership Trends (FY 2017–FY 2019)



Source: MART

The average daily ridership for bus and demand response services (not including demand response taxi) is summarized in Table 6. For fixed routes, Saturday ridership levels are approximately 40 percent of average weekdays. Demand response ridership falls by over 90 percent on Saturdays. This is likely a result of the nature of demand response services : sponsored services are only available Monday through Friday; most COAs do not run on weekends; and subscription service caters primarily to work trips. The remaining demand response ridership that occurs on Saturdays is predominantly ADA. Sunday ridership results from supplemental Route 4 services operate approximately 30 days per year. No other services are offered on Sundays as a result of MART's union contract, which guarantees double overtime pay for Sunday labor, which would make service cost prohibitive.

Table 6. Average Daily Ridership (FY 2019)

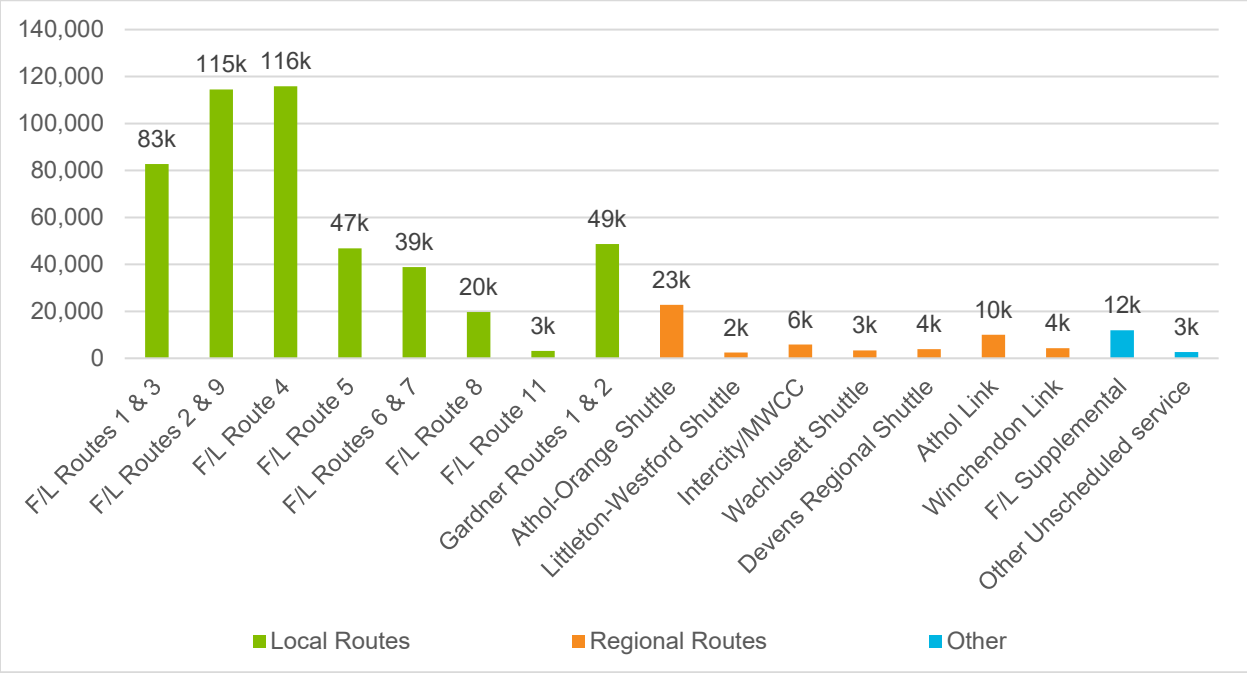
Service Type	Average Weekday	Average Saturday	Average Sunday
Bus	1,970	799	165
Demand Response	1,407	98	3*

Source: MART

** FY 2019 included a few weekend on-demand trips for Devens Regional Shuttle, which were performed on MART vans. In April 2019 this was moved to demand taxi.*

Annual ridership on individual fixed routes is shown on Figure 8. The highest ridership occurs on F/L Route 4, with frequent service to FSU, closely followed by F/L Routes 2 and 9 to the Leominster Hospital and Walmart. The lowest ridership among local routes occurs on F/L Route 11, which operates a more limited number of trips per day than other local routes. Among regional routes, the Athol-Orange Shuttle has the highest ridership.

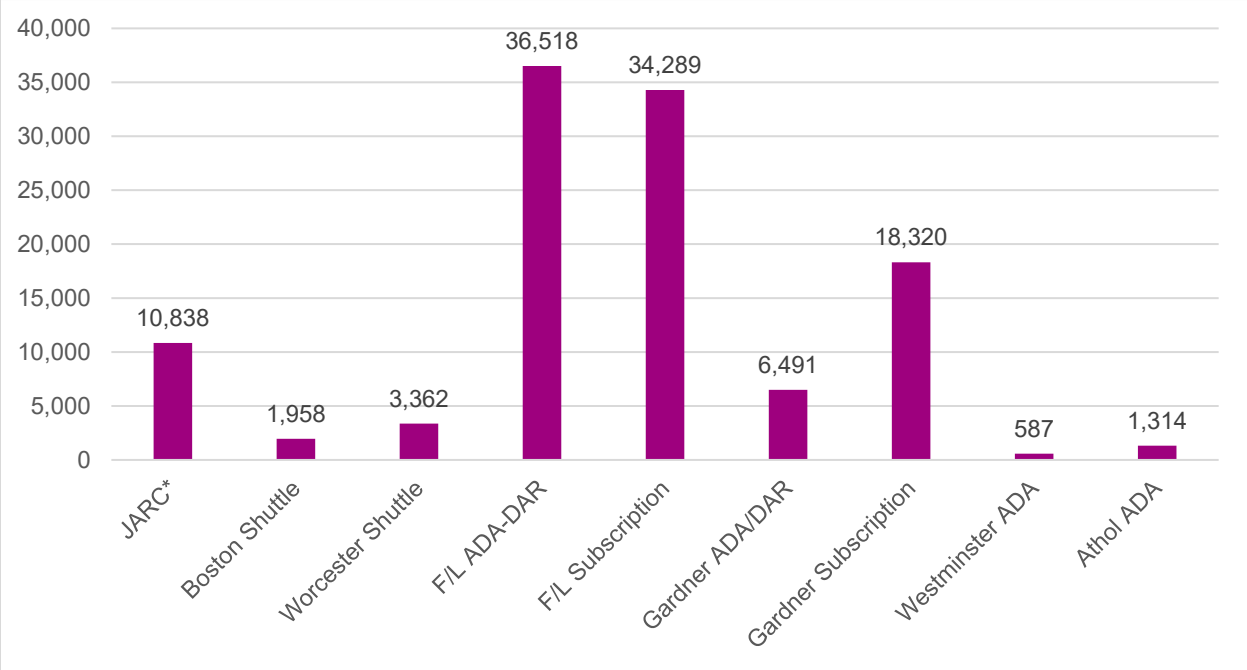
Figure 8. Fixed Route Ridership (FY 2019)



Source: MART

Ridership for selected demand response services, including ADA, JARC service, the Worcester and Boston shuttles, general purpose demand response, and subscription services, are illustrated on Figure 9. Ridership for COA services is listed separately on Figure 10. The highest ridership for both ADA/DAR and COA services occurs in the cities of Fitchburg and Leominster. A similar number of ADA/DAR and subscription trips occur in Fitchburg and Leominster. In Gardner, subscription trips are over twice as common as individually booked ADA/DAR trips. Over 53,000 COA trips occur in Fitchburg and Leominster.

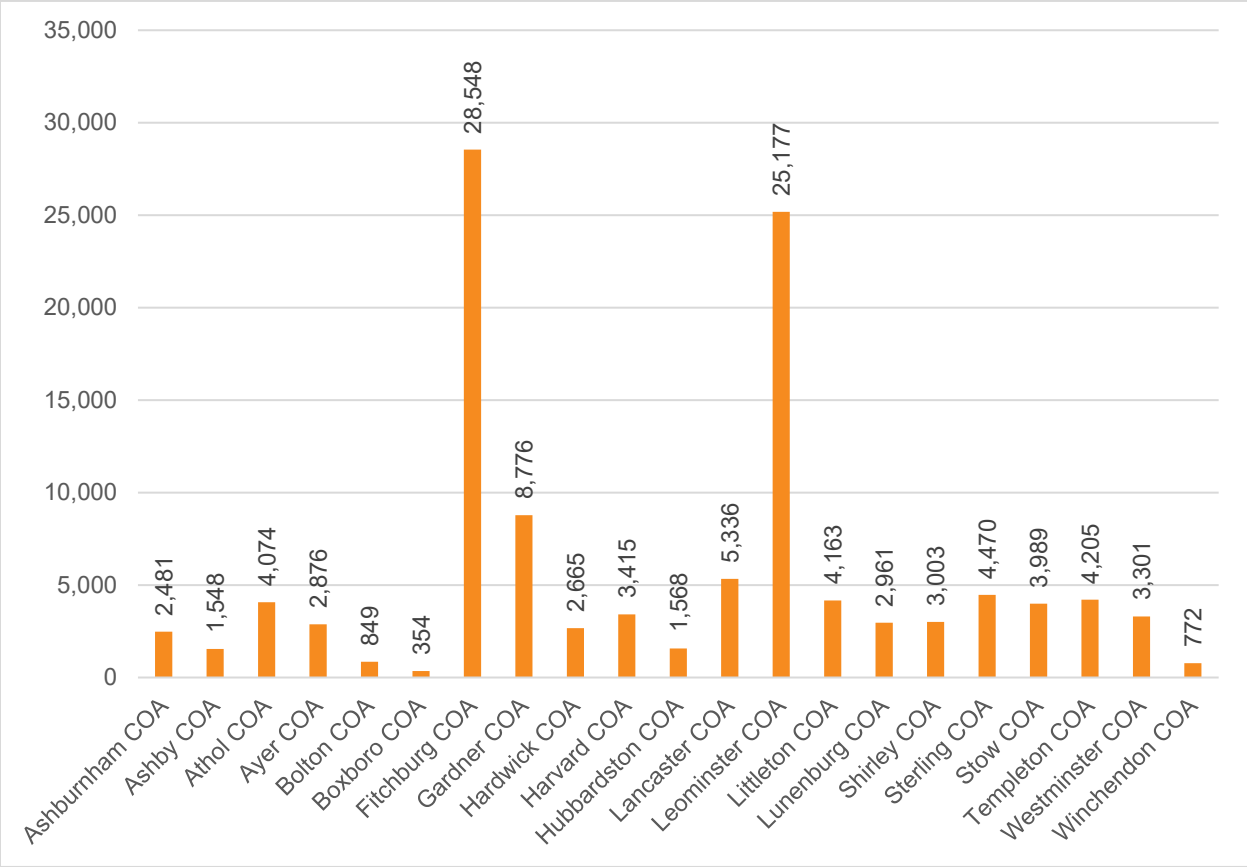
Figure 9. Demand Response Ridership (FY 2019)



Source: MART

** ADA rides in Lunenburg and Lancaster are reported together with F/L ADA/DAR. ADA rides in Templeton and Winchendon are reported together with Gardner ADA/DAR.*

Figure 10. COA Ridership (FY 2019)



Source: MART

Annual revenue hours and annual revenue miles by mode are summarized in Table 7 and Table 8, respectively. The highest levels for bus service were in FY 2019, while demand response service levels were lowest in that same year. Demand response taxi service peaked in FY 2017 for revenue hours and FY 2018 for revenue miles. Consistent FY 2019 service level data are not yet available through the NTD and as such FY 2019 levels reflect internal MART service level reports. However, this initial data reflect a reprioritization of demand response and demand taxi resources to higher levels of fixed route service.

Table 7. Annual Revenue Hours (FY 2015 to FY 2019)

Service Type	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019*
Bus	42,256 (20%)	44,617 (22%)	42,936 (21%)	45,622 (22%)	56,030 (26%)
Demand Response	170,603 (80%)	150,476 (76%)	155,101 (77%)	162,760 (77%)	153,496 (73%)
Demand Response Taxi	700 (0%)	3,496 (2%)	3,824 (2%)	3,630 (2%)	1,989 (1%)
TOTAL	**213,559**	**198,589**	**201,861**	**212,012**	**211,515**

Source: NTD, MART

**In FY 2019 MART's NTD reporting agreement changed to include all HST demand response taxi services, which were previously excluded. For consistency, this table adjusts FY 2019*

demand response taxi and total figures to exclude HST services, as reported by MART. All other figures reflect NTD source data.

Table 8. Annual Revenue Miles (FY 2015 to FY 2019)

Service Type	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019*
Bus	662,671 (21%)	698,883 (23%)	622,853 (20%)	684,392 (21%)	910,583 (28%)
Demand Response	2,435,806 (78%)	2,261,484 (75%)	2,400,546 (78%)	2,473,680 (76%)	2,286,687 (70%)
Demand Response Taxi	15,338 (0%)	45,457 (2%)	61,515 (2%)	92,487 (3%)	48,153 (1%)
TOTAL	**3,113,815**	**3,005,824**	**3,084,914**	**3,250,559**	**3,245,423**

Source: NTD, MART

**In FY 2019 MART's NTD reporting agreement changed to include all HST demand response taxi services, which were previously excluded. For consistency, this table adjusts FY 2019 demand response taxi and total figures to exclude HST services, as reported by MART. All other figures reflect NTD source data.*

Historical operating costs for FY 2015 to FY 2019 are summarized in Table 9. As shown, system operating costs (excluding HST brokerage) increased by approximately $1.56 million over the 5-year period.

Table 9. Annual Operating Cost (FY 2015 to FY 2019)

Service Type	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019*
Bus	$4,930,166	$5,400,389	$5,225,758	$6,028,212	$5,792,883
Demand Response	$10,622,305	$10,239,855	$10,562,566	$10,739,796	$11,236,332
Demand Response Taxi	$17,054	$74,909	$93,237	$110,124	$103,290
TOTAL	**$15,569,525**	**$15,715,153**	**$15,881,561**	**$16,878,132**	**$17,132,505**

Source: NTD, MART

**In FY 2019 MART's NTD reporting agreement changed to include all HST demand response taxi services which were previously excluded. For consistency, this table adjusts FY 2019 demand response taxi and total figures to exclude HST services, as reported by MART. All other figures reflect NTD source data.*

Table 10 summarizes operating characteristics for MART's fixed routes and supplemental fixed route services. Operating costs are not available by route, and as such, financial performance is assessed at the mode and system level and not at the route level. Route-level revenues are based on farebox receipts and do not include approximately $92,000 unallocated revenues from passes, tickets, and stored value cards. Recommendations regarding allocation of financial data by route are discussed in Chapters 6 and 8. A review of available performance metrics is available in Appendix A.

Table 10. Operating Statistics by Route (FY 2019)

Route	Ridership	Revenue Hours	Revenue Miles	Revenue Generated
F/L Routes 1 and 3	82,740	7,804	109,129	$52,650
F/L Routes 2 and 9	114,501	6,954	100,377	$73,637
F/L Route 4	115,846	4,516	41,811	$225,404
F/L Route 5	46,855	4,054	59,785	$22,383
F/L Routes 6 and 7	38,851	4,112	51,311	$18,759
F/L Route 8	19,667	3,668	44,352	$9,894
F/L Route 11	3,145	1,517	27,151	$1,387
Gardner Routes 1 and 2	48,642	6,812	102,949	$29,592
Athol-Orange Shuttle	22,758	4,354	90,390	$18,564
Littleton-Westford Shuttle	2,428	1,610	32,748	$1,024
Intercity/MWCC	5,839	1,633	36,895	$6,072
Wachusett Shuttle	3,360	2,337	63,622	$5,408
Devens Regional Shuttle	3,864	3,064	63,098	$4,021
Athol Link	10,011	3,480	86,257	$12,285
Winchendon Link	4,285	1,720	42,525	$5,743
F/L Supplemental	11,936	718	7,027	$5,996
Other Supplemental	2,663	94	1,248	$6,984

Source: MART

Note: Total of available route-level statistics may not reflect mode or system-level totals.

4.3 Asset Management

MART operates out of several facilities as shown in Table 11. Direct MART staff are located primarily at administrative offices in Fitchburg and Leominster. Operating and maintenance facilities, staffed by MTS, are located in Fitchburg, Gardner, and Athol.

Table 11. Facility Inventory Summary

Facility Name	Location	Age (years)	TERM Condition	Value
MART Administrative Headquarters & Maintenance Depot	1427R Water Street, Fitchburg, MA 01420	33	4	$15M

Facility Name	Location	Age (years)	TERM Condition	Value
MART Maintenance/Dispatch Facility	555 Main Street, Gardner, MA 01440	13	4	$7M
MART Administrative Offices & Storage Facility	840 N. Main Street, Leominster, MA 01453	10	4	$10M
Fitchburg ITC (Administration Facilities)	100-160 Main Street, Fitchburg, MA 01420	16	4	$8M
Fitchburg ITC (Passenger Facilities)	100-150 Main Street, Fitchburg, MA 01420	25	4	$4M
Athol Depot	573 South Street, Athol, MA 01331	148	4	$2M

Source: MART TAM Plan, October 2019 Update

In addition to administrative, operational, and maintenance facilities, the MART service area includes several commuter rail park and ride locations, summarized in Table 12. As shown, the capacity at several park and ride locations is insufficient to meet ridership demand. MART manages the Wachusett, Fitchburg, North Leominster, and Ayer garages, which are available at a rate of $4 per day or $65 per 30 days. A free surface parking lot is available at the Shirley MBTA station. The Littleton/495 park and ride (the only MBTA fare zone #7 station in the MART service area) is managed by MBTA at a rate of $6 per day or $105 per month.

Table 12. Commuter Parking Inventory

Commuter Rail Station	Location	Number of Spaces	Average Daily Ridership (MBTA)*
Wachusett Station	55 Authority Drive, Fitchburg	360	257
Fitchburg Station	100 Main Street, Fitchburg	425	589
North Leominster	36-44 Nashua Street, Leominster	360	479
Shirley	Front Street at Phoenix Street	70	319
Ayer	3 Groton Street, Ayer	170	592
Littleton/495	Foster Street	250	884

Source: MRPC 2020 Montachusett RTP

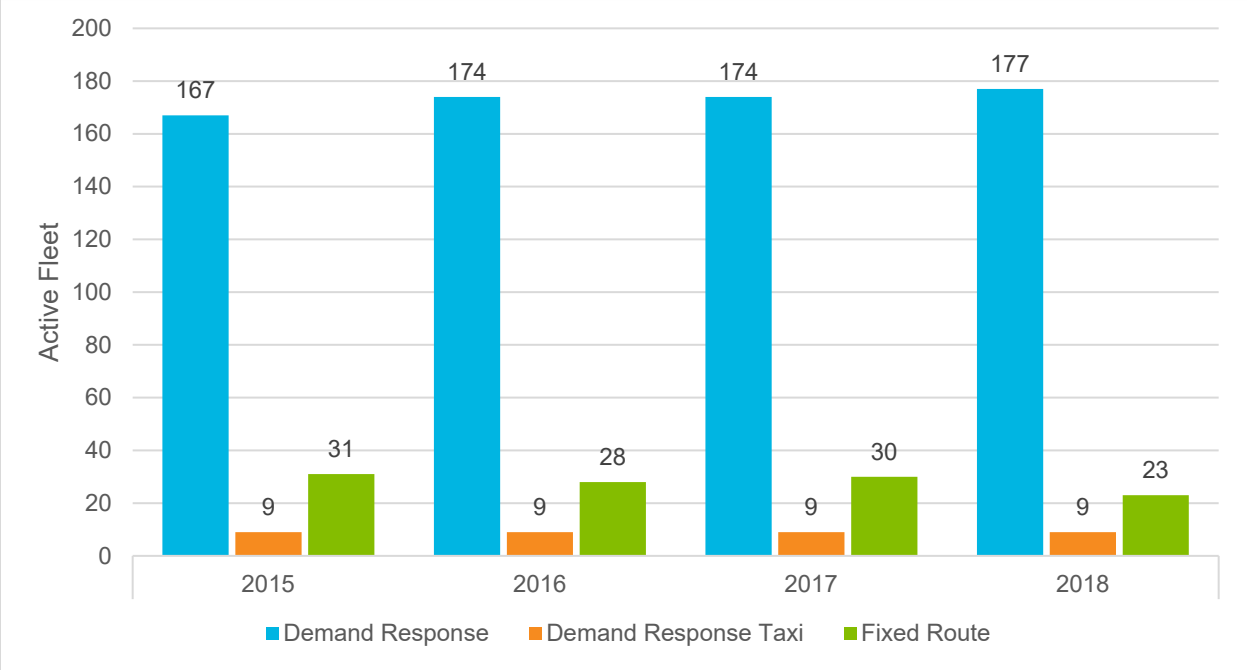
MART's revenue and non-revenue equipment is characterized in Table 13. As of the 2019 TAM Plan update, MART's fleet was made up of primarily (over 80 percent) cutaway bus with a small mix of traditional bus and van revenue service vehicles. The average fleet age met the FY 2021 targets of 9.5 years or less for fixed routes and 6 years or less for demand response. To understand recent fleet changes over time, Figure 11 displays the active fleet for each mode. As shown, MART's fleet has been transitioning from demand response to fixed route.

Table 13. Equipment Inventory Summary

Vehicle Type	Total Number	Average Age	Average Mileage	Average Value
Bus	23	10.5	248,506	$438,500
Cutaway Bus	152	8.0	121,624	$64,318
Van	12	11.3	174,052	$39,250
Revenue Total	**187**	**9.0**	**162,695**	**$165,472**
Non-Revenue Service Vehicle	1	16	81,433	$30,000
Trucks and Other Rubber Tire Vehicles	19	10.4	58,196	$44,583
Other Equipment	4	8.5	N/A	$212,500
Non-Revenue Total	**24**	**10.3**	**60,132**	**$85,312**

Source: Source: MART TAM Plan, October 2019 Update

Figure 11. Active Fleet by Mode (2015–2018)



Source: NTD, FY15-FY18

In the event of an out-of-service vehicle, MART relies on spare vehicles to provide for the continuation of service. To provide maximum service levels, MART requires 150 demand response, 9 demand response taxi, and 20 fixed route vehicles.[18] This represents 85 percent, 100 percent, and 87 percent of available fleet, respectively. MART's spare ratio, defined as the

[18] National Transit Database, 2018

percentage of active fleet not in service, is 14 percent system-wide, less than the industry standard of 20 percent.

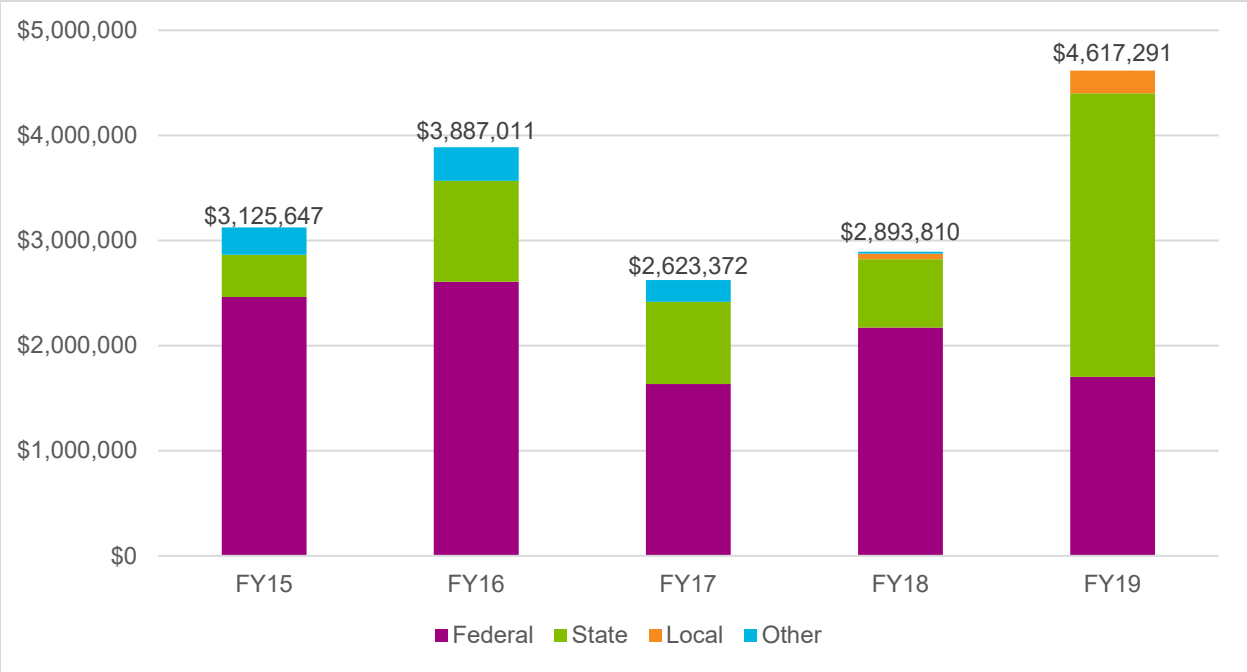
In addition to its facilities and vehicles, MART maintains the following IT assets:

- Automated stop announcements, with limitations
- On-board cameras and facility video systems
- Automated Dispatching & Scheduling System
- Accounting Software (Microsoft GP)

In addition, MART is investigating a new "Where's My Bus?" system. The current ITS, automatic vehicle locator (AVL), and on-board announcement systems have not been reliable and are in need of replacement. MART would also alike to implement APCs on fixed route buses.

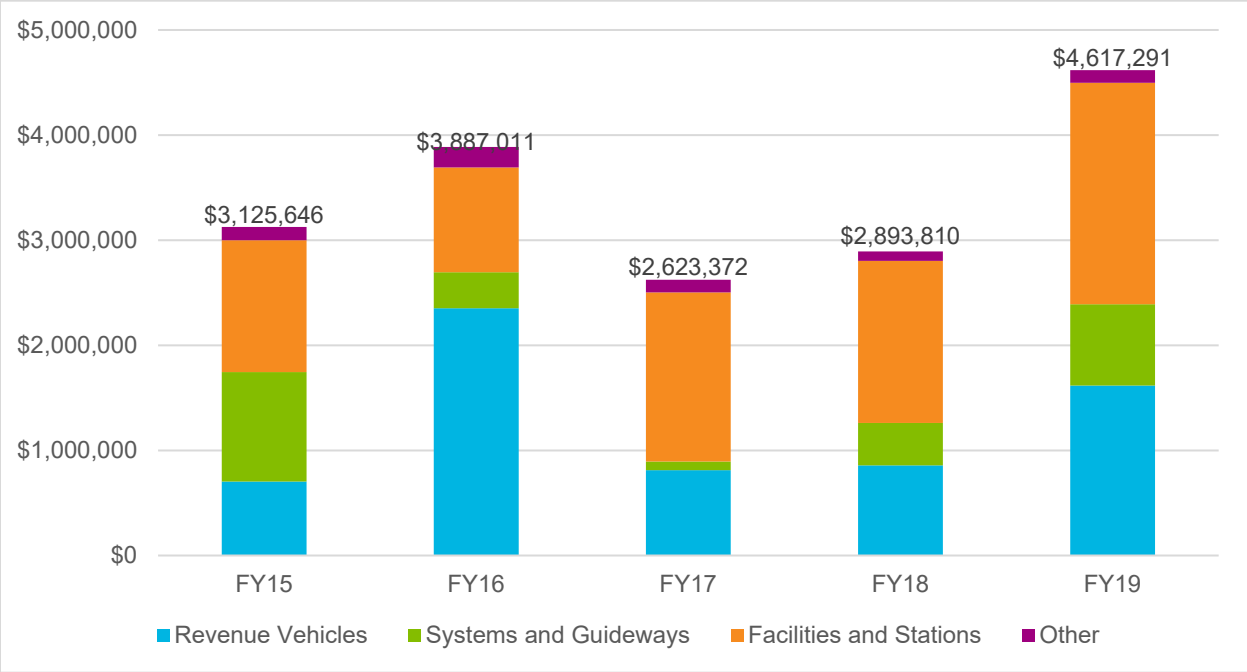
Capital expenditures associated with replacement and expansion of MART's capital assets are summarized on Figure 12 and 13. Typical capital expenses are on the order of $3 million per year. As shown on Figure 12, revenue for capital purchases comes from a mix of federal, state, local, and other funds. Federal funding generally makes up between 62 percent and 75 percent of revenues. The most common use of capital funding is for facility and station expenses, as shown in Figure 13. However, in FY 2016 capital expenses were driven by a larger revenue vehicle purchase.

Figure 12. Capital Revenues (FY 2015–FY 2019)



Source: NTD, 2015 to 2019

Figure 13. Uses of Capital Funds (FY 2015–FY 2019)



Source: NTD, 2015 to 2019

4.4 Policies and Procedures

MART provides a "How to Ride" page on its public website, which includes procedures for flagging down the bus, requesting a stop, using the lift, and enrolling for discounted fares or ADA eligibility.[19] The following rules are in effect on MART buses:

- No smoking.
- No writing on seats or bus destruction.
- No eating or drinking.
- Do not stick arms, hands, or head out window of bus.
- Reserve designated seats for passengers with disabilities.
- Please stay behind the yellow standee line.
- No playing of audio devices or sound equipment.
- Disruptive or combative riders, especially those under the influence of alcohol or drugs, will be removed by security or the police.
- All strollers and carts must be folded.
- Shirts and shoes must be worn.
- No littering.
- Service animals are allowed on buses.

[19] http://www.mrta.us/how_to_ride

- No cursing or disruptive behavior.
- Do not engage in unnecessary conversation with drivers.
- Do not cross in front of the bus when deboarding.

In addition to these rules, MART is an Affirmative Action/Equal Opportunity Employer and complies with the ADA and Title VI of the Civil Rights Act regarding anti-discrimination. Procedures for requesting reasonable accommodation[20] or filing a complaint[21] are available on the agency's website.

