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*massDOT*

**AECOM**

# Comprehensive Regional Transit Plan Update 2020

Pioneer Valley Transit Authority



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## Acronyms

ACS	American Community Survey
ADA	Americans with Disabilities Act
APC	Automated Passenger Counter
AVL	Automatic Vehicle Locator
BAT	Brockton Area Transit
BRT	Bus Rapid Transit
CAD	Computer Assisted Dispatch
CARES	Coronavirus Aid, Relief, and Economic Security
CCRTA	Cape Cod Regional Transit Authority
COA	Council on Aging
COVID-19	Novel Coronavirus Disease of 2019
CSA	Comprehensive Service Analysis
CRTP	Comprehensive Regional Transit Plan
FAC	Fine Arts Center
FRTA	Franklin Regional Transit Authority
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas
GWSA	Global Warming Solutions Act
HCC	Holyoke Community College
HST	Human Service Transportation
HTC	Holyoke Transportation Center
ILC	Integrated Learning Center
MART	Montachusett Regional Transit Authority
MassDOT	Massachusetts Department of Transportation
MBTA	Massachusetts Bay Transportation Authority
MOU	Memorandum of Understanding
MVRTA	Merrimack Valley Regional Transit Authority
NEXT	National Express Transit
NTD	National Transit Database
O&M	Operations and Maintenance

OTP	On-Time Performance
PPRH	Passengers per Revenue Hour
PPRM	Passengers per Revenue Mile
PTASP	Public Transportation Agency Safety Plan
PVPC	Pioneer Valley Planning Commission
PVTA	Pioneer Valley Transit Authority
RFP	Request for Proposal
RTA	Regional Transit Authority
RTP	Regional Transportation Plan
SATCo	Springfield Area Transit Services
SBT	Springfield Bus Terminal
TAM	Transit Asset Management
TCI	Transportation and Climate Initiative
TERM	Transit Economic Requirements Model
TNC	Transportation Network Company
TVM	Ticket Vending Machine
ULB	Useful Life Benchmark
UMTS	UMass Transit Services
UPT	Unlinked Passenger Trip
VA	Veterans Administration
VATCo	Valley Area Transit Company
VRH	Vehicle Revenue Hour
VRM	Vehicle Revenue Mile
WRTA	Worcester Regional Transit Authority
WSU	Westfield State University

## 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 Pioneer Valley Transit Authority (PVTA) 2014 Comprehensive Service Analysis (CSA). This update was recommended by the Task Force on Regional Transit Authority Performance and Funding in its final report issued in April 2019.<sup>1</sup> The report included 24 recommendations in five categories:

- Investment and Performance
- Accountability
- Service Decisions
- Quality of Service
- Environmental Sustainability

The CRTP recommendation (No. 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 (1) the completion or updating of Comprehensive Regional Transit Plans (CRTPs) every five years...”

Following publication of the Task Force Report, a commitment to complete the CRTP update was included in PVTA’s 2-year Memorandum of Understanding (MOU) with the Massachusetts Department of Transportation (MassDOT) executed on August 14, 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.

### PVTA Recognizes Drivers for their Dedication to Providing Essential Service

*“We want to make sure our public transit workers continue to be recognized for their tireless efforts to maintain operations, deliver essential services, and protect and serve the public” —PVTA*

*April 9, 2020*

The PVTA 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, Governor Baker declared a state of emergency and subsequently issued a stay-at-home order on March 23, 2020, closing all non-essential

<sup>1</sup> 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](https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf).

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. PVTA, along with the other RTAs, suspended fare payment and reduced service levels, encouraging non-essential riders to temporarily discontinue travel.

While PVTA 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 and capacity limitations, remote work, furloughs, layoffs, and reluctance to use public transportation due to health safety concerns. In response to continued ridership volatility, this CRTP acknowledges that there will be many uncertainties and challenges over the coming months and years and equips PVTA with data-driven and performance-focused recommendations so that the Authority will be able to adapt quickly to a volatile transit market and ensure success.

## 1.2 Overview of PVTA Services

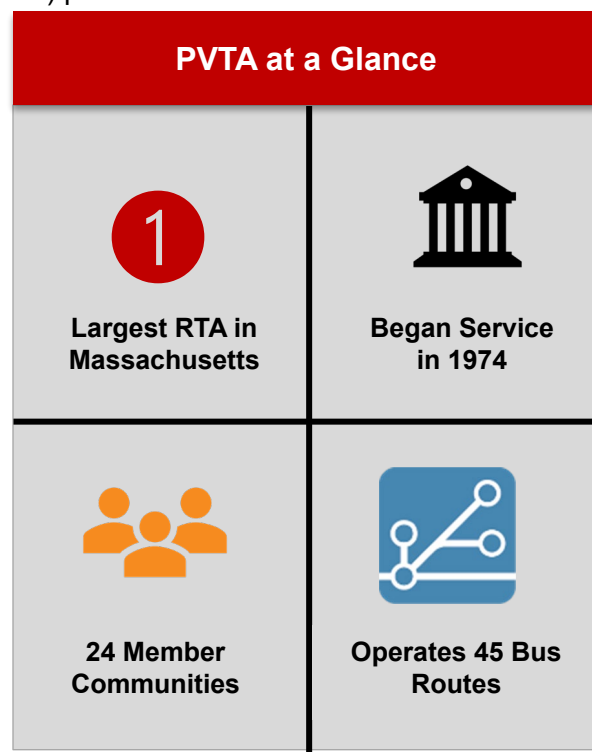
PVTA is 1 of the 15 Regional Transit Authorities (RTAs) that operates public transportation in the Commonwealth along with the Massachusetts Bay Transportation Authority (MBTA). PVTA is the largest regional transit authority in Massachusetts and the fourth largest in New England. PVTA has 24 participating member communities that span three counties and a diverse service area with urban, suburban, rural, and college communities. PVTA member communities include the cities of Agawam, Chicopee, Easthampton, East Longmeadow, Holyoke, Northampton, Springfield, Westfield, and West Springfield and the towns of Amherst, Belchertown, Granby, Hadley, Hampden, Leverett, Longmeadow, Ludlow, Palmer, Pelham, South Hadley, Sunderland, Ware, Wilbraham, and Williamsburg.

PVTA operates 45 bus routes with varying service levels to 20 communities,<sup>2</sup> specifically 36 fixed route local services, 6 express routes, and 3 deviated routes. PVTA also provides a senior van service throughout the entire 24-member service area and operates Dial-A-Ride and complementary Americans with Disabilities Act (ADA) paratransit services. PVTA transit services operate with different spans of service on weekdays and weekends. Given the size of the service area, PVTA contracts with multiple operators to serve riders in the northern and southern tiers, which are divided approximately on the Hampshire/Hampden County line.

PVTA has implemented various service improvements over the last 5 years that support efforts to improve the customer experience and provide better service. Service improvements include adding bus routes, increasing span or frequency or service of routes, adjusting alignments, and minor timing changes to improve on-time performance (OTP).

## 1.3 Planning Process

The impacts and limitations imposed by the COVID-19 pandemic required flexibility in developing this 5-year plan. While some



<sup>2</sup> Leverett, Pelham, and Hampden are member communities that do not have bus service, and Deerfield, Whately, and Southampton are non-member communities with bus service.

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 recommendations' structure, 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 gaps and needs in PVRTA's service area. The analysis indicated that PVRTA service is provided in areas where the data indicate demand is highest. However, safety measures like remote learning and teleworking, along with furloughed workers and lay-offs, have disrupted PVRTA's existing ridership patterns, making it difficult to infer future transit demand from past performance. 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 regarding ridership and market demand. Two months after the state of emergency was issued, PVRTA 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 (a return to 86 percent of pre-pandemic ridership), medium-ridership scenario (60 to 85 percent of pre-pandemic ridership), and low-ridership scenario (less than 60 percent of pre-pandemic ridership) were developed to inform the development of needs and recommendations. These scenarios formed the framework for the recommendations in this plan.

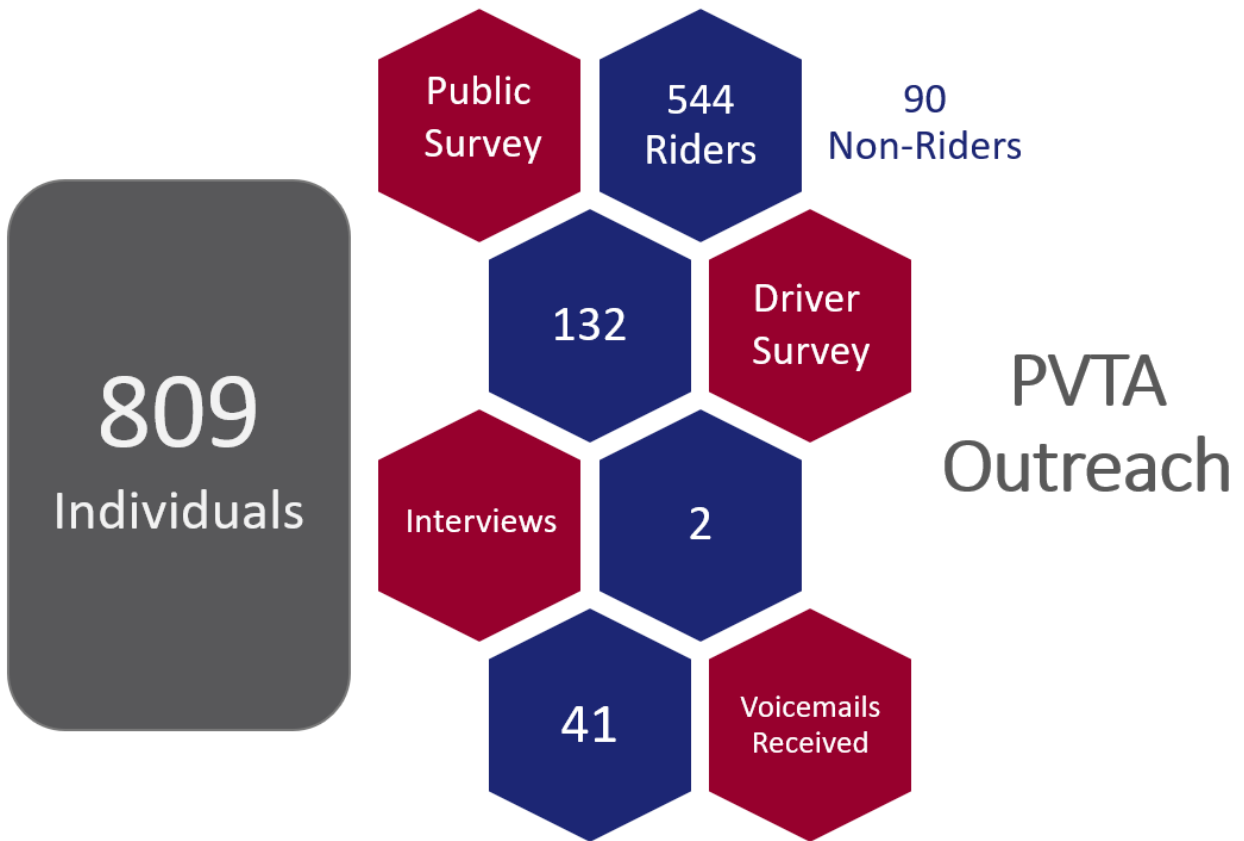
### 1.3.3 Public Outreach

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 CRTTP was undertaken through an online stakeholder outreach survey conducted June 15, 2020 until August 3, 2020. Additionally, PVRTA conducted a driver survey and stakeholder interviews with the PVRTA Consumer Advisory Committee.

Eight hundred and nineteen (809) responses were collected from the various outreach methods (Figure 1). Note that because of the limitations on collection methods due to COVID-19 the findings are not a statistically valid sample of PVRTA riders or the region's residents. They should be used as a guide in the context of other public outreach and data analysis. Nonetheless, key takeaways that correlate with other planning efforts include:

- Demand response service needs a same-day option.
- Improved headways are needed.
- There is a need for later evening service in the southern tier.
- There is a need for express service between transit hubs.
- Non-riders understand the value PVRTA brings to the region and emphasize that PVRTA is a valuable public transportation resource.

**Figure 1. Summary of Outreach**



### 1.4 Needs and Recommendations

PVTA’s needs and recommendations were classified into seven overarching categories (Figure 2). The study identified a total of 197 needs and 177 recommendations that PVTA can address over the next 5 years. Recommendations include expanding service, adjusting service hours, including a data-driven decision-making approach, and promoting PVTA services through existing and new technologies to improve service provision. Further recommendations include hiring additional staff to monitor and improve data analysis and measurement and enhance facilities. The full list of needs can be found in Chapter 7 and recommendations in Chapter 8.

**Figure 2. Classification Categories**





## 2. Background and 2020 Context

The 15 RTAs<sup>3</sup> provide vital mobility options and lifeline services to the millions of people across the Commonwealth outside of the Greater Boston region. The 2020 CRTP update process for the RTAs, funded by MassDOT, came out of Commonwealth-wide initiatives in 2018 and 2019, which prompted this plan update. 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<sup>4</sup>
- A Vision for the Future of Massachusetts' Regional Transit Authorities<sup>5</sup> (RTA Task Force)
- Transportation & Climate Initiative<sup>6</sup>

The RTA Task Force Final Report Recommendation No. 7<sup>7</sup> was a primary driver for the development of this CRTP. The CRTP is carried out as a commitment to PVTA's 2-year MOU 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 PVTA MOU is discussed in more detail in Chapter 6.

The PVTA CRTP update process 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, 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 for 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. PVTA-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 the stage for the CRTP update process. The RTAs play an important role in getting people around the diverse regions of the Commonwealth to work, to school, and to essential services.

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<sup>3</sup> Commonwealth of Massachusetts, "General Laws Chapter 161B: Transportation Facilities, Highway Systems, and Urban Development Plans," <https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXXII/Chapter161B>.

<sup>4</sup> 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>.

<sup>5</sup> 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](https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf).

<sup>6</sup> Transportation and Climate Initiative, accessed 2020, <https://www.transportationandclimate.org/>.

<sup>7</sup> 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](https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf).

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*.<sup>8</sup> 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.
- As with the national trend, transit ridership has been declining in recent years.
- Use of transportation network companies (TNCs)<sup>9</sup> 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 in the Commonwealth accounts for 40 percent of all greenhouse gas (GHG) emissions.
- 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:

- Modernize existing state and municipal transit and transportation assets to more effectively and sustainably move more people throughout a growing Commonwealth.

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<sup>8</sup> 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>.

<sup>9</sup> Ride hailing companies such as Uber and Lyft that utilize technology to connect passengers with drivers using their personal vehicle.

- 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,<sup>10</sup> a Task Force on Regional Transit Authority Performance and Funding was established in the fall of 2018. The Task Force issued a final 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.<sup>11</sup>

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 and evaluate a demonstrated community need for evening and seven-day service.
- Identify and evaluate appropriate transit services and potential partnerships based on level of demand and efficiency.
- Develop pilot programs for innovative delivery models.
- Increase regional collaboration, including cross-RTA services.
- 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.

<sup>10</sup> Commonwealth of Massachusetts, “Budget Summary FY2019,” [https://budget.digital.mass.gov/bb/gaa/fy2019/os\\_19/houtexp.htm](https://budget.digital.mass.gov/bb/gaa/fy2019/os_19/houtexp.htm).

<sup>11</sup> 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](https://malegislature.gov/Reports/7917/SD2385_RTAtaskforceReport.pdf).

- 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 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 choice 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.<sup>12</sup>

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<sup>12</sup> 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>.

## 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, the 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 PVTA to continue building a data-driven and performance-focused decision-making and management framework to lean into and respond to the rapid changes that are expected to continue to impact the future of the transit industry. This data-driven and performance-focused approach will position PVTA for continued success.

### 2.2.1 COVID-19 Pandemic

Impacts to the transit industry from the COVID-19 pandemic in March 2020 included the following:

- Reduction of service due to diminished rider demand and driver availability, social distancing requirements and associated 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 and telemedicine due to safety concerns, and stay-at-home orders and advisories that have depressed demand for discretionary trips, student, and work trips
- Temporary suspension of fare collection or fare collection enforcement along with rear-door boarding by many operators
- Implementation of employee protection measures, such as plexiglass 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 across the country initially declined by up to 80 percent and has been rebounding slowly (see Figure 3).

**Figure 3. Change in Transit Demand (April 15, 2020–October 12, 2020)**



Source: Transit App

Since March 2020, PVTA has experienced a 50 percent decline in ridership overall and a decline between 78.5 and 40.9 percent between April and June 2020. PVTA modified its bus route schedules, cancelled service for a few bus routes, and temporarily suspended fares. Additionally, PVTA implemented capacity restrictions on its fleet, requested passengers to wear masks, and requested only passengers taking essential trips use the service. PVTA worked to ensure that drivers had the necessary equipment to drive safely including personal protective equipment, sanitizer, and disinfecting wipes. In July 2020, PVTA resumed fare collection, announced a fall 2020 schedule with some modified service times, and continued disinfecting and cleaning vehicles and encouraged social distancing.

## 2.2.2 Federal Coronavirus Aid, Relief, and Economic Security (CARES) Act

PVTA 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 has provided operating and capital funds for public transportation to mitigate lost revenue due to severe ridership decline, the suspension of fare collection, the implementation of cleaning and protection protocols, etc. The funding has been provided through the Federal Transit Administration (FTA) Section 5337 (capital – state of good repair), Section 5307 (urbanized area), and Section 5311 (rural areas) programs. For the RTAs, a total of \$213.4 million was apportioned through the CARES Act with \$36,615,416 provided to PVTA.

## 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. The PVTA and study team provided a phone-based survey to participate in the outreach process for people without access to the internet or smartphones. As with all transit planning processes, outreach is one component of many that go into the identification of needs, solutions, and recommendations.

For PVTA, the following are additional considerations for understanding the context of the CRTP:

- Colleges and universities in the PVTA service area transitioned from in-person learning to remote learning. This transition had an impact on PVTA's ridership and service.

### 2.3.1 Transit Demand and Economic Uncertainties

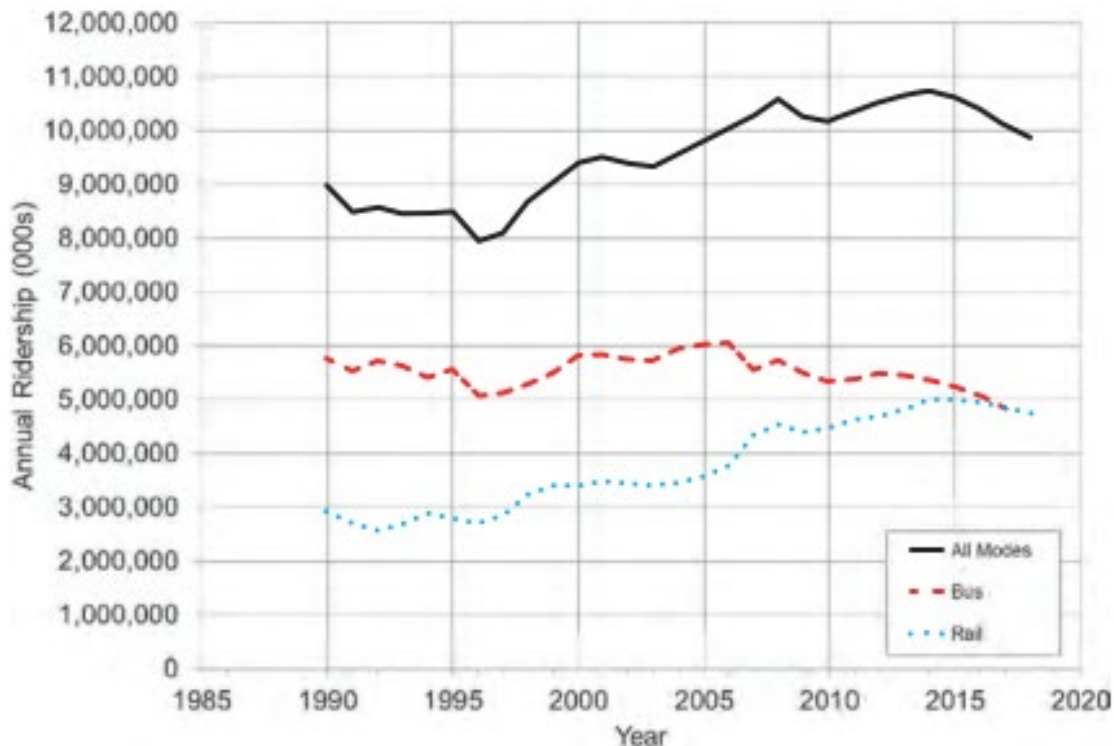
Notwithstanding COVID-19 pandemic-related disruptions, for many years, transit ridership has been stagnant or declining nationally (Figure 4).<sup>13</sup> This trend has accelerated in the past few years, with most systems – and bus transit in particular – experiencing steady declines in ridership, despite a historically good economy. The American Public Transportation Association attributes the decline to four broad categories: erosion of time competitiveness, reduced affinity, erosion of cost competitiveness, and external factors.<sup>14</sup> The erosion of time competitiveness is

<sup>13</sup> 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>.