4.5 Regional Connections and Other Transit Providers

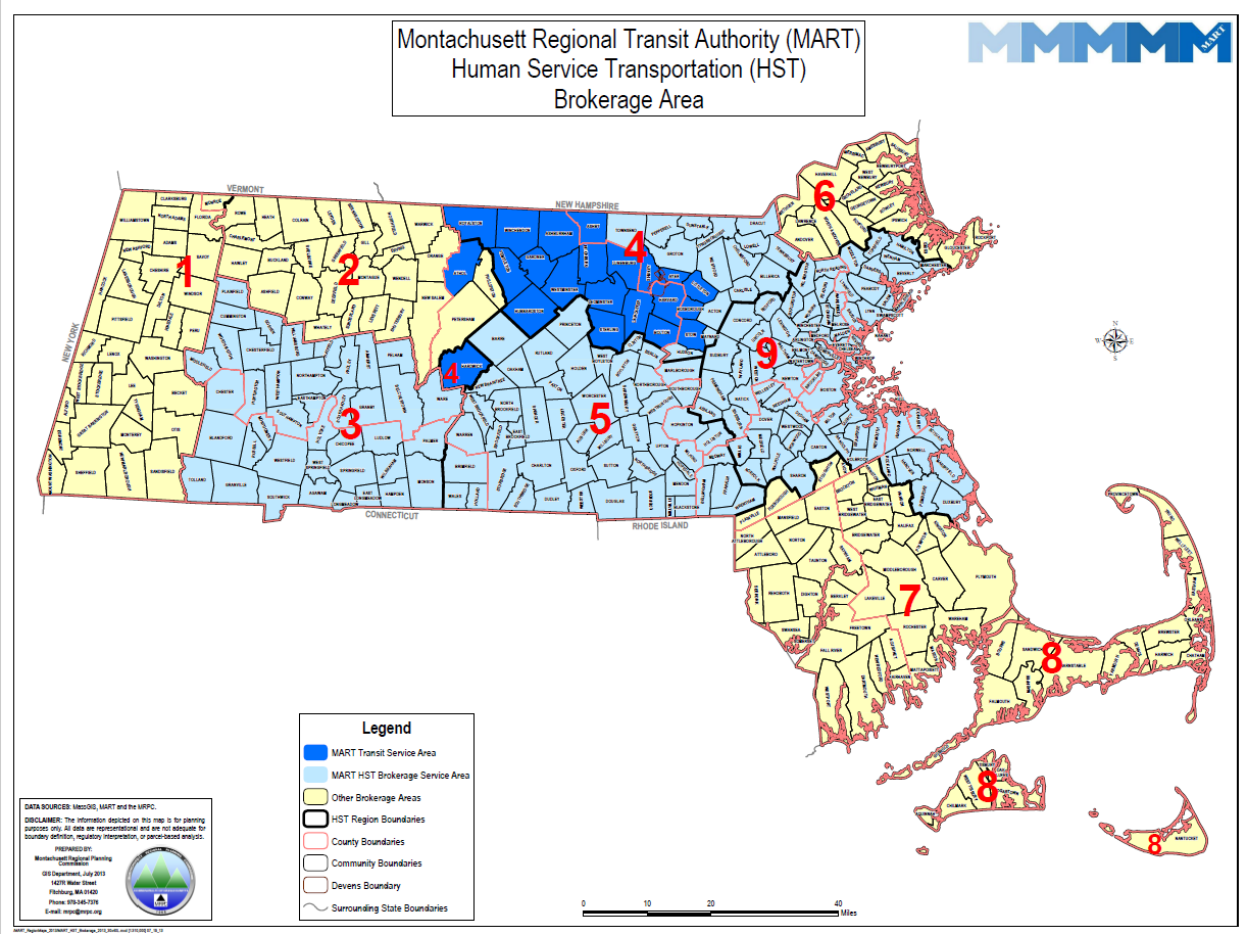
The MART service area connects to MBTA and greater Boston via the MBTA Fitchburg Commuter Rail Line. In September 2016, MBTA extended the Fitchburg Line 4.5 miles and opened the Wachusett Station in Fitchburg. The service operates from Wachusett to Boston, with MART service area stops in Fitchburg, Leominster, Shirley, Ayer, and Littleton. MART also provides its own shuttles to Worcester and Boston. Travelers can transfer to other Worcester Regional Transit Authority (WRTA), MBTA, or regional rail services in either Worcester or Boston.

In addition, the Yankee Trails private bus company operates from Dover, New Hampshire, to New York City via Newburyport, Lowell, Littleton, and Worcester. This line passes through the easternmost part of the MART service area.

MassHealth members can also utilize MART's HST brokerage services to reach areas beyond the MART transit service area. MART brokers HST for four regions covering most of central Massachusetts, as shown on Figure 14.

[20] http://www.mrta.us/customer-information/consumers-rights/reasonable-modification
[21] http://www.mrta.us/customer-information/consumers-rights/complaints-procedures

Figure 14. MART HST Brokerage Areas



Source: MART

4.6 Fare Rates and Structure

MART fixed route buses utilize electronic fareboxes, which scan passenger payments upon boarding and eliminate the need for drivers to handle cash or make change. Customers may pay fares on the bus using cash or stored-value card. Multi-day passes may be purchased with cash or credit card at MART administrative offices in Fitchburg, Gardner, and Athol.

MART uses the CharlieCard, which is compatible with WRTA and MBTA fare collection, for stored value transactions. CharlieCard stored value can be used as fare on any participating system, and value can be added at any sales outlet, using MBTA's website, or by adding cash while boarding the bus. MART multi-day pass products cannot be used to ride WRTA or MBTA services. Customers traveling between service areas must have stored value or add MBTA or WRTA pass products separately. The ability to allow customers to travel through more than one transit system using a single pass product is not possible at this time given the technology limitations of the fare product.

The MART fixed route fare structure is shown in Table 14. MART offers three fare categories for individual trips, 14-day and 1-month passes. For each of these there are two fare tiers for local routes and regional routes. Reduced fares for seniors over 60, veterans, students (under 18 or with a college ID), and persons with a disability are available within each tier with the proper identification. Children under 5 and active service members can ride free on all fixed routes. MART offers free service on Route 4 through an agreement with FSU. No transfers will be issued from Route 4.

MART's JARC service, available in the evenings for local trips in Gardner, Fitchburg, or Leominster, is available for a one-way fare of $2 per trip.[22] The fare for the Boston shuttle starts at $12 one-way with discounts for riders over 60 or with a disability ($10), personal care attendants ($5-$6), and veterans (free). The Worcester shuttle fare is $10 one-way with discounts for riders over 60 or with a disability ($8), personal care attendants ($4 to $5), and veterans (free). Other ADA, subscription, and DAR services are priced to reflect trip characteristics. Riders must pre-qualify, and fares are communicated upon scheduling services.

Table 14. Fixed Route Fare Structure

Fare Type	Standard Local	Reduced Local	Standard Regional	Reduced Regional
Single Trip	$1.25	$0.60	$2.00	$1.00
14-day pass	$16.00	$10.50	$31.00	$21.00
Monthly pass	$30.00	$20.00	$60.00	$40.00

Source: MART

4.7 Fare Policy

On November 17, 2020, the MART Advisory Board adopted a fare policy per its MOU with MassDOT with internal stakeholder coordination. The following describes MART's fare policy.

MART has a very high percent of passengers that pay with cash. While passes do exist, the high percent of cash paying passengers is primarily due to transit riders not being able to afford the large cash outlay of a pass and the low availability of locations to purchase a pass.

MART has raised fares more frequently than most RTAs. The goal for this fare policy is to examine fares every 3 to 5 years, proposing fare modifications as needed, with the expectation that fare changes may occur approximately every 5 years. The reason for this frequency is that the analysis has to consider the impact to riders, to farebox revenue, as well as an equity analysis, which is time consuming with limited administrative staff. In order to properly analyze the need for a fare change, and justify it to the board, the following steps should be incorporated into the fare analysis.

The first step, which occurs annually, is to project the amount of fare revenue expected each year. This is typically done as part of the Authority's budget. As part of the budget process MART should look at indicators that are mentioned in the MassDOT MOU, including farebox recovery.

Every 3 to 5 years, which is approximately how long MART would go between formally considering fare changes, a fare study would be conducted to determine the impacts of fare changes. The fare study would include an analysis of the impact of fare level changes on ridership by fare type, as well as a Title VI analysis to ensure that fare changes do not have a disparate impact to low income and minority populations.

Fare changes are significant and require full public outreach. Full outreach means that public hearing(s) will need to be held and a 30-day comment period must be made available to allow the public to provide input into the fare changes. Once the public hearing(s) and comment period has passed, the board will need to vote on and approve the new fare structure.

[22] Although MART's demand response service for evening commuters has retained the JARC name, it no longer receives dedicated federal revenue through the now expired FTA JARC program.

Implementation of the fare structure encompasses a few items. The first item is making sure that public information is available to inform riders of the new fares. Second, fareboxes will need to be programmed for the new fares. Finally, fare media accommodating the new fare levels may need to be reprinted and sold. A decision will need to be made regarding how long previous fare media would be accepted.

Currently MART is in the process of changing its automated fare collection system; nonetheless, although MART would appreciate its fare system being compatible with the MBTA's, MART has reviewed the transition plans to retain the current S&B system (which would allow for continued compatibility with the MBTA) and finds that it is not in MART's best interest. However, MART will continue with the current fare structure at this time. That decision may change as MART becomes more familiar with its new farebox system and the technological flexibility it allows.

5. Market Evaluation

This chapter describes existing and projected socioeconomic characteristics of the area served by MART.

5.1 Service Area Overview

Understanding the demographics can help explain changes in transit demand and support recommendations for changes in future transit service. Specifically, people living below the poverty level, households without vehicles, seniors, and disabled individuals typically rely on transit; changes in these demographics can provide insight into transit demand trends. The U.S. Census Bureau's American Community Survey (ACS) and Longitudinal Employer-Household Dynamics (LEHD) program are the primary sources of demographic data used in this analysis and provide valuable indications of trends and projections. The block group located in southeast Stow is shown in grey on all demographic maps to avoid mischaracterizing the Assabet River National Wildlife Refuge, which includes zero household and has no demographic profile.

5.2 Demographics Conditions

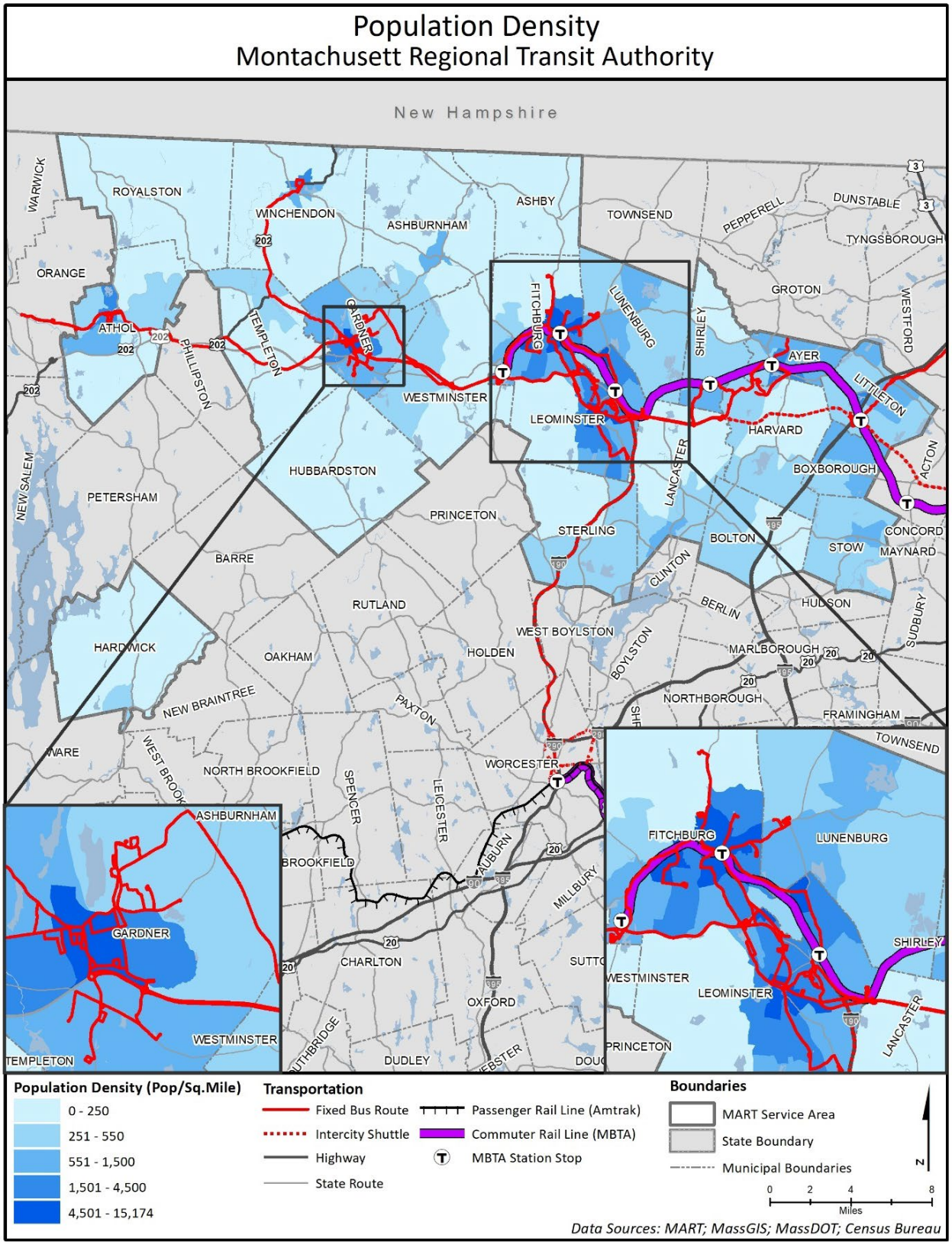
Demographic and socioeconomic statistics are important in transit planning to understand the potential transit markets that exist in an area. Population density maps can help identify where populations may be concentrated and where population distribution may be sparse. This can be particularly helpful in transit planning when considering how and where services can best meet the transportation needs of various populations. Population density in the region is mapped on Figure 15.

The highest population densities in the MART service area are in Fitchburg and Leominster, with generally higher densities in the eastern half of the service area, and pockets of concentrated population in Gardner, Athol, and Winchendon. Royalston, Ashby, and Hubbardston have the lowest population densities.

Transit usage is frequently related to level of income, age, vehicle availability, and disability status. Income is a key determinant in the type of transportation used to commute. Households with lower incomes and those without a private vehicle are often more likely to be in need of public transportation options than households with higher incomes and those who can afford private transportation. Table 15 summarizes a variety of demographic statistics for the MART service area compared to state and national trends.

The MART service area includes a total population of over 235,000 residents and over 88,000 jobs. MART service area residents are generally younger and less diverse than Massachusetts or the nation as a whole.

Figure 15. Population Density



Source: US Census Bureau ACS 2017

Table 15. Demographic and Socioeconomic Profile

Area	Median Household Income	Population Living Below Poverty (%)	Households without a Vehicle (%)	Population Over 65 (%)	Minority Population (%)	Disabled Population (%)
Middlesex County	$97,012	7.9%	10.6%	14.7%	27.5%	9.2%
Worcester County	$71,895	10.4%	9.2%	14.9%	22.9%	12.0%
MART Service Area	$79,562	10.7%	12.5%	15.5%	27.1%	12.2%
Massachusetts	$79,835	10.0%	12.5%	16.5%	29.3%	11.6%
United States	$61,937	13.1%	8.5%	16.0%	39.8%	12.6%

Source: US Census Bureau ACS 2018

5.2.1 Age and Race

The percentages of MART area population over age 65 and under age 18 are illustrated on Figure 16 and Figure 17, respectively. Both groups can be characterized by lower vehicle ownership and potential reliance on public transit for mobility. In addition, riders from both age groups often qualify for a free or reduced fare, such that a route's financial performance (farebox recovery) may be affected by the age composition of the area it serves.

As shown on Figure 16, high concentrations of population over 65 exist in downtown Gardner, Westminster, Shirley, Harvard, and Templeton. Higher percentages of population under 18 occur in Winchendon, Ashburnham, Lunenburg, Harvard, Bolton, Stow, and Littleton, as shown on Figure 17.

Minority population, shown on Figure 18, includes both racial and ethnic minority groups. Areas with the highest percent minority population are found in Fitchburg, Leominster, Shirley, Harvard, and Boxborough.

5.2.2 Socioeconomics

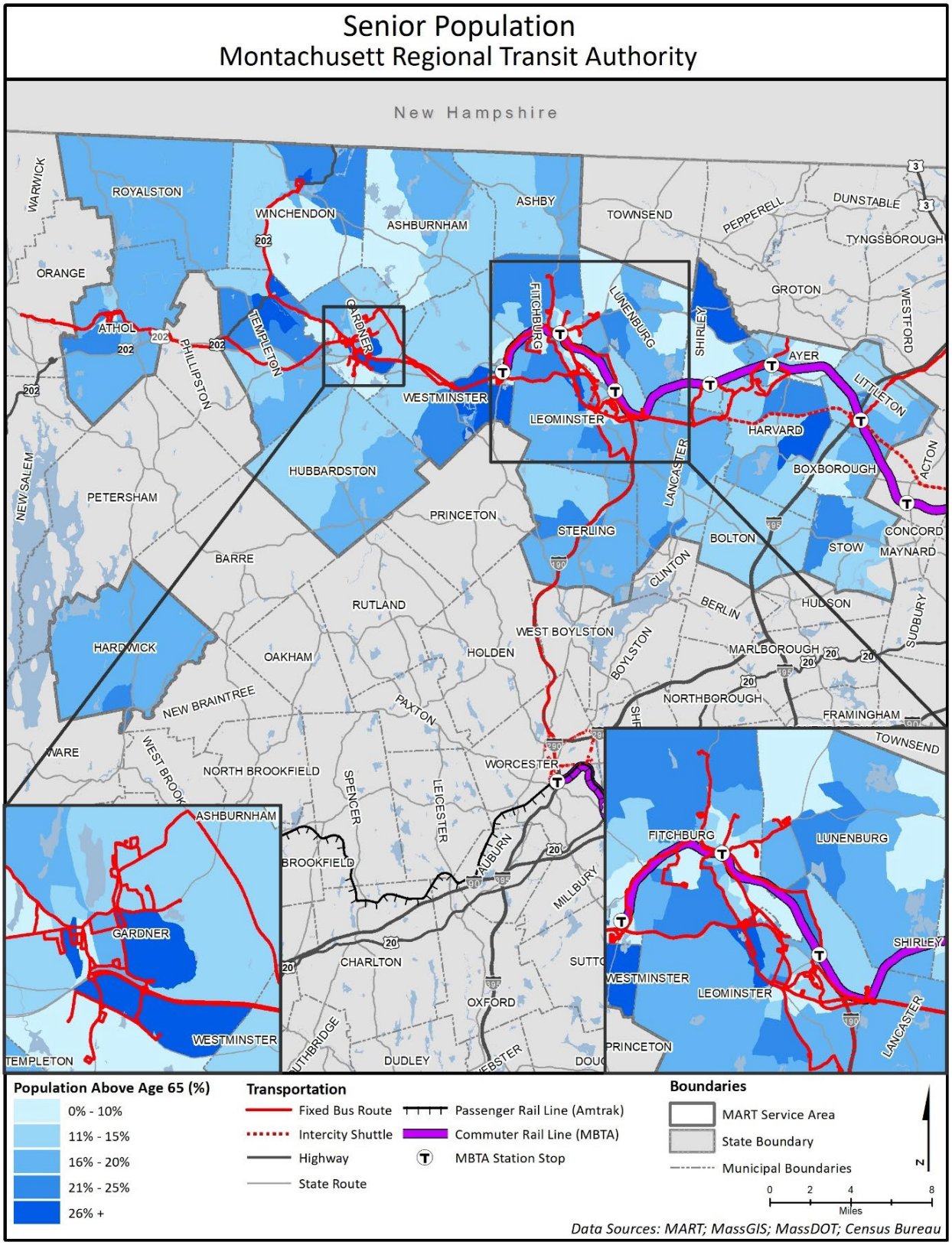
Median household income and the percentage of those living below the poverty level are used as measures for propensity to use transit. Work-trip market shares from ACS show that as income rises the percentage of people using transit decreases. Automobile ownership is expensive and as household incomes decline so does the likelihood of having access to a private vehicle. In addition, those who use transit for non-economic reasons may also be less likely to purchase a vehicle.

Figure 19 shows the percentage of people living below poverty for MART area block groups. Areas with higher percentages of people living below poverty include Gardner, Ayer, Athol, Hardwick, downtown Fitchburg, and Leominster.

Median household income by block group is shown on Figure 20. As shown, the eastern portion of the service area has higher household income, on average, than the western portion. Areas with lower household income include Athol, Hardwick, Templeton, Gardner, and select block groups in Fitchburg and Leominster.

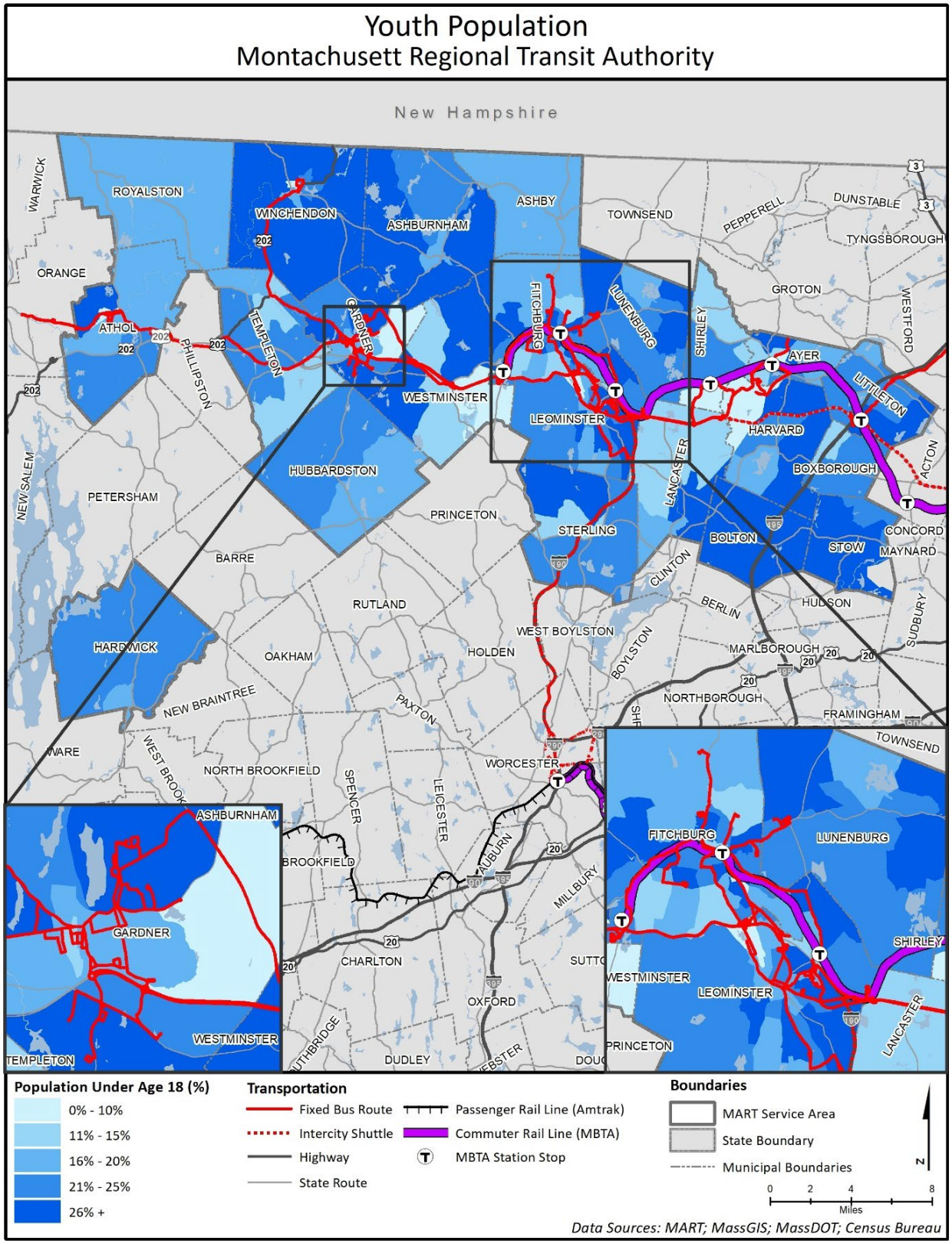
Figure 21 illustrates the concentration of zero-vehicle households. Gardner, Fitchburg, and Leominster have the highest rates of households without a vehicle.

Figure 16. Senior Population



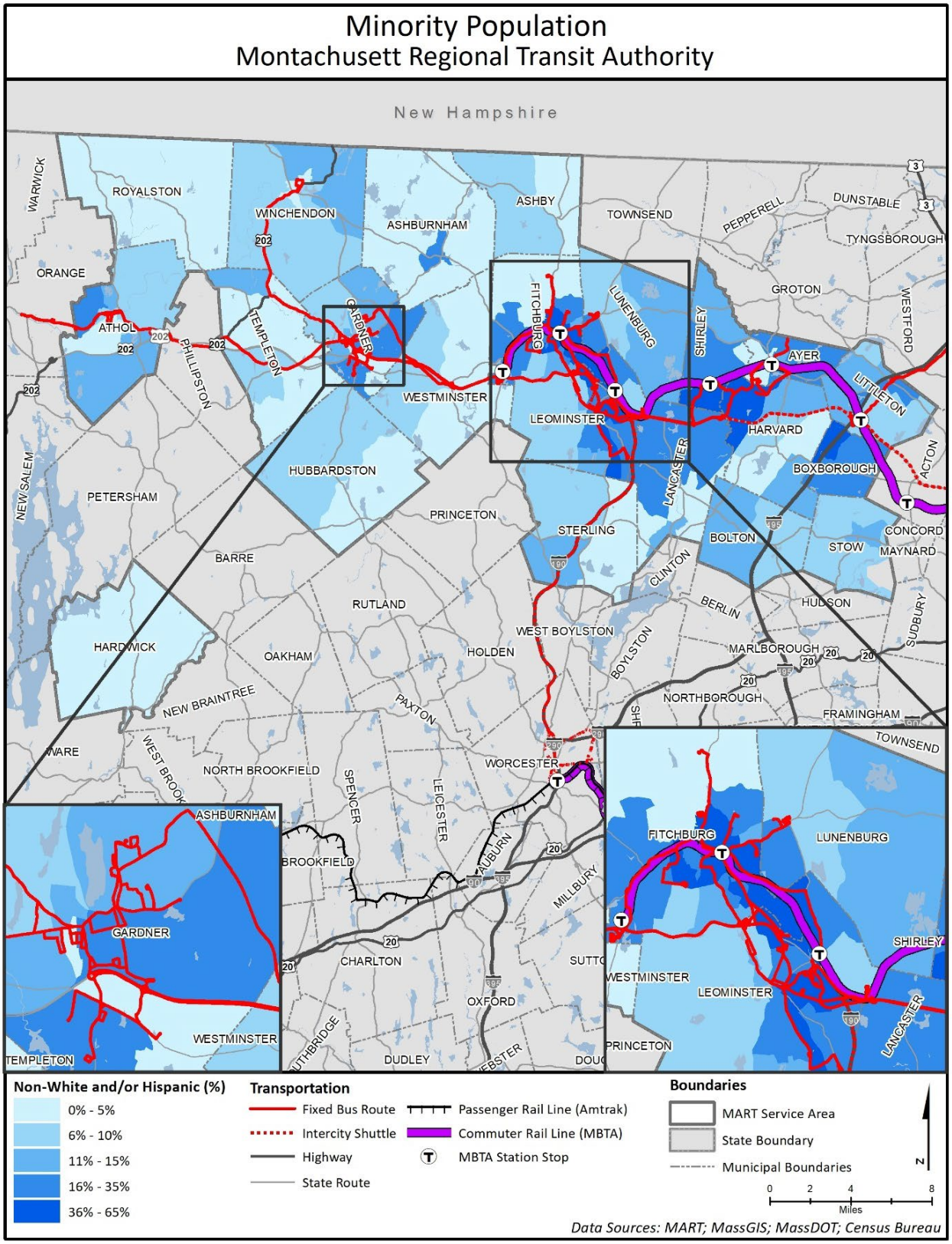
Source: US Census Bureau ACS 2017

Figure 17. Youth Population



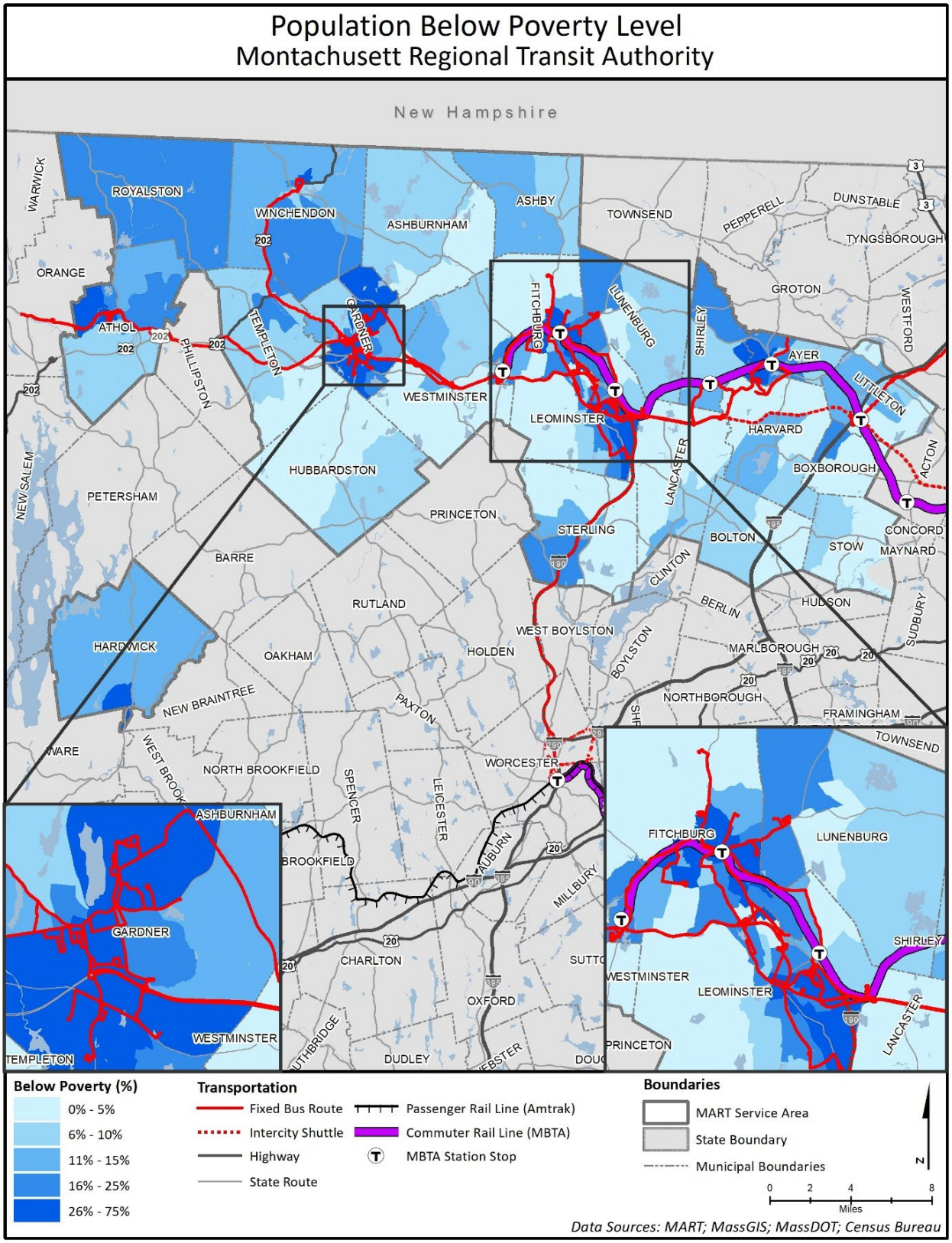
Source: US Census Bureau ACS 2017

Figure 18. Minority Population



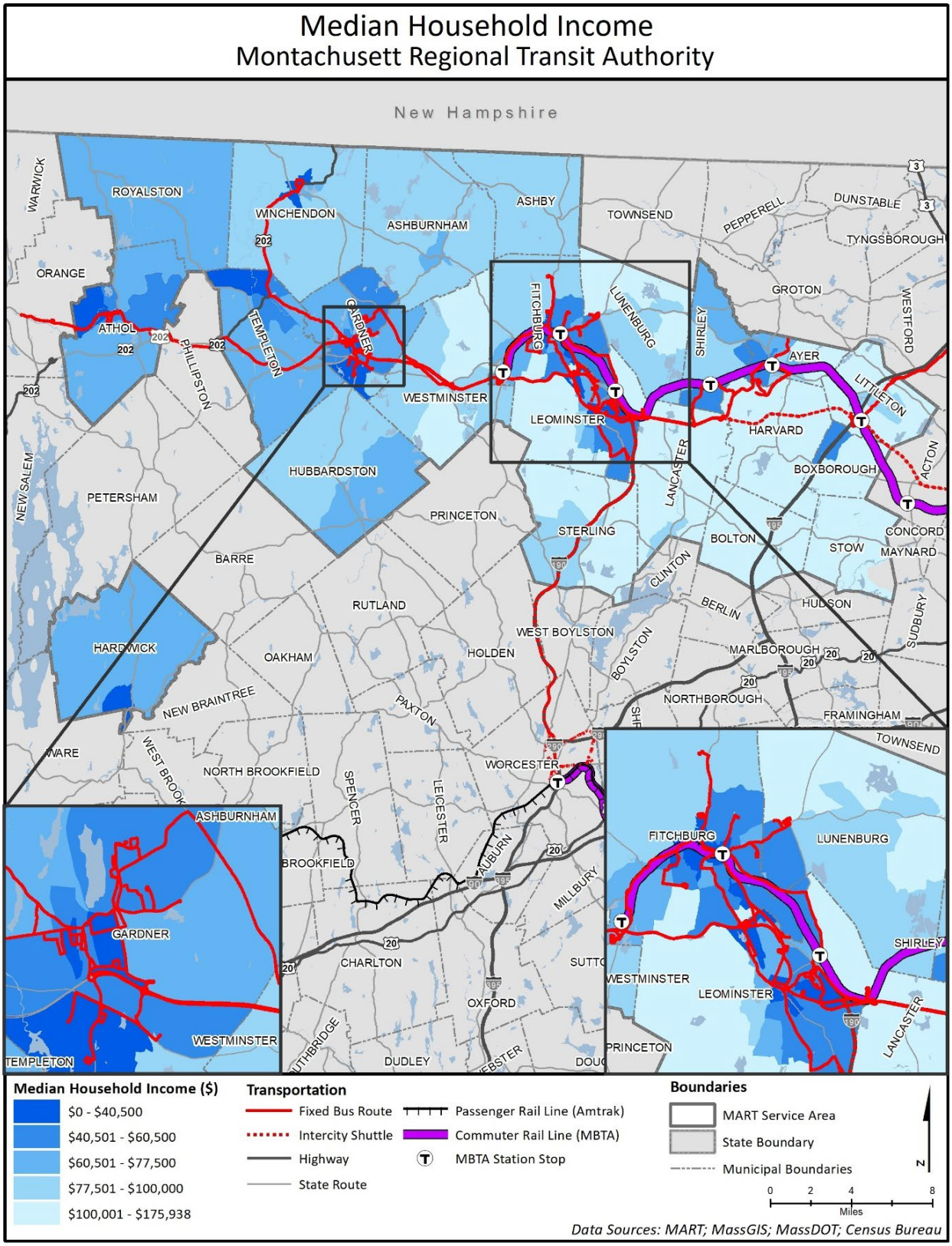
Source: US Census Bureau ACS 2017

Figure 19. Population Below Poverty Level



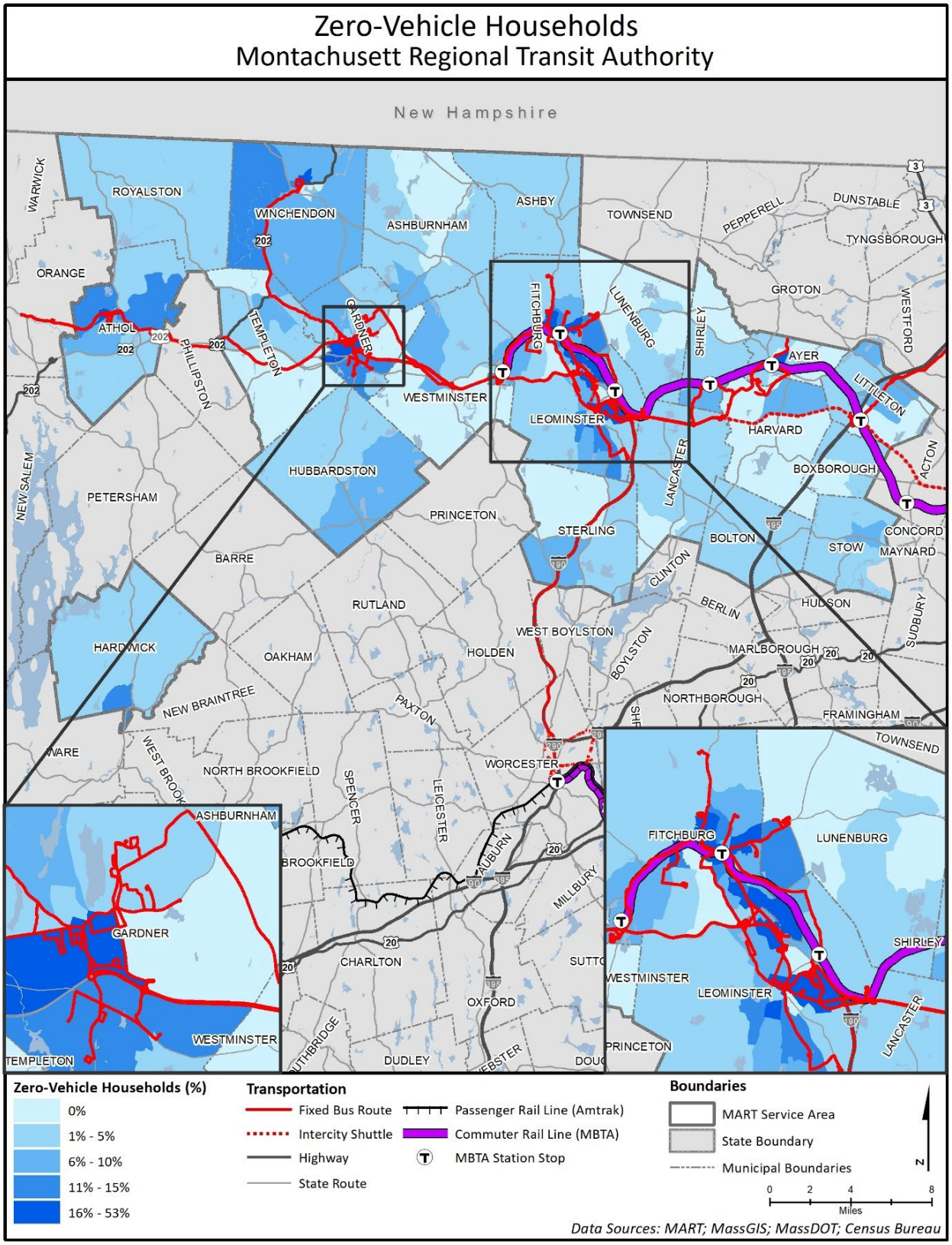
Source: US Census Bureau ACS 2017

Figure 20. Median Household Income



Source: US Census Bureau ACS 2017

Figure 21. Zero-Vehicle Households



Source: US Census Bureau ACS 2017

5.3 Employment

The trip to work is often the most frequent trip taken; therefore, employment characteristics are important factors in the discussion of public transportation. Large employers are commonly destinations for significant numbers of people, which make them important to transit service planning. Job density is shown on Figure 22. Jobs are concentrated along the MBTA commuter rail line in Fitchburg, Leominster, Shirley, Ayer, and Littleton; along the I-495 corridor in Littleton and Boxborough; in Gardner; and in Downtown Athol.

5.4 Local and Regional Travel Patterns

Major trip generators are locations frequented by a significant number of people, traveling by all modes, within the study area. Common transit generators include healthcare facilities, transportation hubs, schools and universities, shopping areas, social service agencies, and recreational areas (such as parks). These generators must be considered when evaluating transit service for a region. Major trip generators within the MART service area are shown on Figure 23.

5.5 Land Use and Growth

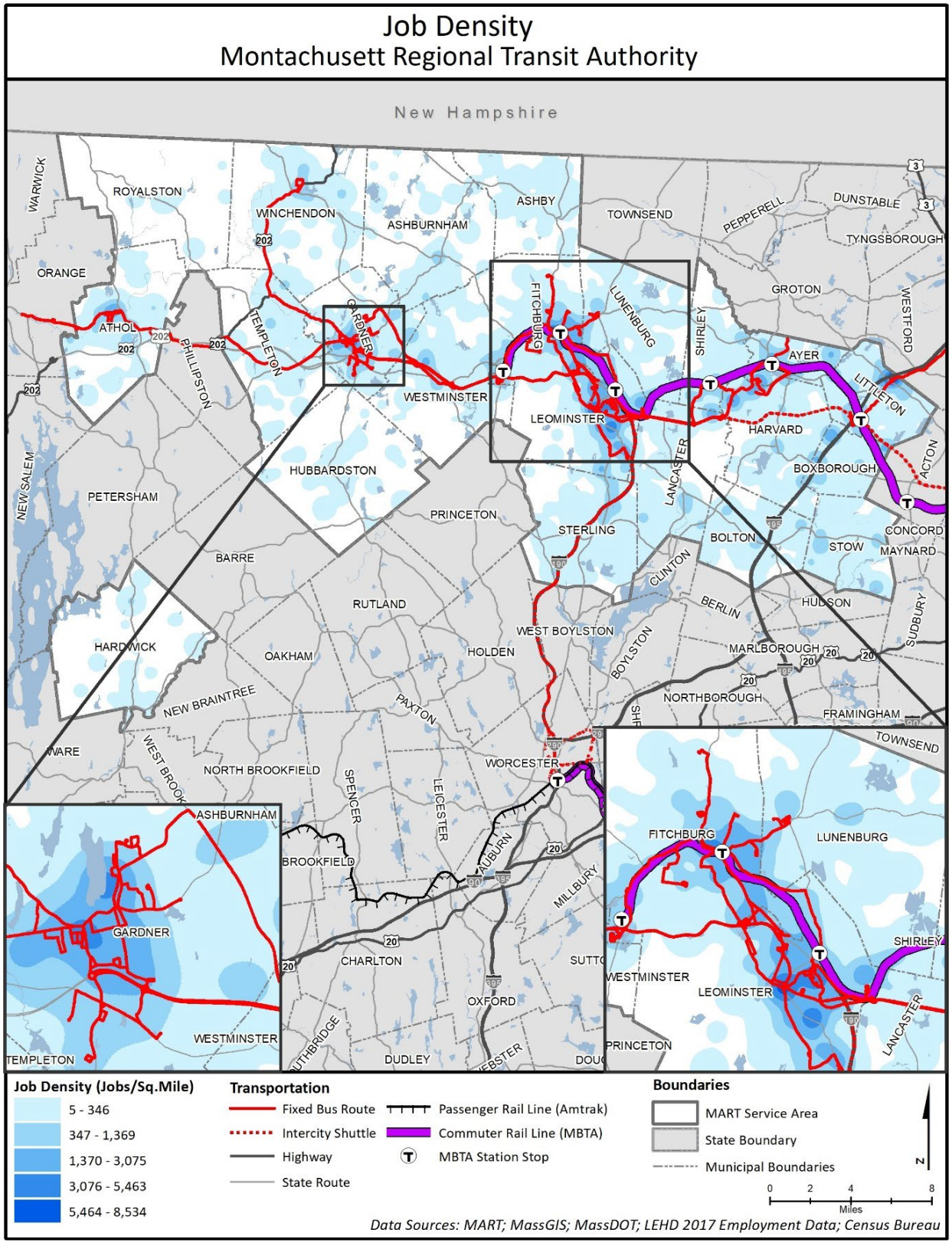
The Montachusett Regional Planning Commission (MRPC) is the primary regional planning agency for communities in the MART service area (with the exception of Hardwick, Littleton, Boxborough, and Stow). The MRPC's 2020 Montachusett RTP documents projected population and employment forecasts.[23] Over the next 10 years, population is expected to grow by 1.76 percent across the region, compared to an average statewide growth of 4.21 percent. This is primarily driven by rapid growth (19.22 percent) in the town of Harvard as well as modest gains in the city of Fitchburg. Several communities, including Royalston, Sterling, and the City of Leominster, are expected to see population losses through 2030. A job loss of 1.57 percent was projected across the region between 2020 and 2030.[24]

The MRPC published its Regional Strategic Framework Plan in 2011, establishing regional goals for open space preservation, economic development, and safe, sanitary affordable housing.[25] Figure 24 illustrates regional zoning patterns, with commercial and industrial activities located primarily along the MBTA/Amtrak rail corridor, I-190, Route 12, and Route 119. A few conservation areas are identified in Groton and Shirley, but the majority of the MART service area is zoned for residential use.

Figure 25 shows the MRPC's priority development areas and priority preservation areas. Preservation areas have been identified across the region, including many Natural Heritage and Endangered Species Program areas and natural habitats surrounding the Ashburnham State Forest. Areas of critical environmental concern are identified in the Townsend, Lunenburg, and Shirley area. Economic development is prioritized along the rail corridor in Fitchburg, Leominster, and Westminster; in downtown Gardner; and in north Lancaster.

[23] https://www.mrpc.org/montachusett-metropolitan-planning-organization-mmpo/pages/working-towards-the-future.
[24] Regional population and employment estimates reflect pre-COVID-19 conditions.
[25] https://www.mrpc.org/sites/g/files/vyhlif3491/f/file/file/montachusett_regional_strategic_framework_plan.pdf.

Figure 22. Job Density



Source: 2017 LEHD

Figure 23. Major Trip Generators

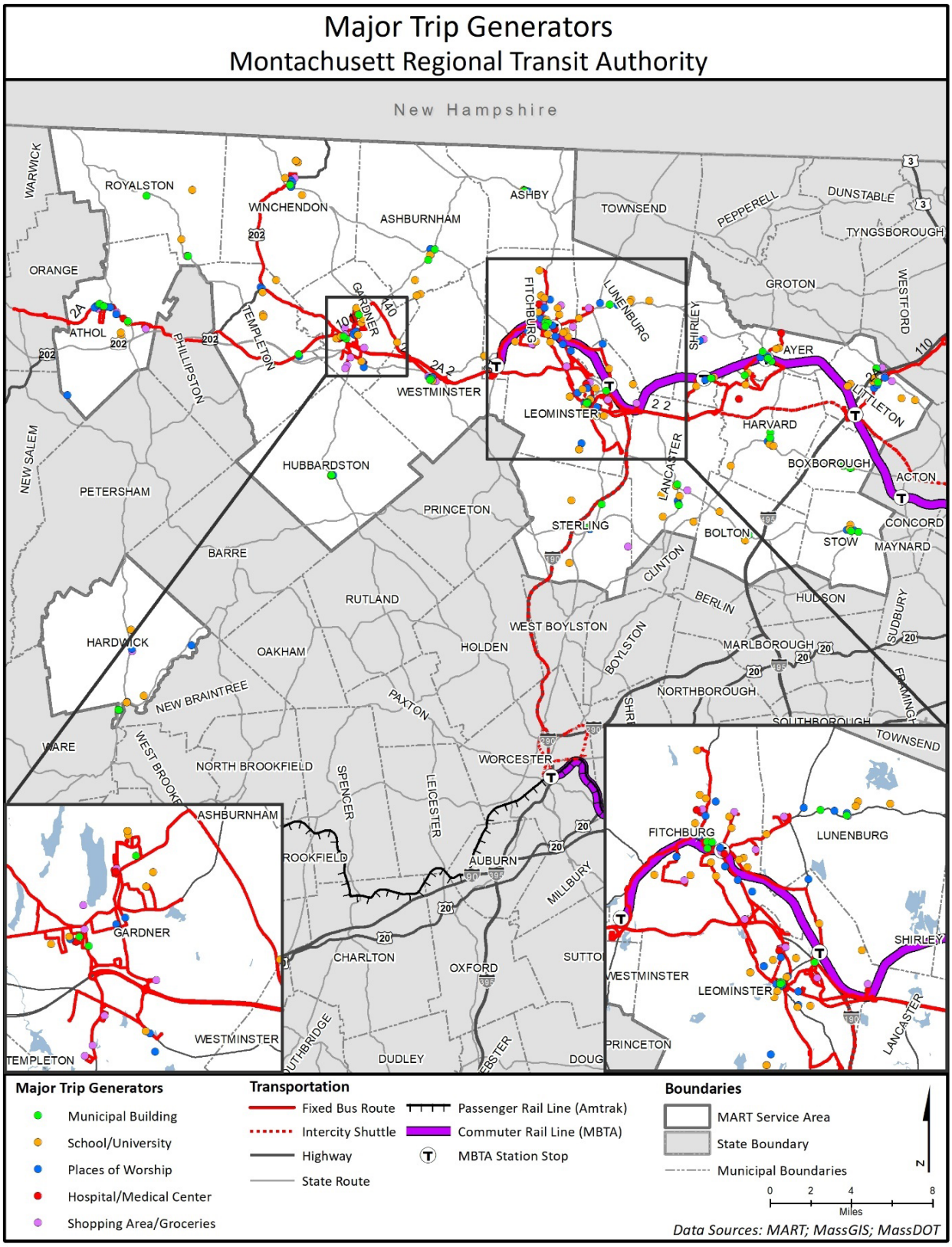
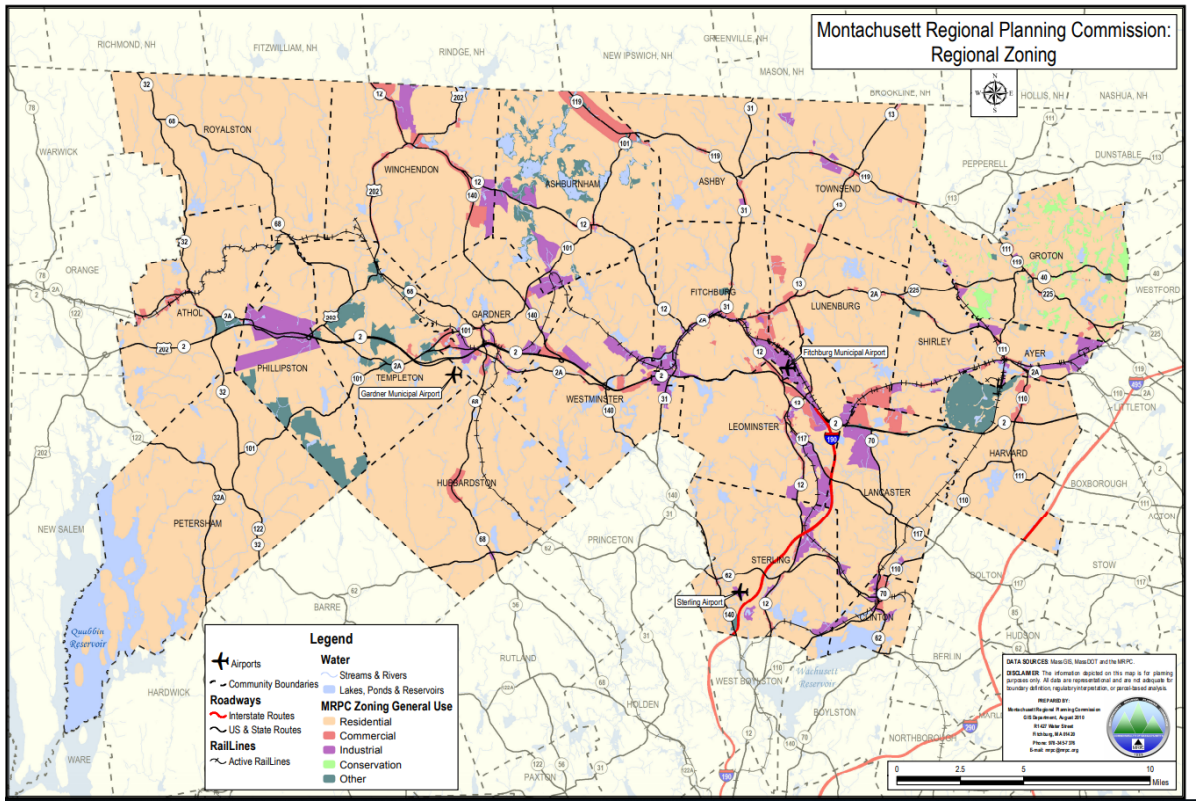
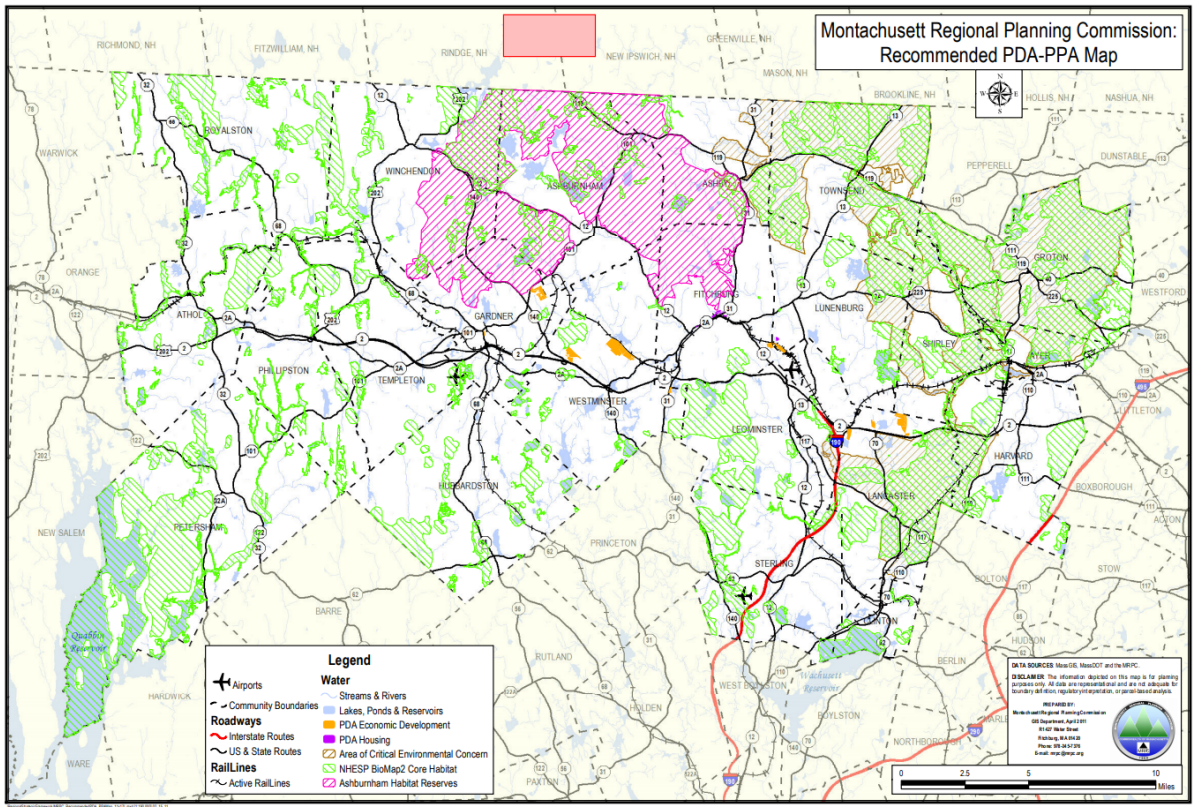


Figure 24. MRPC Regional Zoning



Source: Montachusett Regional Planning Commission, Regional Strategic Framework Plan

Figure 25. MRPC Priority Development and Preservation Areas



Source: Montachusett Regional Planning Commission, Regional Strategic Framework Plan

5.6 Transit Score

The transit score map is created in order to spatially analyze several transit-oriented demographic and socioeconomic characteristics at the same time (the characteristics discussed individually in this chapter so far). The transit score is a relative measure of how successful a fixed route transit system is expected to be in a particular region. Used in conjunction with a congruency analysis of major transit generators, the transit score can be used to evaluate existing service, as well as to identify areas of potential demand.

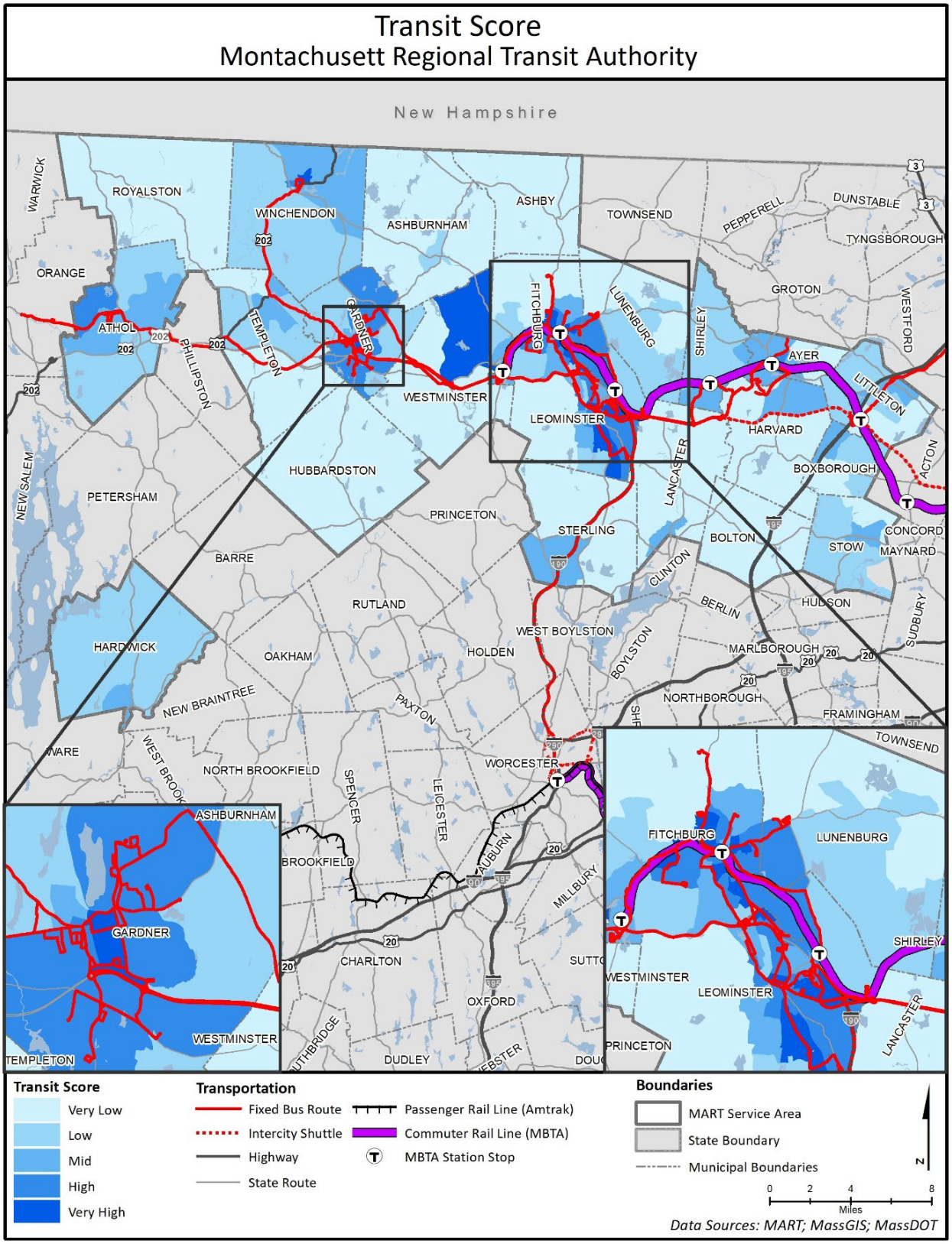
Demographic and socioeconomic information is collected from the US Census Bureau for a region divided into smaller geographic units such as tracts, block groups, or blocks. Block groups and census tracts were used for this analysis. Transit-oriented variables used for the analysis include:

- Overall Population Density
- Overall Job Density
- Density of the Population under the age of 18
- Density of the Population over the age of 65[26]
- Percentage of the Population Living Below the Poverty Level
- Percentage of Zero-Car Households

The results of the transit score analysis are illustrated on Figure 26. As shown the highest transit scores are located in northeastern Westminster, downtown Gardner, and in Fitchburg and Leominster, located generally around Routes 2, 9, 8, 5, and 6.

[26] Note that the federal definition of senior as aged 65 or over is used in this case, but age in relation to transportation need is more nuanced than a strict age cutoff implies. In 2017, Governor Baker signed Executive Order 576 establishing the Governor's Council to Address Aging in Massachusetts. As part of this effort, the Council looked at different methods and solutions to create an age-friendly Commonwealth and conducted research and listening sessions across the state, during which transportation was identified as a key challenge facing older adults. Additionally, research presented from this effort showed a trend toward people staying in the workforce longer than previous generations. This research shows that the topic of transportation for older adults is one that is evolving and will require more attention in transportation planning in the future.

Figure 26. Transit Score



6. Performance Monitoring

Performance-focused management is a critical priority for the Commonwealth and its regional transit providers. The federal government has also led the transportation industry to become more performance-driven in the last decade by mandating that federally funded agencies implement a performance-based approach to planning and programming. This broad emphasis on having a strong enterprise-wide, data driven and transparent performance management framework as the foundation for making decisions is especially relevant in addressing the challenges of COVID-19 and other market uncertainties. The purpose of this chapter is to outline MART's current performance measurement practices, track performance results for the MART/MassDOT Bilateral MOU, and make recommendations supporting data-driven, performance focused decision-making. Historical performance information and a review of peer agencies are included in Appendix A.

6.1 Current Performance Measurement Practices

MART has developed a detailed performance measurement system informing their decision-making processes. MART's system for performance monitoring includes:

- Periodic reporting a broad range of performance results to its Advisory Board and federal and state funding partners
- A commitment to tracking and reporting key metrics to MassDOT under the bilateral 2-year MOU that MART signed with MassDOT in August 2019
- Transparent sharing of performance results with the public, through performance summaries made available on the RTA's website

MART also has internal performance monitoring protocols related to management decisions. MART prepares an annual PDF performance dashboard for its fixed route and demand response services that is posted on the RTA website. This 2-page annual performance summary report shows month to month operating statistics for fixed route and demand response such as unlinked passenger trips, percentage of scheduled trips operated, preventable accidents, vehicle revenue miles, miles between breakdowns, and number of road calls. In addition, the report includes annual FY 2018 and FY 2019 financial and performance information such as:

- Farebox revenue (fixed route, paratransit, and brokerage)
- Operating costs (fixed route, paratransit, and brokerage)
- Fleet size, non-revenue vehicles, and number of routes operated
- Operating expense per passenger trip (fixed route and paratransit)
- Operating expense per revenue hour (fixed route and paratransit)
- Operating expense per revenue mile (fixed route and paratransit)
- Passenger trips per revenue hour (fixed route and paratransit)
- Passenger trips per revenue mile (fixed route and paratransit)
- Subsidy per passenger trip (fixed route and paratransit)
- Fare structure

Although MART has a strong base to build on, it will be very beneficial for the Authority to strengthen their performance management practices to support data-driven enterprise-wide decision-making. Recommendations for improving MART performance management practices are provided at the end of this chapter.

6.1.1 State and Federal Monitoring Requirements

MART collects and reports a variety of performance metrics to both the FTA and the Commonwealth on a monthly, quarterly, and annual basis as part of their funding agreements. Summary performance metrics that MART has tracked and reported to MassDOT through the GrantsPlus and asset data systems over the FY 2015 to FY 2019 time period are displayed in Appendix A. FTA requires transit providers that receive federal funding to submit data (including service, financial, and asset inventory and condition) both monthly and annually to the NTD.

6.1.2 Performance Metrics and Targets from MassDOT Memorandum of Understanding

New to the MART's performance monitoring obligations is a commitment to monitor and report on a selection of performance metrics, baselines, and targets established by MART and MassDOT in the categories of ridership, customer service and satisfaction, asset management, and financial performance. This commitment is contained in a bilateral MOU signed by MART and MassDOT in August 2019. The MOU states that MART's performance is to be measured by comparing established baselines against FY 2020 and FY 2021 targets. With a few exceptions, the baselines are averages of data collected in FY 2016 to FY 2018. The performance measures included in the MART MOU, along with their baselines and targets are shown in Table 16.