<sup>14</sup> American Public Transportation Association, "Understanding Recent Ridership Changes," <https://www.apta.com/research-technical-resources/research-reports/understanding-recent-ridership-changes/>.

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 4. National 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*

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 PVTA 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.

For all transit systems, including PVTA, 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 PVTA 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

PVTA was created by Massachusetts General Laws Chapter 161B in 1974 to provide oversight and coordination of public transportation within the Pioneer Valley region. As the largest regional transit authority in Massachusetts and fourth largest in New England, PVTA has a fleet of 362 active revenue and 54 non-revenue vehicles. PVTA has 24 participating member communities and spans 3 counties and a diverse service area of 619 square miles containing urban, suburban, rural, and college communities. PVTA member communities include the cities of Agawam, Chicopee, Easthampton, East Longmeadow, Holyoke, Northampton, Springfield, Westfield, and West Springfield and the towns of Amherst, Belchertown, Granby, Hadley, Hampden, Leverett, Longmeadow, Ludlow, Palmer, Pelham, South Hadley, Sunderland, Ware, Wilbraham, and Williamsburg. Additionally PVTA serves a small section of Southampton, Deerfield, and Enfield, Connecticut, three non-member communities, in order to connect with adjacent transit systems and provide mobility throughout the region.

#### 3.1 Transit Agency Background

Service is provided via 45 bus routes with varying levels of service to 20 communities (Leverett, Hampden, and Pelham do not have bus service) and a systemwide demand response system. PVTA provides a senior van service throughout the entire service area, operates Dial-A-Ride in Wilbraham for the general public, and provides complementary ADA paratransit services for eligible individuals residing within the geographic boundaries of the member communities or within  $\frac{3}{4}$  mile of a fixed route for non-member communities. Figure 5 and Figure 6 illustrate the participating member communities in the PVTA service area along with the PVTA fixed routes and demand response service areas, respectively.

The service area is divided into northern and southern tiers, divided approximately on the Hampshire/Hampden County line. Service in the northern tier is heavily geared toward college communities. The northern tier has weekday spans of 5:45 AM to 12:00 AM in the Northampton area with select routes running to 12:00 AM and as late as 3:00 AM on Thursdays and Friday. In the Amherst area weekday spans are from 7:00 AM to 12:00 AM with some routes providing late night services until 3:00 AM on Fridays. On Saturdays and Sundays, service hours in the northern tier span from 6:00 AM to 12:50 AM. In the southern tier, service generally ranges from 5:00 AM to 11:30 PM during the weekdays, from 5:00 AM to 10:00 PM on Saturdays, and 9:00 AM to 8:00 PM on Sundays.

PVTA operates 36 fixed route local services, 6 express routes, 3 deviated routes, a systemwide demand response service for the elderly and disabled, plus several “tripper” routes in Springfield and Holyoke that act as overflow on the regular fixed routes during distinct times when public schools are in session.

In FY 2019, PVTA carried 10,125,566 passengers, traveling 7,496,511 miles and 548,804 hours (Table 1). On an average weekday in FY 2019, PVTA transported 41,436 passengers on its bus system.



Figure 5. Location Map with Fixed Route Services

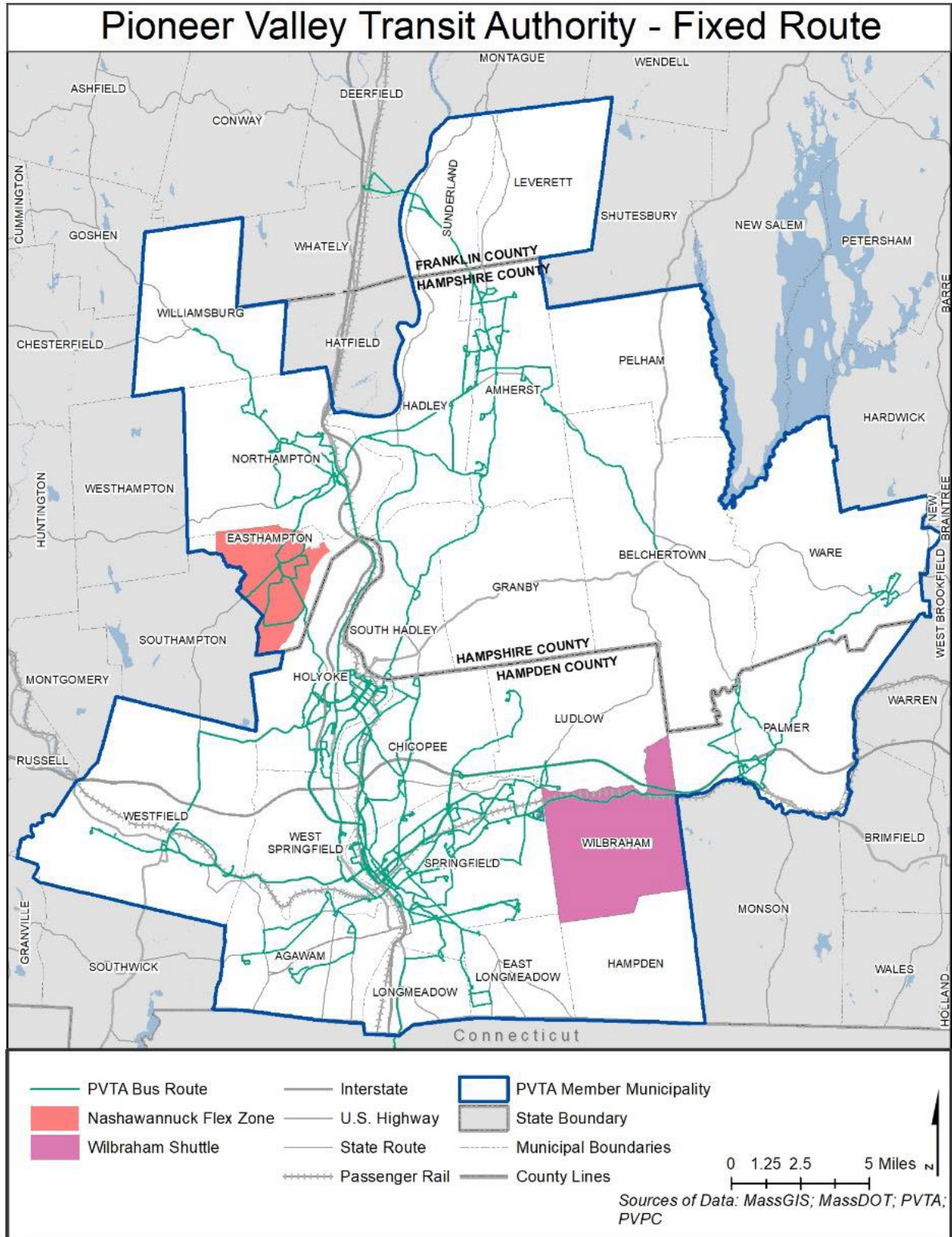
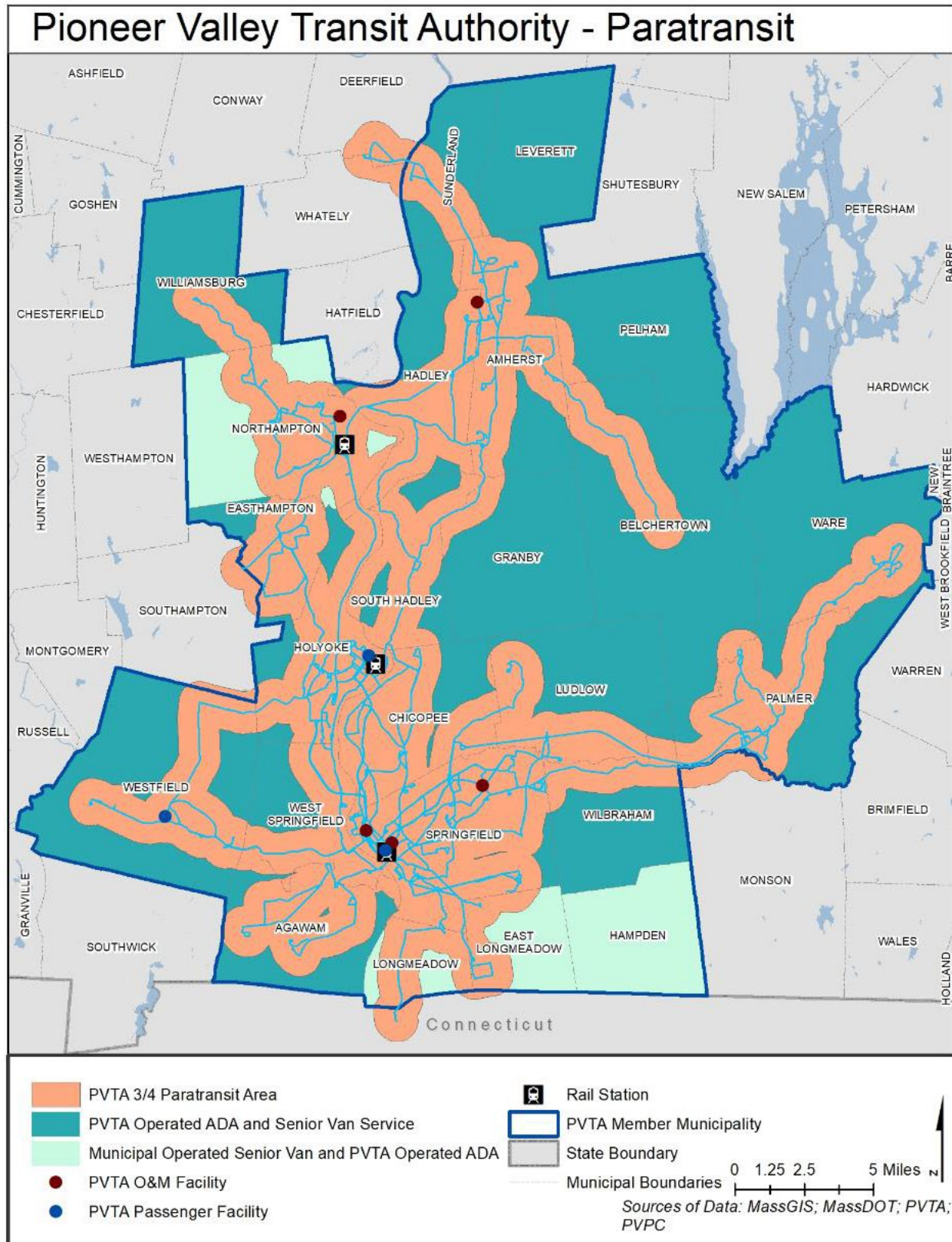


Figure 6. Location Map with Demand Response Services



**Table 1. Service Statistics (FY 2019)**

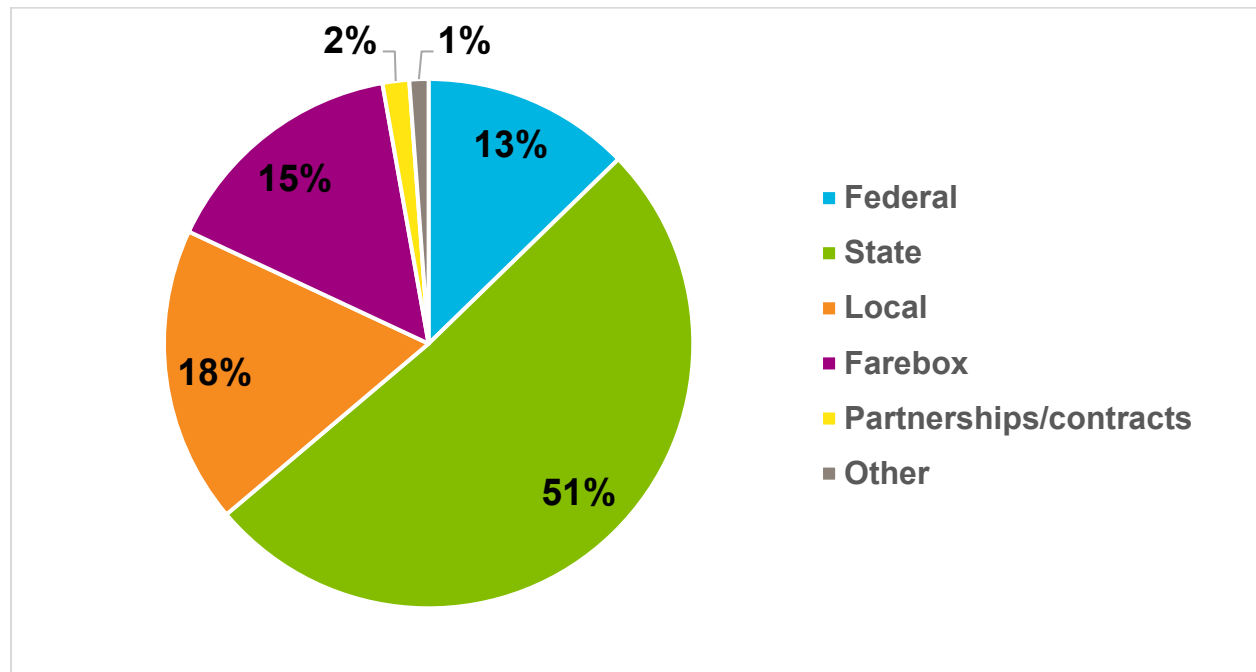
Route	Demand Response	Fixed Route	Express Routes	Deviated Routes	Total
Ridership	244,356 (2.5%)	9,878,152 (95.0%)	185,776 (1.99%)	56,150 (0.6%)	10,364,434 (100%)
Revenue Hours	184,459 (33.3%)	352,962 (63.6%)	9,049 (1.6%)	8,033 (1.%)	554,503 (100%)
Revenue Miles	2,679,969 (35.4%)	4,529,014 (59.9%)	200,944 (2.7%)	149,360 (2.0%)	7,559,287 (100%)

Source: PVRTA FY 2019 Route Data

The FY 2019 operating budget was \$49 million. PVRTA receives funding from several sources to finance the transit service operations, including FTA, MassDOT, local assessments from member communities, farebox revenue, and other revenue sources such as advertising, partnership, and contracts with other operating agencies (Figure 7). The largest percentage of funding (51 percent in FY 2019) comes from the Commonwealth. In FY 2019, farebox revenue accounted for 17 percent, local assessments for 18 percent, and federal participation for 13 percent. PVRTA has several contracts and partnerships with local colleges and businesses, that entirely or partially cover the cost of service on specific routes or for specific segments of the population. In FY 2019, the partnerships and contracts accounted for 2 percent of operating costs. These partnerships and the contracts are discussed further in later sections and exemplify a best practice for transit providers.

Capital expenditures vary each year but are typically in the range of \$5 to \$10 million per year. These funds are utilized for the acquisition of transit vehicles and equipment and to maintain infrastructure.

**Figure 7. PVRTA FY 2019 Funding Sources**



PVTA has general responsibility to develop, finance, and contract the operation of mass transportation services and facilities within its region. While an administrator and support staff are responsible for the day-to-day administration of the agency, PVTA's operations are overseen by an advisory board made up of one member from each of the 24 communities, one representative of the disability community,<sup>15</sup> and a "rider" representative. The Advisory Board consists of the chief elected official of each city; the Chair of the Board of Selectmen of each town having such board, or the Town Manager or Town Administrator of each town.<sup>16</sup> Finance, paratransit, and route committees help guide the board. The paratransit and ridership committees provide input on service design and operations, while the finance committee reviews the budget and any major changes in costs associated with operating service. The PVTA administrator is the only position appointed by the advisory board. In addition to the administrator, PVTA has 24 support staff and IT consultants (Figure 8).

In accordance with Section 25 of Chapter 161B of the Commonwealth of Massachusetts statute, PVTA contracts with private operators for the provision of service. Due to the size of the service area PVTA holds several operating contracts. In the northern tier bus service is operated by the Valley Area Transit Company (VATCo) in the Northampton area, UMass Transit Services (UMTS) on the University of Massachusetts Amherst campus and surrounding communities, and Hulmes Transportation Services LTD in Easthampton, Palmer, and Ware. In the southern tier bus service is primarily operated by the Springfield Area Transit Company (SATCo). National Express Transit (NEXT) operates demand response services, including ADA paratransit service as well as the Survival Center and Wilbraham shuttles. Additionally, PVTA partners with senior centers to provide Dial-A-Ride services in Northampton, East Longmeadow, Longmeadow, Hampden, and Agawam. Hadley is scheduled to begin implementing its own Dial-A-Ride program in late 2020.

The contract with VATCo and SATCo is with First Transit for management services<sup>17</sup> and is a 3-year contract from July 2011 to July 2014 with the option for two additional three year periods. PVTA has exercised these options and the contract is set to expire July 2020, at which time PVTA must then go through the procurement process for a new contract. The contract with UMTS is a 5-year interagency agreement with the University of Massachusetts that will expire June 30, 2025. The contract is not required to be bid out through procurement processes as it is an interagency agreement. The shuttle service operated by Hulmes is not under contract.<sup>18</sup> The contract with Next is a 2-year contract from July 1, 2018 to July 30, 2020, with three consecutive one-year renewal periods. PVTA will be terminating the contract with Next effective June 30, 2021, as the two were unable to successfully negotiate a contract extension.<sup>19</sup> The contracts with the Councils on Aging (COAs) are for 1-year periods, with the ability to extend the agreements one-year at a time.<sup>20</sup>

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<sup>15</sup> This position (mobility representative) is currently vacant.

<sup>16</sup> Voting is based on Massachusetts General Law 161B Section 5 that states each city and town shall have one vote on the advisory board plus additional votes and fractions thereof determined by multiplying one and one half times the number of cities and towns in the authority by a fraction of which the numerator shall be the total amount of all assessments made by the state treasurer to such city or town under this chapter and the denominator shall be the total amount of all such assessment made by the state treasurer to such cities and towns. The rider representative and mobility representative each have one vote.