Table 16. FY 2021 Performance Measure Targets in the MOU

Metric	Fixed Route	Demand Response	System-wide
Unlinked passenger trips (UPT)	564,225	412,437	976,662
UPT/VRM	0.8244	0.1622	0.3040
UPT/VRH	12.37	2.47	4.61
Travel trainings	N/A	N/A	12
On-time performance	System implementation	97.27%	N/A
Average call wait time	N/A	N/A	1.25
Missed trip volume (annual)	N/A	580	N/A
Revenue vehicles meeting TAM Plan Useful Life Benchmarks	Meets/Doesn't Meet Target		
Reportable equipment meeting TAM Plan Useful Life Benchmarks	Meets/Doesn't Meet Target		
Facilities meeting TAM Plan Useful Life Benchmarks	Meets/Doesn't Meet Target		
Average age of fleet (years)	9.5	6.0	7.7

Metric	Fixed Route	Demand Response	System-wide
% preventive maintenance	100%	100%	100%
Farebox recovery	12.63%	36.16%	27.70%
Operating cost/ VRM	$8.55	$4.21	$5.15
Operating cost/ VRH	$128.20	$64.02	$78.07
Operating cost/trip	$10.89	$27.02	$17.63
Revenue/revenue hour	$16.69	$23.86	$22.29
Revenue/revenue mile	$1.11	$1.57	$1.47
Own-source revenue	N/A	N/A	$8,362,069

Source: MassDOT, MART 2019 MOU

6.1.3 How the Transit Market Has Been Affected by COVID-19

When initially negotiated, MOU targets reflected the reasonable expectation that MART could improve upon the identified baselines for the period of FY 2020 through FY 2021. However, the pandemic has impacted and continues to impact MART through the fourth quarter of FY 2020. Months into the pandemic, the transit industry is trying to understand what the “new normal” will look like. Transit providers are uncertain how many former customers will return (ridership has dropped as much as 80 percent in some systems) and what that timeline looks like. They are also grappling with how to ensure a safe workplace and retain employees as the risk associated with transit operations (and driving a transit vehicle in particular) has gone up significantly since March 2020.

After the outbreak became widespread in Massachusetts in mid-March, many institutions and industries that fuel the region’s economy, as well as MART’s ridership, have been severely altered for the foreseeable future. Some of the most significant include:

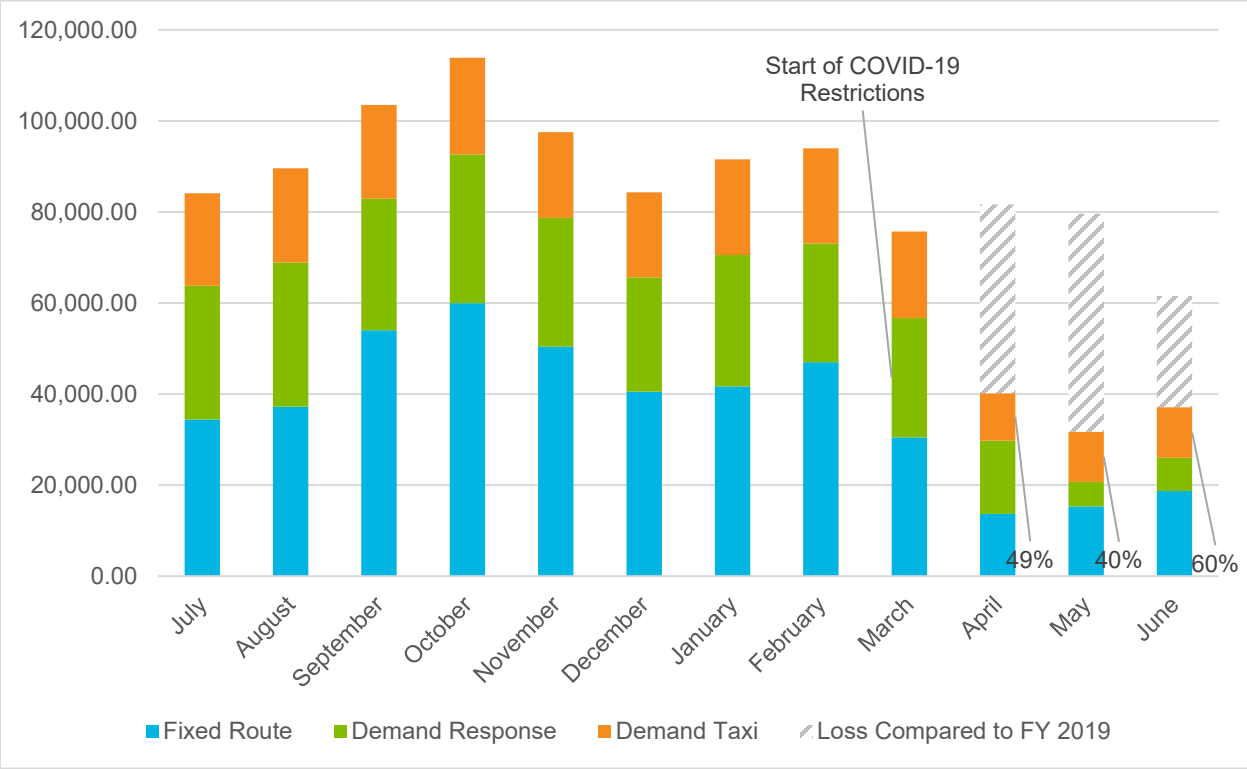
- Suspension of classes and a shift toward virtual learning at FSU
- Shift toward virtual and hybrid learning options at MWCC and the region’s public schools
- Reduction in MBTA commuter rail ridership
- Reduction in leisure and travel activities, including temporary closure of Great Wolf Lodge
- Reduction in senior activities and services provided by area COAs

Not only have these institutions and services historically generated large numbers of trips, but they also contribute to area employment and economic conditions that impact MART’s state and local revenue streams. As the timeline for eradicating the virus and the impact that pandemic-related trends (such as increased telework, distance learning, telemedicine, and online shopping) could have on future transit demand are extremely uncertain, MART will need to be flexible in its ability to adjust service according to demand and funding availability. Access to ridership data that are detailed and readily available is imperative to MART’s ability to both maintain lifeline service and transport essential workers.

Figure 27 shows FY 2020 ridership information for MART, compared to an FY 2019 baseline. At the beginning of the fiscal year, MART was exceeding FY 2019 month-over-month ridership. Restrictions to travel and stay at home orders related to COVID-19 began in March, and

ridership levels fell dramatically across all modes in the following months. By May, ridership had fallen to 40 percent of FY 2019 levels. June was characterized by a slight recovery, but ridership was still hovering at 60 percent of FY 2019 levels. During this time, MART had suspended fare collection in an effort to allow more social distancing between its drivers and customers. Lower ridership and suspension of fare collection combine such that MART's productivity and financial efficiency performance metrics are not comparable to MOU targets during this time. This trend of depressed ridership has continued into FY 2021, especially apparent compared to traditionally high fall ridership as education-oriented trips are replaced by students learning virtually from home.

Figure 27. FY 2020 COVID-19-related Ridership Loss



Source: MART, MassDOT FY 2020 RTA Service Report

Figure 28 shows FY 2020 performance for select service effectiveness metrics, as a percentage of the FY 2020 MOU target. During the first and second quarters, fixed route productivity (passengers per revenue hour and passengers per revenue mile) was performing consistently below expectations (between 60 and 100 percent of MOU targets). This period was characterized as having somewhat better performance in the fall, with the return of school trips, than in August or December. In the third quarter, fixed route productivity fell to as low as 33 percent of targets in April as a result of the pandemic. On the other hand, productivity across demand response services increased in April, likely due to a number of essential trips being shifted from fixed route to the more personalized mode to mitigate pandemic concerns around public spaces. Demand response performed near or above targets throughout the year.

FY 2020 costs per revenue hour and costs per revenue mile for fixed route and demand response, as a percentage of the FY 2020 MOU targets, are shown in Figure 29. Fixed route costs were below targets throughout the first quarter, second quarter, and part of the third quarter. Demand response costs exceeded expectations throughout the first and second quarters (generally between 100 and 150 percent of FY 2020 MOU targets). Costs for both modes climbed in March and April and have remained high through the end of the fiscal year.

Figure 28. FY 2020 Service Effectiveness Metrics Relative to Targets

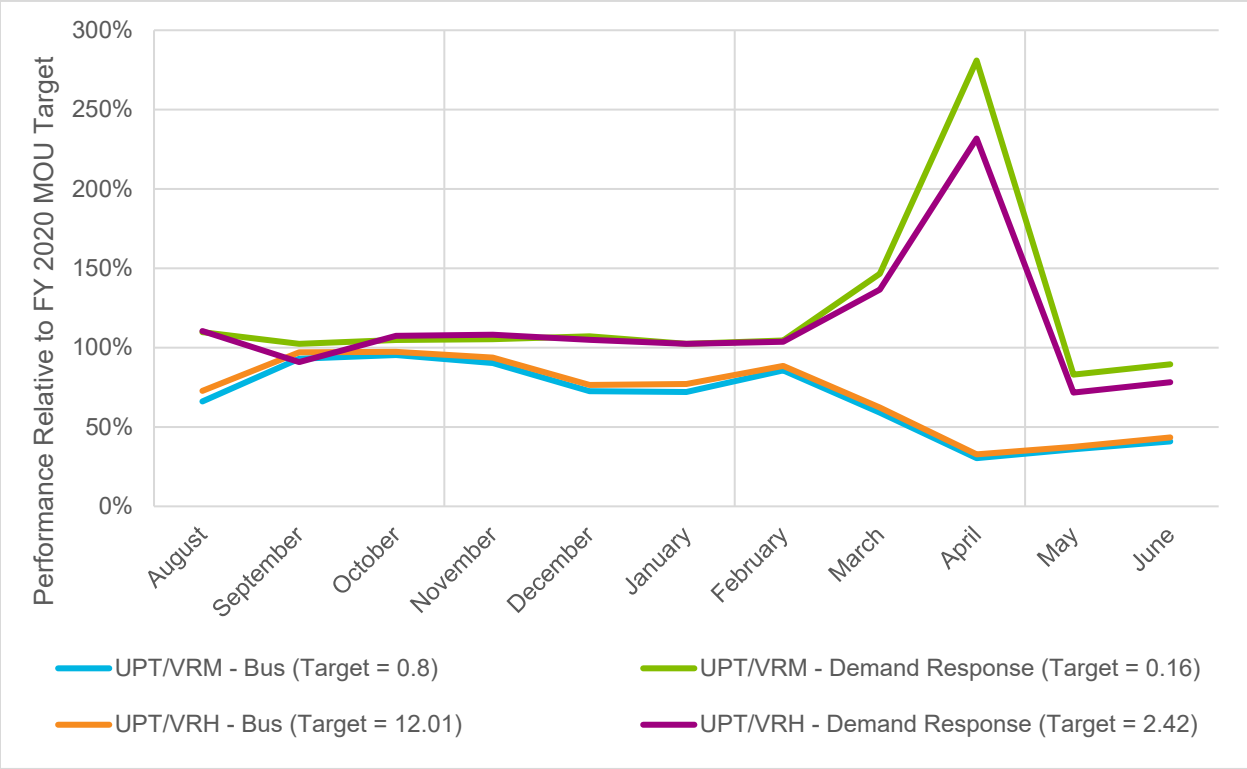
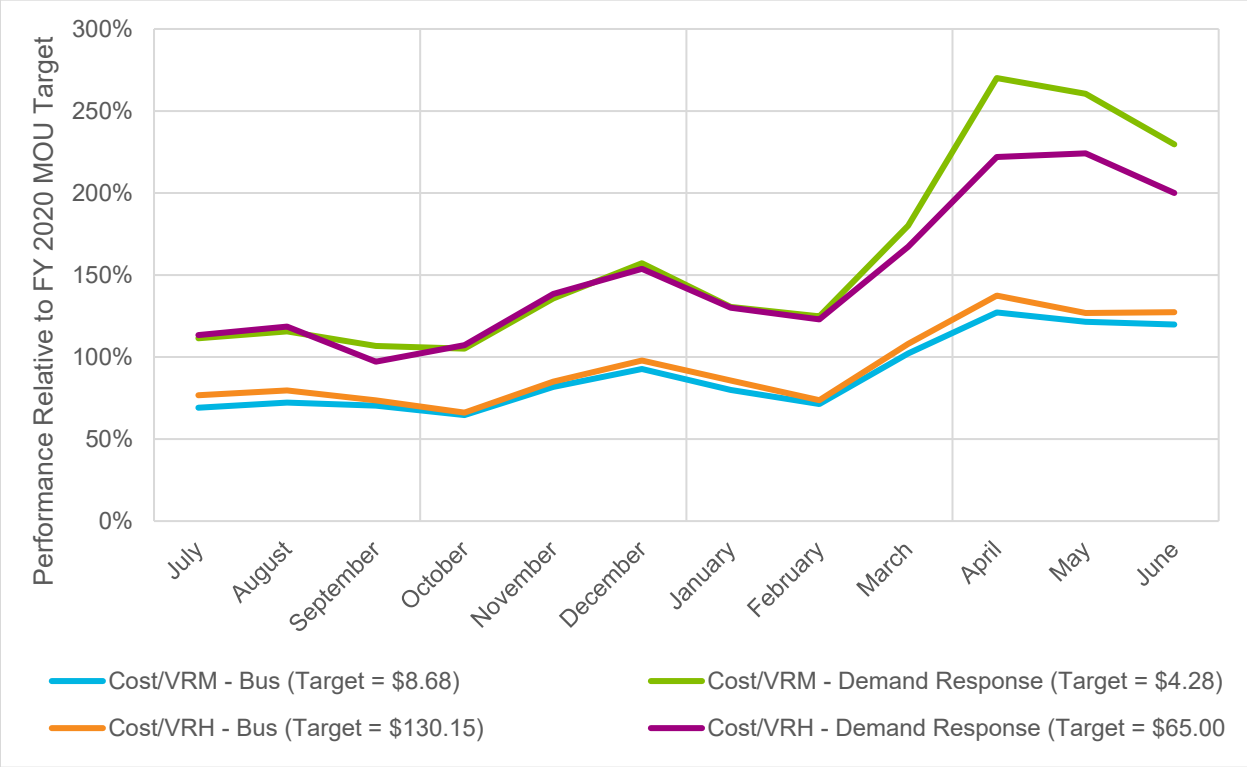


Figure 29. FY 2020 Financial Efficiency Metrics Relative to Targets



MART and MassDOT will continue to review MOU performance results through the term of the agreement and will mutually utilize this data to inform agreement for FY 2022 and beyond.

6.2 Considerations for the Next 5 Years: Moving to a Data-Driven, Performance-Focused Decision-Making Framework

Building on MART's current performance management practices, there are some critical improvements and measures that MART should implement over the next 5 years. These changes support an enterprise-wide decision-making process guided by data and performance. Ultimately, adopting a data-driven performance-focused decision-making framework will aid in the navigation of the uncertainties brought on by COVID-19 and other market trends.

6.2.1 Data

The first critical need that MART should fulfill to enhance performance management is in the area of data collection and evaluation. While MART collects, analyzes, and reports performance data, the Authority would greatly benefit from strengthening its data collection tools to better support performance-driven decision making. It will be critical for MART to evaluate its data collection and evaluation tools and invest in technology driven solutions to provide real-time information on key system indicators and reaffirm the key metrics that will best inform Authority decisions, particularly in the service planning, cost control, and financial business lines.

Principals for data evaluation include:

- **Data Collection**: A transit agency must have the data collection systems in place from which to draw the information for making decisions. These systems can be automated, such as APCs, or drawn from manual observations or samples. Validation of the information collected is a crucial aspect of data-driven decision making. As transit operations equipment has become more technologically sophisticated, vast amounts of operations data have become available to service providers. Authorities should have technology-driven data analysis tools and strategies that ensure that the data collected facilitates MART's reporting requirements and informs operations, service, and financial planning.
- **Data Analysis**: Transit operators have ample data produced on a daily or even hourly basis from the systems used to deliver service. Information from AVLs, APCs, fareboxes, phone systems, and other technology can be voluminous, and having appropriate levels of data analysis capacity is essential to distilling the information into key decision-driving reports. MART can build on the data available through AVL systems in use across its fleet; however, MART notes that the data generated by its current system has been unreliable. MART is currently investigating new systems to better meet this need. MART has not yet equipped its fleet with APC technology but plans to do so within the 5-year planning horizon. APC systems facilitate consistent and more easily collected ridership data across its bus routes and stops, enabling ridership and efficiency performance comparisons. MART should procure, install, and calibrate APC systems on its fixed route fleet and continue to monitor, analyze, and apply the data collected through its APC system to facilitate review of performance metrics for every route and stop.

6.2.2 Performance Metrics

MART should continue to assess its performance around key service and financial indicators to establish performance targets and corrective actions that better reflect the Authority's priorities through a variety of scenarios. When evaluating existing practices and developing recommendations for new metrics, it is important to keep in mind that performance measures should be:

- Easily measurable
- Inclusive of realistic aspirational targets that will lead to successful outcomes

- Clear and intuitive to transit staff as well as to non-transportation professionals
- Acceptable and useful to transportation professionals
- Comparable across time and between geographical areas
- Reported on a regular schedule (monthly, quarterly, or annually), depending on the state and federal requirements and the nature of the data
- Functionally related to actual system operations so that changes are reflected with minimal lag time in operating statistics
- A cost-effective means of data collection
- Based on statistically sound measurement techniques, where appropriate
- Consistent with measures identified for other systems
- Readily available, when possible, to facilitate flexibility and agility in service planning
- Framed around actionable language, setting thresholds when additional analysis or service changes are warranted

MART should establish regular review of actionable guidelines for the performance metrics they regularly report to better reflect a variety of potential transit market scenarios. MART's 2015 RTP identified several thresholds for identifying service levels. For example, level of service (frequency) guidelines for new services based on population and employment densities are shown in Table 17. In addition, the 2015 RTP recommended minimum frequencies (by route function) of 60 minutes for local routes, 120 minutes for regional routes, and at least two trips per peak period for commuter routes.

Table 17. 2015 RTP New Service Thresholds

Jobs and Population per Square Mile	2015 RTP Recommended Service Thresholds
2,000-3,000	120-minute headways or peak only service
3,001-6,500	60-minute headways
6,501-16,000	30-minute headways
16,001-250,000	15-minute headways
Over 250,000	5-minute headways

Source: MART 2015 RTP

At this time, it is worthwhile to refresh some of these thresholds to reflect pandemic-related impacts on travel demand, as well as emerging technologies and service delivery options (e.g., microtransit or commuter express services). Most importantly, the decision to add new services should consider both the characteristics of the area requesting service as well as the overall landscape for transit. New service criteria should increase public transparency for the service planning and decision-making process without hampering MART's ability to interject flexibility and nuance into the process. Lower density areas may not be good candidates for new service during depressed system ridership conditions, such as those experienced during the pandemic. Higher density areas may also warrant a range of appropriate service levels: meeting basic service needs through depressed ridership conditions while also accommodating capacity for social distancing as ridership recovers. Table 18 provides an update to MART's new service thresholds.

Table 18. Recommended New Service Thresholds

Jobs and Population per Square Mile	Service Thresholds (Low Ridership)	Service Thresholds (High Ridership)
2,000-3,000	No service	Limited trips/day or alternative modes*
3,001-6,500	Limited trips/day or alternative modes*	60-minute headways
6,501-16,000	30/60-minute headways by time of day or trunk	30-minute headways
Over 16,000	30-minute headways	15-minute headways

** Indicates that MART should weigh the potential for demand response, microtransit, commuter express, or other modes to meet transportation needs in an area not conducive to traditional fixed route service.*

The 2015 RTP established additional thresholds for when corrective actions (such as more extended analysis or service changes) should be undertaken for underperforming routes. As post-pandemic ridership stabilizes, it will be important to review and reestablish thresholds for corrective actions in order to simplify service planning and boost transparency of the decision-making process, especially in the event of sustained funding shortages or ridership loss following the pandemic. Thresholds identified in the 2015 RTP are shown in Table 19.

Table 19. 2015 RTP Service Correction Thresholds

Service Threshold	Local Route	Regional Route	Commuter Route
Passengers per hour*	13.5	7.5	7.5 per trip
Subsidy per passenger**	$11	$11	$11
Farebox recovery	8%	8%	8%
Cost per revenue hour	Above 75% of system average	Above 75% of system average	Above 75% of system average
On-time performance	95%	95%	95%
Miles between road calls	20,000	20,000	20,000
Accidents per 100,000 miles	3	3	3

Source: MART 2015 RTP

** 2015 RTP identified routes 75% or below benchmarks (18 and 10 passengers per hour, respectively) as warranting re-evaluation*

*** 2015 RTP identified routes above 200% of benchmark ($5.50) as warranting re-evaluation*

Looking forward, the thresholds for passengers per hour, subsidy per passenger, and farebox recovery should be widened to accommodate a variety of system recovery scenarios. Thresholds for cost per hour should be modified to reflect a focus on high cost routes. Routes with lower costs per hour will not necessarily warrant additional service but may be monitored to determine the factors contributing to lower costs and transferability to other routes. In addition, it

is critical that MART establish thresholds specific to the local and regional route types it offers, with thresholds for local routes not overly tied to Route 4 historical performance. Similar thresholds applicable to new microtransit or other zone-based should also be adopted. Recommended service correction thresholds, based on a synthesis of MART's previous thresholds, MOU targets, and past performance, are shown in Table 20.

Table 20. Recommended Service Correction Thresholds

Service Threshold	Local	Regional	Zone-Based	Potential Corrective Action(s)
Passengers per hour	9	4	4	Route realignment, schedule adjustments, reclassification
Subsidy per passenger*	Above 150% of system average	Above 150% of system average	$8	Route or schedule adjustments, zone- or distance-based fares, alternate revenue stream
Farebox recovery (excluding periods of fare suspension)	10%	10%	10%	Route or schedule adjustments, zone- or distance-based fares, alternate revenue stream
Cost per revenue hour	Above 150% of system average	Above 150% of system average	Above fixed route average	Route realignment/turn-backs, layover adjustments, labor/overtime allocation
On-time performance	94%	94%	N/A	Schedule analysis, recovery time adjustments, capital improvements
Miles between road calls	10,000	10,000	10,000	Vehicle reassignment, preventive maintenance
Accidents per 100,000 miles	3	3	3	Route safety analysis and realignment, operator training

It is recommended that MART continue to monitor and adjust service evaluation thresholds in light of new data reflecting the pandemic, with updates occurring at least every 5 years (in conjunction with MART's 5-year CRTP updates).

6.2.3 Public Transparency

MART already collects and reports a variety of system and mode level financial performance, and route-level performance measures. MART's website includes an "Open Government" page, which includes annual payroll, audited financial statements, an "open checkbook" app, and a performance measures report. Advisory Board meeting minutes are available under the Customer Information – Public Meetings page of the website. The purpose of providing this information is to boost public trust in MART and allows the public to better understand the service and key decision making. The "open government" page does not include relevant planning documents (such as the 2015 RTP), budgets, or route-level performance data. MART should consider adding that material and asses the following options for presenting key mode-level and route-level operating statistics on its website:

- Key route-level operating statistics can be formatted in Microsoft Word or a similar word processing tool and then saved as a static PDF file. This report can be combined with or presented separately from the similarly formatted fixed route and demand response performance metrics report.
- If possible, use of Microsoft references or strategic visual basic may allow for a more automated update of a customized dashboard template using standard data formats, reducing MART staff burden in creating a monthly public-facing performance dashboard.
- Several platforms exist for creating customizable data visualization dashboards that allow the public to interactively explore operational data.
  - **Tableau**: Most commonly used tool for transit providers that maintain a performance dashboard. Requires proficiency in SQL queries.
  - **Microsoft Power BI**: Drag and drop dashboard format that is integrated with other Microsoft software. Does not work well for complex data associations. Free version may be suitable for limited data analysis.
  - **Domo**: Selection of pre-built graphics allows for less technical staff to develop some visualizations, while more technical staff may customize more complex visualizations using SQL.

If feasible, MART should consider the option to allow download of limited raw data sets, making the data easy to access so that analysis can be included in efforts to educate the public, academic studies, or planning studies. It is recommended that MART incorporate some route-level performance information in its annual performance report, including:

- **Ridership by Stop:** This measures passengers boarding and disembarking by location. Although the prevalence of flag stops in MART's service area means that this information will not be available until MART can install the appropriate data collection systems (APC and reliable AVL), it is especially important in the context of a shifting transit market due to the COVID-19 pandemic to understand how ridership demand has changed.
- **Route Performance by Route Type:** An indication of how each MART route performs against key indicators (passengers per hour, subsidy per passenger, and farebox recovery) established by route type. This information will help educate the public about the decision-making process behind service changes. The thresholds against which routes are compared should be reevaluated after ridership has stabilized post-COVID-19 pandemic.

7. Transportation Needs

This section provides a summary of the process used to identify MART's 5-year service, capital, staffing and technological needs, as well as key opportunities for growth. Needs identified during this process were scored and prioritized as recommendations (see Chapter 8). In some cases, needs may reflect MART's long-term vision and may not be immediately feasible as recommendations during the COVID-19 pandemic or during periods of diminished local, state, or federal revenue. Other needs may serve as temporary measures intended to facilitate recovery. The strategy for classifying needs and recommendations embraces the uncertainty facing the region and the transit industry as a whole as a result of the pandemic and places each within the context of a specific recovery scenario.

7.1 Needs/Opportunities Identification Process

To identify needs, the project team held regular coordination meetings with MART technical staff. These meetings provided an opportunity to discuss performance trends observed for existing services and discuss challenges and opportunities for strategic investment to better meet the needs of the community or increase operational efficiency. In addition, targeted outreach was conducted with MART drivers, stakeholders, and members of the public. Summaries of the outreach process and findings are included in Appendix C. Driver, stakeholder, and public input was reviewed and vetted with MART staff.

The needs identified by this process reflect a time of unprecedented uncertainty in the transit industry (particularly due to the COVID-19 pandemic). Several looming questions face transit agencies across the country:

- When might system-wide ridership return to pre-pandemic levels?
- How might the transit market be permanently changed by the pandemic?
- Which user groups are going to be more or less impacted by the pandemic?
- How can new technology be used to provide mobility options in a potentially transformed transit market?
- Which fixed routes will see faster recovery and which ones will see a slower recovery?
- Will the pandemic drive increased sprawl as people seek larger houses with home offices, more space for at-home child education, and yard space?

The answers to these questions, and ones like them, will be determined by broad driving forces largely outside of the control of MART, such as national economic policy, unemployment rates, education policy, availability of funding for capital investments, and municipal land use plans. However, MART can plan for contingencies based on how the future might unfold and in so doing be prepared for multiple potential scenarios.

7.2 Recovery Scenarios

In order to address this uncertainty, this analysis defines three qualitative ridership scenarios to sketch out the future of transit demand in three potential futures through 2025. These include a high-ridership scenario, a medium-ridership scenario, and a low-ridership scenario (explored more below). Each identified need was categorized as either a core need or a ridership-dependent need. Core needs are those that MART is likely to face regardless of ridership or economic recovery and typically includes capital items such as regular maintenance, fleet replacement, and technology solutions needed to keep up with changing industry standards and

customer expectations. Although core needs are expected to be addressed within the 5-year planning horizon regardless of ridership, the exact implementation strategies and timing are dependent on available funding and should provide administrative flexibility to pair with or pivot off of other ridership-dependent needs and recommendations. For example, while fleet replacement is a core need, the exact procurement schedules should be cognizant of potential fleet impacts of ridership-dependent service change recommendations.

7.2.1 High-Ridership Scenario

The high ridership scenario is defined as a return to 86 percent or more of 2019 levels. This scenario imagines the transit needs associated with a relatively well-recovered and stable economy precipitated by the following possible conditions:

- There is an effective vaccine developed and widely available.
- There is continued federal support for small businesses and state and local governments to reduce layoffs resulting from the pandemic and prevent further reductions in staffing due to lagging consumer spending and tax receipts.
- There is federal support to transit agencies to fill any budget gaps resulting from reduced fare revenue, reduced state and local tax support, and increased costs associated with cleaning and installation of personal protective equipment.

As a result of this successful vaccination development and distribution effort, and/or ongoing federal support, we would expect to see ridership rise to levels similar to 2019. Specific aspects of this return of ridership demand include the following:

- Educational institutions, including FSU, resume with primarily in-person classes, though it is likely that distance learning is likely to comprise a larger share of course offerings than observed before the pandemic.
- MBTA commuter rail ridership and service levels returns to pre-pandemic conditions.
- Restaurants and non-essential businesses open with strong sales.
- Unemployment drops to 2019 levels, with people traveling to work on transit, and in particular service-sector workers who depend on transit for mobility.

Importantly, the high-ridership scenario does not envision ridership rising above where it was before the pandemic, but rather envisions a return to ridership at roughly the same levels seen in 2019.

7.2.2 Medium-Ridership Scenario

The medium-ridership scenario imagines a future in which ridership recovers somewhat from its lowest level in 2020 but has not fully recovered. This scenario may be characterized by stable ridership between 60 and 85 percent of 2019 levels or by a less predictable or volatile ridership that precludes either a “low” or high” ridership scenario. This scenario would envision the following conditions:

- The COVID-19 vaccine is slow to be developed, has limited effectiveness, has distribution problems, or has low-uptake due to public skepticism about its safety. While many people would be vaccinated, this lack of widespread immunization (herd immunity) means that many are still reluctant to be in public spaces.
- Federal support for small businesses and laid off workers is modest, and state and local governments are forced to reduce services and lay off staff due to funding shortfalls.

While some economic activity returns as portions of the population are vaccinated and return to pre-pandemic activities, unemployment still remains substantially higher than in 2019.

- Transit agencies see some additional direct federal aid that prevents the deepest cuts in transit service. Lifeline service on suburban and rural routes is maintained with modest route consolidation or restructuring seen on some low-performing routes.

As a result of this middling performance on vaccination development and economic support, the transit market remains depressed. Some specific transit market impacts are:

- There is a moderate return of student activity on the FSU campus.
- Some area schools return to in-person instruction while others continue virtually or on a hybrid schedule.
- MBTA commuter rail service runs at full-service levels, although commuter ridership may remain somewhat depressed.
- Riders most sensitive to the risks of the pandemic (seniors, people with pre-existing conditions) rely more on demand response transit, which is more expensive to provide than fixed route services.
- Unemployment remains somewhat high and travel to service-sector places of work is depressed, reducing overall ridership.

These factors interact to produce a scenario where there is some rebound from the lows of spring 2020 but keep overall system ridership below 2019 numbers.

7.2.3 Low-Ridership Scenario

The low-ridership scenario is defined as ridership that remains below 60 percent of 2019 levels. This scenario imagines a future where the transit market is compromised and transit demand plateaus at or near ridership levels seen post-pandemic.

Some parts of MART's service area may experience recovery at different rates than others. For example, routes that support essential services, jobs, or populations with limited travel options may experience higher and quicker ridership recovery than routes better characterized as providing leisure travel. Identified needs that are specific to a particular route or service reflect the recovery scenario most appropriate for that particular route or service.

7.3 List of 2021–2025 Needs/Growth Opportunities

Table 21 summarizes the needs that were identified through this process, the rationale for the need, and identifies each need as either a core need, or a need specific to one of the three assumed recovery scenarios. The primary sources that helped to define each need are noted in the table, but needs may be more broadly supported by groups and agencies not listed.

Table 21. Needs by Recovery Scenario

Description of Need	Source	Rationale	Scenario
Reduced gap in early evening service between fixed route and JARC service	Survey, Staff	Fitchburg/Leominster fixed routes run until 5:30 PM to 7:30 PM and JARC service begins at 9:00 PM	Core Need

Description of Need	Source	Rationale	Scenario
Alternate delivery modes that can reduce costs of less productive services	Stakeholders	Demand response or microtransit zones where feasible can reduce costs, provide more flexible service.	Low Ridership
Consolidation of less productive services	Staff	Route 11, MWCC, and Wachusett Shuttle operate in similar areas and may be more productive as a single frequent route.	Low Ridership
Extended evening hours at Whitney Field Mall	Stakeholder, public request	Current schedules do not accommodate shift close.	High Ridership
Coordinated services between MART and WRTA	Staff, Survey	Worcester is second most requested destination after Boston, Clinton is exploring dual member city status, WRTA identifies similar goal.	High Ridership
Coordinated services between MART and LRTA	Staff	MBTA Commuter Rail in Littleton does not offer easy connections to Littleton activity centers or LRTA services area, Low ridership on Littleton-Westford shuttle.	High Ridership
Fleet replacement, including better customer recognition of fixed route vehicles	Staff, Drivers	MOU target to meet TAM Plan replacement benchmarks. Customers are missing connections when mistaking small vehicles for demand response.	Core Need
Automated passenger counters	Staff	More streamlined and automated performance reporting.	Core Need
Bike storage	Stakeholder	Customer requests.	High Ridership
More targeted performance metrics for regional routes	Staff	Better decision-making that accounts for variety of different route purposes.	Core Need
Enhanced performance management system	RTA Task Force, MassDOT	Management and decision-making based on data and performance; provides accountability and transparency.	Core Need
Coordinated transit and land use planning.	Staff, Stakeholder	Modifying service to accommodate a new land use is costly and often not feasible given large service area geography.	Core Need
Increased marketing.	Stakeholder	Expand awareness of transit service information among potential customers.	Core Need

In addition to the above needs, many survey respondents also identified a need for expanded Sunday service. However contractual agreements regarding overtime pay, which effectively doubles the costs associated with Sunday service, preclude a recommendation for Sunday services within a financially constrained plan.

8. Recommendations

The recommendations for this 5-year plan reflect a data-driven process that takes into account historical operational data, stakeholder input, industry best practices, Commonwealth-wide goals, and RTA priorities. Specific recommendations were developed to address each identified need, then scored and prioritized to reflect appropriate recovery scenario assumptions, cost and complexity of implementation, and potential impact. These recommendations provide a framework for pursuing strategic service changes, capital enhancements, and policy approaches to ensure the best mobility options for the region's residents.

8.1 Guiding Principles

Despite the uncertainty facing the transit industry due to the COVID-19 pandemic, several guiding principles remain steadfast despite the shifting transit landscape. These guiding principles must be considered as MART's needs are analyzed and recommendations are made.

- **Safety:** One of MART's primary responsibilities is ensuring the safety of its customers and employees. This includes consideration of not only operational and traffic safety, but also, as underscored by the pandemic, a focus on health and hygiene of its vehicles and facilities.
- **Customer Experience:** A high-quality customer experience begins when a customer searches for transit information or books a demand response trip and includes all interactions with MART facilities, vehicles, and staff from waiting for a bus, to the ride itself, and any last mile needs.
- **Equity Considerations/Title VI**: Recommendations must avoid, minimize, or mitigate disproportionately high adverse effects on minority or low income populations; ensure full and fair participation of affected communities in the decision-making process; and prevent the denial, reduction, or delay in the receipt of benefits by minority and low-income populations
- **Fiscal Responsibility:** MART's service plans and fare policies are financially constrained based on available state and federal resources. Recommendations seek to maximize the value of each dollar spent on MART services.
- **Environmental Stewardship**: MART is committed to environmental stewardship both in helping as many riders as possible reduce their carbon footprint and through consideration of lower emission technologies across its fleet and facilities.
- **Regional Land Use and Economic Development Goals:** MART service changes and capital investment should be consistent with regional planning efforts.

8.2 Scoring

Scoring is based on two categories, complexity of implementation (described in Figure 30) and presumed impact of the recommendation (described in Figure 31). Scores for each category are relative to the recommendation (route-based or community-specific or system-wide) and will be presented as high, medium, or low.

Factors used to assess the complexity of implementation include:

- Capital and/or operating costs
- Contractual obligations (union issues, need for more operators, third party limitations)

- Technology or logistical concerns
- Political or board challenges
- Coordination with other agencies

Figure 30. Recommendation Complexity Thresholds

Low	Medium	High
Easier to implement with very little costs or barriers to do so.	Either a low cost but several barriers or a mid-high cost but no other barriers.	Significant costs to implement with several barriers such as internal needs/issues, political challenges, and/or coordination with others.

Factors used to assess the potential impacts of recommendations include:

- Number of riders or potential riders that would benefit
- Environmental Benefits
- Benefits to equity or inclusion of environmental - justice communities
- Communities and businesses
- Operational

Figure 31. Recommendation Impact Thresholds

Low	Medium	High
Would most likely go unnoticed by riders but would have an impact.	Would impact only a segment of riders on the route or system.	Large benefit to everyone.

Complexity scores were assigned a value of 1, 2, or 3 from high to low, while impacts were assigned a value of 1, 2, or 3 from low to high, such that total scores range from 2 (high complexity and low impact) to 6 (low complexity and high impact).

8.3 Recommendations Overview

Table 22 summarizes the recommendations designed to meet each need, as well as its complexity and impact score. Further detail and staging considerations are provided in the following sections.

Table 22. Recommendations

Need	Recommendation	Complexity	Impact	Score
Reduced gap in early evening service between fixed route and JARC	Extend JARC service span by 1 hour to begin at 8:00 PM	Low	Mid	5
Alternate service delivery modes	Transition Devens Regional shuttle from fixed route to on-demand.	Mid	Low	3
	Utilize on-demand/microtransit zone for last mile connections around Wachusett Station, for example Great Wolf Lodge, businesses along Authority Drive, and Regional Vocation Center.	Mid	Low	3
Consolidation of less productive services	Consider opportunities to consolidate Intercity/MWCC, Wachusett Shuttle, Route 5, and/or Route 11 patterns.	Low	Low	4
Extended evening hours at Whitney Field Mall	Extend evening service on Route 2/9 with an evening routing that detours to the mall at Whitney Field.	Mid	Low	3
Coordinated services between MART and WRTA	Coordinate with WRTA to provide a timed transfer in Clinton.	Mid	Mid	4
	Coordinate with WRTA to pursue a shared-operation or shared-cost agreement for a one-seat Fitchburg/Clinton/Worcester express service.	High	High	4
Coordinated services between MART and LRTA	Establish timed transfers between Littleton Westford Shuttle and LRTA services. Locations such as Groton could be utilized as a timed transfer location.	Mid	Low	3
Fleet replacement, including better customer recognition of fixed route vehicles	Continue to replace aging vehicles as they exceed useful life benchmarks, following TAM Plan schedule. Vehicle replacement should include transition to cutaway fleet.	Mid	Mid	4
Automated passenger counters	Install APC on large bus routes. Transition smaller bus routes to APC in conjunction with vehicle replacement.	Mid	Low	3
Bike storage	Explore third-party vendor arrangements to provide secure bike storage at ITC.	Mid	Low	3

Need	Recommendation	Complexity	Impact	Score
More targeted performance metrics for regional routes	Develop different service benchmarks for regional route level reporting as well as thresholds and corrective actions for under-performing routes.	Low	Low	4
Enhanced performance management system	Identify technology-driven data tools and key performance metrics to establish an improved enterprise-wide data-driven management and decision-making framework. Implement a public-facing and transparent performance reporting mechanism.	Mid	Low	3
Coordinated transit and land use planning	Designate MART staff liaison who can provide planning assistance/coordination to with other stakeholders.	Low	Low	4
Increased marketing	Develop targeted marketing of new and under-performing services utilizing “new media” sources that focus on potential ridership markets.	Low	Low	4
	Pursue collaborative marketing initiative for MART and Twin Cities Rail Trail.	Low	Low	4

8.3.1 Service Recommendations

This section provides additional detail regarding service-related recommendations. In some cases, recommendations are grouped where they represent a choice between multiple options or where alignment and scheduling recommendations may be paired for a more streamlined roll-out.

8.3.1.1 Extend JARC Service

The recommendation that stands out as providing the most potential impact with the lowest complexity (Score=5) is an extension of JARC service beginning at 8:00 PM Currently, JARC service (a demand response taxi service for evening trips) begins at 9:00 PM, while fixed routes in Fitchburg and Leominster begin to taper off starting at 5:30 PM, with Routes 1, 3, and 5 running as late as 7:30 PM This leaves a 90-minute service gap for riders in traditionally productive parts of the service area and a 3-hour service gap in the northern half of Fitchburg. Customers (including survey respondents) often request an extension of fixed route services later in the day, but attempts by MART to meet this demand using fixed route have not been productive. However, MART's previous adjustment of JARC service (from starting at 10:00 PM to starting at 9:00 PM) was well received by customers. JARC remains a relatively low-cost service with ridership productivity similar to MART's fixed routes.

The addition of 1 hour of early evening JARC service is identified as a core need because it addresses an early evening gap in coverage between fixed route service and the current JARC service and is likely to be used for essential travel regardless of recovery conditions. This is recommended for an early year implementation as it is one of the highest scoring service improvement alternatives and as it has the potential to help facilitate recovery by providing essential trips for those most effected by the COVID-19 pandemic. In addition, the knowledge that there is a viable option for return trips if a customer misses the last fixed route bus may help to build ridership levels during the day on MART fixed routes.

8.3.1.2 Service to Worcester

Two recommendation options address the need for connections between the MART and WRTA service areas. The first option would be to pursue a timed transfer with a WRTA fixed route in Clinton or vicinity. A second option would be to provide a single service offering a one-seat ride between Fitchburg, Clinton, and Worcester. Either option presents a reasonably effective solution (Score=4) and can be selected based on short-term ridership recovery and opportunities for collaboration. It is not anticipated both recommendations would be pursued simultaneously.

Implementation of a seamless one-seat service has the potential to produce more new ridership, especially if implemented as a commuter or express service. The costs of a long-haul service from Fitchburg to Worcester would be relatively high with higher costs associated with a more frequent, accessible, or comfortable trip. Costs could be reduced through collaboration with WRTA, for example through a joint operation agreement or cost sharing formula.

Another cost-saving measure would be to instead operate a shorter local route to the Clinton, Sterling, or Lancaster area. Trips to Worcester would then require a transfer to a new WRTA service from a shared stop. Customer experience would be dependent on coordinated timing of transfers and open communication between the agencies in the event of delayed trips. An effective partnership presents its own administrative and logistical complexities.

Either option would provide customers with an affordable travel option between Fitchburg and Worcester, compared to current transit options, which are either high cost or involve circuitous routing with a transfer in Boston. Clinton (a WRTA member city) is exploring the possibility of

dual membership with MART, and the towns of Sterling and Lancaster have expressed interest in the planning process.

8.3.1.3 Devens Regional Shuttle

Another short-term (low-ridership scenario) recommendation is to formally transition the Devens regional shuttle, which was developed in partnership with local partners and employers, to a demand response or microtransit service. This change has already been implemented as a temporary measure during the 2020 pandemic. Issues that the fixed route Devens service change is intended to address include:

- Lowest ridership productivity among all MART fixed routes (1.26 passengers per revenue hour in FY 2019).
- Nashoba Valley Medical shift changes no longer align with routes schedule.
- Terminus of the fixed route requires a three-quarter mile ADA paratransit zone that extends outside the service area.
- Temporary workforce in Devens/Ayer results in shifting trip demand that is difficult to serve with fixed route.

MART has already transitioned this service to demand response (taxi) as a temporary COVID-19-related service change, and productivity has increased as a result. This recommendation would formalize the change as a more permanent cost saving measure that would address the low ridership productivity on this route even before the effects of the pandemic. Although the recommendation represents a reduction in service costs, it scored as “Mid” level complexity (Score=3) due to political concerns in making this change permanent. The town of Ayer has expressed a desire for the return of its previous service levels.

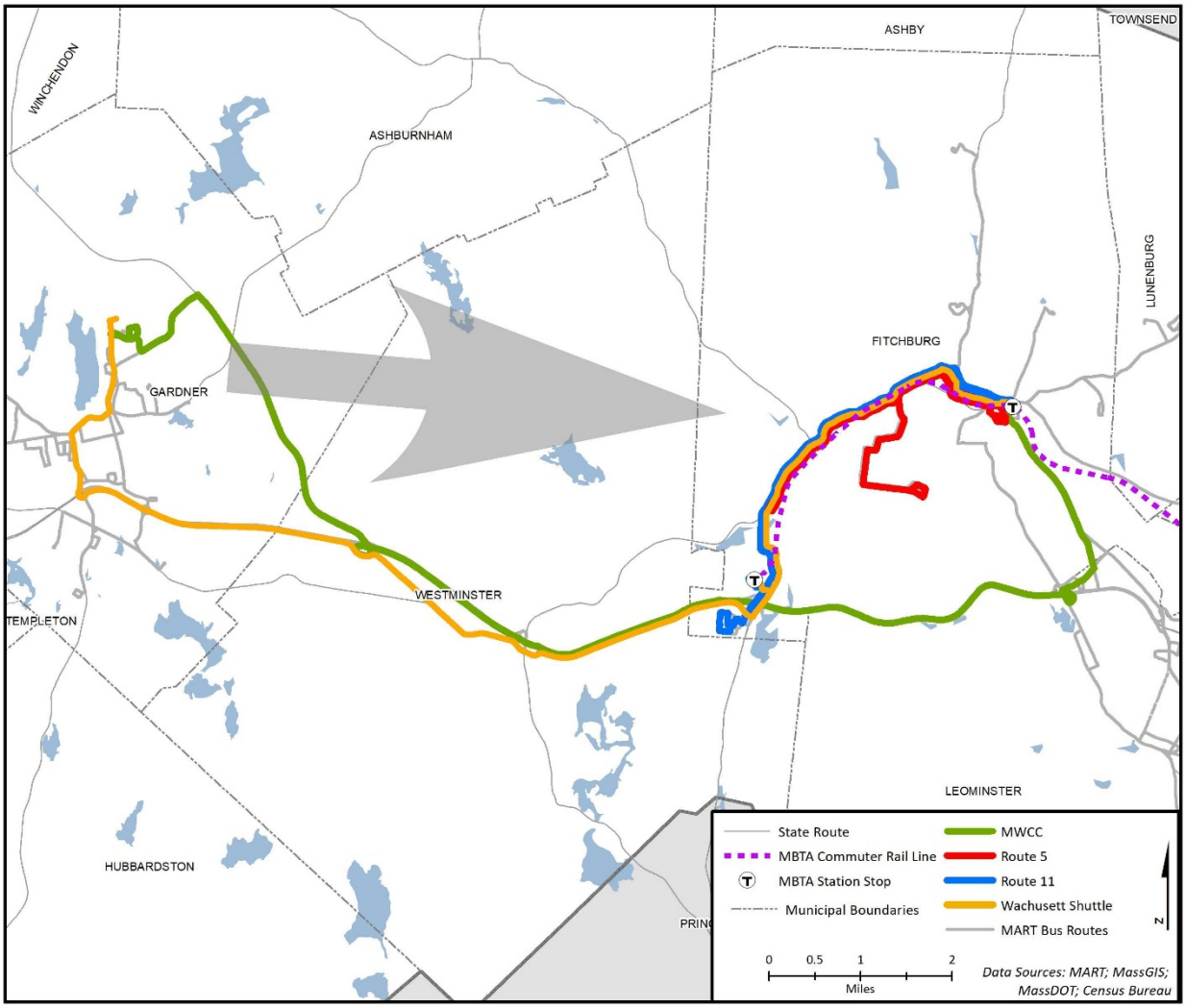
Note that while this recommendation is intended for the low-ridership scenario, Demand response service may continue to be an appropriate solution for this area for several years and the early time frame for this 5-year plan. If ridership rebounds to the point where fixed route services make sense for Devens and/or Ayer, MART can utilize the origin/destination data from the demand response service to inform a fixed route that better meets the communities’ needs than the existing Devens Regional Shuttle.

8.3.1.4 Consolidated Gardner to Fitchburg Services

Several of MART’s services including Route 5, Route 11, the Intercity/MWCC, and Wachusett Shuttle provide similar east-west connections between Gardner, Westminster, and Fitchburg, as shown in Figure 32. The Intercity/MWCC approaches Fitchburg ITC via Massachusetts Route 2 and Water Street, in order to connect the MWCC Campus in Gardner with the Leominster campus. Prior to the pandemic, Route 11 and Route 5 paralleled the MBTA commuter shuttle with service along River Street with Route 11 connecting at Wachusett Station to the Wachusett Shuttle for trips to Gardner. In response to reduced ridership during the pandemic, Route 11 has been suspended and the Wachusett Shuttle extended along River Street to the Fitchburg ITC for all trips rather than just select runs.

Even before depressed pandemic ridership conditions, the Intercity/MWCC served 3.58 passengers per revenue hour in FY 2019, Wachusett shuttle served 1.44, and Route 11 served 2.07. MART should continue to monitor these routes and stop level boarding to identify opportunities for cost savings, supplemented schedules, and/or coordinated marketing of interrelated services.

Figure 32. Consolidate Gardner to Fitchburg Services



In the event that streamlining of these services may take the form of a more frequent express trips between key regional destinations, MART could utilize a new demand response or microtransit zone that would mitigate impacts to less productive and difficult to serve mid-route stops. For example, when MBTA ridership returns, a microtransit zone could serve the Wachusett MBTA station area encompassing Great Wolf Lodge, the Montachusett Regional Vocation Center, and employers located along Authority Drive. Although a new service, microtransit could represent a cost savings where it allows consolidation of multiple fixed routes.

Phasing of this package of recommendations makes most sense in mid years, or upon a moderate level of ridership recovery. MART has already made temporary service reductions to the Route 11 and Wachusett Shuttle, so the streamlining of services could occur as a way to transition out of those temporary measures. Demand response services should reflect a return of activity to the Wachusett Station, Great Wolf Lodge, and/or local businesses.

8.3.1.5 Evening Service to Whitney Field Mall

Several riders and stakeholders have identified a need for later evening service to Whitney Field Mall to provide a later transit option for employees working a close shift. However, evening extension of Route 3, which serves the Mall, would prompt a similar extension of hours for Routes 1 and 5 due to current interlining and circulation patterns. Outside of the mall, these routes do not serve land uses that typically warrant later evening service.

Instead, it is recommended that the span of service for Routes 2/9 be extended to approximately 8:00 PM. A slight route adjustment for Route 9 evening runs would be needed to connect passengers to the Mall. Runs on Route 9 earlier in the day would continue using the current configuration while the Mall is serviced by Route 3. After 8:00 PM it is anticipated that any trips from the Mall could be accommodated by the extension of Fitchburg JARC service (see Section 8.3.1.1).

8.3.1.6 Coordinated Services with LRTA

The Little-Westford Shuttle is temporarily suspended during the COVID-19 pandemic due to limited ridership as area employers shifted to remote work options and MBTA commuter rail activity declined. As ridership recovers enough to warrant reinstatement of the Littleton Westford Shuttle, MART should explore route and schedule adjustments to facilitate timed transfers for connections to the LRTA service area.

The function of this route can be expanded to serve travel needs beyond those of MBTA rail commuters. Two new apartment complexes in Westford and continued growth in Littleton warrant exploring the potential for transit connections between Littleton and Westford independent of commuter rail schedules.

In addition, new service options could be explored that connect Fitchburg to Lowell with a possible timed transfer in Groton.

8.3.2 Capital Recommendations

This section describes recommendations for capital improvements or purchases.

8.3.2.1 Vehicle Replacement/Expansion

MART has established reasonable vehicle replacement guidelines through its TAM Plan. Follow through of the TAM Plan will result in a need to replace a portion of MART's fleet each year as vehicles reach the end of their useful life. In addition, new in-service vehicles and spares may be required to implement new services to Worcester or Clinton. The process of regular vehicle replacement affords an opportunity to adjust the current fleet mix of vehicle types to better meet MART's needs.

MART is interested in transitioning its fleet to include a larger mix of low-floor cutaway vehicles. This change can help address several issues and inefficiencies:

- Lower operations and maintenance costs compared to larger vehicles.
- Improved travel times and on time performance by removing the need for lift deployment for mobility limited passengers.
- Easier to maneuver compared to larger vehicles.
- Some customers have missed trips due to failure to flag down routes utilizing vans, which are difficult to distinguish from paratransit service.

MART has already begun the process of replacing its large vehicles with cutaways as appropriate. The RTA was recently awarded a $4.5 million discretionary federal grant, which will be used to replace 10 of its large capacity vehicles with 5 new large capacity and 16 new low floor cutaway vehicles. Future years should focus on replacement of fixed route vans (in use on Route 11, Athol-Orange Shuttle, Athol Link, Winchendon Link, and Wachusett Shuttle) with similar cutaway vehicles. All cutaways will be "painted" in the style of the larger buses and include destination signs, bike racks, and full fareboxes to help passengers identify them as a fixed route vehicle.

8.3.2.2 Automated Passenger Counters

APC systems can offer several benefits, including more streamlined data collection and reporting processes, ridership data consistency, and elimination of a potential source of distraction for drivers. MART should pursue installation of APC systems across its fixed routes over the 5-year plan timeline. As of October 2020 MART has made significant progress toward this goal and has included a request for proposal for the installation of APC systems on its FY 2021 docket.

8.3.3 Administrative Recommendations

This section describes administrative or organizational recommendations.

8.3.3.1 Bike Storage

Stakeholders have expressed a need for more secure bike storage at Fitchburg ITC. Construction is currently underway for the Twin Cities Rail Trail, which will offer a wide bike trail parallel to Main Street between the ITC in Fitchburg and Monument Square in Leominster. Better accommodation of cyclists can help provide first and last mile connections for passengers and can alleviate unnecessary baggage on MART vehicles. MART has previously studied bike storage options and determined that in-house solutions were too cost prohibitive. However, MART should explore vendor arrangements, to determine whether a third party may be able to provide secure bike storage at the ITC.

8.3.3.2 Staff Liaison for Planning Initiatives

This recommendation would establish a formal MART staff liaison who is responsible for coordination with MassDOT and town planners. This position would:

- Provide technical assistance or plan review as needed to help towns assess the ability of transit to serve proposed high-density or social service-oriented developments.
- Manage MART's priority list of collaborative capital improvement projects, including desired locations for transit priority treatment and bus stop pull-outs.
- Collaborate with MassDOT and towns to pursue creative financing strategies for capital improvement projects, including pursuit of federal or state grant support or local cost sharing agreements.

These responsibilities are likely to comprise less than a full-time employee and may already be informally performed in house. The intention of this recommendation is not to hire additional staff, but rather to establish a single point of contact and demonstrate planning support capabilities for other local jurisdictions and decision makers.

8.3.3.3 Marketing

Table 22 identifies two recommendations related to MART's marketing strategies. The first is to establish a more targeted marketing campaign for MART's new, modified, or underperforming routes. In particular, new services to Worcester, consolidation of Gardner to Fitchburg Routes, a repurposing of the Littleton Commuter Shuttle as an inter-regional connector, and the extension of JARC services all present opportunities to relaunch these services under a cohesive MART system brand. While it is important to maintain separate local, regional, and commuter service route designations as an internal data tracking strategy, too much distinction of services on public facing information can be overwhelming for the less initiated transit consumer. Easily accessible maps and schedules that summarize the variety of transit resources in an area allow

the rider to feel more informed about transit choices and more secure in the availability of a return trip. New marketing initiatives should build upon the following strategies:

- Expand on previous media efforts by including more online or social media marketing.
- Coordinate a unified rollout for new services with route-level and system mapping, schedule adjustments, website alerts, and Google GTFS feed updates to ensure consistent information across platforms.
- Schedule a periodic review of website information and Google transit assignments to verify accuracy of customer facing information.
- Educate lost riders regarding new health and hygiene protocols.
- Market benefits of Devens Regional Shuttle as a flexible demand response service.
- Include JARC service information noted as a “guaranteed ride home” on all Fitchburg/Leominster routes and schedules.
- Pursue collaborative marketing materials for WRTA or LRTA timed connections (two-system route information and transfer policies that can be accessed from either RTA’s website).

The second marketing recommendation is to collaborate with the Twin Cities Rail Trail in marketing efforts for the new trail. It is anticipated that this effort would be led by Twin Cities Rail Trail. MART’s role would be to provide shapefiles, route information, or transit-specific bike policies and initiatives to help trail advocates present a seamless trail-to-transit network.

Appendix A Illustrative FY 2015–FY 2019 Performance Results and Peer Review

To provide historical context for MART performance since the 2015 RTP was completed, this appendix provides information on MART system-wide performance for fixed route and demand response modes for FY 2015 through FY 2019. (FY 2020 and FY 2021 results are covered under the Bilateral MART/MassDOT MOU discussed in Chapter 6.) A brief performance comparison with peer transit systems is also provided below.

FY 2015 to FY 2019 Performance Evaluation

Service Effectiveness

Service effectiveness describes the amount of service utilized per unit of transit service provided. Service effectiveness is measured based on two indicators: passengers per mile and passengers per hour. Service effectiveness by route is summarized in Table 23. As shown, MART bus routes tend to generate fewer passengers per revenue mile compared to 1.42 for Massachusetts RTAs and 3.46 nationally. By revenue hour, the highest performing MART Route, F/L Route 4, generated 25.65 passengers per revenue hour in FY 2019, compared to 18.98 among Massachusetts RTAs and 28.9 nationally. Because of the wide differences between MART's student routes, other local routes, and intercity routes, it would be helpful to develop more specific performance thresholds (specific to individual routes or route types) to help evaluate a particular route's performance relative to expectations (see Chapter 6).

Table 23. Fixed Route Productivity (FY 2019)

Route	Passengers/Mile	Passengers/Hour
F/L Routes 1 and 3	0.76	10.60
F/L Routes 2 and 9	1.14	16.47
F/L Route 4	2.77	25.65
F/L Route 5	0.78	11.56
F/L Routes 6 and 7	0.76	9.45
F/L Route 8	0.44	5.36
F/L Route 11	0.12	2.07
Gardner Routes 1 and 2	0.47	7.14
Athol-Orange Shuttle	0.25	5.23
Littleton-Westford Commuter Shuttle	0.07	1.51
Intercity/MWCC	0.16	3.58
Wachusett Shuttle	0.05	1.44
Devens Regional Shuttle	0.06	1.26
Athol Link	0.12	2.88
Winchendon Link	0.10	2.49

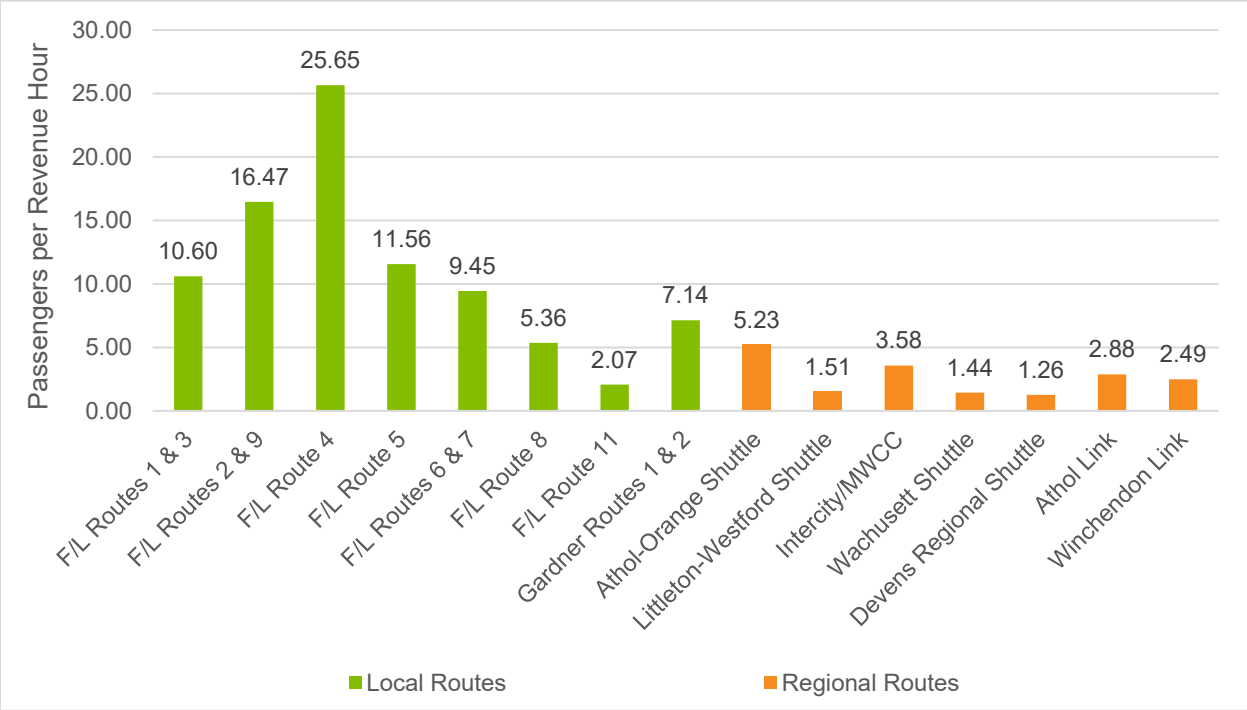
Route	Passengers/Mile	Passengers/Hour
Massachusetts Average*	**1.37**	**18.39**
National Average	**2.26**	**27.21**

Source: MART, NTD, 2018

** Massachusetts average excludes MBTA.*

Figure 33 illustrates productivity per revenue hour for fixed routes. As shown, Route 4 was MART's highest performing route in FY 2019.

Figure 33. Fixed Route Passengers per Revenue Hour (FY 2019)



Source: MART

Among demand response services, the JARC program is one of the most productive, both in terms of passengers per hour and passengers per mile. Other services with higher passenger per hour productivity are the Westminster ADA, the F/L ADA/DAR, and the Gardner ADA/DAR programs.