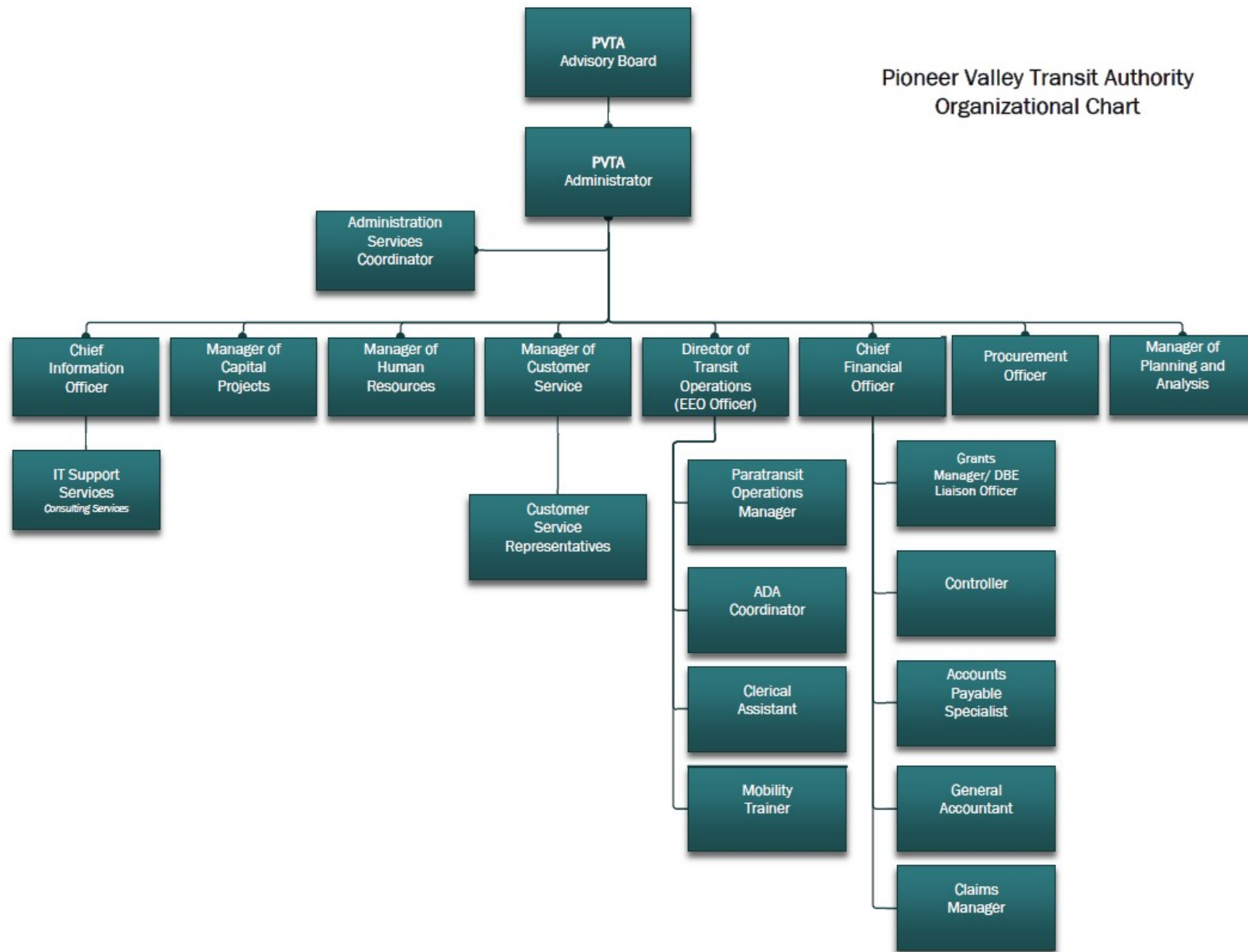
<sup>17</sup> SATCo and VATCo are subsidiaries of First Transit. SATCo is represented by the Amalgamated Transit Union, and VATCo by the United Food and Commercial Workers Union. Both are protected under public transit employee protections in Section 13(c) of the Federal Transit Act, which gives them the right to operate the service in that area as they were the private operator prior to the creation of PVTA in 1974. PVTA is responsible for contracting out management for both.

<sup>18</sup> The contract has expired but Hulmes is still operating the service.

<sup>19</sup> Services will be provided by a temporary operator until PVTA is able to procure services through an RFP process.

<sup>20</sup> PVTA is not required to go through a competitive procurement for these operators because of the contract value.

Figure 8. Organizational Chart (as of February 2020)



## 3.2 Mission

PVTA's mission statement as listed on the official website is stated below:

“PVTA is committed to providing the highest quality of convenient and accessible public transportation service that meets the needs of our customers in an efficient, cost effective manner.”

## 3.3 Vision Statement

PVTA's vision statement as listed on the official website is stated below:

“The vision of PVTA is to assist the Pioneer Valley in making our communities more livable through transportation services.”

## 3.4 Goals and Objectives

PVTA has identified the following 6 goals and 19 supporting objectives to support the completion of the CRTP update. These goals and objectives were developed based on feedback at the kick-off meeting with PVTA staff and contracted operators.

### **Goal 1. Maximize mobility options for residents of the region**

Objectives:

- Improve connectivity between the north and south service areas.
- Pursue innovative service delivery models and develop pilot programs.
- Adjust existing service and/or implement new service to meet service demands of existing and potential customers.
- Provide transit options for all community members in the PVTA service area.

### **Goal 2. Deliver the service of choice**

Objectives:

- Improve frequency and span of service.
- Implement faster more direct service along key corridors with connecting feeder services.
- Increase the mode share for transit in the region.

### **Goal 3. Obtain sustainable funding options**

Objectives:

- Secure a long-term local dedicated funding source such as a regional ballot initiative or other measures to increase funding at the local level.
- Advocate for state contract assistance to include an automatic inflator to prevent level funding.
- Identify and determine the feasibility of new funding partnerships.

**Goal 4. Operate in the most cost-effective and efficient way possible**

## Objectives:

- Examine route performance to determine service adjustments as needed.
- Continue program of monitoring route and system performance.

**Goal 5. Support economic development**

## Objectives:

- Coordinate with Pioneer Valley Planning Commission (PVPC) and member municipalities to integrate transit into land use planning and development/infrastructure plans.
- Enhance service to centers of employment and shopping within the region.
- Identify Environmental Justice communities and their transportation needs to ensure that these populations benefit from economic development efforts.

**Goal 6. Develop a capital program that aligns with the Governor's Commission on the Future of Transportation**

## Objectives:

- Replace vehicles according to their useful life benchmark (ULB) and the Transit Asset Management (TAM) Plan with financially and environmentally sustainable choices.
- Reduce the amount of capital funding flexed to operating while maintaining or increasing service levels.
- Implement a plan to operate, maintain, and upgrade the transportation system.
- Examine facility infrastructure needs to accommodate an alternate fuels fleet.

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

PVTA provides fixed route bus, ADA paratransit, and senior demand response van service to 24 member communities in the Pioneer Valley region, including Agawam, Amherst, Belchertown, Chicopee, Easthampton, East Longmeadow, Granby, Hadley, Hampden, Holyoke, Leverett, Longmeadow, Ludlow, Northampton, Palmer, Pelham, South Hadley, Springfield, Sunderland, Ware, West Springfield, Westfield, Wilbraham, and Williamsburg. While PVTA provides bus service to 24 areas, service covers 48 percent of the land area<sup>21</sup> (coverage is defined as being within  $\frac{3}{4}$  mile of a bus route), leaving over half of the area without access to general public transit.

The region PVTA service is developed around two urban areas. The largest, in the south of the region, has the cities of Springfield, Chicopee, and Holyoke as its urban core. In the north, the City of Northampton is a hub around which development is occurring in the surrounding towns of Hadley, Amherst, and Easthampton. As home to the flagship campus of the state university, Amherst is also a significant center of employment and activity.

The 24 communities that PVTA serves have a population of 575,550 and widely varying development patterns. These communities include highly urbanized centers and rural communities. While the City of Springfield is densely populated, having 4,798 residents per square mile, most of the communities PVTA serves have population densities of less than 1,000 residents per square mile. Nine of the 24 communities have fewer than 300 residents per square mile and 56.6 percent of PVTA's service area is considered rural (per the 2010 census classifications).<sup>22</sup> Serving mixed population densities shapes the services that PVTA provides and how it functions.

In addition to the mixed population densities, PVTA serves a mixed socioeconomic area, providing lifeline connections for a large proportion of minority and low-income population in the region. According to the 2013-2017 5-year American Community Survey (ACS) data, of the 4979 census block groups in PVTA's service area, 30 percent of them have a population with poverty rate greater than 20 percent. The average poverty rate for the PVTA communities is 25.1 percent. Hampden County, and especially the principal cities of Springfield, Holyoke, Chicopee, and West Springfield, have a large proportion of low-income, transit-dependent households. For example, Springfield and Holyoke have an average poverty rate of 36 and 29 percent, respectively, including some areas with a poverty rate as high as 90 percent, and 22 percent of households in both cities have no personal vehicle access. To the north in Hampshire County, PVTA serves a large low-income area in Amherst and Northampton, which includes the student population in University of Massachusetts-Amherst and other Five College Consortium area schools.

### 4.1 Description of Transit Services

PVTA operates 45 scheduled bus routes (36 fixed route local services, 6 fixed route express routes, and 3 deviated fixed routes) and 3 demand response services, including ADA paratransit service, senior van services, and the Survival and Wilbraham Shuttle. PVTA's fixed route buses operate on scheduled timetables and travel along a preset route, while the deviated fixed routes may travel off the main route to pick up or drop off passengers upon request. Additionally PVTA operates express routes between certain points that do not stop at local stops along the way.

PVTA provides paratransit services to eligible individuals residing within the geographic boundaries of the member communities or within  $\frac{3}{4}$  mile of a fixed route. The service provides a shared ride, door-to-door trip and is available all days and times when fixed route service is

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<sup>21</sup> This includes areas of water and mountains not just populated areas.

<sup>22</sup> Rural is defined as an area that is not considered an urbanized area or urban cluster per the most recent census delineations.



operating. Additionally, PVTA provides shared ride, demand response senior van service, also known as "Senior Dial-a-Ride," to residents 60 years of age and older in all 24 member communities in the Pioneer Valley. Senior van service is offered on a space available basis with priority given to certified ADA passengers in accordance with federal law.

PVTA's fixed route system can be organized by the garages that operate them: SATCo operates 26 routes in the southern portion of Hampden County and carries 57 percent of bus riders; UMTS/UMass operates 10 routes in the Five Colleges area in eastern Hampshire County and carries 31 percent of bus riders; VATCo operates 6 routes in the central portion of PVTA's service area around Northampton and carries 9 percent of bus riders; and Hulmes operates 2 shuttles in Easthampton and Palmer/Ware, and carries about 0.3 percent of bus riders. PVTA's ADA paratransit, Senior Van Service, Wilbraham Shuttle, and Northampton Shuttle are operated by Next and/or COAs and carry about 2.7 percent of riders. An overview of PVTA transit services by operator is presented in Table 3.

PVTA bus routes are categorized into one of five service tiers based on their termini's typical weekday departure intervals (Table 2). Other services, including Wilbraham/Eastfield Mall, ADA paratransit service, the various Senior Van Services, Northampton, Agawam, and the Tri-Town Trolley are demand response services and operate only on-demand and are not classified into service tiers.

**Table 2. PVTA Service Tiers–Bus Routes**

<b>Service Tier</b>	<b>Frequency</b>	<b>Number of Routes</b>
1	Every 15 Minutes	7
2	Every 20 Minutes	5
3	Every 30 Minutes	15
4	Every Hour	14
5	More than Hourly	16

Source: PVTA

*\*Route sums may total greater than 45 due to the double counting of reduced service or seasonally operating routes that have different headways.*

**Table 3. Transit Service Overview**

<b>Route</b>	<b>Operator</b>	<b>Service Tier</b>	<b>Description</b>	<b>Towns Served</b>
G1 - Chicopee/ Sumner-Allen/Canon Circle	SATCo	2	Between Chicopee Big Y and Canon Circle via Union Station. Some trips serve Riverbend Medical Center and 5 Town Plaza before Canon Circle; others serve Stop & Shop and 5 Town Plaza after Canon Circle. Some trips turn back at Chicopee Center instead of continuing to Chicopee Big Y.	Chicopee Springfield East Longmeadow
G2 - East Springfield via Carew/Belmont- Dwight	SATCo	3	Between Memorial Industrial Park and either East Longmeadow Big Y or Dwight and Benton Streets via Union Station. Some trips serve Mercy Medical Center or Cottage Street. Some weekday trips serve East Longmeadow Industrial Park.	Chicopee Springfield East Longmeadow Longmeadow
G2E - East Springfield Express	SATCo	4	Express service between Memorial Industrial Park and Union Station.	Springfield
G3 - Springfield Plaza via Liberty/ King- Westford	SATCo	3	Between Springfield Plaza and Westford Circle via Union Station. Some trips serve the Springfield Registry of Motor Vehicles. Sunday service to Chicopee Falls.	Chicopee Springfield
B4 - Plainfield Street	SATCo	3	Between Union Station and the Baystate Medical Offices via Plainfield Street.	Springfield
G5 - Springfield/ Dickinson/ Jewish Home/ Longmeadow	SATCo	4	Between Union Station and the Jewish Home in Longmeadow with select trips serving MassMutual Center in Enfield.	Springfield East Longmeadow Longmeadow Enfield
B6 – Ludlow via Bay Street	SATCo	2	Between Union Station and the Ludlow Big Y via Bay Street, Berkshire Avenue, and Indian Orchard. Some trips operate via Pasco and Goodwin Streets. Sunday service to Eastfield Mall. Select trip service to Encompass Health (formerly HealthSouth).	Ludlow Springfield

<b>Route</b>	<b>Operator</b>	<b>Service Tier</b>	<b>Description</b>	<b>Towns Served</b>
B7 – Eastfield Mall via State Street/Boston Road	SATCo	1	Springfield Route connecting Eastfield Mall and Union Station via Walmart. Some trips serve Independence House or PriceRite. Select weekday trip service to MassMutual. Saturday express service operates via I-291, stopping at Walmart on outbound trips.	Springfield
B7S - State Street Shuttle*	SATCo	1	Shuttle between the Raymond Jordan Senior Center and Union Station.	Springfield
10S - Westfield Center/ Westfield State University**	SATCo	3	Shuttle during semesters only connecting Westfield Center and WSU via Stop & Shop (trips from WSU to Westfield Center do not serve Stop & Shop).	Westfield
R10 - Westfield State University / West Springfield	SATCo	4	Westfield Route connecting Union Station and Westfield Center via the Westfield Walmart with service to WSU when Route 10S is not running. Some trips operate via Union and Meadow Streets in Westfield. Select trip service to Western Mass Hospital in Westfield.	Westfield West Springfield Springfield
P11 - Holyoke Community College Express	SATCo	4	Service when school is in session only between HCC and Union Station.	Holyoke Springfield
B12 - Stonybrook Express	SATCo	5	Connects Union Station and the Hampden County Correctional Facility.	Springfield Ludlow
R14 - Feeding Hills/Springfield***	SATCo	4	Between Union Station and Feeding Hills Center, Agawam. Outbound trips operate via North Street and inbound trips operate via Springfield Street in the morning, vice versa in the afternoon. Select trip service to Heritage Nursing Home and Agawam Industrial Park via Agawam Center.	Springfield West Springfield Agawam

<b>Route</b>	<b>Operator</b>	<b>Service Tier</b>	<b>Description</b>	<b>Towns Served</b>
B17 - Eastfield Mall via Worthington-Wilbraham Road	SATCo	4	Between Union Station and Eastfield Mall via Worthington Street and Sixteen Acres.	Springfield
P20 - Holyoke/ Springfield via Riverdale Street	SATCo	2	Between Union Station and the HTC via Riverdale Street and the Holyoke Mall.	Holyoke West Springfield Springfield
P20E - Holyoke Mall/ Union Station I-91 Express	SATCo	3	Express bus between Union Station and the Holyoke Mall.	Holyoke Springfield
P21 - Holyoke/ Springfield via Chicopee	SATCo	3	Between Union Station and HTC via Chicopee Center. Some trips operate via Meetinghouse and Meadow Streets in Willimansett.	Holyoke Chicopee Springfield
P21E - Springfield/ Holyoke via 391 Express	SATCo	4	Express bus between Union Station and HTC. Some weekday trips and all weekend trips operate via Baystate Medical Center.	Holyoke Springfield
B23 - Holyoke/ Westfield via HCC	SATCo	4	Between Westfield Center and HTC via HCC. Additional helper services when Holyoke Public Schools are in session. One morning trip to WSU during the academic year (trip to WSU has since been eliminated).	Holyoke Westfield
R24 - Cabot-Pleasant Street-Holyoke Medical Center-Sargeant Street	SATCo	4	Circulator around Holyoke connecting HTC, Stop & Shop, Holyoke Hospital, Holyoke Mall, and the Amtrak Station.	Holyoke
R29 - Amherst/ Holyoke Mall via Route 116 & Holyoke Trans Center	SATCo	5	Between Holyoke Mall and UMass via HTC and Route 116.	Holyoke Granby South Hadley Amherst

<b>Route</b>	<b>Operator</b>	<b>Service Tier</b>	<b>Description</b>	<b>Towns Served</b>
X90 - Inner Crosstown	SATCo	3	Crosstown service connecting HTC and East Longmeadow via Springfield Plaza and Chicopee. Route splits into "A" and "B" segments with 60 minute frequencies to serve different parts of Chicopee Falls, Aldenville, and Fairview.	Holyoke South Hadley Chicopee Springfield East Longmeadow
X92 - Mid-City Crosstown	SATCo	4	Springfield Route. Additional helper service when Springfield Public Schools are in session.	Springfield
Loop - The Loop	SATCo	3	Springfield Route. The Loop Evening Extension service provides extended service to La Quinta Inn in the evenings. No service on Monday and Tuesday.	Springfield
OWL - Westfield State University Shuttle	SATCo	1	Shuttle service on the WSU campus connecting parking lots to academic centers; different timetables for Monday/Wednesday/Thursday and Tuesday/Thursday but same span and frequency.	Westfield
39E - Smith/ Mount Holyoke Express	VATCo	4	Express service between Smith College and Mount Holyoke via Route 47.	Northampton South Hadley Hadley Amherst
R41 - Northampton/ Easthampton/ HCC/ Holyoke Mall	VATCo	4	Between downtown Northampton and the Holyoke Mall via Easthampton and HCC.	Northampton Easthampton Holyoke
R42 - Northampton/ Williamsburg/VA Hospital	VATCo	4	Between downtown Northampton and Williamsburg via Route 9 and the VA Hospital.	Northampton Williamsburg
B43 - Northampton/ Hadley/Amherst	VATCo	2	Between Smith College and Amherst College via Route 9 and UMass (express service uses Route 116).	Northampton Hadley Amherst

<b>Route</b>	<b>Operator</b>	<b>Service Tier</b>	<b>Description</b>	<b>Towns Served</b>
R44 - Florence Heights via King Street and Bridge Road	VATCo	5	Between downtown Northampton and Florence Heights via Florence Center, service to the Hampshire County House of Corrections; some trips serve Florence Center via High Street; serves VA Medical Center on Sunday only.	Northampton
R44a - Florence Center via Hampshire Plaza and Northampton Center via Florence Heights	VATCo	5	Counter-clockwise loop between Salvo House and Florence Center. Florence-bound service operates via Big Y and Salvo House bound service via Hampshire County House of Corrections; some trips serve Florence Center via High Street.	Northampton
R44b - Florence Center via Florence Heights and Northampton Center via Hampshire Plaza	VATCo	5	Clockwise loop between Salvo House and Florence Center, operating the reverse route of Route 44a.	Northampton
B48 - Northampton/Holyoke via Route 5	VATCo	3	Between HTC and downtown Northampton via Route 5.	Holyoke Northampton
51 - UMass Helper Bus	UMTS	5	Shadow bus used on the Routes 30 and 31 to pick up passengers left behind during peak times.	Amherst
30 - North Amherst / Old Belchertown Road	UMTS	1	Between Puffton Village in North Amherst and Old Belchertown Road (east Amherst) via the UMass Campus and downtown Amherst.	Amherst
31 - Sunderland / South Amherst	UMTS	1	Between Sugarloaf Estates Apartments and the Boulders Apartments in South Amherst. South Amherst bound trips operate via Sunderland Center and Sugarloaf Estates trips operate via the UMass Campus and downtown Amherst.	Sunderland Amherst

<b>Route</b>	<b>Operator</b>	<b>Service Tier</b>	<b>Description</b>	<b>Towns Served</b>
33 - Puffers Pond/ Shopper Shuttle	UMTS	3	Between Stop & Shop and Amherst Survival Center via UMass.	Amherst
34 - Campus Shuttle Northbound	UMTS	1	Campus circulator connecting various residential and parking areas.	Amherst
35 - Campus Shuttle Southbound	UMTS	1	Campus circulator connecting various residential and parking areas.	Amherst
36 - Olympia Drive/ Atkins Farm	UMTS	4	Between Atkins Farm and Olympia Drive via UMass Campus and downtown Amherst.	Amherst
38 - Mount Holyoke/ Hampshire/ Amherst/ UMass	UMTS	3	Connects UMass and Amherst College, Hampshire College, and Mount Holyoke College via downtown Amherst.	Amherst South Hadley
39 - Smith/ Hampshire	UMTS	3	Smith College to/from Hampshire College via Bay Road and Northampton Center. Evening and weekend service between Hampshire College and Hampshire Mall. Winter session weekday service operates between Smith College and Mount Holyoke College via Hampshire College.	Northampton Hadley South Hadley Amherst
45 - Belchertown Center / UMass	UMTS	5	Between Belchertown Center and UMass via Route 9, Gatehouse Road, and Amherst Center.	Amherst Belchertown
46 - South Deerfield / UMass	UMTS	5	Between UMass and South Deerfield with service to the Whatley park and ride.	Whately Sunderland Amherst South Deerfield
WP - Ware Palmer Circular	Hulmes	5	Local circulator within Palmer and Ware with express service to/from Union Station.	Ware Palmer Springfield
NE - Nashawannuck Express	Hulmes	5	Local circulator within Easthampton with connections to Northampton and Southampton.	Easthampton Northampton Southampton

<b>Route</b>	<b>Operator</b>	<b>Service Tier</b>	<b>Description</b>	<b>Towns Served</b>
S - Northampton Survival Center Shuttle	Next	4	Service between downtown Northampton and the Survival Center during food distribution hours.	Northampton
W - Wilbraham Eastfield Mall	Next	N/A	Van shuttle riders must be within Wilbraham travelling to the Eastfield Mall or travelling from the Eastfield Mall to a destination in Wilbraham.	Wilbraham Springfield
ADA Paratransit Service	Next	N/A	Service provides a shared ride, door-to-door van transportation throughout the Pioneer Valley within ¾ mile of a city bus route. Available all days when city bus is in service. Service is provided outside of the ¾ mile limit for a premium fare.	Towns throughout PVTA service area
Senior Van Service – Regionwide	Next	N/A	Only available Monday through Friday to seniors in 24 member communities in Pioneer Valley on a space available basis with priority given to certified ADA passengers.	All 24 PVTA member communities
Northampton Senior Van	Northampton COA	N/A	On-demand rides and regularly scheduled trips to markets and shopping centers including Mountain Farms Mall, Hampshire Mapp, Big Y, and River Valley Market and Stop & Shop.	Northampton Hadley
Agawam Senior Van****	Agawam COA	N/A	On-demand rides include priority rides to medical appointments, senior activities, and employment or volunteer opportunities. Non-priority rides are for any other purpose including shopping centers and beauty salon within the Agawam boundaries.	Agawam



Route	Operator	Service Tier	Description	Towns Served
Tri-Town Trolley: East Longmeadow/Longmeadow/Hampden	East Longmeadow COA	N/A	On-demand transportation for residents of East Longmeadow, Longmeadow, and Hampden. Trips are provided for shopping, hair salons, groceries, medical, and recreation.	East Longmeadow Longmeadow Hampden Ludlow Springfield West Springfield

Source: PVTA Springfield Area Schedules, Northampton Area Schedules, and Amherst & Surrounding Areas Schedules, <http://pvta.com/schedules.php>; PVTA Mobility Impaired Information, <http://pvta.com/mobility.php>; PVTA Seniors, <http://pvta.com/seniors.php>

*\*Route has since been eliminated.*

*\*\*Route has since been eliminated; now operates Westfield Route connecting Union Station and Westfield Center via the Westfield Walmart with most trips servicing WSU. Some trips operate via Union and Meadow Streets in Westfield. Select trip service to Western Mass Hospital in Westfield.*

*\*\*\*Route had a service change in August 2020; route now operates between Union Station and Feeding Hills Center, Agawam via Springfield Street. Select trip service to Maple/Walnut Streets as well as Pheasant Hill Apartments.*

*\*\*\*\*Service began June 2019.*

### 4.1.1 Service Characteristics

PVTA transit fixed route buses and shuttles operate with different spans of service on weekdays and weekends. Table 4 summarizes the span of service hours and days of operation for each route. Weekday span of service generally ranges from 5:00 AM to 11:30 PM in the Springfield (SATCo) area; 5:45 AM to 12:00 AM in the Northampton (VATCo) area; and 7:00 AM to 12:00 AM in the Amherst UMTS area, with some routes providing late night services until 3:00 AM on Thursdays and Fridays. As shown in the table, express services (Routes G2E, P11, B12, P20, P21E, and 39E) generally end their services by 8:00 PM since they primarily serve commuter traffic. Schedules are adjusted each quarter to account for seasonality in service demands and are denoted with an “R” for reduced or “ns” for no school in Table 4. Since most UMTS routes and some SATCo and VATCo routes are college oriented, their schedules are in part informed by the school calendar. UMTS Routes 30, 31, 33, 35, 38, 39, and 45, VATCo Route B43, and SATCo Route P11 and OWL operate reduced service schedules, or no service when the universities/colleges they serve are not in session. As shown in the table, 14 bus routes do not operate on Saturday and 24 bus routes do not operate on Sunday. On weekends, ADA paratransit operates on the same schedule as bus routes. Demand response senior van services (including Agawam and Tri-Town Trolley) and the Wilbraham/Eastfield Mall (Route W) do not operate on Saturdays or Sundays.

ADA paratransit service is operated the same days and hours as fixed route bus service, and as such, days and hours of service vary for each community. PVTA member communities that do not have fixed route services do not have complementary ADA paratransit service. Senior Van Service (60 years and older) is available within the entire PVTA service area between 8:00 AM and 4:30 PM Monday through Friday. Service is available on a space available basis with priority given to certified ADA passengers in accordance with federal law.

Accounting for day of week travel patterns and traffic volumes, PVTA fixed route and shuttle services operate different headways on the weekday and weekend. Table 5 summarizes the headways of each route for weekday and weekend services.

PVTA currently serves 24 communities, which range from densely populated urban areas to traditional New England villages. Generally these two areas are separated by relatively low-density rural areas. PVTA strives to provide services to those who need it the most; however, it can be challenging for any transit provider to balance the tradeoff between two key transportation planning principles—coverage and frequency. Coverage routes are those routes with longer headways, in part because they serve areas of lower population density. While these coverage routes tend to be less direct, reach farther, and have varying deviations from the main routing, coverage routes provide vital transportation services to much of PVTA’s service areas. In comparison, frequency routes serve smaller, typically high-density geographic areas with shorter headways along more direct paths. Some PVTA routes are considered hybrid, with moderate frequency and coverage.

**Table 4. Span of Service Hours**

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
G1 - Chicopee/Sumner-Allen/ Canon Circle	2	5:35 AM – 10:10 PM	6:00 AM – 9:30 PM	7:00 AM – 8:20 PM
G2 - East Springfield via Carew/Belmont-Dwight	3	5:00 AM – 10:15 PM	5:37 AM – 9:30 PM	9:00 AM – 7:00 PM
G2E - East Springfield Express	4	9:40 AM – 6:00 PM	No Service	No Service
G3 - Springfield Plaza via Liberty/King-Westford	3	5:50 AM – 7:45 PM	7:00 AM – 6:45 PM	9:00 AM – 5:58 PM
B4 - Plainfield Street	3	5:55 AM – 6:58 PM	6:00 AM – 5:58 PM	9:00 AM – 6:43 PM
G5 - Springfield/ Dickinson/ Jewish Home/Longmeadow	4	6:05 AM – 7:50 PM	7:30 AM – 5:58 PM	No Service
B6 - Ludlow via Bay Street	2	5:10 AM – 10:30 PM	7:00 AM – 9:18 PM	8:30 AM – 7:28 PM
B7 - Eastfield Mall via State Street/Boston Road	1	5:00 AM – 11:05 PM	5:00 AM – 9:58 PM	9:00 AM – 8:08 PM
B7S - State Street Shuttle	3	7:55 AM – 5:20 PM	No Service	No Service
10S - Westfield Center/ Westfield State University	3	6:17 AM – 5:35 PM	No Service	No Service
R10 - Westfield State University / West Springfield	4	5:00 AM – 11:13 PM	7:00 AM–9:48 PM	9:00 AM – 7:45 PM
P11 - Holyoke Community College Express	4	7:30 AM – 9:48 PM (Monday-Thursday)  7:30 AM–5:18 PM (Friday) (when class is in session only)	No Service	No Service
B12 - Stonybrook Express	5	1:55 PM – 6:58 PM	1:55 PM – 6:58 PM	No Service
R14 - Feeding Hills/Springfield	4	6:10 AM – 7:18 PM	7:10 AM – 6:28 PM	8:30 AM – 4:58 PM

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
B17 - Eastfield Mall via Worthington-Wilbraham Road	4	5:55 AM – 7:25 PM	7:00 AM – 6:58 PM	No Service
P20 - Holyoke/ Springfield via Riverdale Street	2	5:30 AM – 11:25 PM	6:00 AM – 10:38 PM	9:00 AM – 7:58 PM
P20E - Holyoke Mall/Union Station I-91 Express	3	7:10 AM – 6:35 PM	10:15 AM – 6:10 PM	No Service
P21 - Holyoke/Springfield via Chicopee	3	5:00 AM – 9:08 PM	8:00 AM – 9:08 PM	8:00 AM – 7:13 PM
P21E - Springfield/Holyoke via 391 Express	4	6:05 AM – 7:58 PM	8:00 AM – 6:58 PM	9:05 AM – 5:58 PM
B23 - Holyoke/Westfield via HCC	4	5:30 AM – 7:20 PM	No Service	No Service
R24 - Cabot-Pleasant Street-Holyoke Medical Center-Sargeant Street	4	8:00 AM – 4:55 PM	No Service	No Service
R29 - Amherst/Holyoke Mall via Route 116 & Holyoke Transportation Center	5	7:30 AM – 7:50 PM	7:30 AM – 10:20 AM 5:30 PM -7:50 PM	7:30 AM – 10:20 AM 5:30 PM – 7:50 PM
X90 - Inner Crosstown	3	6:10 AM – 9:25 PM	6:55 AM – 9:25 PM	9:00 AM – 5:10 PM
X92 - Mid-City Crosstown	4	6:00 AM – 6:43 PM	5:50 AM – 5:48 PM	No Service
Loop - The Loop	3	9:55 AM – 9:50 PM (No service on Monday and Tuesday)	9:55 AM – 9:50 PM	9:55 AM – 9:50 PM
OWL - Westfield State University Shuttle	1	7:58 AM – 3:00 PM	No Service	No Service
39E - Smith/Mount Holyoke Express	4	6:50 AM – 5:00 PM	No Service	No Service

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
R41 - Northampton/ Easthampton/ HCC/Holyoke Mall	4	6:15 AM – 7:40 PM	8:00 AM – 5:45 PM	No Service
R42 - Northampton/ Williamsburg/VA Hospital	4	5:45 AM – 8:55 PM	7:10 AM – 7:00 PM	No Service
B43 - Northampton/ Hadley/ Amherst	2	6:00 AM – 12:15 AM (Monday, Tuesday, Wednesday)  1:45 AM (Thursday)  3:00 AM (Friday)	6:00 AM – 3:00 AM	8:00 AM – 10:53 PM
B43ns - No School - Northampton/ Hadley/Amherst	3	6:30 AM – 12:00 AM	7:30 AM – 11:00 PM	8:00 AM – 11:00 PM
R44 - Florence Heights via King Street and Bridge Road	5	No Service	7:02 AM – 6:43 PM	10:55 PM – 4:58 PM
R44a - Florence Center via Hampshire Plaza and Northampton Center via Florence Heights	5	5:50 AM – 6:40 PM	No Service	No Service
R44b - Florence Center via Florence Heights and Northampton Center via Hampshire Plaza	5	6:20 AM – 7:10 PM	No Service	No Service
B48 - Northampton/ Holyoke via Route 5	3	7:00 AM – 8:00 PM	9:00 AM – 9:00 PM	9:00 AM – 7:00 PM
30 - North Amherst / Old Belchertown Road (full service schedule)	1	7:12 AM – 12:10 AM (Monday, Tuesday, Wednesday)  7:12 AM – 1:40 AM (Thursday, Friday)	7:45 AM – 1:40 AM	10:45 AM – 12:40 AM

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
30 R - North Amherst / Old Belchertown Road (reduced service schedule)	3	7:15 AM – 10:50 PM	7:45 AM – 10:40 PM	10:45 AM – 8:40 PM
31 - Sunderland / South Amherst (full service schedule)	1	7:00 AM – 12:11 AM (Monday, Tuesday, Wednesday)  7:00 AM – 1:21 AM (Thursday, Friday)	7:06 AM – 1:59 AM	10:51 AM – 12:49 AM
31 R- Sunderland / South Amherst (reduced service schedule)	3	6:47 AM – 11:16 PM	7:06 AM – 11:01 PM	10:51 AM – 8:41 PM
33 - Puffers Pond/Shopper Shuttle	3	7:06 AM – 9:12 PM	10:46 AM – 7:15 PM	10:46 AM – 7:15 PM
34 - Campus Shuttle Northbound	1	7:05 AM – 8:09 PM	No Service	No Service
35 - Campus Shuttle Southbound	1	7:22 AM – 12:35 AM	11:07 AM – 12:35 AM (and on holidays)	11:07 AM – 12:35 AM (and on holidays)
36 - Olympia Drive/Atkins Farm	4	8:00 AM – 8:05 PM	8:00 AM – 8:05 PM	No Service
38 - Mount Holyoke/Hampshire/Amherst/UMass (Fall and Spring semesters, no summer service)	3	6:45 AM – 1:20 AM (Monday, Tuesday, Wednesday)  2:35 AM (Thursday)  2:35 AM (Friday)	9:30 AM – 2:35 AM	9:00 AM – 12:35 AM
38 R - Mount Holyoke/Hampshire/Amherst/UMass (Winter Session)	3	6:30 AM – 9:25 PM	9:00 AM – 8:35 PM	No Service

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
39 - Smith/Hampshire (Fall and Spring semesters, no summer service) Smith College – Hampshire College – Smith College	3	7:30 AM – 7:05 PM (with two express trips Smith College - Mount Holyoke College in late afternoon)	9:50 AM – 2:05 AM	9:50 AM – 11:40 PM
39 - Smith/Hampshire/Hampshire Mall (Fall and Spring semesters, no summer service) Smith College – Hampshire College – Hampshire Mall - Hampshire College – Smith College	3	7:15 PM – 11:45 PM (Monday, Tuesday, Wednesday, Thursday) 1:30 AM (Friday)	9:50 AM – 2:05 AM	9:50 AM – 11:40 PM
39 R- Smith/Hampshire/Mount Holyoke (Winter semester)	3	7:15 AM – 9:20 PM	9:50 AM – 8:15 PM	No Service
45 - Belchertown Center / UMass	5	6:30 AM – 8:19 PM	No Service	No Service
46 - South Deerfield / UMass	5	7:00 AM – 7:45 AM 4:51 PM – 5:35 PM (semester) 5:41 PM – 6:26 PM (summer)	No Service	No Service
WP - Ware Palmer Circular	5	8:00 AM – 5:30 PM	No Service	No Service
NE - Nashawannuck Express	5	10:45 AM – 8:15 PM	10:45 AM – 8:15 PM	No Service
S - Northampton Survival Center Shuttle	4	11:10 AM – 1:40 PM (Monday, Wednesday, Friday) 4:10 PM – 6:40 PM (Tuesday, Thursday)	No Service	No Service

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
W - Wilbraham Eastfield Mall	N/A	6:40 AM – 6:25 PM	No Service	No Service
ADA Paratransit Service	N/A	Available when the city bus service operates	Available when the city bus service operates	Available when the city bus service operates
Senior Van Service Region-Wide	N/A	8:00 AM – 4:30 PM	No Service	No Service
Agawam Senior Van	N/A	8:45 AM – 2:45 PM	No Service	No Service
Tri-Town Trolley	N/A	9:00 AM – 3:00 PM	No Service	No Service
Northampton Senior Van	N/A	Hadley Shopping - Second Wednesday of the Month 9:00 AM – 2:30 PM  Big Y and River Valley Market: Every Tuesday 9:00 AM – 1:00 PM  Stop & Shop Every Thursday 8:30 AM – 3:30 PM  All other times 8:30 AM – 3:30 PM	No Service	No Service

Source: PVTA Schedules <http://pvta.com/schedules.php>; PVTA Mobility Impaired Information, <http://pvta.com/mobility.php>; PVTA Seniors, <http://pvta.com/seniors.php>



**Table 5. Service Headways**

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
OWL - Westfield State University Shuttle	1	15 minutes	No Service	No Service
34 - Campus Shuttle Northbound	1	15 minutes	No Service	No Service
B7 - Eastfield Mall via State St/Boston Road	1	15 minutes (30 minutes late evening and night)	20 minutes	30 minutes
30 - North Amherst / Old Belchertown Road (full service schedule)	1	15 minutes (30 minutes late night)	60 minutes	60 minutes
31 - Sunderland / South Amherst (full service schedule)	1	15 minutes (35 minutes late night)	75 minutes	75 minutes
35 - Campus Shuttle Southbound	1	15 minutes (40 minutes late night)	45 minutes (40 minutes late night)	45 minutes (40 minutes late night)
G1 - Chicopee/Sumner-Allen/Canon Circle	2	20 minutes	30 minutes	45 minutes
B6 - Ludlow via Bay Street	2	20 minutes (30 minutes late evening and night)	30 minutes	60 minutes
B43 - Northampton/Hadley/Amherst	2	20 minutes (45 minutes late night)	30 minutes	30 minutes (60 minutes late night)
P20 - Holyoke/ Springfield via Riverdale Street	2	20 minutes (60 minutes late night)	20 minutes	30 minutes
P20E - Holyoke Mall/Union Station I-91 Express	3	20–40 minutes	40 minutes	No Service
P21 - Holyoke/Springfield via Chicopee	3	30 minutes	30 minutes	45 minutes
G2 - East Springfield via Carew/Belmont-Dwight	3	30 minutes	30 minutes	60 minutes
G3 - Springfield Plaza via Liberty/King-Westford	3	30 minutes	30 minutes	60 minutes
X90 - Inner Crosstown	3	30 minutes	30 minutes	60 minutes
B7S - State Street Shuttle	3	30 minutes	No Service	No Service
10S - Westfield Center/ Westfield State University	3	30 minutes	No Service	No Service

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
38 - Mount Holyoke/Hampshire/ Amherst/ UMass	3	30 minutes (40 minutes late night)	45 minutes	90 minutes
B48 - Northampton/ Holyoke via Route 5	3	30 minutes peak / 60 minutes off-peak	60 minutes	60 minutes
39 - Smith/Hampshire (Fall and Spring semesters)	3	30 minutes (90 minutes late night)	90 minutes	90 minutes
B4 - Plainfield Street	3	40 minutes	30 minutes	60 minutes
Loop - The Loop	3	40 minutes	40 minutes	40 minutes
33 - Puffers Pond/Shopper Shuttle	3	40 minutes	80 minutes	80 minutes
B17 - Eastfield Mall via Worthington-Wilbraham Road	4	45 minutes	45 minutes	No Service
R10 - Westfield State University / West Springfield (No school)	4	45 minutes	60 minutes	60 minutes
G2E - East Springfield Express	4	50 minutes	No Service	No Service
R10 - Westfield State University / West Springfield (school in session)	4	60 minutes	60 minutes	60 minutes
P21E - Springfield/Holyoke via 391 Express	4	60 minutes	60 minutes	60 minutes
R14 - Feeding Hills/Springfield	4	60 minutes	60 minutes	60 minutes
X92 - Mid-City Crosstown	4	60 minutes	45 minutes	No Service
R42 - Northampton/Williamsburg/VA Hospital	4	60 minutes	60 minutes	No Service
36 - Olympia Drive/Atkins Farm	4	60 minutes	60 minutes	No Service
R41 - Northampton/Easthampton/ HCC/Holyoke Mall	4	60-65 minutes	60 minutes	No Service
G5 - Springfield/Dickinson/Jewish Home/Longmeadow	4	60 minutes	90 minutes	No Service