Table 24. Demand Response Productivity (FY 2019)

Service	Passengers/Mile	Passengers/Hour
F/L Job Access Reverse Commute	0.23	5.58
Boston Shuttle	0.04	1.03
Worcester Shuttle	0.09	2.42
F/L ADA/DAR	0.18	2.93
F/L Subscription	0.12	2.44

Service	Passengers/Mile	Passengers/Hour
Gardner ADA/DAR	0.09	2.65
Gardner Subscription	0.08	1.93
Westminster ADA	0.16	4.28
Athol ADA	0.24	0.24*
Dial-a-MART	0.18	3.17
HST	0.09	1.93
Massachusetts Average**	**0.15**	**2.13**
National Average	**0.13**	**1.97**

Source: MART, NTD, 2018

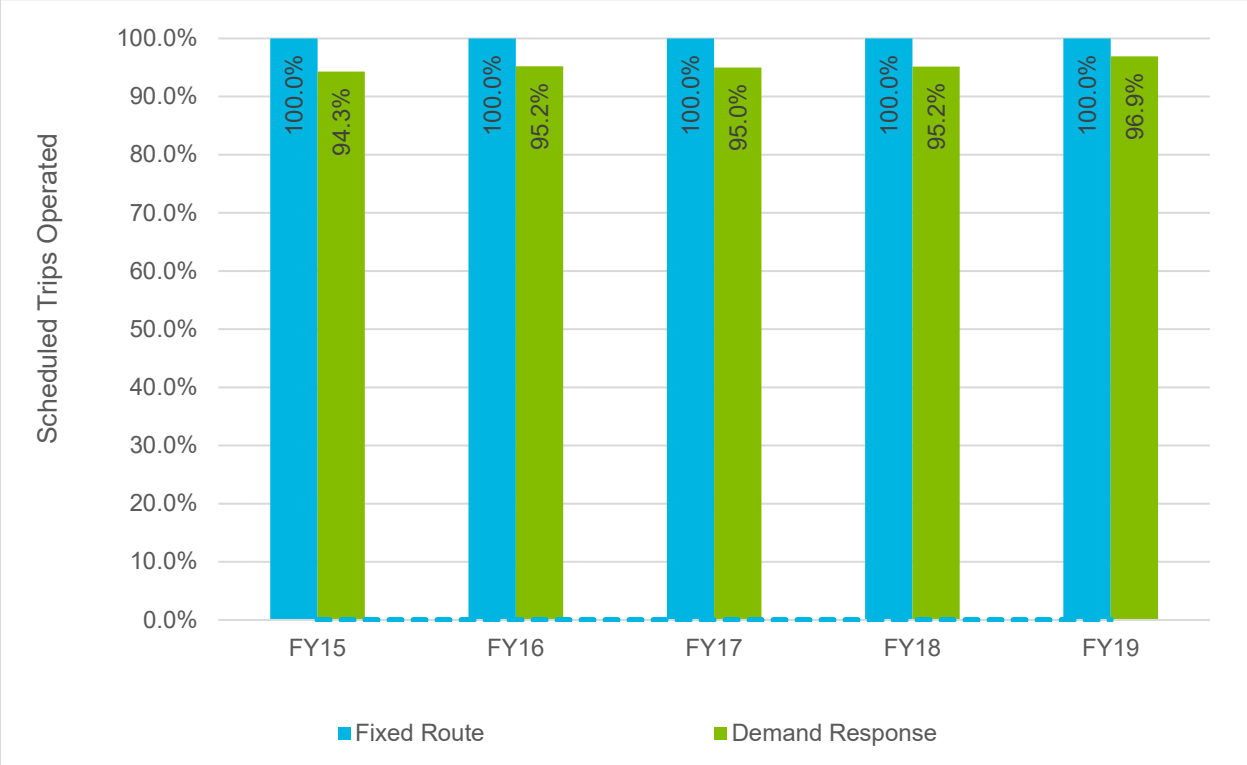
**Potential database error shows identical revenue miles and revenue hours for Athol ADA.*

***Massachusetts average excludes MBTA, CCRTA, and MART.*

Customer Service and Satisfaction

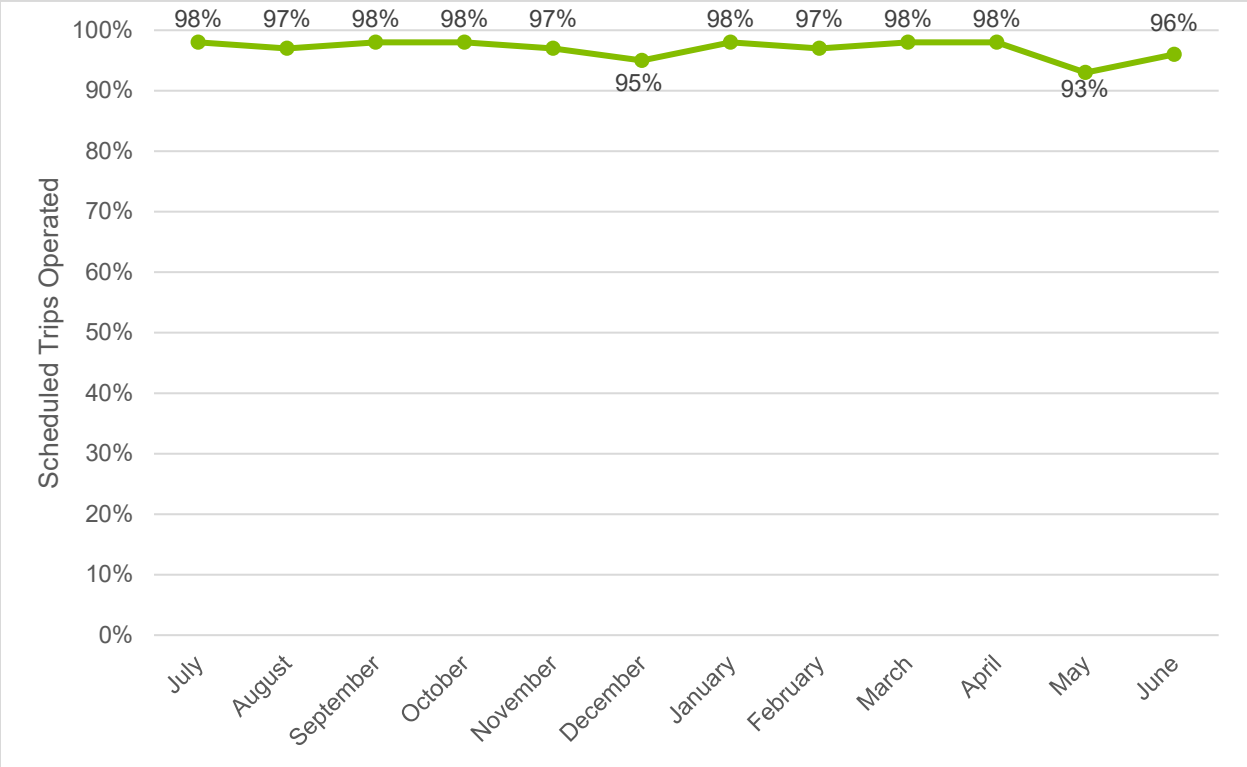
Figure 34 shows the percentage of scheduled trips that operated each year from FY 2015 to FY 2019. Demand response schedule adherence generally improved through FY 2019. As shown on Figure 35, FY 2019 demand response schedule adherence was often between 97 and 99 percent, but lower performance in May and December lowered the average.

Figure 34. Scheduled Trips Operated by Mode (FY 2015–FY 2019)



Source: MassDOT, RTA Service Report

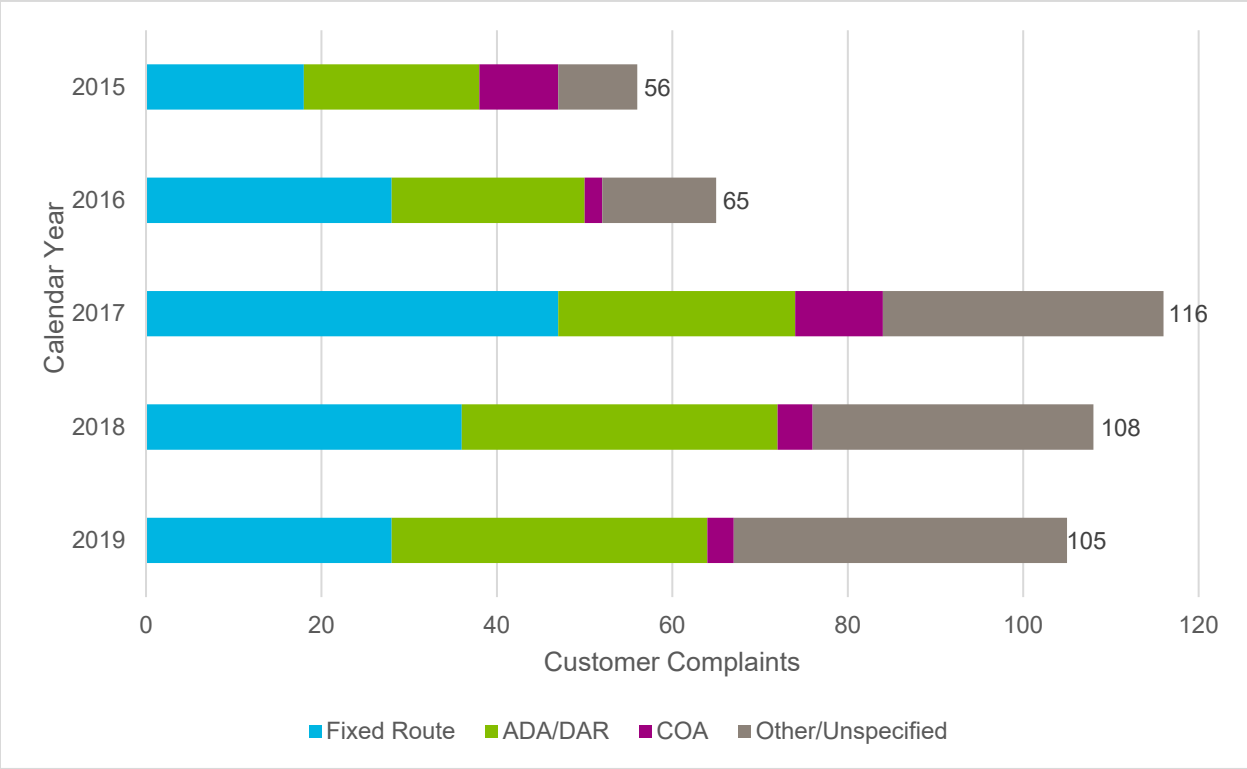
Figure 35. FY 2019 Demand Response Schedule Adherence by Month



Source: MassDOT, RTA Service Report

MART began tracking customer service call wait times (system-wide) in FY 2018. The average answer speed in FY 2018 was 1 minute and 19 seconds and in FY 2019 was 1 minute 32 seconds. MART also tracks customer complaints by date and, when feasible, service type, as summarized on Figure 36. Complaints (across all service types) spiked in FY 2017 but decreased in FY 2018 and FY 2019.

Figure 36. Customer Complaints (2015–2019)



Source: MART

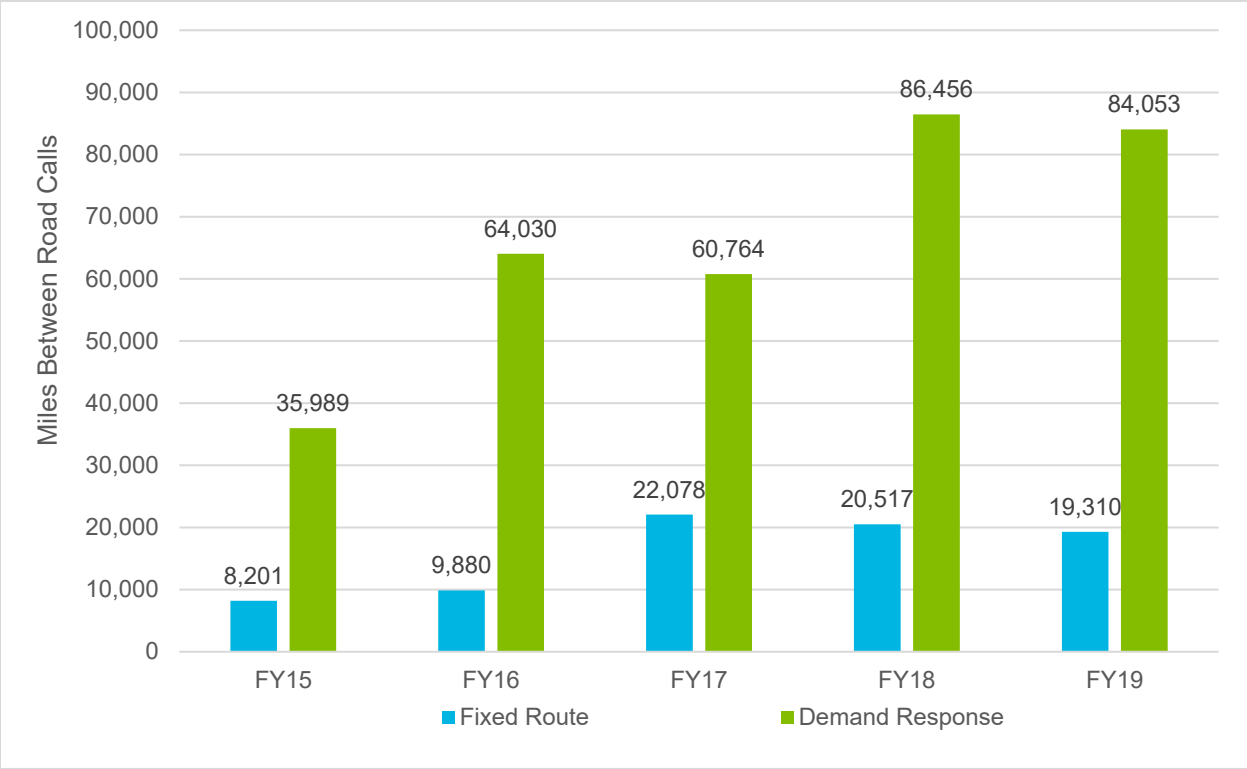
Asset Management

Information regarding MART's fleet and facilities, including TERM rating and ULB, are documented in Section 4.3. The following section describes MART performance across several uniformly reported metrics related to asset maintenance and operational safety. Consistently reported data such as these can help to document historical trends and may be useful if incorporated into MART's performance monitoring framework.

The average mileage between road calls for FY 2015 to FY 2019 are shown on Figure 37. This information helps categorize the maintenance needs of MART's existing fleet. As shown, fixed route vehicles required servicing ("road calls") approximately every 8,000 miles or more, while demand response vehicle went 36,000 or more before needing a road call. Performance is generally better across the last 3 years (FY 2017 to FY 2019) than it was for FY 2015 and FY 2016, for both modes.

Figure 38 summarizes preventable accidents by mode. As shown, there were consistently seven to nine preventable accidents on fixed routes each year. Demand response showed more noticeable change, with strong improvement in FY 2017 and then reverting to the mean in FY 2018 and FY 2019.

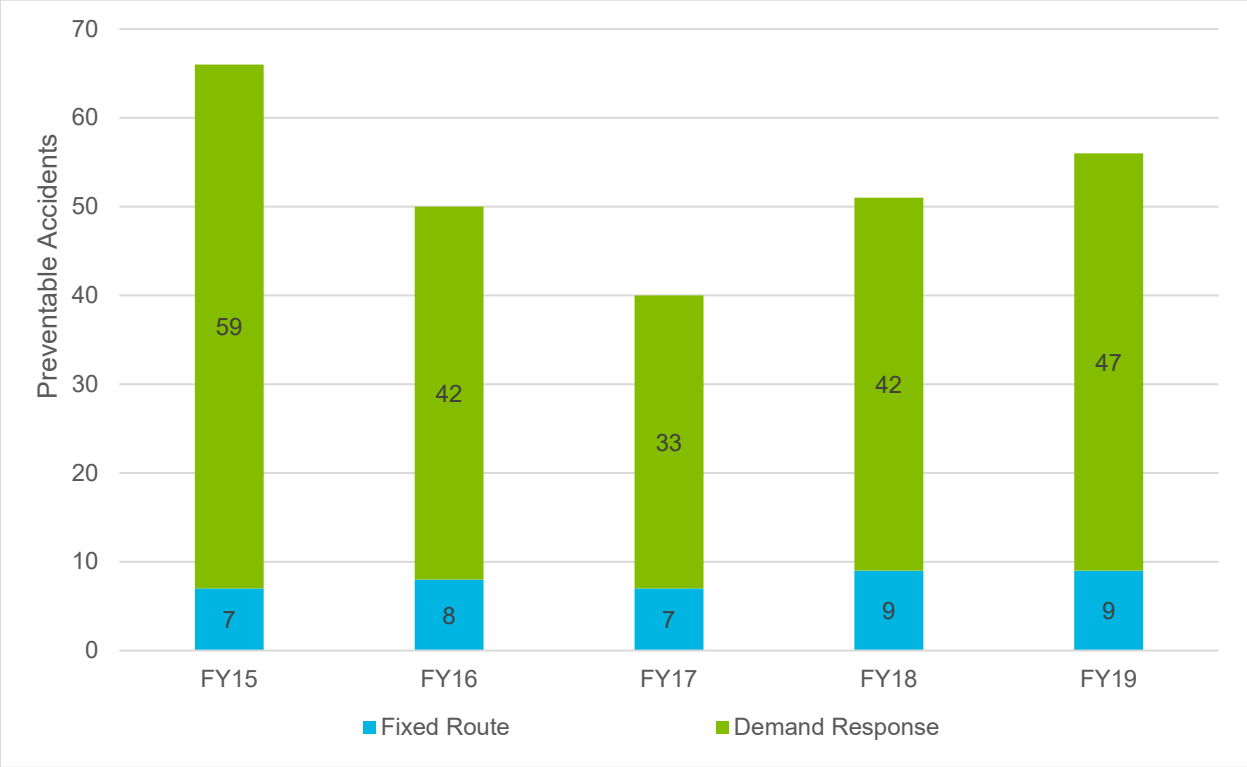
Figure 37. Average Mileage Between Road Calls (FY 2015–FY 2019)



Source: MassDOT, RTA Service Reports, FY 2015-FY 2019

Note: Demand response taxi removed due to insufficient data.

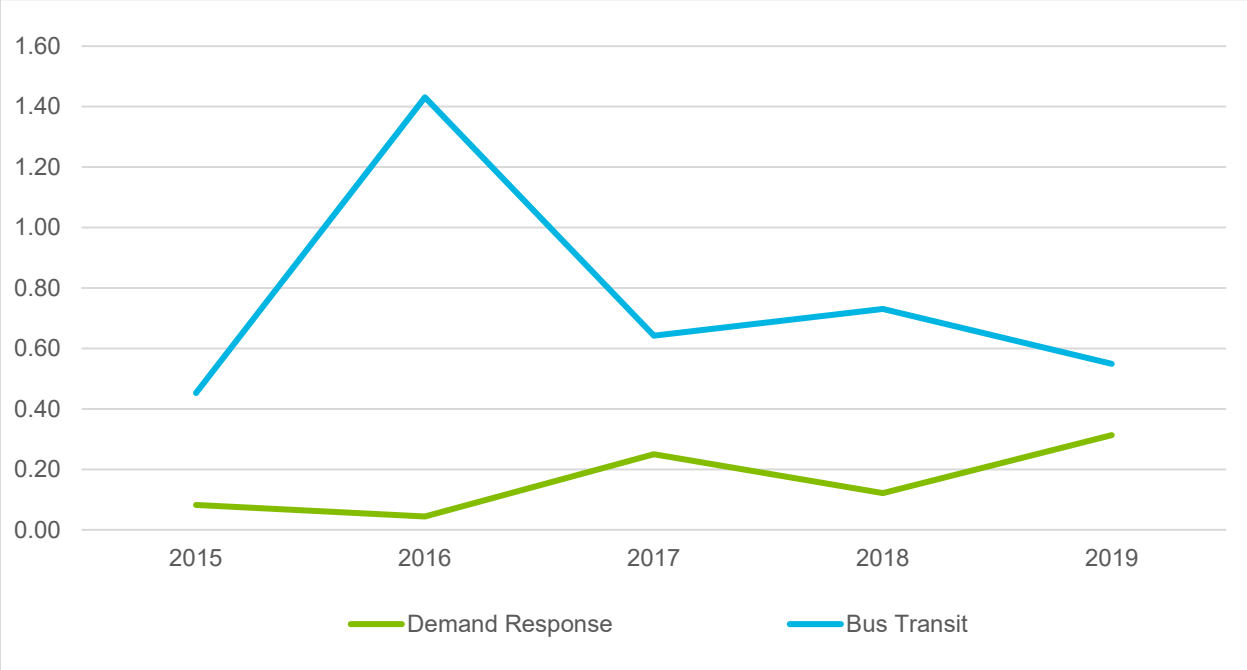
Figure 38. Preventable Accidents (FY 2015–FY 2019)



Source: MassDOT, FY 2015 to FY 2019 RTA Service Reports

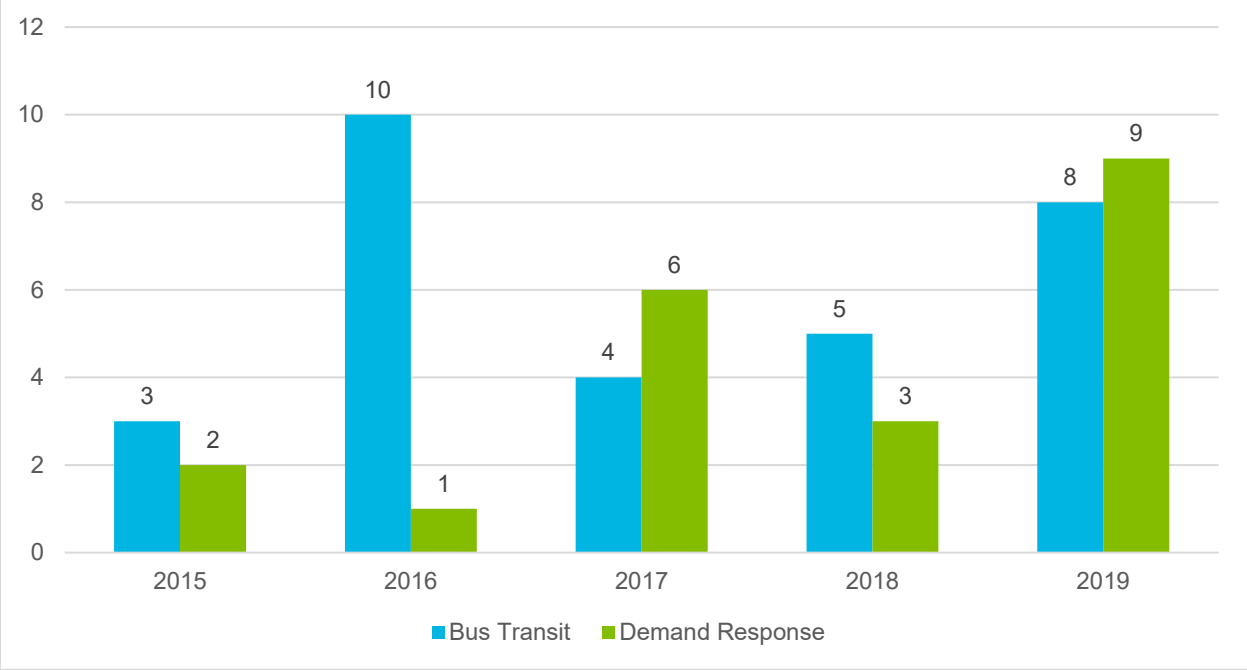
Historical accident and injury rates are presented on Figure 39 and Figure 40, respectively. Safety events occur approximately every 500,000 miles for demand response and usually every 150,000 miles for fixed routes, with the exception of FY 2017, which brought a higher accident rate for fixed route services. The total number of NTD-reported injuries involving fixed route and demand response services ranged from 5 in FY 2015 to 17 in FY 2019. No fatalities occurred between 2015 and 2019.

Figure 39. NTD Reported Safety Events per 100,000 Vehicle Revenue Miles (2015–2019)



Source: NTD, 2015-2019

Figure 40. NTD Reported Injuries by Mode (2015–2019)



Source: NTD, 2015-2019

Financial Performance

Cost effectiveness measures the effectiveness of the system from a financial standpoint – how well the dollars put into the system are being used to produce trips. The cost effectiveness indicators are cost per passenger, cost per mile, cost per hour, farebox recovery, and subsidy per passenger. MART does not allocate operating costs by route or by service. As a result, financial performance metrics are calculated by mode for FY 2015 through FY 2019.

As shown in Table 25, unit costs for MART fixed routes increased steadily through FY 2018 (though still below national averages) and then declined in FY 2019 with the uptick in service levels (see Tables 7 and 8 in Section 4.2). Conversely, demand response service levels were reduced in 2019, and as a result, costs per unit of service continued increasing as shown in Table 26.

Table 25. Fixed Route Financial Efficiency (FY 2015–FY 2019)

Year	Cost/ Mile	Cost/ Hour	Cost/ Passenger	Subsidy/ Passenger	Farebox Recovery
FY 2015	$7.44	$116.67	$6.86	$6.03	12.1%
FY 2016	$7.73	$121.04	$7.80	$6.85	12.2%
FY 2017	$8.39	$121.71	$9.26	$8.04	13.2%
FY 2018	$8.81	$132.13	$11.22	$9.86	12.1%
FY 2019	$6.36	$103.39	$10.78	$9.42	12.6%
FY 2018 Massachusetts Average*	**$7.24**	**$97.20**	**$5.29**	**$4.47**	**15.4%**
FY 2018 National Average	**$11.15**	**$133.99**	**$4.92**	**$3.83**	**22.1%**

Source: NTD, 2015 - 2018

**Massachusetts average excludes MBTA.*

Table 26. Demand Response Financial Efficiency (FY 2015–FY 2019)

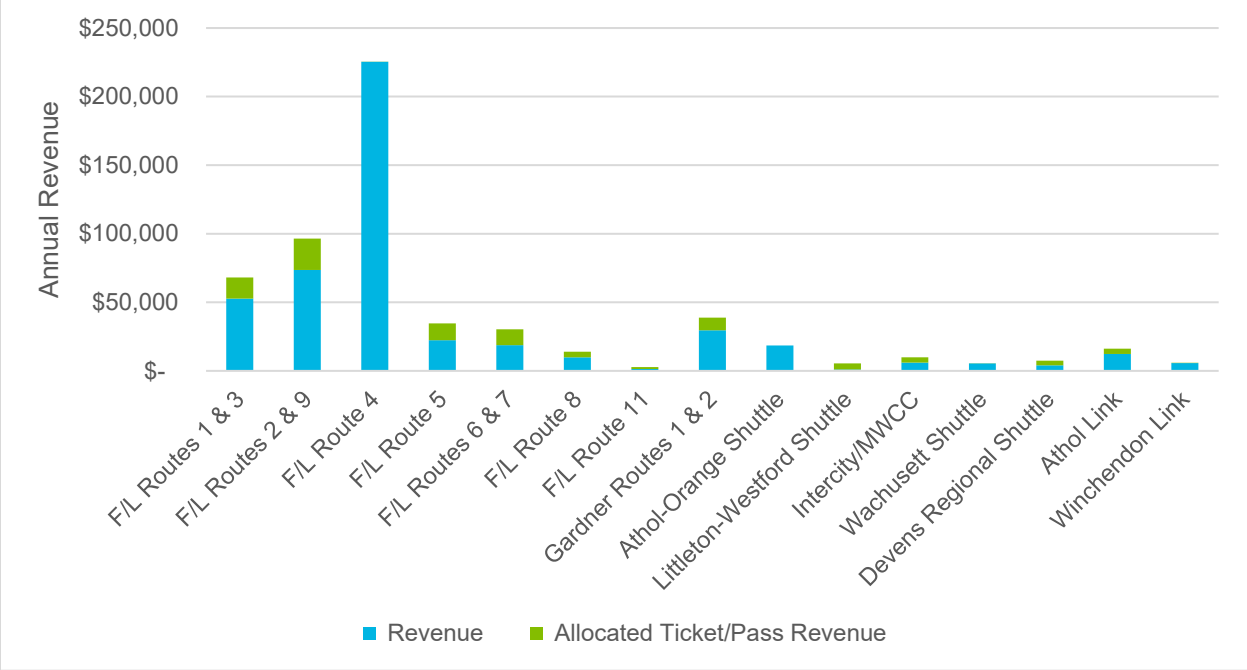
Route	Cost/ Mile	Cost/ Hour	Cost/ Passenger	Subsidy/ Passenger	Farebox Recovery
FY 2015	$4.36	$62.26	$23.70	$15.49	34.6%
FY 2016	$4.53	$68.05	$25.69	$15.46	39.8%
FY 2017	$4.40	$68.10	$27.18	$17.45	35.8%
FY 2018	$4.34	$65.99	$27.85	$18.17	34.8%
FY 2019	$4.91	$73.20	$31.61	$21.70	31.3%
FY 2018 Massachusetts Average*	**$4.38**	**$59.86**	**$28.28**	**$25.95**	**8.3%**
FY 2018 National Average	**$4.33**	**$64.93**	**$32.92**	**$30.46**	**7.5%**

Source: NTD

**Massachusetts average excludes MBTA, CCRTA, and MART.*

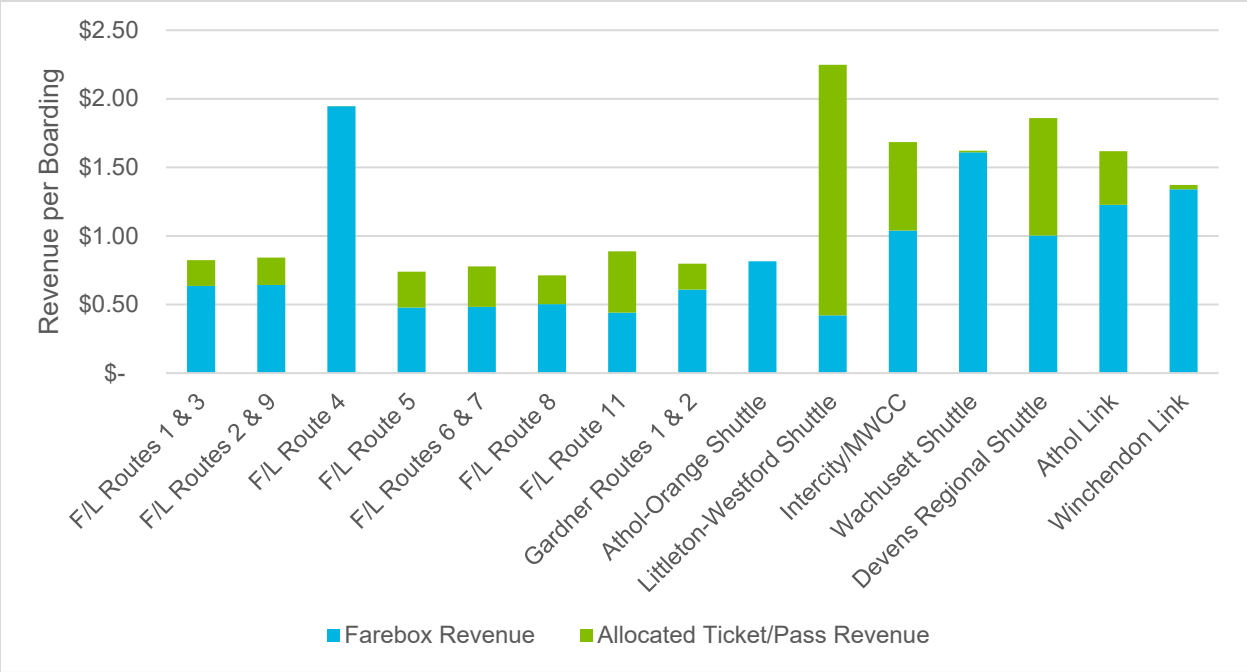
An assessment of fare revenue for MART fixed routes merges the individual line farebox receipts and contract revenues (which are reported by route) with ticket and pass sales (which are recorded by geography/jurisdiction). Unallocated ticket and pass sales were distributed among routes serving the designated location, proportional to the percentage of boardings that used a ticket or pass. Annual revenue by route, including assumed allocation of ticket and pass revenue, is shown on Figure 41. Figure 42 shows the calculated revenue generated per boarding on a particular fixed route. Route 4 to FSU is a no-fare route that is paid for by supplemental contract revenue from FSU. All local costs associated with the Route 4, FSU supplemental shuttles and ADA service within ¾ mile of the Route 4 are covered in full through the fixed cost contract. After Route 4, the highest revenues come from Route 2 and 9. The Littleton-Westford shuttle had a large proportion of pass and ticket riders and is estimated to generate the highest fare per boarding after pass revenue allocation.

Figure 41. Fixed Route Revenue (FY 2019)



Source: MART

Figure 42. Fixed Route Revenue per Boarding (FY 2019)



Source: MART

Peer Evaluation

As part of the CRTP update, a peer review was prepared to gain an understanding of how other similar systems are operating transit service. This peer review explores five transit properties that operate in similar conditions. Although each transit system and route is unique, the similarities and differences in these five peers provide useful insight into how transit service is provided and operated throughout the country.

Peers were chosen using iNTD,[27] which assigns transit agencies across the country and their service areas with likeness scores for demographic and service metrics summarized in Table 27 and Table 28, respectively. After excluding outliers (transit properties with two or more characteristics that widely differed from MART), iNTD's overall likeness score was used to rank peers and select the top five.

Table 27. Peer Systems Census Data (FY 2018)

System	Town	State	Population Density	Percent Poverty
Southeastern Regional Transit Authority	New Bedford	MA	2,707	16.4%
Blue Water Area Transportation Commission	Port Huron	MI	1,418	18.4%
Greater Roanoke Transit Company	Roanoke	VA	1,732	13.4%
Greater Peoria Mass Transit District	Peoria	IL	1,838	14.6%
Stark Area Regional Transit Authority	Canton	OH	1,669	15.0%

[27] For more information on the iNTD process, visit https://www.ftis.org/urban_iNTD.aspx.