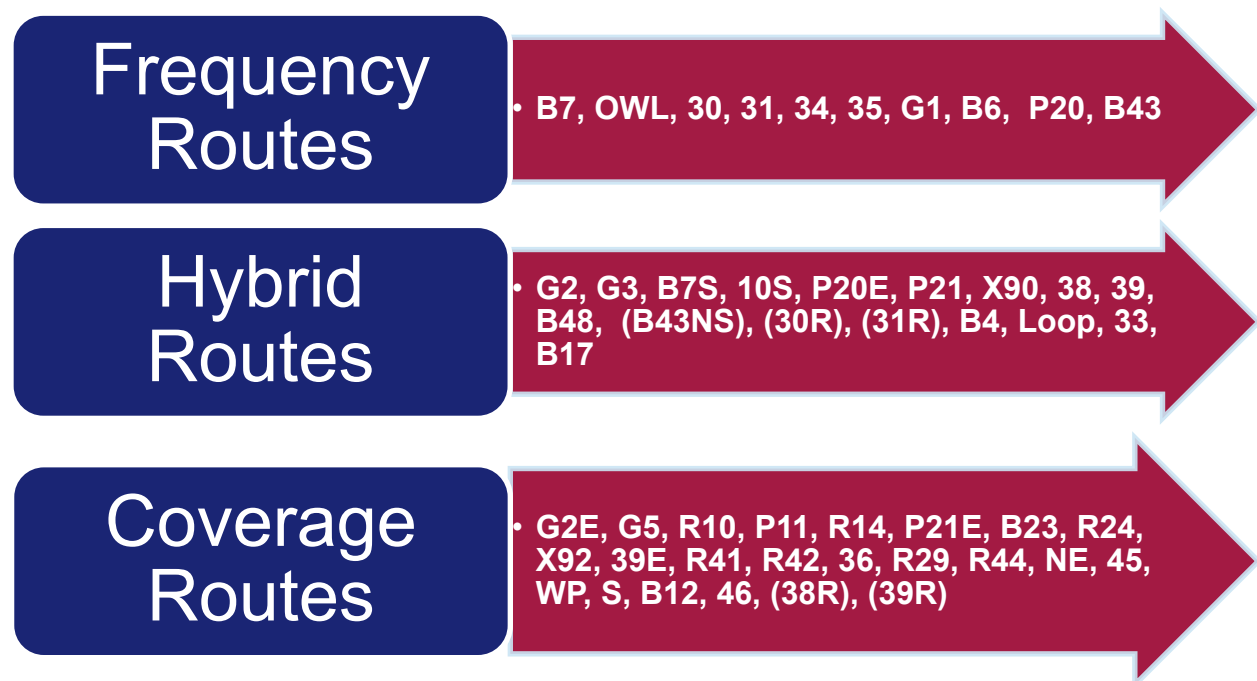
<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
P11 - Holyoke Community College Express	4	60 minutes	No Service	No Service
B23 - Holyoke/Westfield via HCC	4	60 minutes	No Service	No Service
R24 - Cabot-Pleasant Street-Holyoke Medical Center-Sargeant Street	4	60 minutes	No Service	No Service
39E - Smith/Mount Holyoke Express	4	60-65 minutes	No Service	No Service
S - Northampton Survival Center Shuttle	4	3 trips (60 minutes)	No Service	No Service
R44a - Florence Center via Hampshire Plaza and Northampton Center via Florence Heights	5	70 minutes	No Service	No Service
R44b - Florence Center via Florence Heights and Northampton Center via Hampshire Plaza	5	70 minutes	No Service	No Service
NE - Nashawannuck Express	5	90 minutes	90 minutes	No Service
R29 - Amherst/Holyoke Mall via Route 116 and Holyoke Transportation Center	5	120 minutes	2 trips	2 trips
46 - South Deerfield / UMass	5	2 trips	No Service	No Service
B12 - Stonybrook Express	5	3 trips	3 trips	No Service
WP - Ware Palmer Circular	5	6 trips	No Service	No Service
45 - Belchertown Center / UMass	5	7 trips (6 trips during reduced service)	No Service	No Service
R44 - Florence Heights via King Street and Bridge Road	5	No Service	120 minutes	120 minutes
B43ns - No School - Northampton/Hadley/Amherst	3	30 minutes peak / 60 minutes off-peak	60 minutes	60 minutes
30 R - North Amherst / Old Belchertown Road (reduced service schedule)	3	30 minutes (60 minutes late night)	60 minutes	60 minutes
31 R- Sunderland / South Amherst (reduced service schedule)	3	35 minutes (70 minutes late night)	75 minutes	75 minutes

<b>Route</b>	<b>Service Tier</b>	<b>Weekday</b>	<b>Saturday</b>	<b>Sunday</b>
39 R- Smith/Hampshire (Winter semesters)	5	90 minutes	90 minutes	No Service
38 R – Mount Holyoke/Hampshire/ Amherst/UMass (Winter session)	5	90 minutes	90 minutes	No Service
W - Wilbraham Eastfield Mall	N/A	On-demand	No Service	No Service
ADA Paratransit Service	N/A	On-demand	On-demand	On-demand
Senior Van Service	N/A	On-demand	No Service	No Service
Northampton On-Demand	N/A	On-demand	No Service	No Service
Agawam On-Demand	N/A	On-demand	No Service	No Service
Tri-Town Trolley On-Demand	N/A	On-demand	No Service	No Service

Source: PVTA Springfield Area Schedules, <http://pvta.com/schedules.php>

Existing route headways were used in order to categorize PVTA routes as frequency, hybrid, or coverage. Routes with a headway of 20 minutes or less were classified as frequency, routes with headways between 20 and 45 minutes were classified as hybrid,<sup>23</sup> and those with a headway greater than 45 minutes were classified as coverage<sup>24</sup> (Figure 9). Based on these three categories, currently 41.8 percent of the service hours (fixed route, express bus, and deviated fixed route) operated by PVTA are frequency routes, 31.8 are hybrid routes, and 23.4 percent are coverage routes. However, other factors can impact how PVTA routes operate such as service demand, fluctuating funding levels, demographic data, and other local conditions. Overall, evaluating the tradeoff between coverage and frequency is an ongoing conversation in the transit community for all transit agencies, and all existing PVTA services should be evaluated according to performance.

**Figure 9. Frequency versus Coverage Routes**



Source: PVTA Schedules

#### 4.1.1.1 Helper Service

PVTA holds contracts with local school districts to operate “Helper” trips (also referred to as “Tripper” services) on weekdays only when Springfield and Holyoke public schools are in session. The service schedules for these helper trips are determined in coordination with the local schools. Helper routes operate in the morning or afternoon peaks that coincide with the start and end of the school day. Table 6 lists the helper services and their service hours. Although different from the previously discussed scheduled helper service, UMass Transit also operates helper services or unscheduled overflow buses sent out to supplement service during high demand peak hours on weekdays. These services are also included in Table 6.

<sup>23</sup> These routes are neither frequent, nor are they “coverage” as they typically operate along more direct paths.

<sup>24</sup> 20 minutes is the maximum desirable time to wait if a bus is missed according to the TCRP Transit Capacity and Quality of Service Manual [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_webdoc\\_6-e.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_webdoc_6-e.pdf). In TCRP Report 30 frequent is defined as 15 minutes or less, [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_30-a.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_30-a.pdf).

**Table 6. Span of Service Hours - Helper Service**

<b>Route</b>	<b>Morning Trips</b>	<b>Afternoon Trips</b>
G1 - Chicopee/Sumner-Allen/Canon Circle (Helper T1 Sumner Avenue – State Street)	6:28 AM – 7:13 AM	---
G1 - Chicopee/Sumner-Allen/Canon Circle (Helper T1 Main Street – State Street)	6:46 AM – 7:18 AM	--
G1 - Chicopee/Sumner-Allen/Canon Circle (Helper T1 State Street – Sumner Avenue – The X/Dickinson to Main Street)	---	2:30 PM – 3:24 PM
G2 - East Springfield via Carew/Belmont- Dwight (Helper T2 Carew – Roosevelt – State Street to Main Street)	6:46 AM – 7:15 AM	---
G2 - East Springfield via Carew/Belmont- Dwight (Helper T2 Dickinson to the X-Belmont to Main Street)	6:25 AM – 7:22 AM	---
G2 - East Springfield via Carew/Belmont- Dwight (Helper T2 Carew to Plainfield)	---	2:30 PM – 2:55 PM
G2 - East Springfield via Carew/Belmont- Dwight (Helper T2 State Street to Main Street – Belmont to the X-Sumner Avenue to Main Street)	---	2:30 PM – 3:37 PM
G3 - Springfield Plaza via Liberty/King-Westford (Helper T3 Liberty – Carew – Roosevelt - State Street)	6:36 AM – 7:18 AM	---
G3 - Springfield Plaza via Liberty/King-Westford (Helper T3 State Street – Liberty/ Carew)	---	2:30 PM – 2:55 PM
G3 - Springfield Plaza via Liberty/King-Westford (Helper T3 State Street – Armory - Carew)	---	2:30 PM – 3:03 PM
B4 - Plainfield Street (Helper T4 Plainfield – Carew – State Street)	6:36 AM – 7:15 AM	---
B4 - Plainfield Street (Helper T4 Plainfield – State Street via Main Street)	6:40 AM – 7:15 AM	---
B4 - Plainfield Street (Helper T4 State Street - Plainfield via Main Street)	---	2:30 PM – 3:10 PM
G5 - Springfield/Dickinson/Jewish Home/Longmeadow (Helper T1 State Street – Sumner Avenue to the X/Dickinson to Main Street)	---	2:30 PM – 3:24 PM
G5 - Springfield/Dickinson/Jewish Home/ Longmeadow (Helper T2 Dickinson to the X- Belmont to Main Street – State Street)	6:25 AM – 7:22 AM	---

<b>Route</b>	<b>Morning Trips</b>	<b>Afternoon Trips</b>
G5 - Springfield/Dickinson/Jewish Home/Longmeadow ( <i>Helper T5 Belmont to the X-Dickinson to Main Street – State Street</i> )	6:33 AM – 7:15 AM	--
G5 - Springfield/Dickinson/Jewish Home/Longmeadow ( <i>Helper T5 State Street – Dickinson/X-Belmont to Main Street</i> )	---	2:30 PM – 3:17 PM
B6 - Ludlow via Bay Street ( <i>Helper T6 Downtown Springfield</i> )	---	2:30 PM – 2:50 PM
P20 - Holyoke/ Springfield via Riverdale Street ( <i>Helper T20 Lower Westfield/Homestead – Beech</i> )	7:15 AM – 7:50 AM	3:00 PM – 3:25 PM (Monday, Tuesday, Thursday, Friday)  2:10 PM – 2:35 PM (Wednesday)
P21 - Holyoke/Springfield via Chicopee ( <i>Helper T21 Glenwood Circle – Carew – State Street</i> )	6:41 AM – 7:15 AM	---
P21 - Holyoke/Springfield via Chicopee ( <i>Helper T21 Glenwood Circle – Main Street – State Street</i> )	6:40 AM – 7:15 AM	---
P21 - Holyoke/Springfield via Chicopee ( <i>Helper T21 State Street - Carew – Chestnut</i> )	---	2:30 PM – 3:07 PM
P21 - Holyoke/Springfield via Chicopee ( <i>Helper T21 State Street – Chestnut - Carew – Plainfield</i> )	---	2:30 PM – 2:55 PM
P21 - Holyoke/Springfield via Chicopee ( <i>Helper T21 State Street – Chestnut – Liberty – Carew to Glenwood Circle</i> )	---	2:30 PM – 3:00 PM
B23 - Holyoke/Westfield via HCC ( <i>Helper T23 Highlands – Beech</i> )	7:15 AM – 7:50 AM	3:00 PM – 3:35 PM (Monday, Tuesday, Thursday, Friday)  2:10 PM – 2:45 PM (Wednesday)
R24 - Cabot-Pleasant Street-Holyoke Medical Center-Sargeant Street ( <i>Helper 24 Flats-Beech</i> )	7:15 AM – 7:50 AM	---
R24 - Cabot-Pleasant Street-Holyoke Medical Center-Sargeant Street ( <i>Helper 24 Dwight-Flats-Beech</i> )	7:20 AM – 7:50 AM	---
R24 - Cabot-Pleasant Street-Holyoke Medical Center-Sargeant Street ( <i>Helper 24 Beech-Flats</i> )	---	3:00 PM – 3:35 PM (Monday, Tuesday, Thursday, Friday)  2:10 PM – 2:45 PM (Wednesday)

Route	Morning Trips	Afternoon Trips
X92 - Mid-City Crosstown ( <i>Helper T92 Orange-White-Maple-State Street</i> )	6:25 AM – 7:11 AM	---
X92 - Mid-City Crosstown ( <i>Helper T92 State Street-Sumner-White-Central to Maple</i> )	---	2:30 PM – 3:25 PM
51 - North Amherst/UMass/Main Street/Amherst Center/UMass	8:43 AM – 11:05 AM (Monday, Wednesday, Friday)  9:28 AM – 11:20 AM (Tuesday, Thursday)	---

Source: PVTA Schedules

#### 4.1.2 Service Changes

PVTA has made several changes to its transit services in the past few years (Table 7) in response to several factors, including the 2014 CSA, budget constraints, new partnerships, workforce shortages, relocation to the new operations and maintenance (O&M) facility, and the availability of discretionary grants from MassDOT. Changes in FY 2015 are largely a response to recommendations in the 2014 CSA. Between FY 2015 and FY 2016, PVTA discontinued 7 routes, added 9 routes, and increased span or frequency of service on 18 routes. In FY 2018, due to level funding from the state and increasing operating costs, PVTA eliminated 5 routes, modified service hours or reduced frequency/trips on 21 routes, and adjusted alignments on 6 routes. Since 2017, PVTA has implemented four new routes from contracts and partnerships with local colleges and businesses, and two new routes from discretionary grant awards. Minor timing changes were also made across the system to improve OTP. A more thorough list of changes can be found in Appendix A.

**Table 7. PVTA Service Changes (FY 2015–FY 2019)**

Fiscal Year Implemented	Route	Service Change
FY 2015	G1E, G8, B13, B15, G19, R25, R22, 32, 37	Discontinued routes
FY 2015	R10s, R14E, R29, X90, X92, Tiger Trolley, 33, 36, X98	Created new routes
FY 2015	G2, G3, G5, B6, R14, B17, P20, P21, B23, R24, X90, R41	Adjusted alignment
FY 2015	R41	Added Saturday service
FY 2015	R42	Increased weekday span of service
FY 2015	R42, R41	Increased weekday frequency
FY 2015	G5, B6, R14, P21E	Added trips
FY 2015	G3, R44	Increased Saturday span of service
FY 2015	G2, B7	Increased Sunday span of service



<b>Fiscal Year Implemented</b>	<b>Route</b>	<b>Service Change</b>
FY 2015	G3, B6	Adjusted alignment on weekends
FY 2016	R14	Added running time
FY 2016	39E	Discontinued route
FY 2016	P20E, P21E	Separated into own schedules
FY 2016	45, 46	Eliminated evening trip on weekdays, added mid-day trips
FY 2016	G1, B4, B7, P21, P11, B23, X98, 36	Adjusted alignment
FY 2016	P20, P21, B43, B48, 33	Increased number of weekend trips
FY 2016	P20, P21, B48	Increased number of weekday trips
FY 2016	B4, 10S	Reduced weekday frequency
FY 2016	X98	Adjusted service span
FY 2016	Tiger Trolley	Adjusted alignment
FY 2016	B7	Created consistent frequency all day on weekdays
FY 2018	Springfield systemwide	Relocated hub from Springfield Bus Terminal (SBT) to Union Station
FY 2018	G3, G5	Revised weekday and Saturday schedules
FY 2018	Tiger Trolley	Eliminated route
FY 2018	R14E	Eliminated route
FY 2018	R27	Eliminated route
FY 2018	M40	Eliminated route
FY 2018	P20E, B23, 46, X98, G5 south of Longmeadow, X90, B4	Reduced number of trips daily on weekdays
FY 2018	45, 46	Eliminated weekend service
FY 2018	39	Temporarily adjusted alignment and frequency due to construction
FY 2018	B23	Eliminated Saturday service
FY 2018	R29, B48, B4	Reduced weekend frequency
FY 2018	X90	Adjusted alignment - eliminated Sunday service north of Memorial Drive

<b>Fiscal Year Implemented</b>	<b>Route</b>	<b>Service Change</b>
FY 2018	P21E	Altered route to serve Baystate Medical Center and Chestnut/Dwight Streets on alternate weekday trips as well as on all weekend trips
FY 2019	Loop, Survival Center Shuttle, Wilbraham Shuttle, 39E	Added new route
FY 2019	Systemwide	Reduced holiday service to Sunday service levels
FY 2019	R24	Adjusted alignment, eliminated Saturday service, reduced weekday span
FY 2019	NE	Shortened service span
FY 2019	30, 31	Reduced service during the summer
FY 2019	46, Palmer Shuttle, Ware Shuttle	Adjusted alignment - combined with another route
FY 2019	30,31,33	Reduced service frequency on weekdays 6:00 PM to 8:00 PM
FY 2019	45	Eliminated one mid-day trip
FY 2019	30,31,38,39	Reduced winter service frequency
FY 2019	34	Eliminated weekday evening service
FY 2019	39	Adjusted alignment at night and on weekends
FY 2019	X98	Eliminated and replaced with Survival Shuttle
Fall 2018 only	33, 34, 35	Reduced weekday frequency
FY 2019	R44	Reduced Sunday frequency
FY 2019	X92	Adjusted alignment, reduced frequency
FY 2019	B17	Adjusted alignment, eliminated route segment
FY 2019	Wilbraham Shuttle	Added service
FY 2019	B43	Reduced number of trips daily on weekdays
FY 2019	G2	Reduced weekday afternoon frequency
FY 2019	Loop	Adjusted alignment, added trips
FY 2019	G2E, B7s	Added new route
FY 2019	R44	Adjusted alignment, redesigned route
FY 2019	G1	Revised weekday schedule
FY 2019	P20E	Added weekday trips

Source: *PVTA Service Equity Analysis for 2019 Service Change Proposals; PVTA Equity Analysis for Service Changes Effective Fall 2017*

### 4.1.3 Financial

The total operating budget was \$49,373,444 in FY 2019, which is an increase of 6 percent from FY 2018, with the increase primarily due to contractual labor requirements, preventive maintenance on the buses, insurance claims payments, contractual paratransit vendor payments, fuel prices, and consumption, and an increase in rent at the Springfield Union Station. PVTA revenues come from federal, state, local, farebox revenue, partnerships/contracts, and other sources. Table 8 summarizes the funding amount by source from FY 2015 to FY 2019, and Figure 10 shows the funding sources by percentage of total revenue. In FY 2019, PVTA received its highest level of revenue, which had increased by 14 percent from FY 2015. As shown in Figure 10, in FY 2019 51 percent of revenue was received from the Commonwealth of Massachusetts,<sup>25</sup> followed by 18 percent from local member communities, 15 percent from farebox revenue, 13 percent from federal grants, and the remaining 3 percent from other sources such as advertisement revenues, service contracts, and interest income.

As shown in Figure 10, between FY 2015 and FY 2019 state funding remained relatively consistent, ranging between 53.4 percent and 49.4 percent, with a 2 percent funding reduction in FY 2018, followed by a 2 percent base funding increase in FY 2019.<sup>26</sup> The other two largest sources of financial assistance are local and farebox sources. Farebox revenue contributed 15.2 percent of the operating funding sources in FY 2019, up \$500,000 from FY 2018. Local funding also remained relatively consistent at 18 and 19 percent between FY 2015 and FY 2019. With the exception of FY 2016 each year the total dollar value from local sources increased by 2.5 percent in accordance with Proposition 2 ½, which does not allow the local assessment to increase by more than 2.5 percent unless new service is added.<sup>27</sup> Between FY 2015 and FY 2019 farebox revenue contributed 15.0 percent to 18.0 percent of the operating funding sources. In FY 2019, the farebox revenue increased by \$515,147 due to fare increases and accounted for 15 percent of revenues.

**Table 8. Operating Revenue Sources (FY 2015–FY 2019)**

Revenue Source	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Farebox	\$7,780,297	\$7,950,748	\$7,293,723	\$7,011,521	\$7,526,668
Federal	\$3,366,626	\$5,107,467	\$5,702,070	\$6,858,006	\$6,283,734
State	\$22,980,428	\$23,554,939	\$23,554,939	\$23,095,330	\$25,233,938
Local	\$7,827,620	\$8,309,002	\$8,516,727	\$8,729,645	\$8,947,886
Partnerships/ contracts	\$784,122	\$289,517	\$176,813	\$591,690	\$803,396
Other	\$398,314	\$439,577	\$390,420	\$475,544	\$577,822
<b>TOTAL</b>	<b>\$43,137,407</b>	<b>\$45,651,250</b>	<b>\$45,634,692</b>	<b>\$46,761,736</b>	<b>\$49,373,444</b>

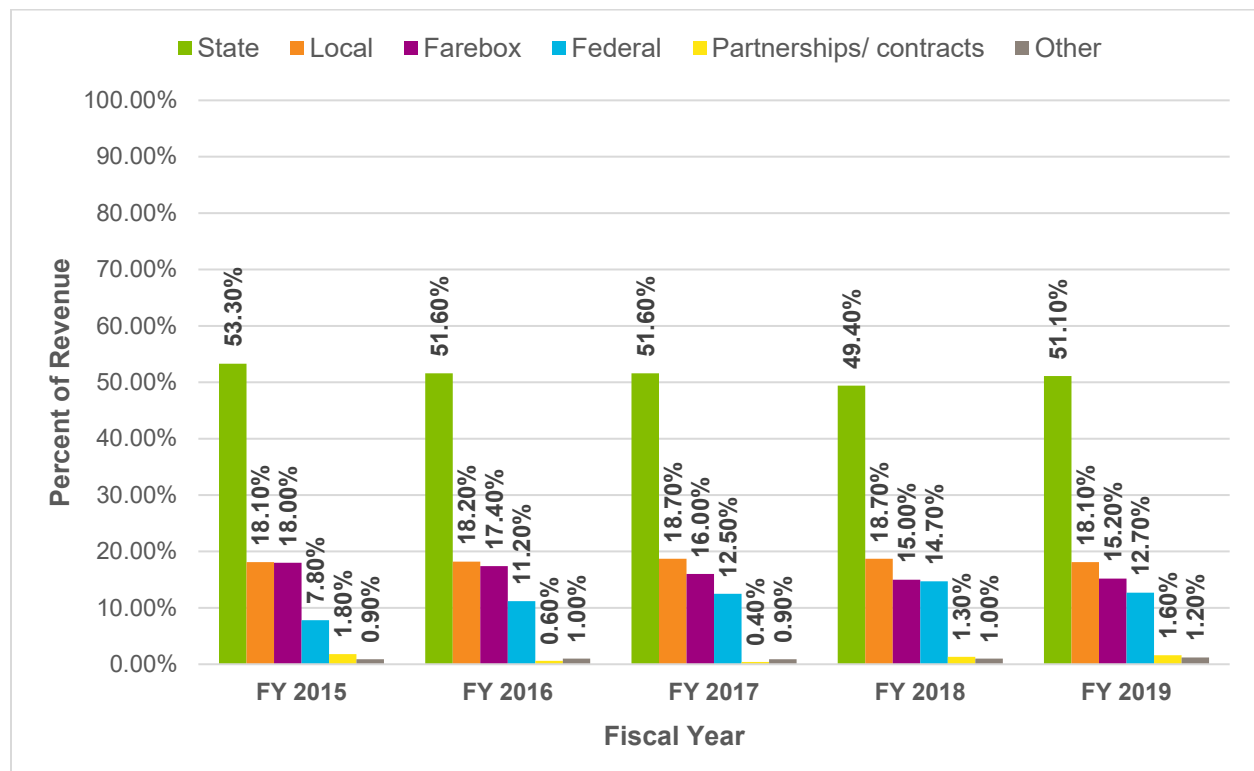
Source: *NTD, RTA Service Data FY 2015-FY 2019*

<sup>25</sup>Across the 15 RTAs in the state, state funding makes up approximately 39 percent of their collective operating costs.

<sup>26</sup> This includes one-time discretionary grants beginning in FY 2019 for service improvements. Since the grants are not long-term sustainable sources the service improvements are often temporary. In FY 2019 state discretionary grants for PVTA amounted to \$600,241 (plus an additional 2.4% in state discretionary grants).

<sup>27</sup> In 2016, local funding increased by 6.2% because PVTA implemented substantial service changes in accordance with their CSA, adding 30,000 new revenue hours.

**Figure 10. Operating Revenue Source Percentage by Fiscal Year (FY 2015–FY 2019)**

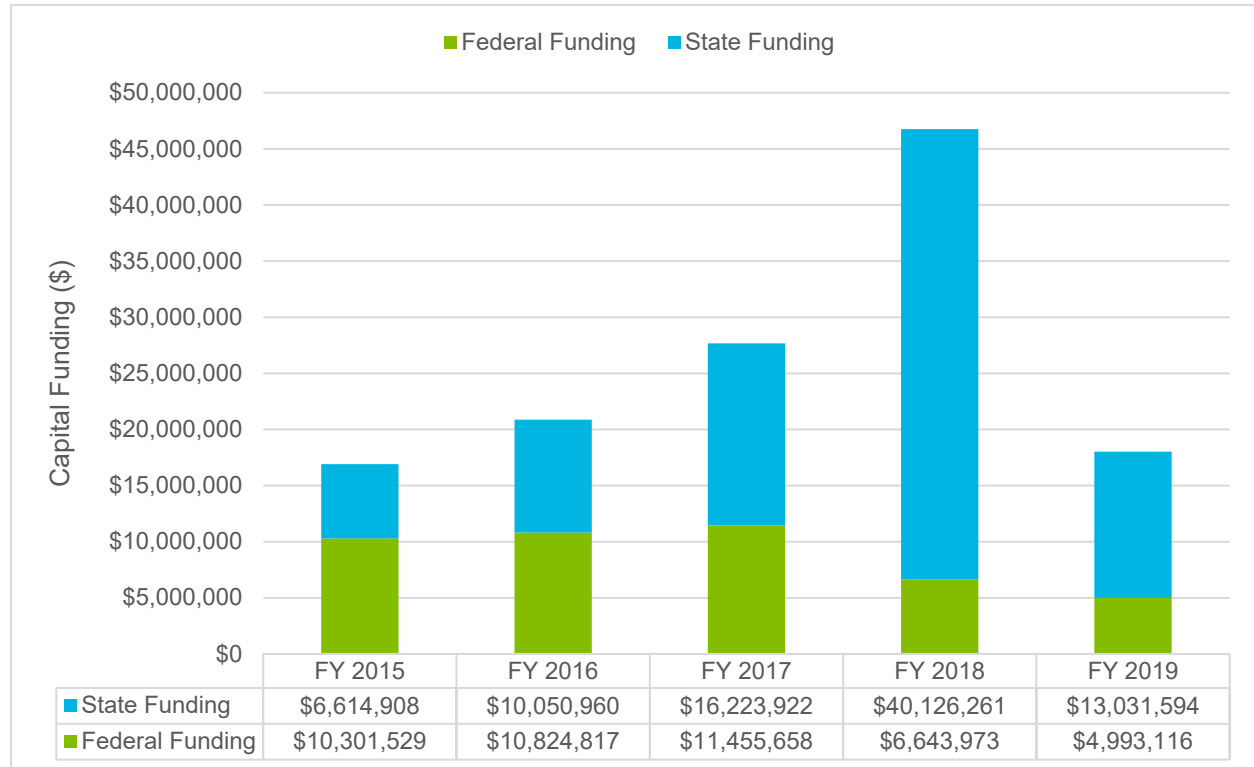


Source: RTA Service Data FY 2015-FY 2019

From FY 2015 to FY 2019 PVTA received between \$16.9 million and \$46.7 million in capital funding (Figure 11). Each year the federal government provides 14 and 61 percent of the capital revenue. Each year PVTA also receives between 39 and 86 percent of capital funds from the Commonwealth of Massachusetts. Together federal and state sources make up the entirety of PVTA’s capital revenue sources.

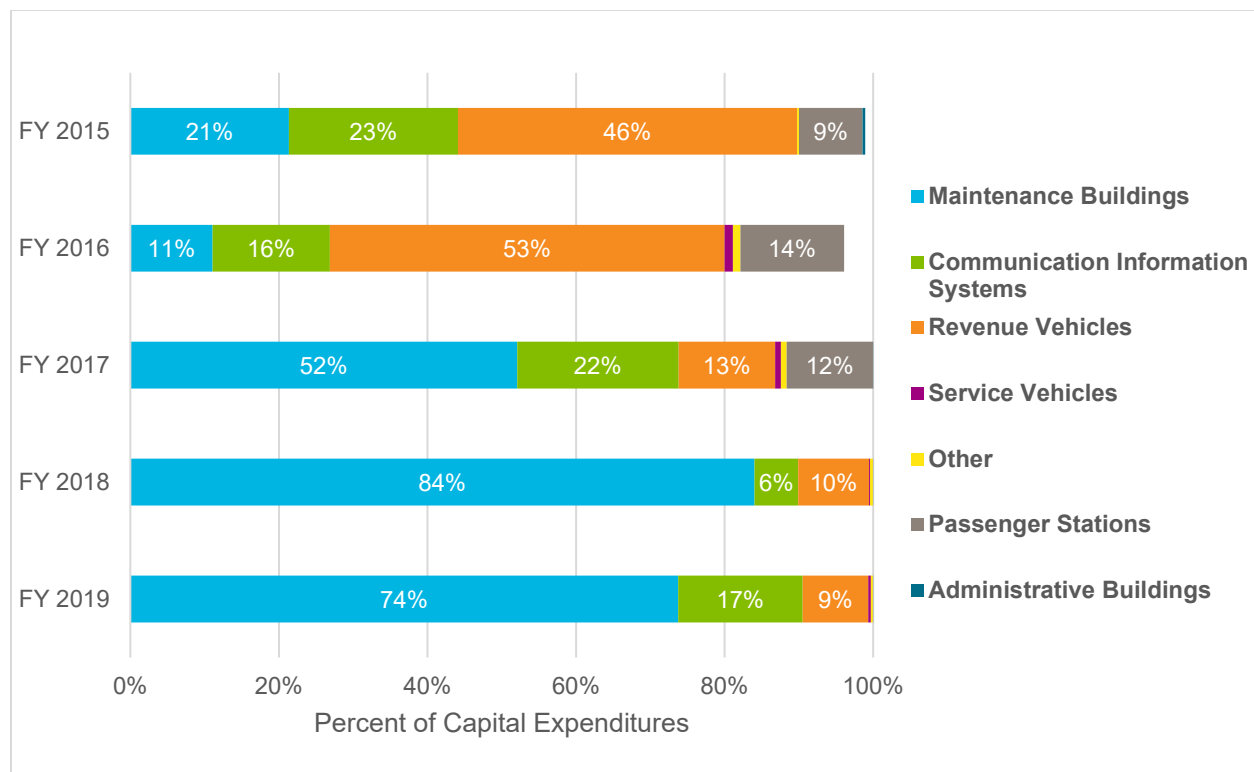
PVTA utilizes its capital funding received from the state and federal government for various capital expenditures. From FY 2015 to FY 2016, PVTA spent the largest portion of its capital funding on revenue vehicles (46 to 53 percent) (Figure 12). During this period PVTA also invested its capital funds in passenger stations and communication systems. In more recent fiscal years (FY 2018 to FY 2019), the greatest amounts of PVTA’s capital funding have been used to construct the new Cottage Street Bus Maintenance and Operations Facility in Springfield. The increase in capital funding in FY 2018 is associated with the construction of this facility. The remainder of the capital funding in FY 2018 and FY 2019 was used for communication information systems and revenue vehicles.

**Figure 11. PVTA Capital Funding (FY 2015–FY 2019)**



Source: NTD (FY 2015 – FY 2019)

**Figure 12. PVTA Capital Expenditures (FY 2015–FY 2019)**



Source: NTD (FY 2015 – FY 2019)

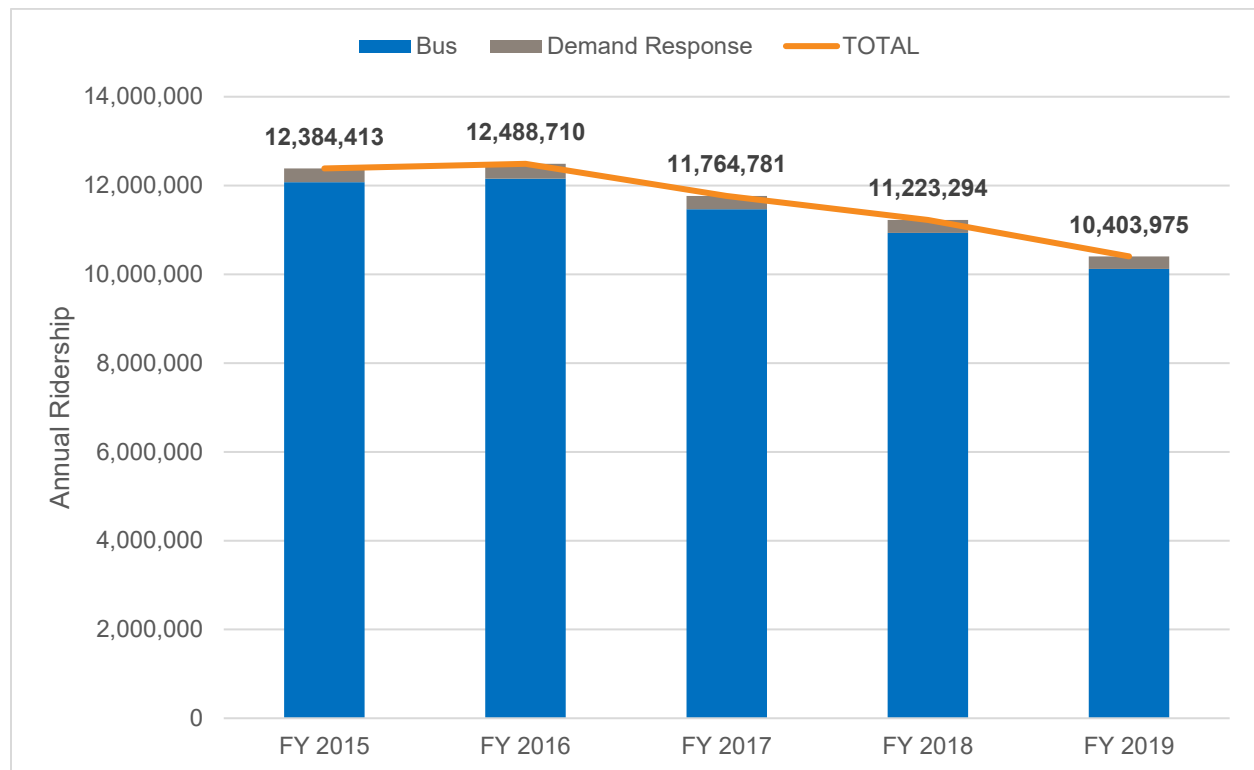
## 4.2 Ridership and Service Operations

This chapter provides an overview of ridership and the amount of service provided. Appendix B provides further information on performance metrics.

### 4.2.1 Ridership

PVTA experienced a decrease in ridership systemwide between FY 2015 and FY 2019, with an overall decline of 2,208,965, or 17.8 percent (Figure 13). While ridership increased slightly in FY 2016 by 100,000, a continued impact from the 2014 CSA recommended service additions, it then began to decrease annually at a rate of 5 to 8 percent, or approximately 700,000 per year. During this period of decline PVTA experienced reduced state funding, which led to service reductions and increased systemwide fares, which likely contributed to the decline in the number of riders, in conjunction with national trends of transit decline corresponding with the onset of TNCs such as Uber and Lyft. Beginning in 2015, transit ridership began decreasing nationally at 7.24 percent annually. During this national decline, over 56.0 percent of all US systems lost ridership. In Massachusetts, PVTA was not alone in its decline in ridership; other RTAs also saw ridership decline, between 0.9 and 22 percent.<sup>28</sup>

**Figure 13. Annual System Ridership Trends (2015–2019)**

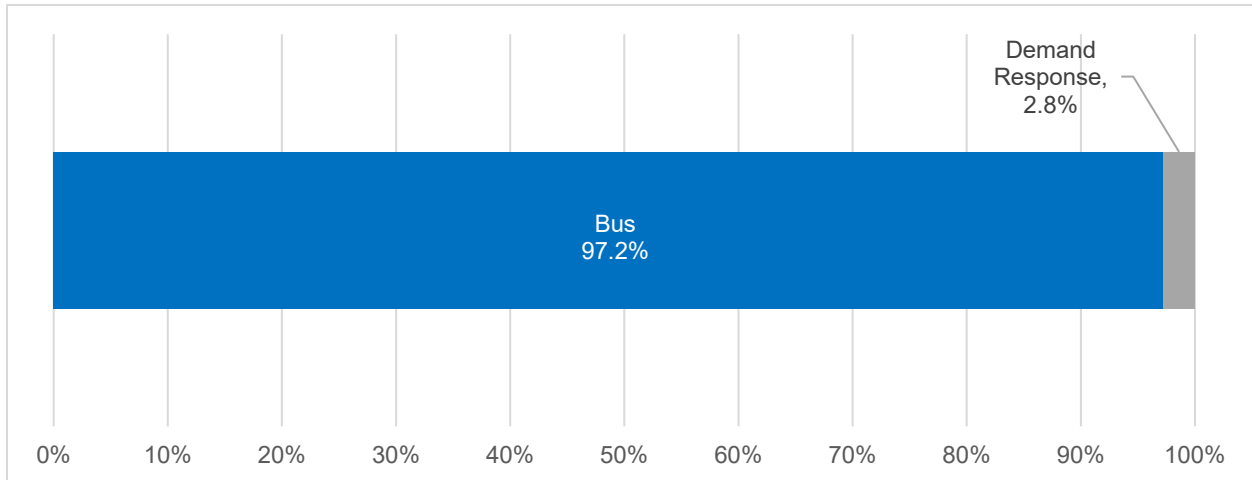


Source: NTD

Figure 14 shows a breakdown of the FY 2019 ridership by service type. As shown in the figure, in FY 2019 97.2 percent of the total passengers (9.9 million riders) used the fixed route bus system and 2.8 percent (283,897 riders) used demand response, which includes the ADA paratransit service, region-wide senior van service, and Wilbraham Shuttle.

<sup>28</sup> According to the FTA, Service Data and Operating Expenses Time Series by Mode, <https://www.transit.dot.gov/ntd/data-product/ts21-service-data-and-operating-expenses-time-series-mode-2>.

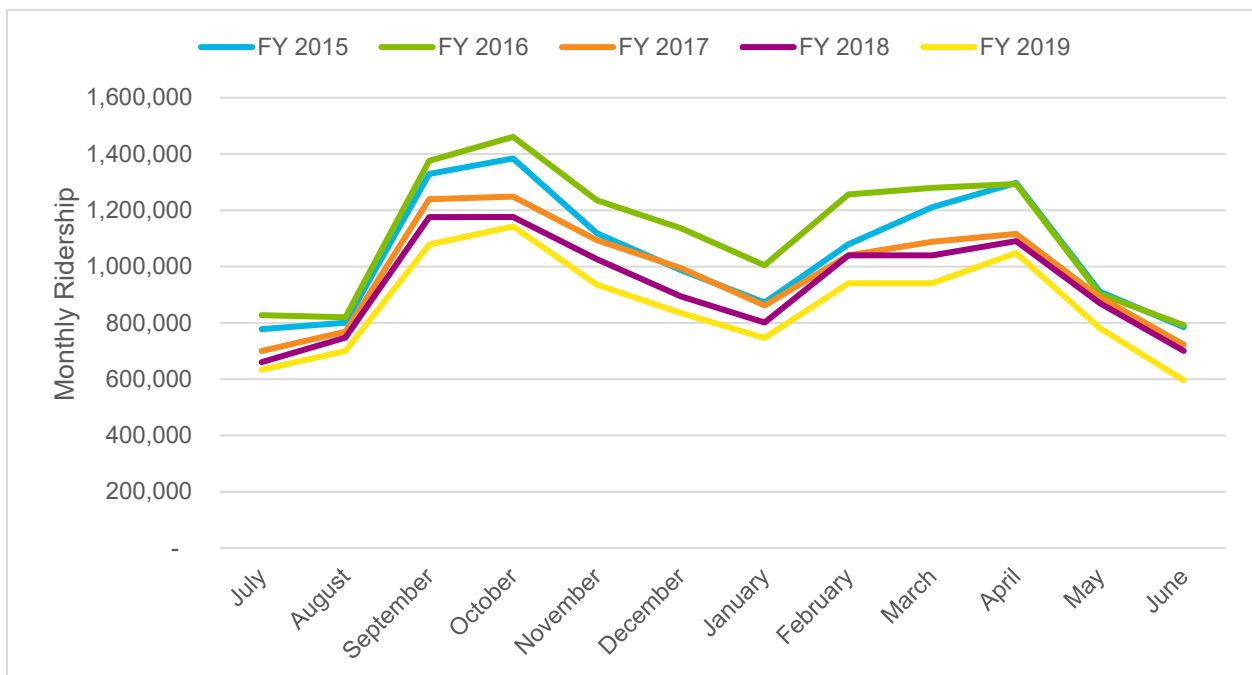
**Figure 14. Ridership Breakdown by Service Type (2019)**



Source: NTD

PVTA transported an average of 1,046,064 passengers each month during FY 2015 which decreased by 17 percent in FY 2019 to 865,077 passengers each month. The average monthly ridership trend over the last 5 years is shown on Figure 15. During the summer and winter months, when schools and colleges are closed and college student riders have returned home, ridership dips below the levels reported in the other months of the year. Conversely, ridership increases to peak levels during the fall and spring months predominantly driven by educational traffic. As a result, PVTA adjusts service on UMTS, VATCo, and SATCo routes to account for the seasonal trends in ridership.