System	Town	State	Population Density	Percent Poverty
Montachusett Regional Transit Authority	**Fitchburg**	**MA**	**1,826**	**14.1%**

Source: iNTD, 2018

Table 28. Peer Systems Operating Data

System	Ridership	% Miles Demand Response	Operating Budget	Revenue Miles Operated	Revenue Hours Operated	Farebox Revenue
Southeastern Regional Transit Authority	2,706,197	26%	$17,782,116	2,095,348	158,568	$2,378,967
Blue Water Area Transportation Commission	1,607,591	83%	$12,497,008	2,969,909	187,401	$3,860,974
Greater Roanoke Transit Company	2,071,948	31%	$9,499,838	2,448,722	154,818	$2,036,299
Greater Peoria Mass Transit District	2,826,657	31%	$22,257,873	2,893,762	177,014	$1,907,592
Stark Area Regional Transit Authority	2,451,284	36%	$21,510,663	3,600,293	210,856	$2,237,054
Montachusett Regional Transit Authority	**933,473**	**76%**	**$16,878,132**	**3,250,559**	**212,012**	**$4,485,669**

Source: NTD, 2018

A comparison of key service metrics across peers is presented in Table 29. As shown, MART services generate fewer unlinked passenger trips per revenue mile and per revenue hour than peers. MART's cost to provide a revenue hour of service is below average among peers, but its cost per passenger is more than double peer agencies. MART's farebox recovery is the second highest among the peer group, likely due to inclusion of its demand response services in system-wide metrics.

Table 29. Peer System Performance

Peer	UPT/ Mile	UPT/ Hour	Cost/ Hour	Cost/ UPT	Subsidy/ UPT	Farebox Recovery
Southeastern Regional Transit Authority	1.29	17.07	$112.14	$6.57	$5.69	13.4%
Blue Water Area Transportation Commission	0.54	8.58	$66.69	$7.77	$5.37	30.9%
Greater Roanoke Transit Company	0.85	13.38	$61.36	$4.58	$3.60	21.4%
Greater Peoria Mass Transit District	0.98	15.97	$125.74	$7.87	$7.20	8.6%

Peer	UPT/ Mile	UPT/ Hour	Cost/ Hour	Cost/ UPT	Subsidy/ UPT	Farebox Recovery
Stark Area Regional Transit Authority	0.68	11.63	$102.02	$8.78	$7.86	10.4%
Montachusett Regional Transit Authority	**0.29**	**4.40**	**$79.61**	**$18.08**	**$13.28**	**26.6%**

Source: NTD, 2018

Appendix B Commonwealth Environmental Policies

Transportation is a leading producer of greenhouse gas emissions (GHG) in the Commonwealth, and the only sector identified through the Global Warming Solutions Act of 2006 (GWSA) with a volumetric increase in GHG emissions; meaning that any effort to reduce emissions must significantly target the transportation system. In 2008, through the passage of the GWSA, Massachusetts committed to reduce its GHG emissions by 80 percent below 1990 baseline levels by 2050. Commonwealth policies and action on environmental sustainability in the transportation sector can be summarized by a series of executive orders, regulations, and recommendations to achieve the Commonwealth's goal of reducing transportation-related emissions by 40 percent over the next 20 years,[28] helping to meet the emissions reduction goals of the GWSA.

Massachusetts is establishing an integrated climate change strategy for the Commonwealth through the implementation of Executive Order 569, which was issued in 2017 and had major elements codified in 2018.[29] It aims to develop a roadmap for climate mitigation and adaptation for the Commonwealth.

Sustainability requirements for transportation are summarized in 310 CMR 60.05,[30] where the Climate Protection and Green Economy Advisory Committee advises the Executive Office of Energy and Environmental Affairs on measures to reduce GHG emissions in accordance with the GWSA. The purpose of 310 CMR 60.05 is to assist the Commonwealth in achieving the GHG emissions reduction goals, and to establish an annually declining aggregate GHG emissions limit for MassDOT, as well as general requirements for determining aggregate transportation GHG emissions in the transportation planning process.

To be in line with this regulation, RTAs in particular must conduct comprehensive service reviews; identify service enhancements to increase passenger ridership; identify vehicle technology and operational improvements that can reduce aggregate transportation GHG emissions; and work within the MPO process to prioritize and fund GHG reduction projects and investments.

In Executive Order 579: Establishing the Commission on the Future of Transportation in the Commonwealth, the goal is to determine "how to ensure that transportation planning, forecasting, operations, and investments for the period from 2020 through 2040 can best account for likely demographic, technological, climate, and other changes in future mobility and transportation behaviors, needs and options."[31] This will be accomplished by further investigating topics such as climate and resiliency, transportation electrification, autonomous and connected vehicles, transit and mobility services, and land use and demographics.[32] In 2019, the Commission on the Future of Transportation released their report, *Choices for Stewardship: Recommendations to Meet the Transportation Future*.[33]

The report provides five recommendations with a planning horizon of year 2040. The recommendations include (1) modernizing existing transportation assets; (2) creating a 21st Century "mobility infrastructure" to prepare the Commonwealth for emerging changes in transportation technology and behavior; (3) substantially reducing GHG emissions from the transportation sector; (4) coordinating and modernizing land use, economic development, housing, and transportation policies and investment in order to support resilient and dynamic regions and communities throughout the Commonwealth; and (5) changing current

[28] https://www.mass.gov/doc/a-vision-for-the-future-of-massachusetts-regional-transit-authorities/download.
[29] https://www.mass.gov/executive-orders/no-569-establishing-an-integrated-climate-change-strategy-for-the-commonwealth.
[30] https://www.mass.gov/doc/final-regulation-4/download.
[31] https://www.mass.gov/executive-orders/no-579-establishing-the-commission-on-the-future-of-transportation-in-the.
[32] https://www.mass.gov/executive-orders/no-579-establishing-the-commission-on-the-future-of-transportation-in-the.
[33] https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download.

transportation governance and financial structures in order to better position Massachusetts for the transportation system that it needs in the next years and decades.

Appendix C Public Outreach Survey Summary

MART Public Outreach Survey

As a primary tool to gather feedback from current riders and non-riders, the AECOM team worked closely with MART staff to develop an online survey to gain a better understanding of stakeholder preferences regarding current services and elicit feedback about the desire for potential improvements or changes. The following is a summary of the survey results for the duration of the survey.

Survey Development and Publication

Through a series of bi-weekly meetings, the AECOM team and MART staff developed a detailed list of survey questions to capture an understanding of critical data, including who uses and does not use MART services; what are the incentives that drive ridership; what are the barriers to attracting more customers; and from a customer satisfaction perspective, how is MART doing. In addition, the survey included questions to measure the frequency of use, routes used, and connections to out of town shuttles. The survey was made available online in English and Spanish with an introduction question to select a language.

As a result of the COVID-19 pandemic and the required social distancing protocols mandated by the state, in-person public outreach events were cancelled and moved to a virtual platform. To drive traffic to the online survey, which was hosted on Survey Monkey, a series of email blasts urging participation were sent to an extensive list of stakeholder groups, major employers, community partners, elected officials, local chambers of commerce, and municipal website administrators. MART posted a link to the survey on its website, and a series of posts were shared and advertised on the MART Facebook page. To further drive awareness, MART also arranged to have a link to the survey posted on the Montachusett Metropolitan Planning Organization site and made survey flyers available on buses.

The survey was designed to be mobile-friendly and not require someone to be at a computer to fill it out. The survey link was accompanied by a QR code to enable a quick scan using a smart phone to direct immediately to the survey.

Online Survey

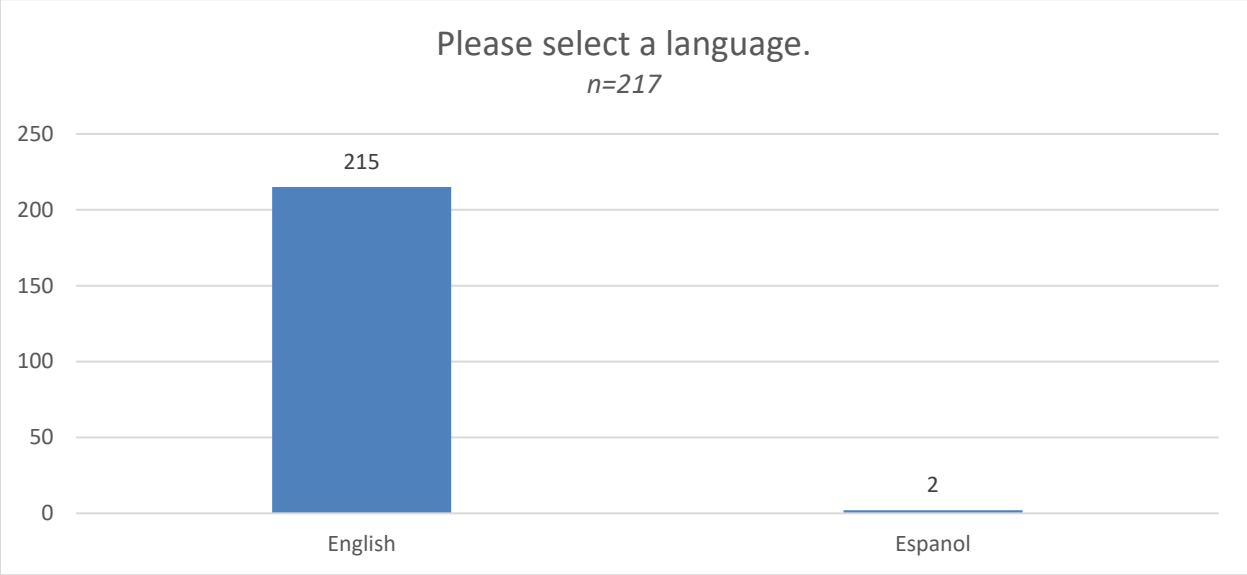
The online survey for MART opened to the public on June 9, 2020, and was open through August 7, 2020. The survey was designed to gather feedback from current MART riders and non-riders. In light of the COVID-19 pandemic, ridership decreased across all the Massachusetts RTAs, so a question was added to determine whether reductions in MART service affected riders or not. For those who indicated they use the service, a series of questions about current use of the system were also asked. For those who indicated they did not use the service, questions focused on why they do not use the service and also what it might take to attract them as riders. Not all respondents answered all of the survey questions. The percentages in all figures are based on the number of responses received for that question rather than on the total number of responses.

Responses

A total of 223 responses were collected using the online survey:

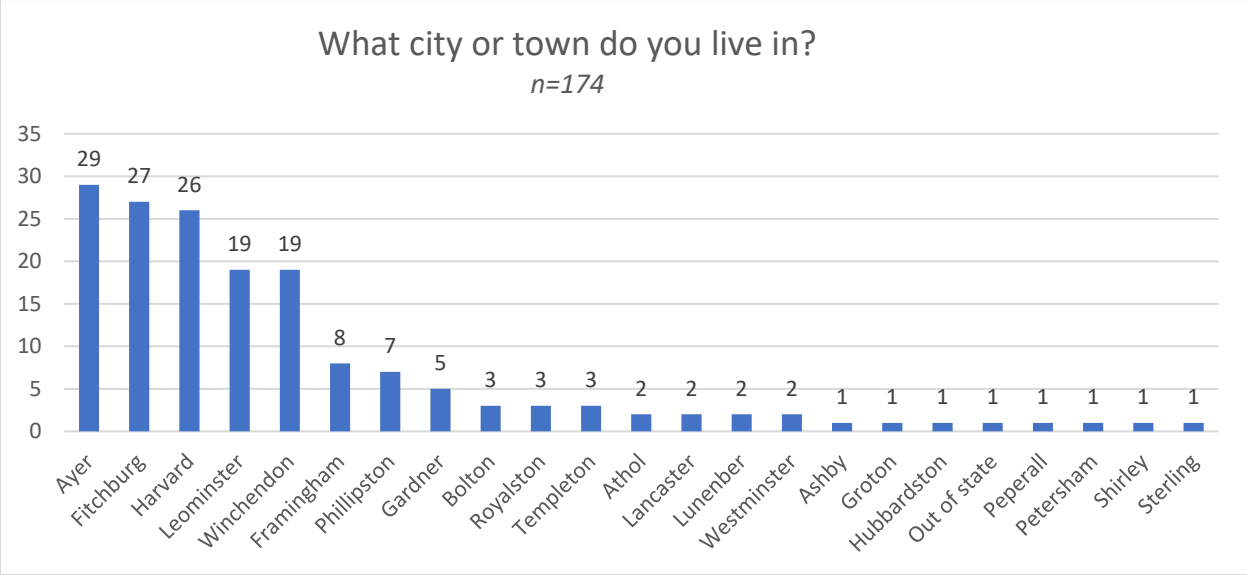
1. Please select a language: Por favor, seleccione un idioma.

A total of 215 participants selected English versus participants (92 percent) who selected Spanish.



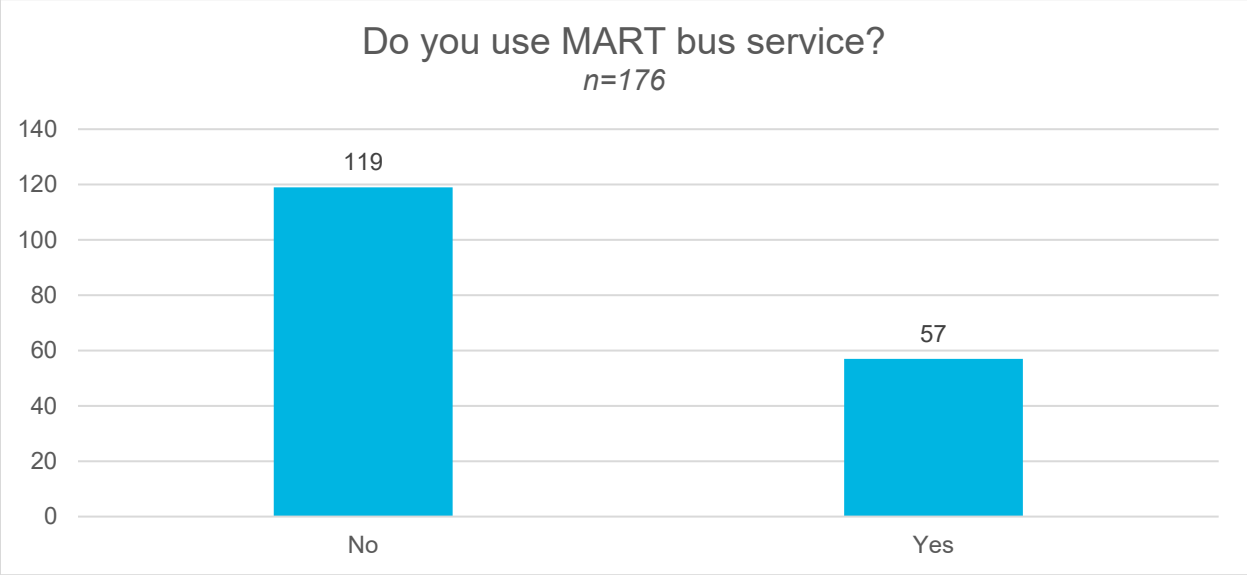
2. What City or Town do you live in?

174 respondents answered this question with 49 skipping it. Notable spikes in participation originated from Ayer, Fitchburg, Harvard, Leominster, and Winchendon. The broad number of towns represented indicates a broad geographic cross-section of respondents.



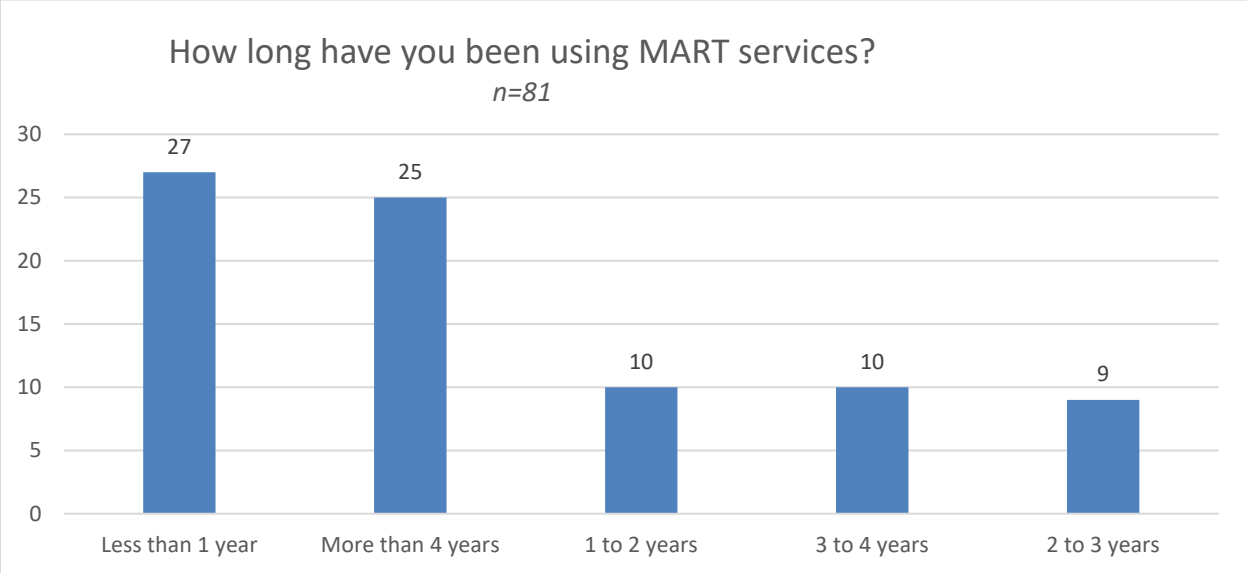
3. Do you use MART bus service?

176 respondents answered this question and 47 skipped it. Sixty-seven percent (119) selected “No” and 32 percent (57) selected “Yes.”



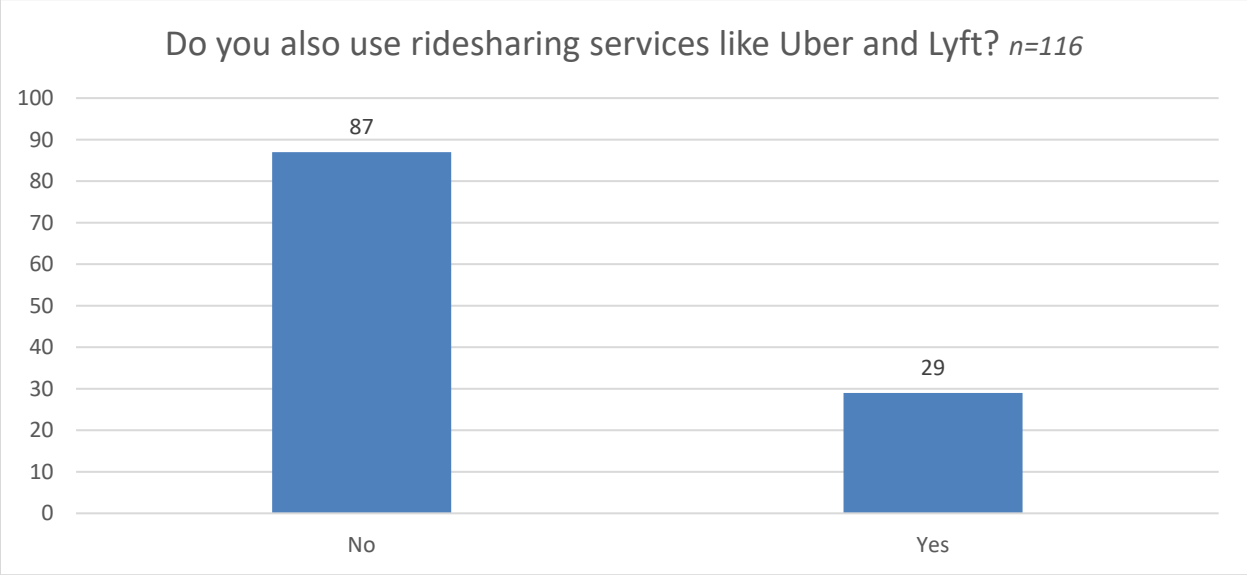
4. How long have you been using MART services?

A total of 81 respondents answered this question and 142 skipped it. Of those 81 who answered the question, 33 percent (27) have been using the service less than one year; 30 percent (25) have been using the service more than 4 years; 12 percent (10) have been using the service 1 to 2 years; 12 percent (10) have been using the service 3 to 4 years; and 11 percent (9) have been using the service 2 to 3 years.



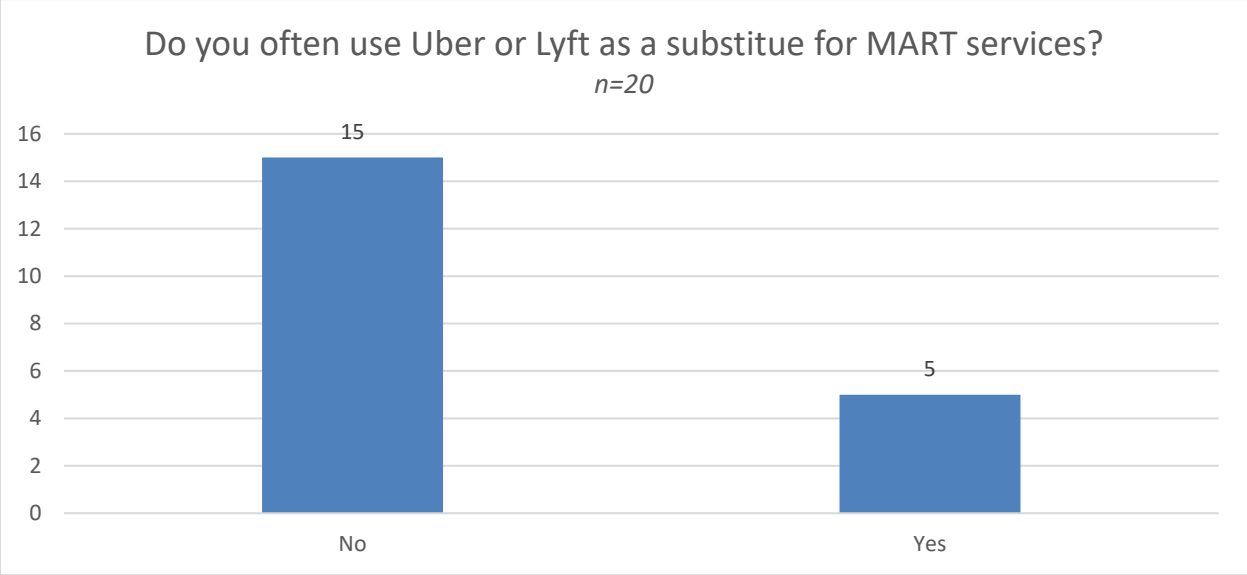
5. Do you also use ridesharing services like Uber and Lyft?

A total of 116 respondents answered this question with 107 skipping it. Among respondents, 75 percent (87) responded “No” they do not use the ridesharing services. 25 percent answered “Yes” they do use ridesharing service.



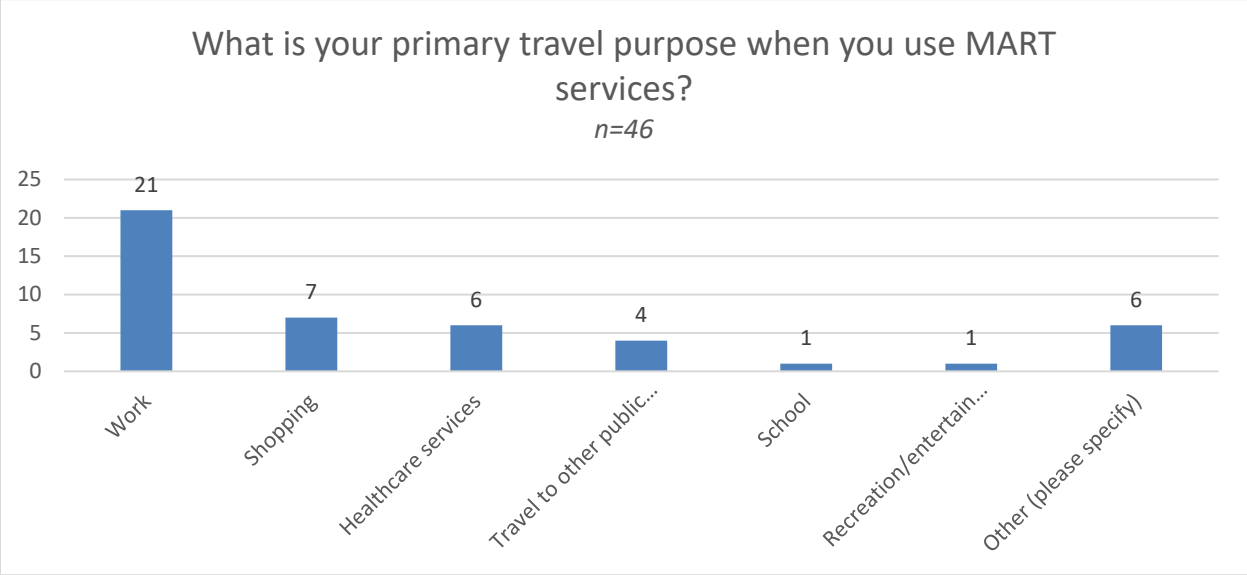
6. Do you often use Uber or Lyft as a substitute for MART service?

A total of 20 respondents answered this question and 203 skipped it. Of those 20 who answered, 75 percent (15) selected “No” they do not use Uber or Lyft as a substitute for MART. 25 percent (5) selected “Yes” they do use ridesharing as a substitute for MART.



7. What is your primary travel purpose when you use MART services?

A total of 46 respondents answered this question and 177 skipped it. Of those 46 who answered, approximately 45 percent (21) stated they use MART to get to work. Approximately 15 percent (7) use MART to get to shopping destinations. 13 percent (6) use MART to get to healthcare services. About eight percent (4) use MART services as an intermodal link to other public transportation. Two percent (1) use MART services for school and 2 percent (1) use MART for recreation/entertainment. About 13 percent (6) of those who responded selected “Other (please specify).” The specific reasons stated included shopping, healthcare, and intermodal uses.

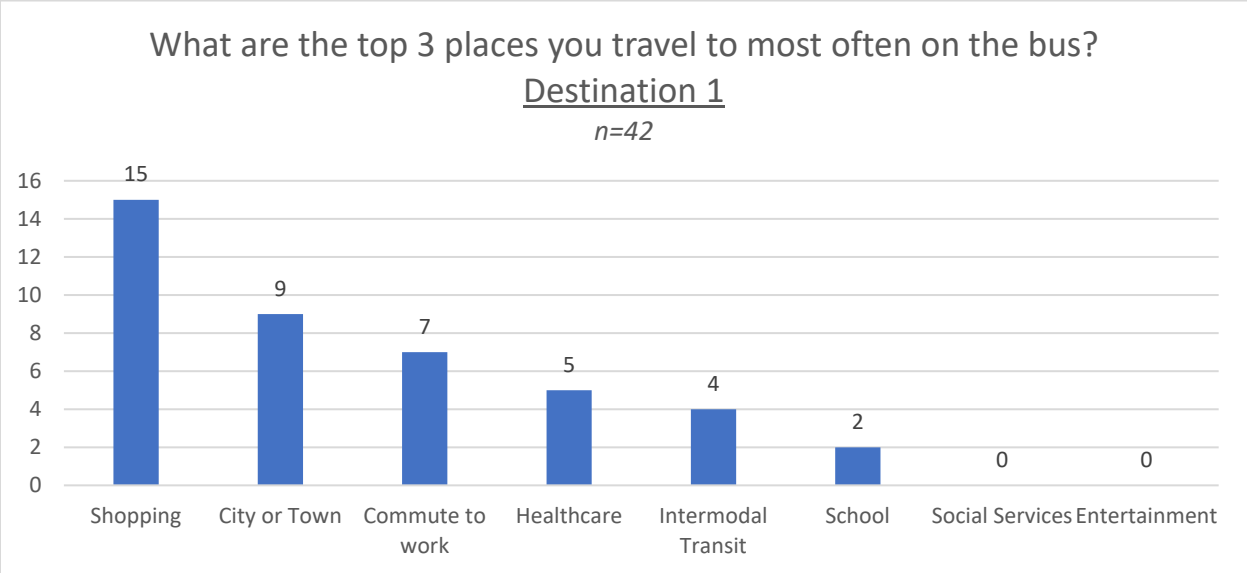


8. What are the top 3 places you travel to most often on the bus?

A total of 44 respondents answered this question and 179 skipped it. This was an open-ended question. Respondents were allowed to enter up to three destinations. Based on the assumption that most respondents would enter their top priority as "Destination 1." The data are analyzed by Destination 1, 2, and 3 below.

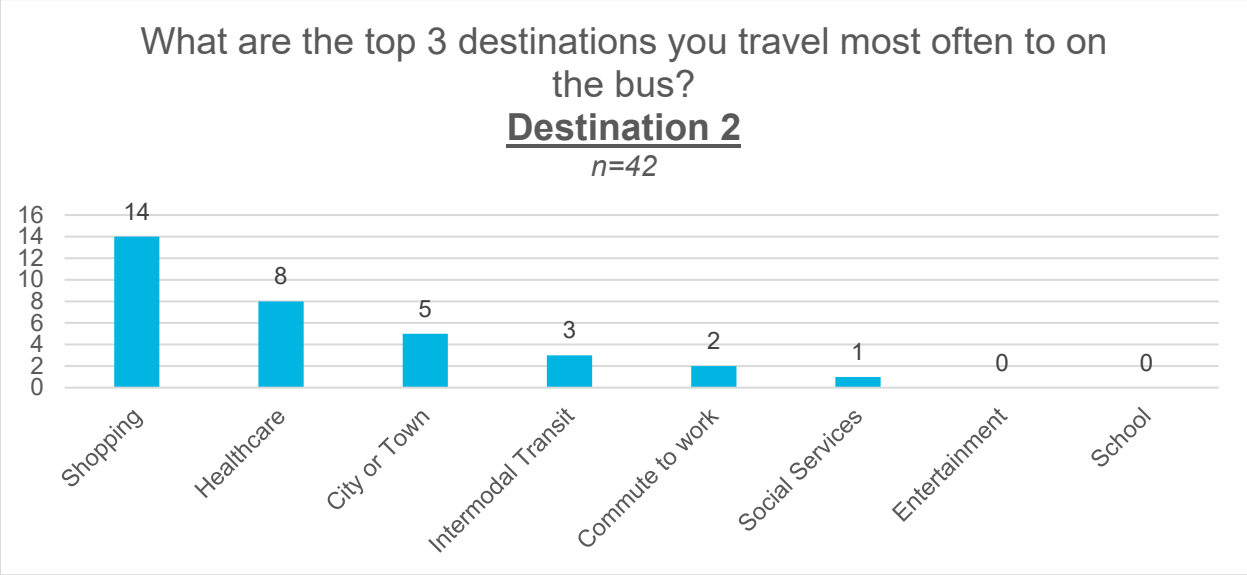
Destination 1

A total of 42 respondents participated in this category. For Destination 1, 36 percent (15) entered a shopping destination; 21 percent (9) specified a city or town; 17 percent (7) entered a work destination; 12 percent (5) entered a healthcare destination; 10 percent (4) specified a school destination; and 5 percent (2) specified school as a destination.



Destination 2

For destination 2, 33 percent (14) of respondents entered a shopping related destination; 19 percent (8) entered a healthcare related destination; 12 percent (5) entered a city or town; 7 percent (3) entered an intermodal transit destination; 5 percent (2) entered a work commute; and 2 percent (1) entered a social services destination.