**Figure 15. Monthly Ridership Trends (2015–2019)**

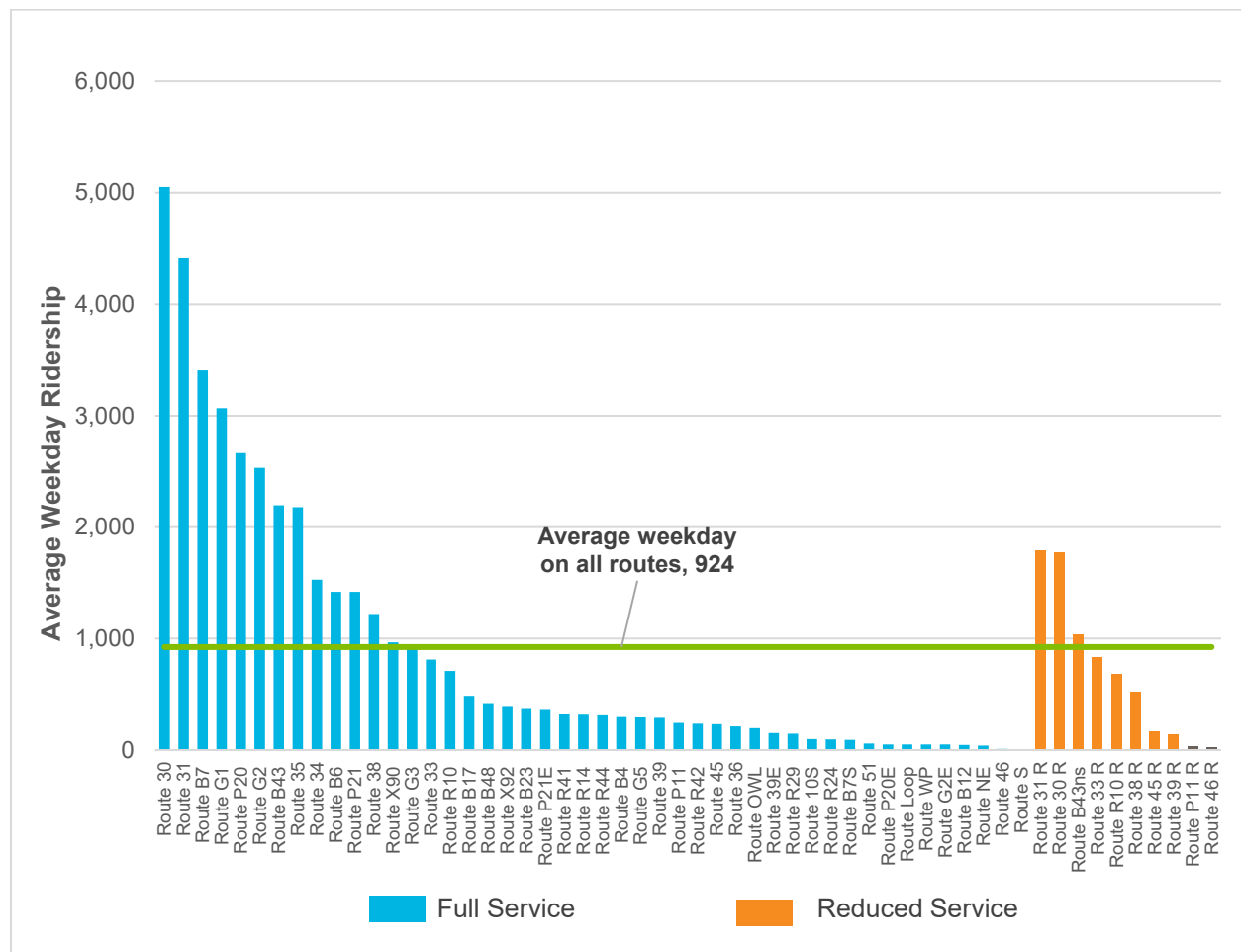


Source: NTD Time Series Data

### 4.2.1.1 Weekday Average Ridership by Route

During FY 2019, PVTA transported an average of 42,685 passengers per weekday on all fixed routes (local and express services, not including the reduced services) combined (Figure 16). The reduced service routes have modified schedules during periods when the service’s target populations, the colleges, are not in session; they often have shorter spans and longer headways. During full service, the average ridership per route was 924, with 13 of the 46 routes having greater than average ridership. Average daily ridership varied from as low as 4 on the Northampton Survival Center Shuttle to as high as 5,051 on Route 30. Routes 30, 31, B7, G1, P20, and G2 were the top six highest ridership routes and account for 46 percent of daily ridership.

**Figure 16. Weekday Average Ridership by Route (FY 2019)**



Source: PVTA

Routes G2E, B12, 46, NE, S, and WP had low ridership (50 passengers per day or fewer). The low ridership can be attributed to several factors. Route B12 services the county jail, and service is limited to visiting hours and primarily used for pre-release activities.<sup>29</sup> Route G2E operates in lieu of running out of service between the new operations and maintenance facility on Cottage Street and Union Station. Route 46 is interlined with Route 31 for the majority of the alignment, and as such, the unique ridership for the route only reflects a handful of stops. In 2019 the service was reduced, along with routing and timetables changes on Route WP by combining two routes, resulting in better performance metrics despite low ridership. The S is a new route

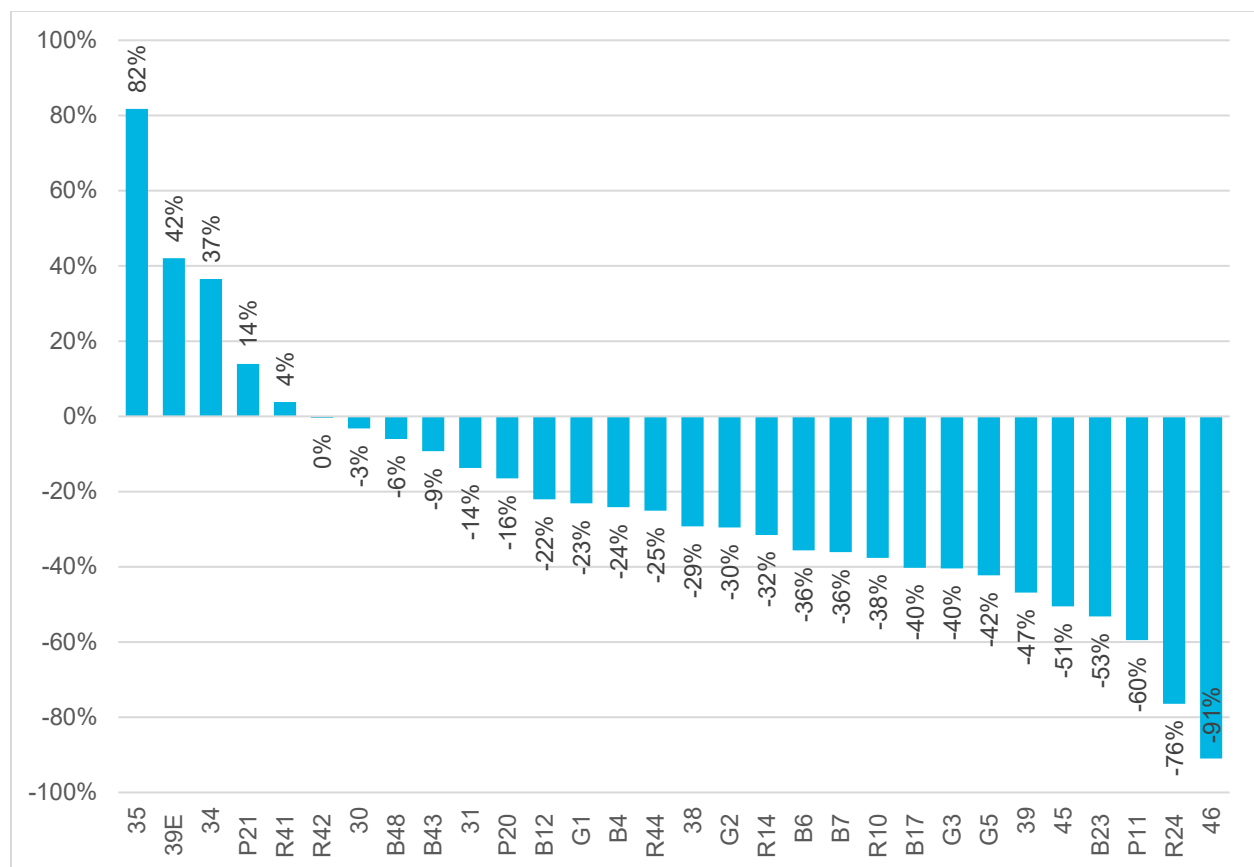
<sup>29</sup>Route B12 also has a funding partnership where the county jail pays the cost of operating the route.



that replaced a poor performing route in FY 2019, and as a result the service increased in performance.

During FY 2012, 30 of the current PVTA routes operated during weekdays. Figure 17 illustrates the weekday average ridership change for those routes that operated during both FY 2012 and FY 2019.<sup>30</sup> Routes R29, 33, 36, X90, X92, Loop, NE, OWL, S, and WP did not operate during FY 2012, were not included in the 2014 CSA, or have undergone redesigns such that they are no longer comparable; therefore, ridership data for these routes were not available for analyzing trends.<sup>31</sup> As the figure shows, weekday average ridership for most of the routes decreased over the past 7 years. This decline in ridership on several routes may be attributed to several service changes and fare increases that have been implemented since the last analysis; furthermore as a result of service changes, ridership may have shifted between routes.

**Figure 17. Weekday Average Ridership Change (FY 2012–FY 2019)**



Source: FY 2019 Ridership data from PVTA, FY 2012 ridership data from PVTA Comprehensive Service Analysis Final Report, June 2014

Of the 30 routes that operated during both FY 2012 and FY 2019, only Routes 35, 39E, 34, 41, and P21 recorded increased weekday daily ridership. Routes 34 and 35 had ridership growth despite service reductions. Route 35 had the highest weekday average ridership increase of 82 percent, from 1,199 riders in FY 2012 to 2,179 riders in FY 2019. The increases in ridership on Routes 34 and 35 is largely attributed to the new Olympia Oaks housing complex constructed on Olympia Drive. The increase on Route 39E is correlated to the decrease on Route 39. The timed transfer between Routes 38 and 39 was eliminated in order to maintain

<sup>30</sup> Route-level ridership data from FY 2012 were utilized in the PVTA Comprehensive Service Analysis Final Report (2014) and thus were used as the baseline comparison for FY 2019 ridership.

<sup>31</sup> Routes 20 and 21 include express variants P20E and P21E ridership. Route 10 includes the 10S variant.

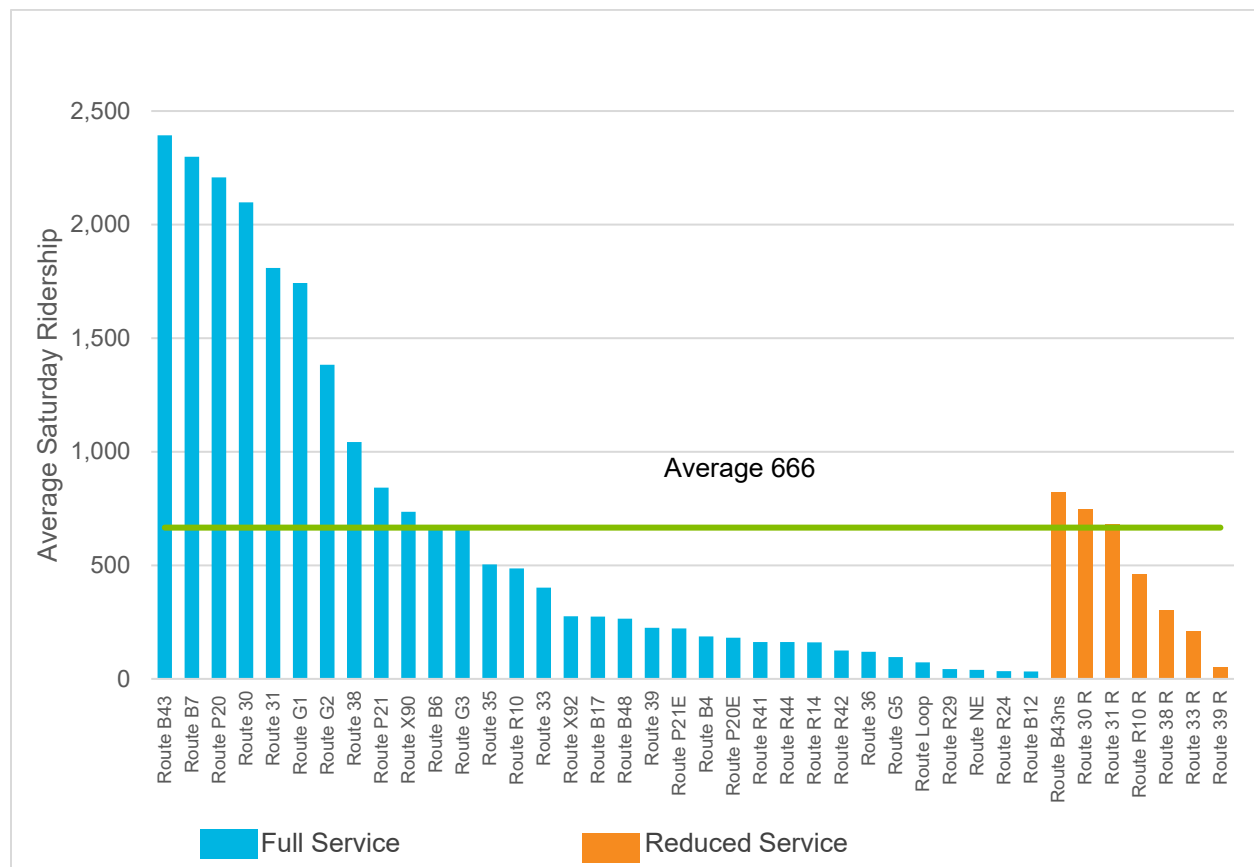
OTP, shifting ridership from Route 38 to Route 39 to Route 39E for those going between Smith College and Mount Holyoke College.

Ridership decreased by more than 50 percent on five routes: Routes 45, B23, P11, R24, and 46. Several of the routes (B17, G3, G5, and 39) that experienced over a 40 percent decrease in daily ridership had reductions in frequency, service spans reduced, or alignment changes between FY 2012 and FY 2019. Among them, Routes R24 and 46 had the greatest decrease in weekday average ridership. Route R24 ridership decreased by 76 percent, from 598 riders in FY 2012 to 96 riders in FY 2019. Route 46 ridership decreased by 91 percent, from 111 riders in FY 2012 to 10 riders in FY 2019.

#### 4.2.1.2 Saturday Average Ridership by Route

In FY 2019, an average of 21,965 passengers used the fixed routes on Saturday, or an average of 666 passengers per route. This is 54 percent of weekday ridership and is in line with the service level supplied, as Saturday revenue hours are 63 percent of weekday (per NTD data). Saturday ridership by route is shown in Figure 18. Twelve routes do not operate on Saturday, and many routes operate at reduced frequencies and have shorter spans of service, also contributing to lower Saturday ridership. Routes B43, B7, P20, 30, 31, and G1 had the highest ridership, as seen in trends for weekday and Sunday average ridership. Route B43 ridership doesn't fluctuate because the route is for students. These six routes account for 12,550 riders, or 57 percent of ridership, on Saturday. Routes B12, R24 (Saturday service has since been discontinued), R29, and NE had the lowest ridership (fewer than 50 passengers).

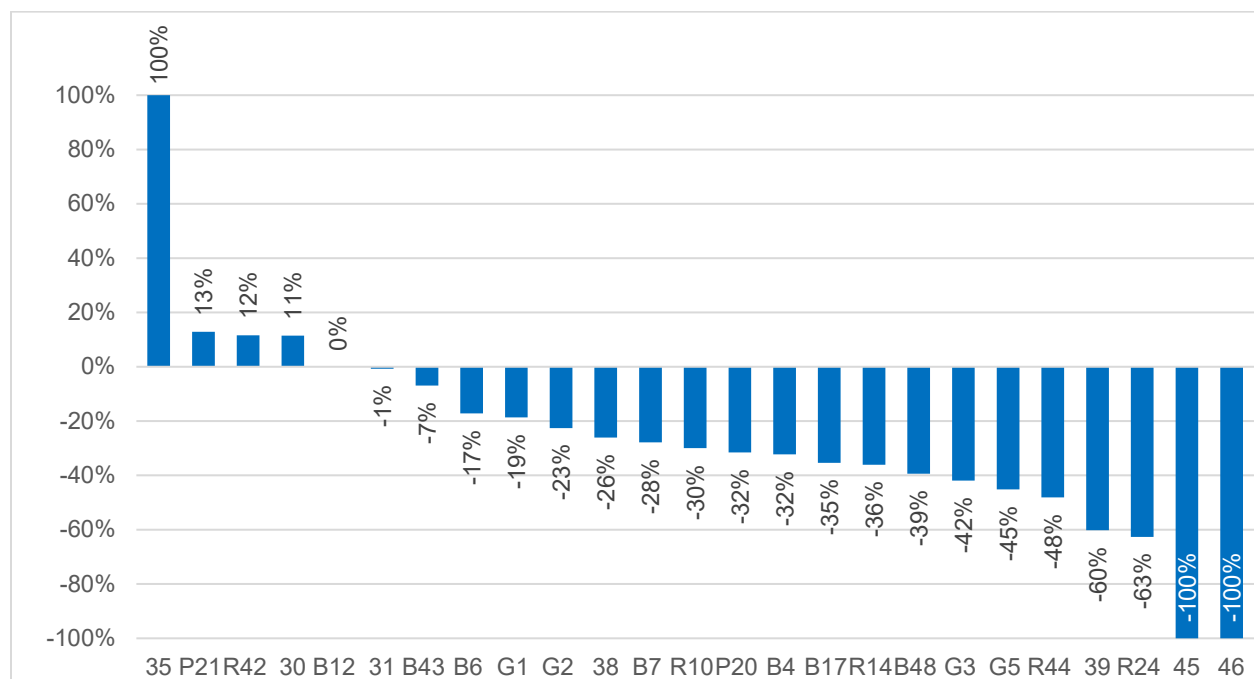
**Figure 18. Saturday Average Ridership by Route (FY 2019)**



Source: PVTA

Figure 19 illustrates the change in Saturday average ridership between FY 2012 and FY 2019. As shown in the figure, 25 routes that operated on Saturday in FY 2012 currently operate. Of the 25 routes, only 4 routes had an increase in daily Saturday ridership. Route 35 ridership increased by 100 percent, from 252 riders in FY 2012 to 504 riders in FY 2019; this coincides with service beginning 6 hours earlier on Saturdays. Routes P21, R42, and 30 experienced slight increases in ridership ranging from 11 to 13 percent between FY 2012 and FY 2019. Route P21 had an increase in the number of Saturday trips when the Route P21E schedule was separated out and the Route R42 frequency was improved in 2015. Route B12 experienced no change in ridership during this period (33 riders in both FY 2012 and FY 2019). The remaining 20 routes experienced decreases in ridership ranging from as little as 1 percent on Route 31 to as high as 63 percent on Route R24. Routes R24 and 39 experienced more than a 60 percent decrease in ridership. Route 39 ridership decreased by 340 riders (from 565 riders in FY 2012 to 225 riders in FY 2019); this is not surprising as weekday ridership also experienced a decline most likely attributed to the decline in enrollment at Hampshire College. Route R24 ridership decreased by 57 riders (from 91 riders in FY 2012 to 34 riders in FY 2019). Saturday service has since been eliminated on Route R24.