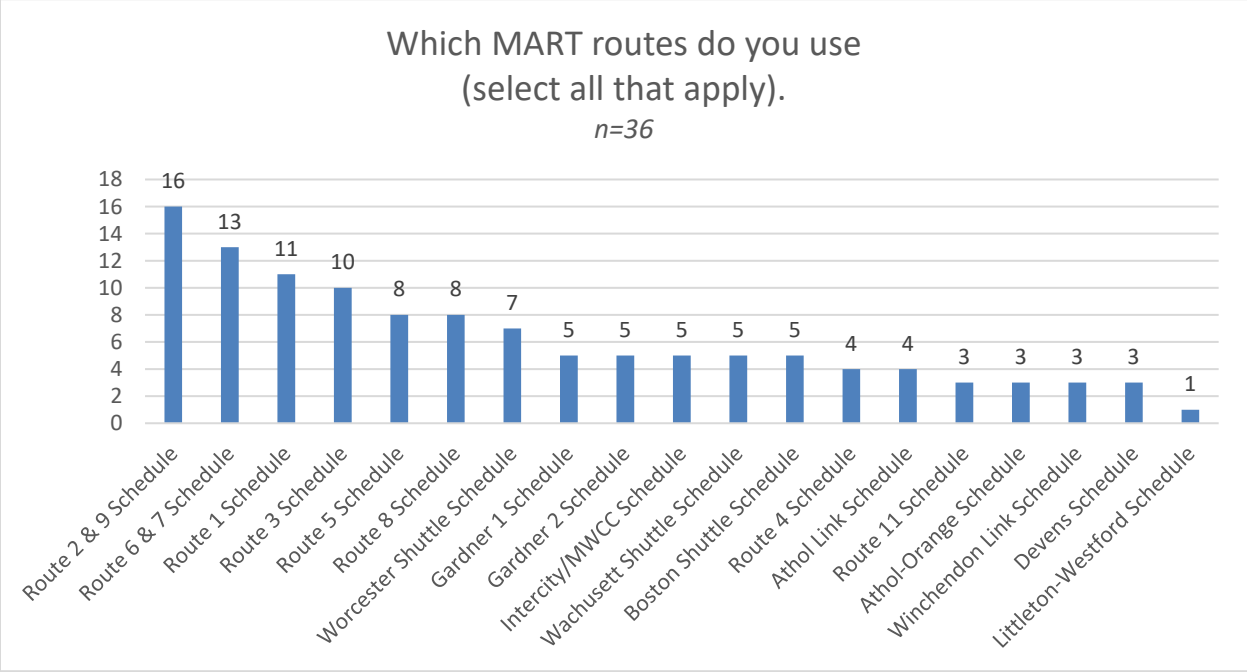


Destination 3

For destination 3, 19 percent (8) entered a healthcare related destination; 17 percent (7) entered a shopping related destination; 5 percent (2) entered an entertainment related destination; 5 percent (2) intermodal transit; 2 percent (1) entered work; 2 percent (1) entered school; 2 percent (1) entered social services; and 2 percent (1) entered a city or town.

9. Which MART routes do you use (select all that apply).

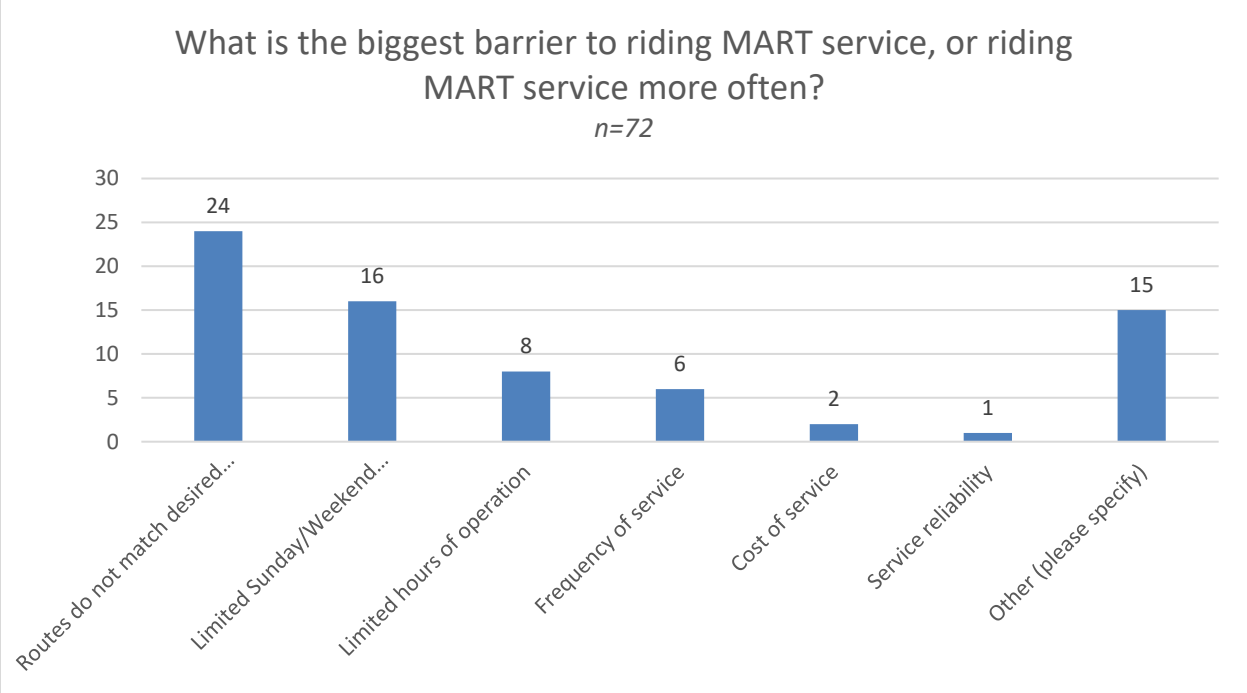
A total of 187 respondents skipped this question with 36 providing responses. The following chart depicts the number of times each route was selected. Since respondents were allowed to select multiple routes, the numbers and percentages exceed the number of respondents. Approximately 44 percent of respondents (16) selected Route 2 & 9; 36 percent (13) selected Route 6 & 7; 31 percent (11) selected Route 1; 28 percent (10) selected route 3; 22 percent (8) selected Route 5; 22 percent (8) selected Route 8; 19 percent (7) selected the Worcester Shuttle; 14 percent (5) selected Gardner 1; 14 percent (5) selected Gardner 2; 14 percent (5) selected Intercity/MWCC; 14 percent (5) selected Boston Shuttle; 11 percent (4) selected route 4; 11 percent (4) selected Athol Link; 8 percent (3) selected Route 11; 8 percent (3) selected Athol-Orange; 8 percent (3) selected Winchendon Link; 8 percent (3) selected Devens Schedule; and 3 percent (1) selected Littleton-Westford.



10. What is the biggest barrier to riding MART service, or riding MART service more often?

A total of 72 respondents answered this question and 151 skipped it. Of the 72 who answered the question, 33 percent (24) selected “Routes do not match desired destinations”; 22 percent (16) selected “Limited Sunday/Weekend Service”; 11 percent (8) selected “Limited hours of operation; 8 percent (6) selected “Frequency of service”; 2 percent (2) selected “Cost of Service”; 1 percent (1) selected “Service Reliability”; and 20 percent (15) selected “Other (please specify)”.

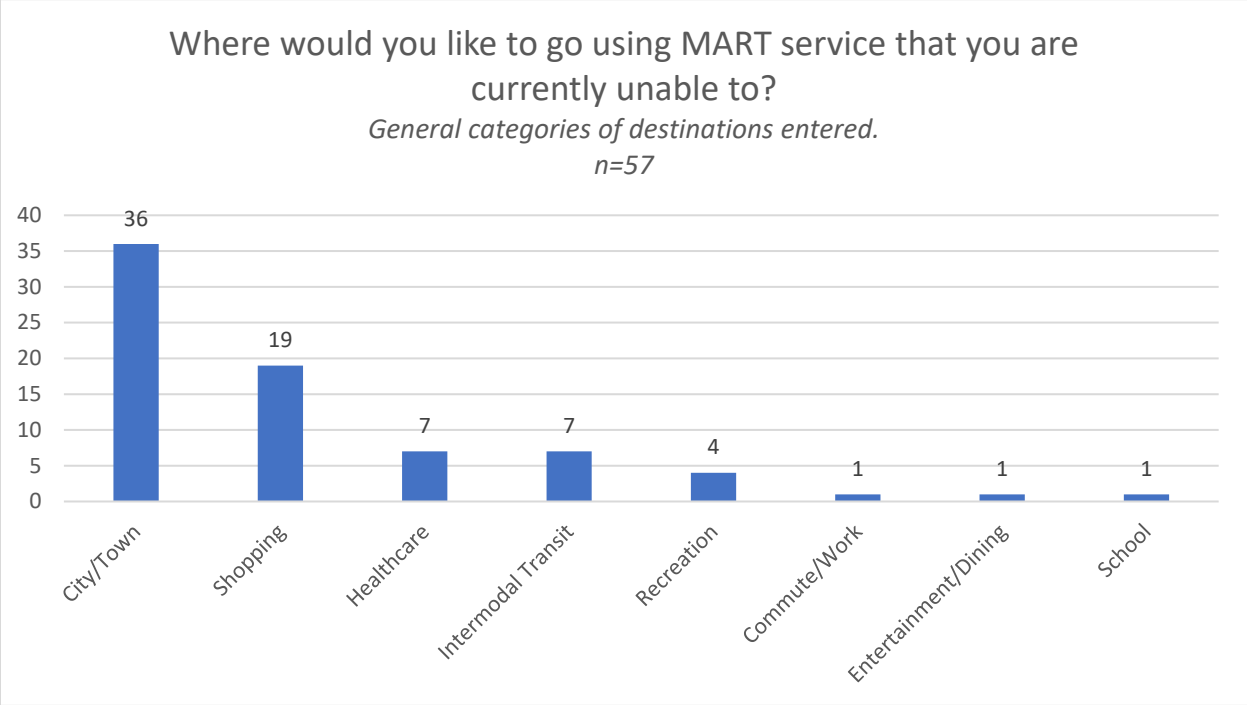
Notable answers entered in “Other (please specify)” included, “1.7 mile walk on dangerous road,” “suspended service to Fitchburg High School,” and, “I wish there were more stops on Route 13.”

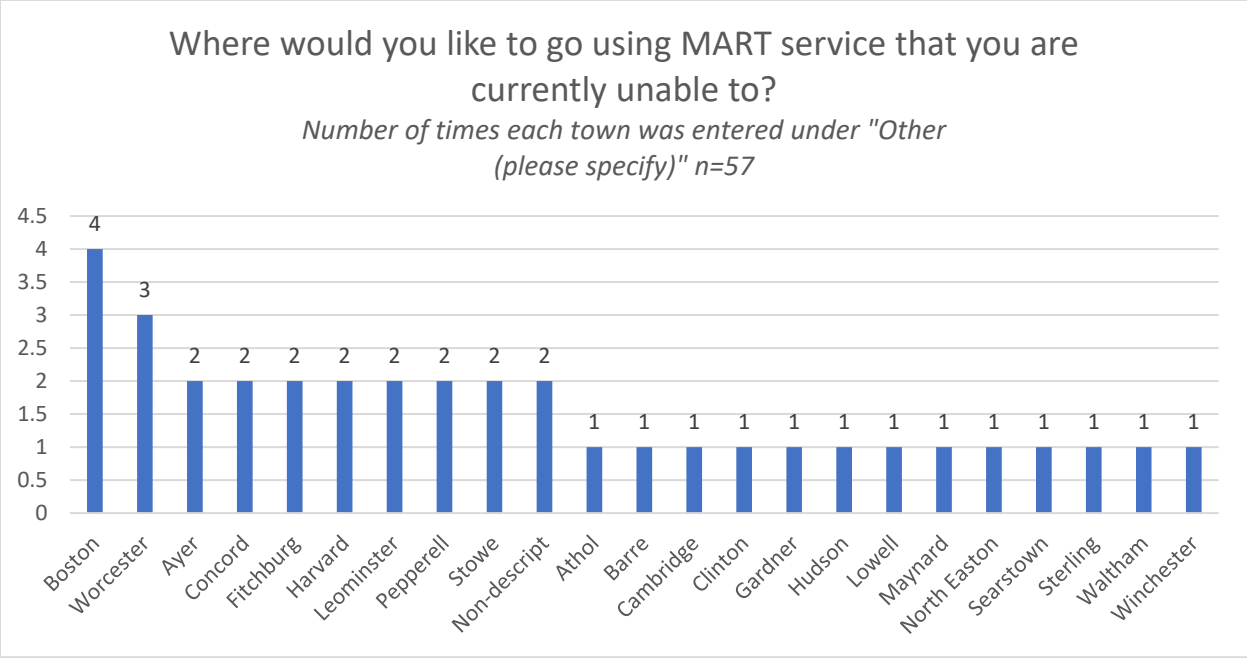


11. Where would you like to go using MART service that you are currently unable to? (Leave blank if you are satisfied with the current destinations offered).

A total of 57 respondents answered this question and 166 skipped it. The answers from the 57 who responded generated 76 individual entries as each person was allowed to state up to 3 desired destinations or state that they were satisfied with the service. A wide range of general and specific destinations were listed. There were 36 entries that mentioned towns including Boston, Worcester, Waltham, Winchester, Harvard, Maynard, Leominster (including specific references to The Mall at Whitney Field in Leominster, which was formerly known as "Searstown"), Lowell, Athol, Ayer, Clinton, Cambridge, Stow, Concord, Hudson, Pepperell, and North Easton. Examples of specific destinations include places like the aforementioned mall at Whitney Field, "Super Walmart" or "Littleton/495 Commuter Rail stop," whereas examples of general destinations might include "Arts" or "Waltham." In order to analyze the results, all destinations were defined using eight general categories shown in the chart below. The categories were also broken down as percentages.

Summary	Responses	Percent
City/Town	36	47%
Commute/Work	1	1%
Entertainment/Dining	1	1%
Healthcare	7	9%
Intermodal Transit	7	9%
Recreation	4	5%
School	1	1%
Shopping	19	25%
TOTAL ENTRIES	76	100%
SKIPPED	166	



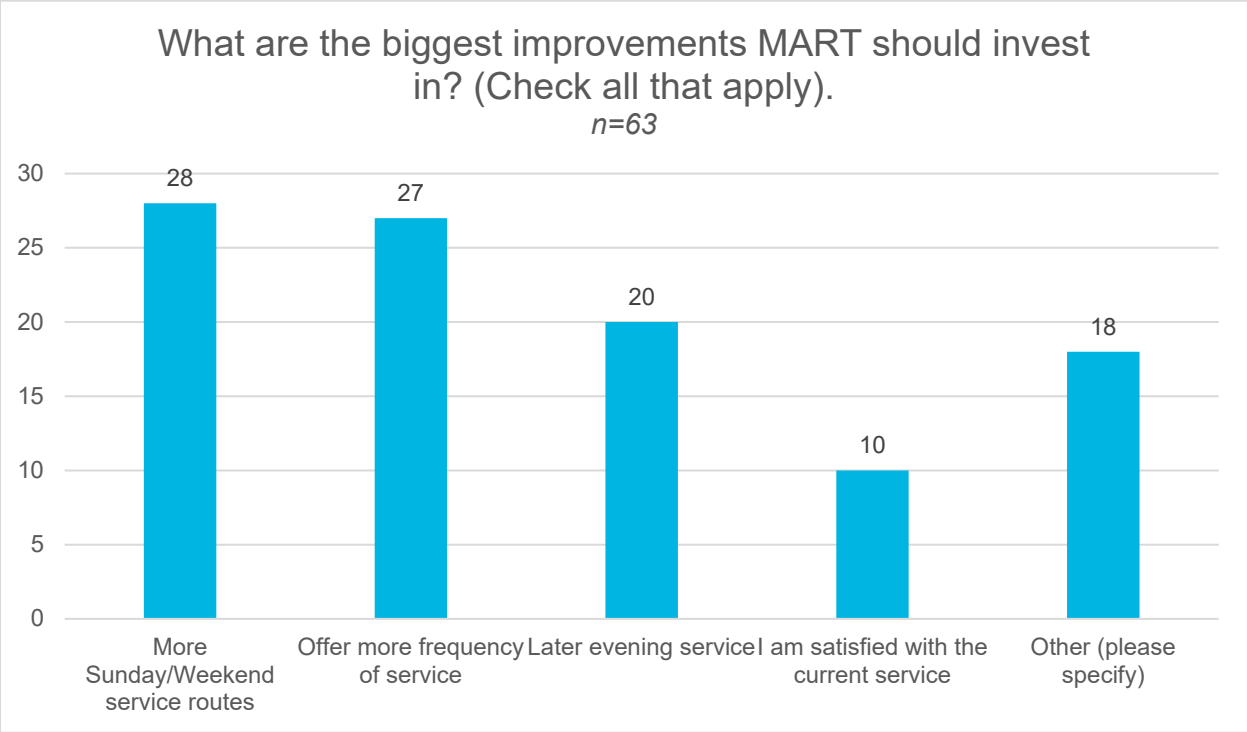


12. What are the biggest investments MART should invest in? (check all that apply).

A total of 63 answered the question while 160 skipped it. Of the 63 who answered the question, 103 entries were provided. Forty-four percent (28) selected “More Sunday/weekend service routes”; 43 percent (27) selected “More frequency of service”; 32 percent (20) selected “Later evening service”; 16 percent (10) selected “I am satisfied with the current service”; and 28 percent (18) selected “Other (Please specify).”

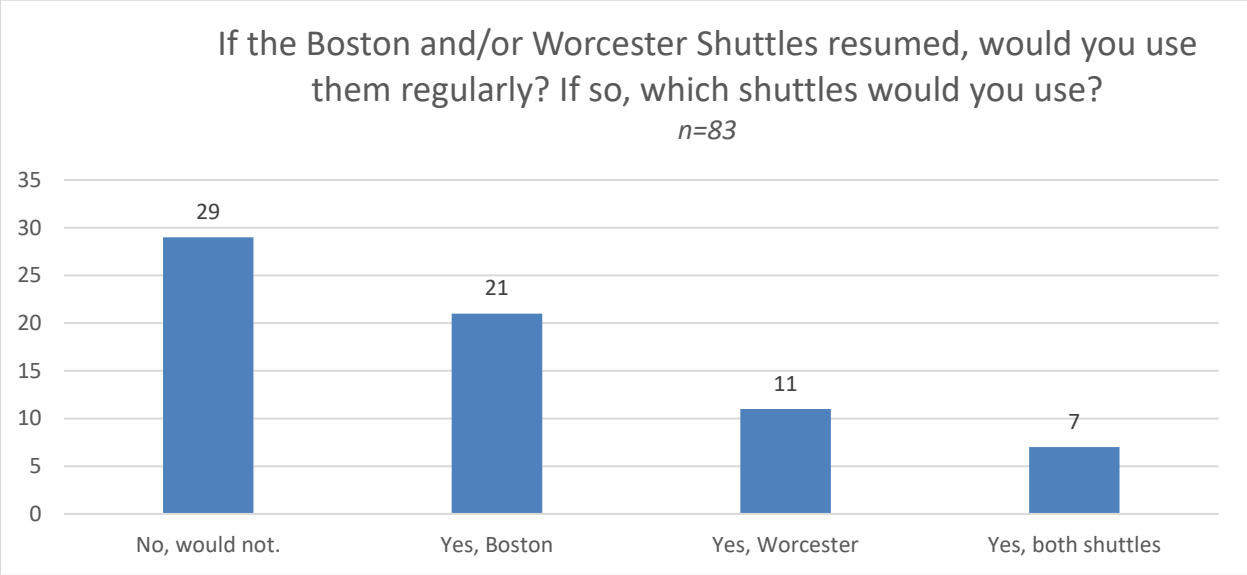
Specific comments covered a wide range of desires including running MART vans to coincide with commuter rail schedules, advance-schedule microtransit service with 100 percent

accessible vehicles, activating the Boston shuttle, as well as general requests for overall expansion of services, cleaner buses, and electric vehicles.



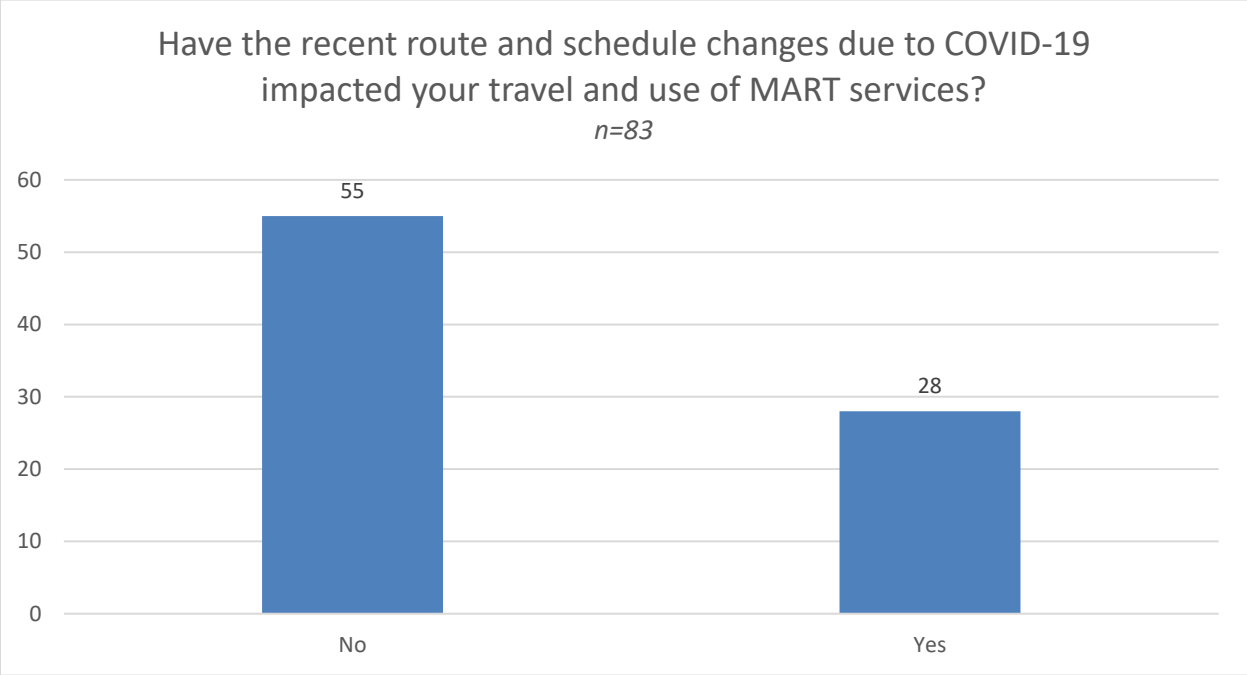
13. If the Boston and/or Worcester Shuttles resumed, would you use them regularly? If yes, which shuttles would you use?

A total of 71 respondents answered the question and 152 skipped it. Of the 71 who answered, 59 percent (42) selected “Yes” and 41 percent selected “No.” Of those who stated which shuttle they would use, half (21) stated they would use the Boston Shuttle. Approximately one-quarter (11) stated they would use the Worcester Shuttle, and 7 stated they would use both shuttles (three remaining answers were not relevant).



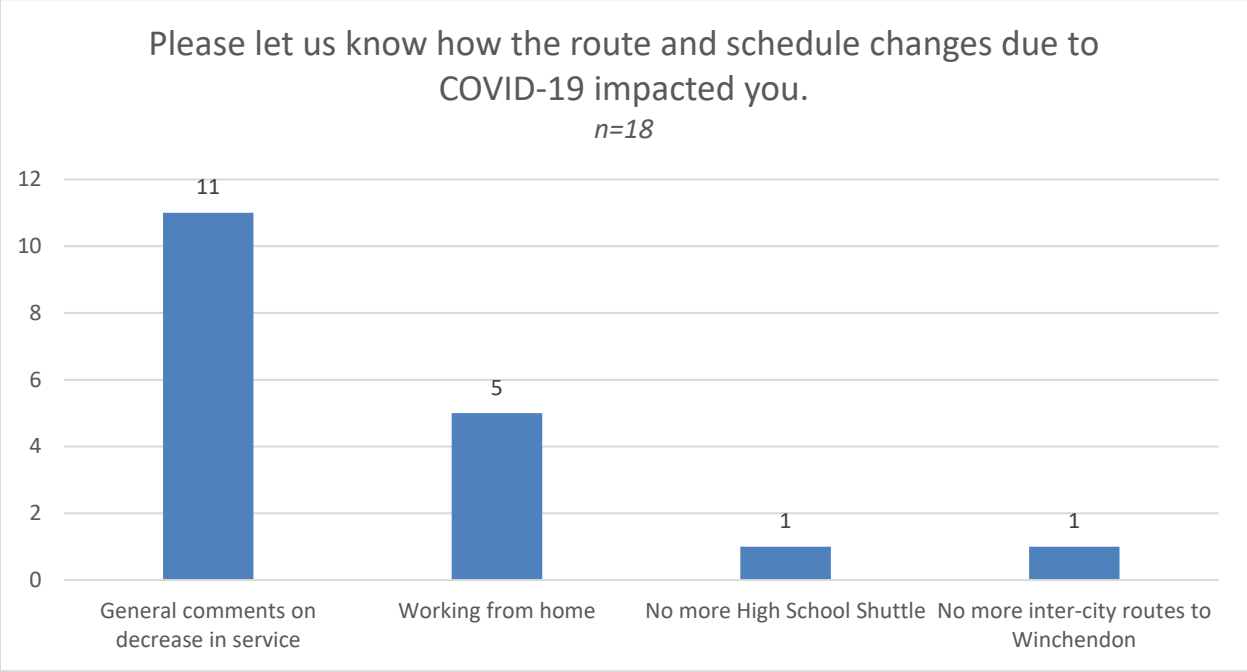
14. Have the recent route and schedule changes due to COVID-19 impacted your travel and use of MART services?

A total of 83 respondents answered this question and 140 skipped it. Among respondents, 66 percent (55) selected “No” indicating that schedule changes due to COVID-19 have not affected their travel and use and 33 percent (28) selected “Yes,” indicating the schedule changes have impacted their travel use.



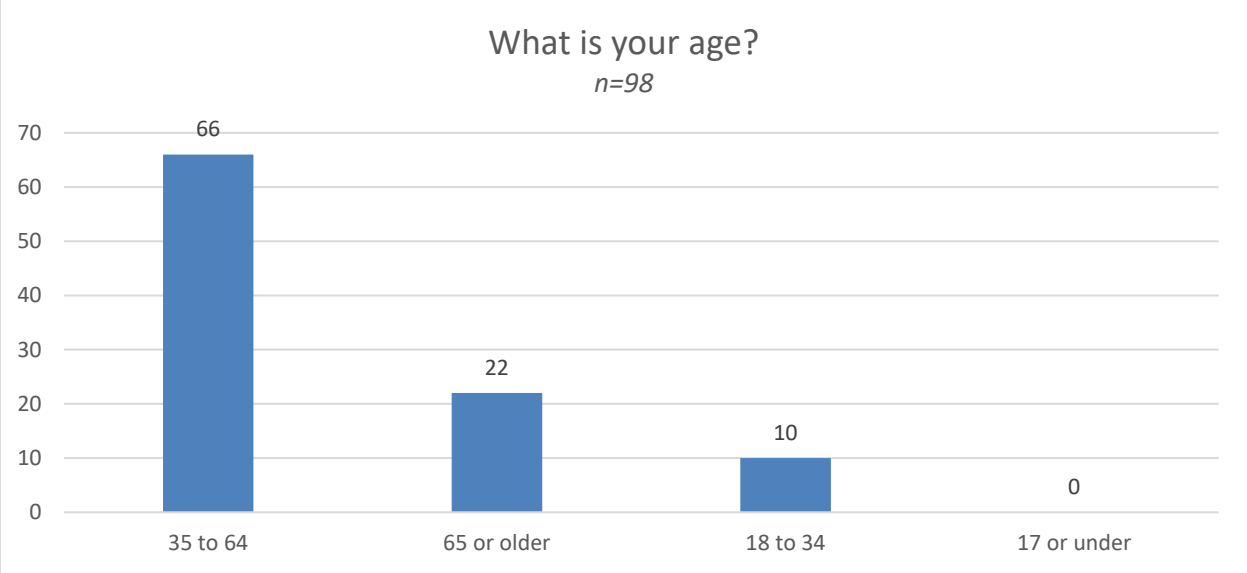
15. Please let us know how the route and schedule changes due to COVID-19 impacted you.

A total of 18 respondents answered the question and 205 skipped it. Of the 18 who answered the question, 5 mentioned no longer having the Boston Shuttle; 5 mentioned working from home and no longer need the service; 1 mentioned no longer having the High School Shuttle; 1 mentioned no longer having the regional routes so they can’t get to Winchendon; and the rest were general statements about decreased service.



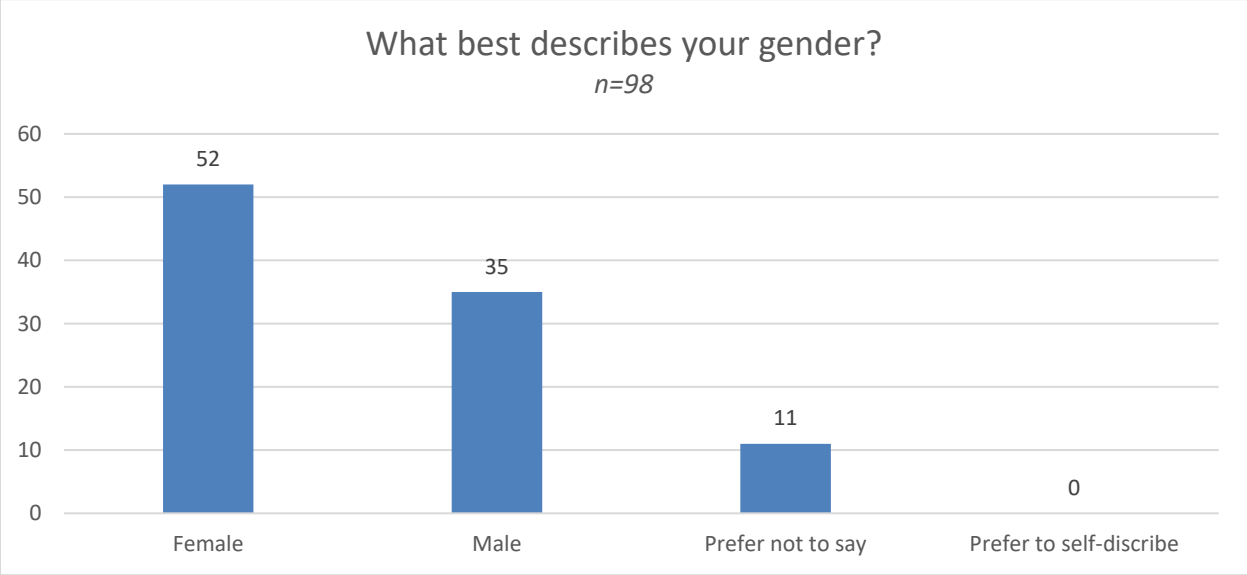
16. What is your age?

A total 98 respondents answered the question and 125 skipped it. Sixty-six percent (66) selected “35 to 64”; 22 percent (22) selected “65 or older”; 10 percent (10) selected “18 to 34”; and no respondents selected “17 or under.”



17. What best describes your gender?

A total of 98 respondents answered this question and 125 skipped it. Of the 98 who answered, 53 percent (52) selected Female; 35 percent (35) selected Male; and 11 percent (11) selected “Prefer not to say.”


What best describes your gender?
n=98
60
50
40
30
20
10
0
52
35
11
0
Female
Male
Prefer not to say
Prefer to self-discribe