**Figure 19. Saturday Average Ridership Change (FY 2012–FY 2019)**



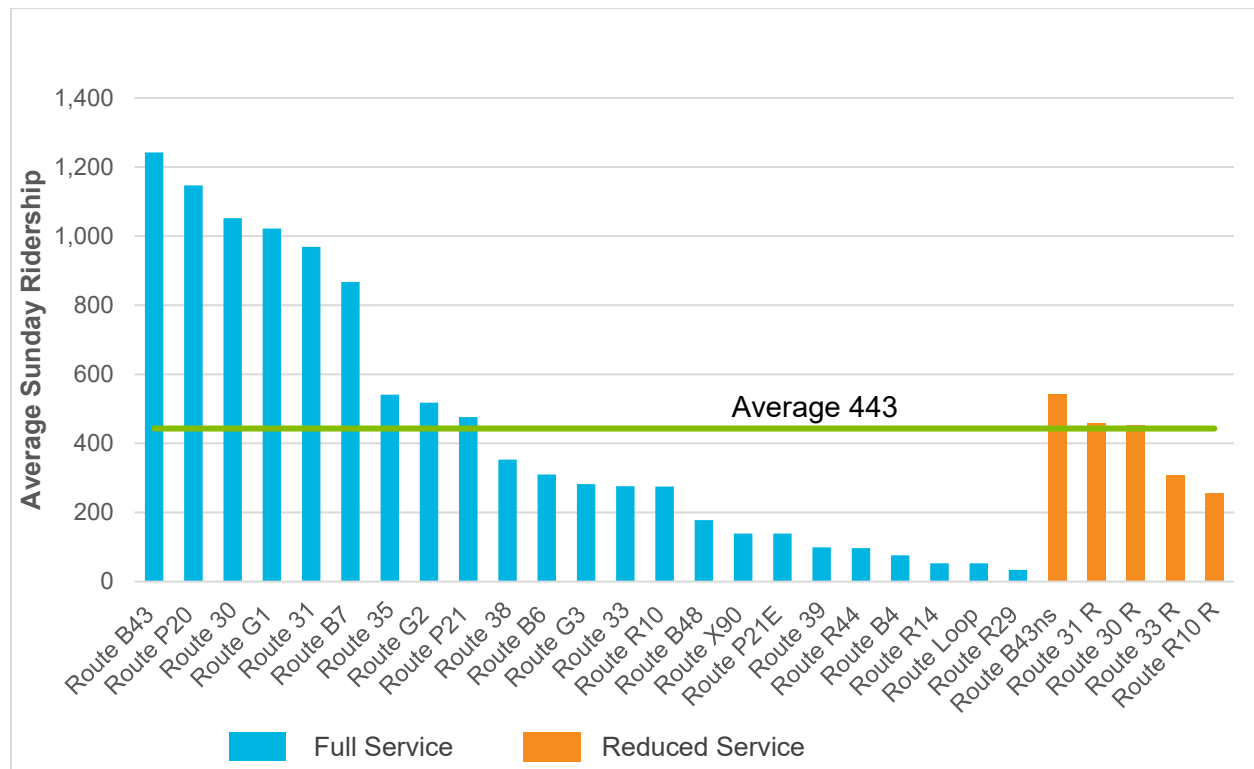
Source: FY 2019 Ridership data from PVTA, FY 2012 ridership data from PVTA Comprehensive Service Analysis Final Report, June 2014

**4.2.1.3 Sunday Average Ridership by Route**

In FY 2019, Sunday ridership totaled 10,198 passengers, or an average of 443 passengers per route, which is 25 percent of weekday ridership and 46 percent of Saturday ridership (Figure 20). This is in line with the service level supplied, as Sunday revenue hours are 47 percent of Saturdays and 30 percent of weekday (per NTD data). Additionally, 22 routes do not operate on Sundays and many routes operate at reduced frequencies and have shorter spans of service, contributing to even lower Sunday than Saturday ridership. Similar to Saturday ridership, Routes B43, B7, P20, 30, 31, and G1 had the highest Sunday ridership. These six routes account for 6,299 riders, or 62.0 percent of ridership, on Sunday. Only Route R29 had fewer than 50 passengers.

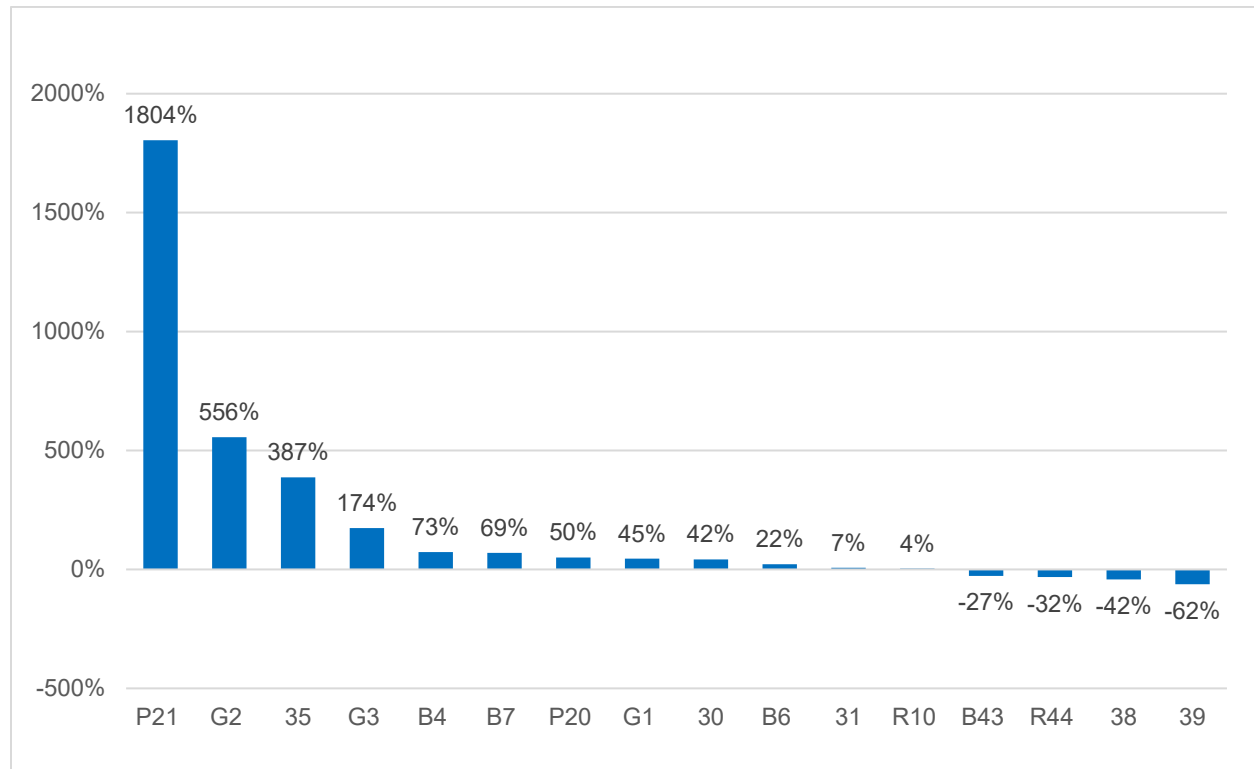
Figure 21 illustrates the Sunday average ridership change between FY 2012 and FY 2019. As shown in the figure, 18 routes operated on Sunday in both FY 2012 and FY 2019. Sunday average ridership increased on two-thirds of the routes over the past 7 years. Of the 18 routes, ridership increased on 12 routes. Routes P21, G2, 35, and G3 recorded more than 100 percent increase in ridership; all four of these routes had an increase in service span and all but Route 35 had an increase in frequency. Routes P21, G2, and 35 had an increase in ridership by 430 to 451 riders between FY 2012 and FY 2019.

**Figure 20. Sunday Average Ridership by Route (FY 2019)**



Source: PVTA

**Figure 21. Sunday Average Ridership Change (FY 2012–FY 2019)**



Source: FY 2019 Ridership data from PVTA, FY 2012 ridership data from PVTA Comprehensive Service Analysis Final Report, June 2014

**4.2.1.4 Stop Level Ridership**

Ridership is concentrated in several corridors and at several nodes within the northern tier and southern tier service areas as shown on Figure 22 and Figure 23, respectively. In the northern tier, ridership is concentrated in downtown Northampton, and in Amherst on North Pleasant Street from North Amherst through the UMass Campus to the intersection of Route 9. In the southern tier, ridership is concentrated in Holyoke along Maple Street and High Street, in the vicinity of the Holyoke Mall, and in Springfield in the downtown core spreading outwards along State Street and Main Street. Of the 1,531 stops with ridership data, 12.8 percent have less than one person per day get on or off (Figure 24).<sup>32</sup> Those corridors where ridership activity is low include Route R10 in West Springfield, Route 45 in Belchertown, Route G5 south of the Jewish Home stop, Route R14 along State Route 47, and Route B17 along Parker Street.

<sup>32</sup> This does not account for the number of times a day a stop is serviced or the number of routes. PVTA has many stops where the bus is not required to stop except when there is a passenger to pick up or drop off. Based on October 2019 stop level ridership for weekdays only.

Figure 22. Northern Tier Ridership Heatmap

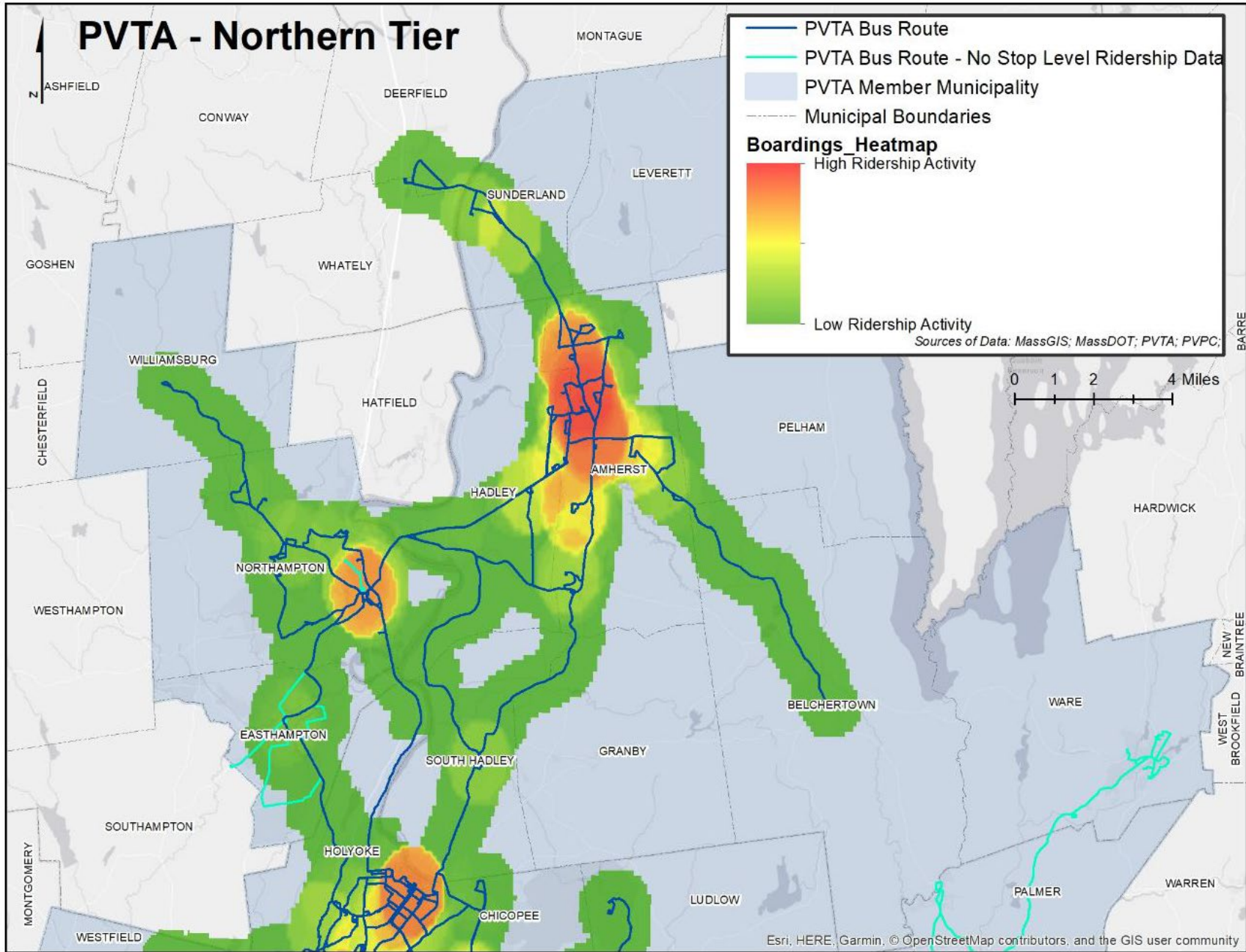


Figure 23. Southern Tier Ridership Heatmap

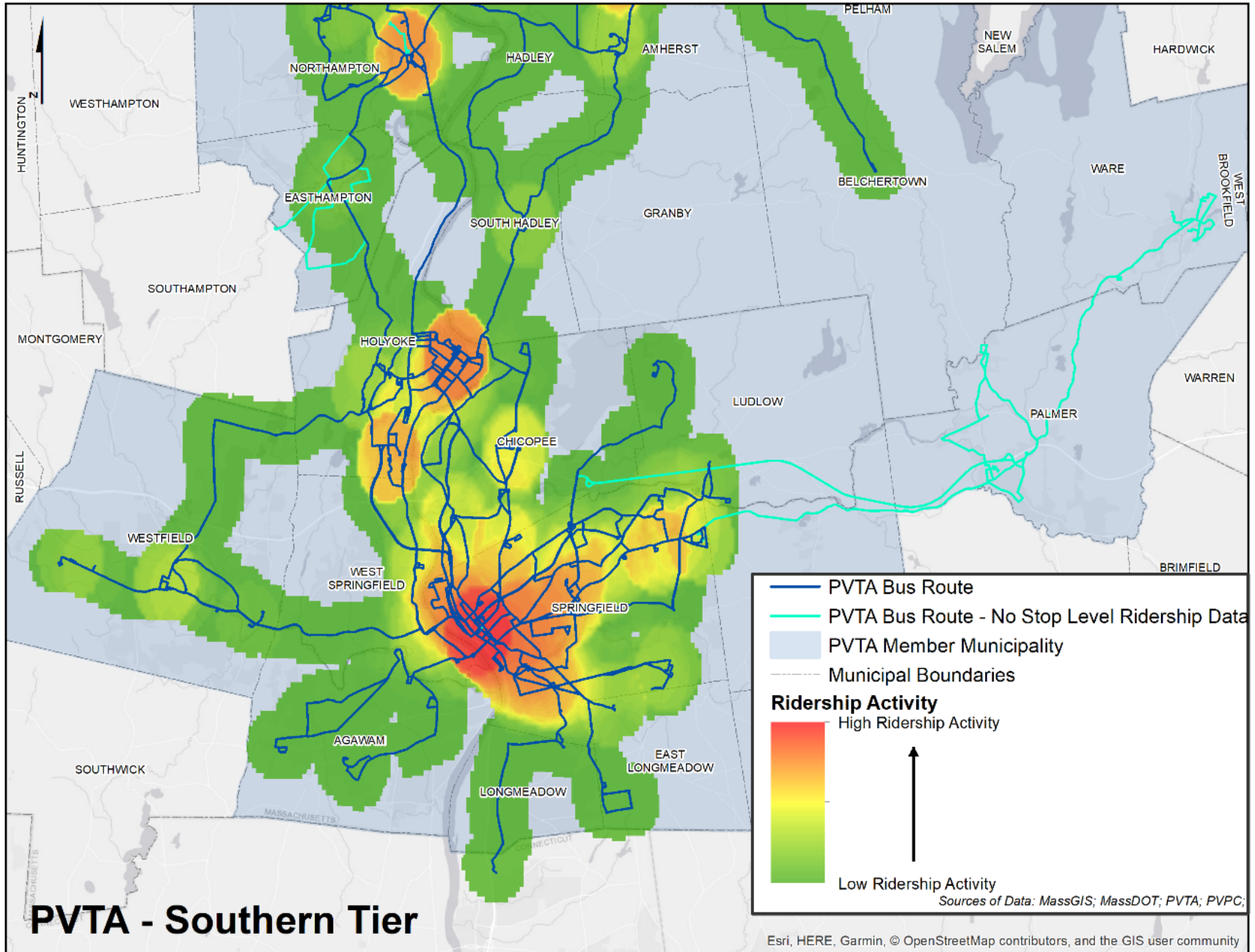


Figure 24. Stops With Less Than One On or Off per Day

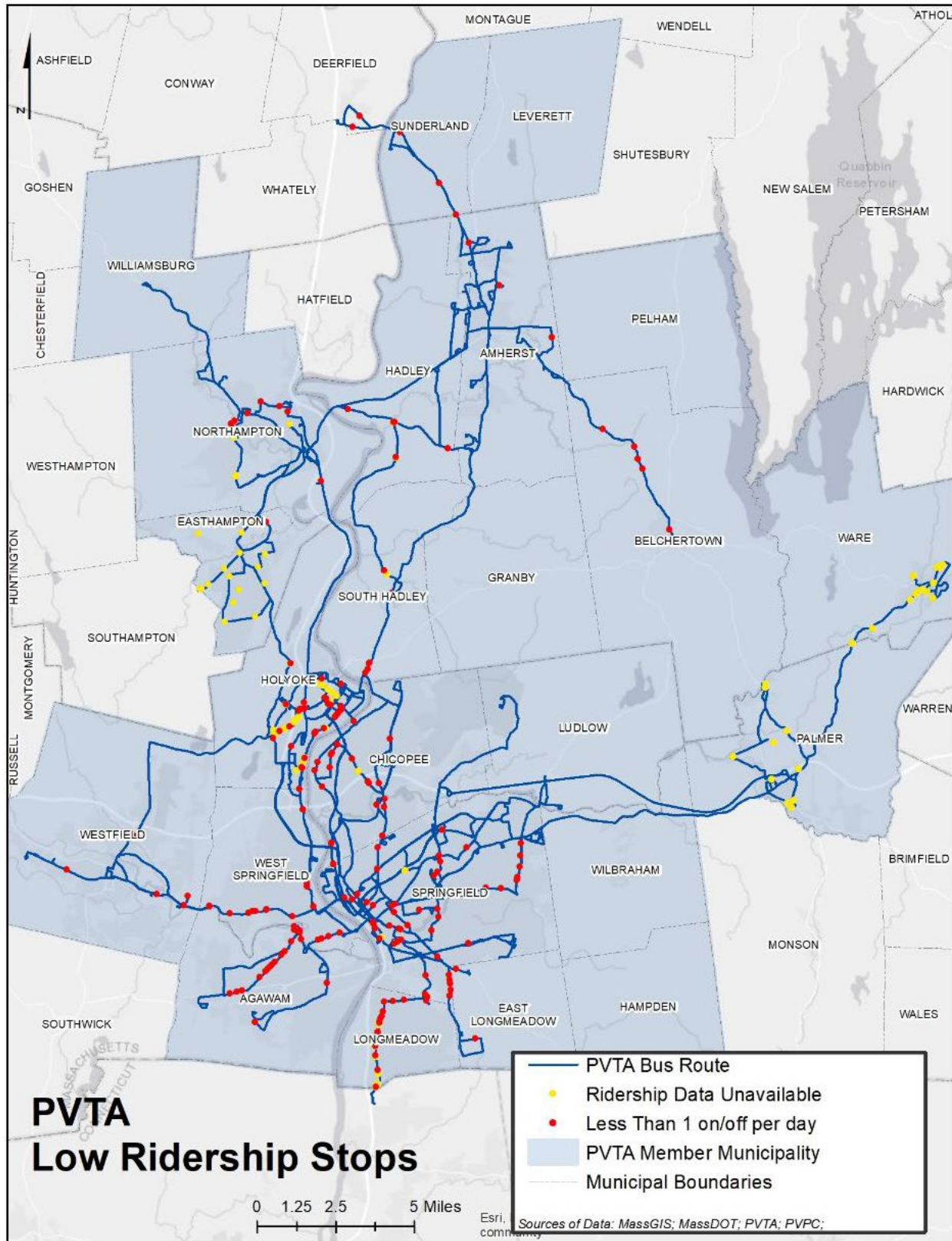




Figure 25 illustrates the average daily corridor boardings along the 1.35 mile Main Street corridor in Springfield from Union Station to Locust Street. The Main Street corridor has an average daily boarding of 4,500 passengers; 82 percent of them are at Union Station, which is the hub for transferring passengers. The 0.35 mile long segment between Union Station and Harrison Avenue is the busiest corridor segment along Main Street in both the northbound and southbound directions, with 20 buses per peak hour heading northbound and 17 heading southbound. Fifty-six percent of routes depart Union Station at even increments (though not all routes depart during each increment) at 0:00, 0:15, 0:30, and 0:45 past the hour, creating bunching along the corridor. Forty-four percent of routes depart at other times, which results in at least one bus every 5 minutes between 0:00 and 0:30 and 0:45 and 0:00 past the hour. There is, however, a 15-minute period between 0:30 and 0:45 where there are no departing buses, except G1, P20, and B4.

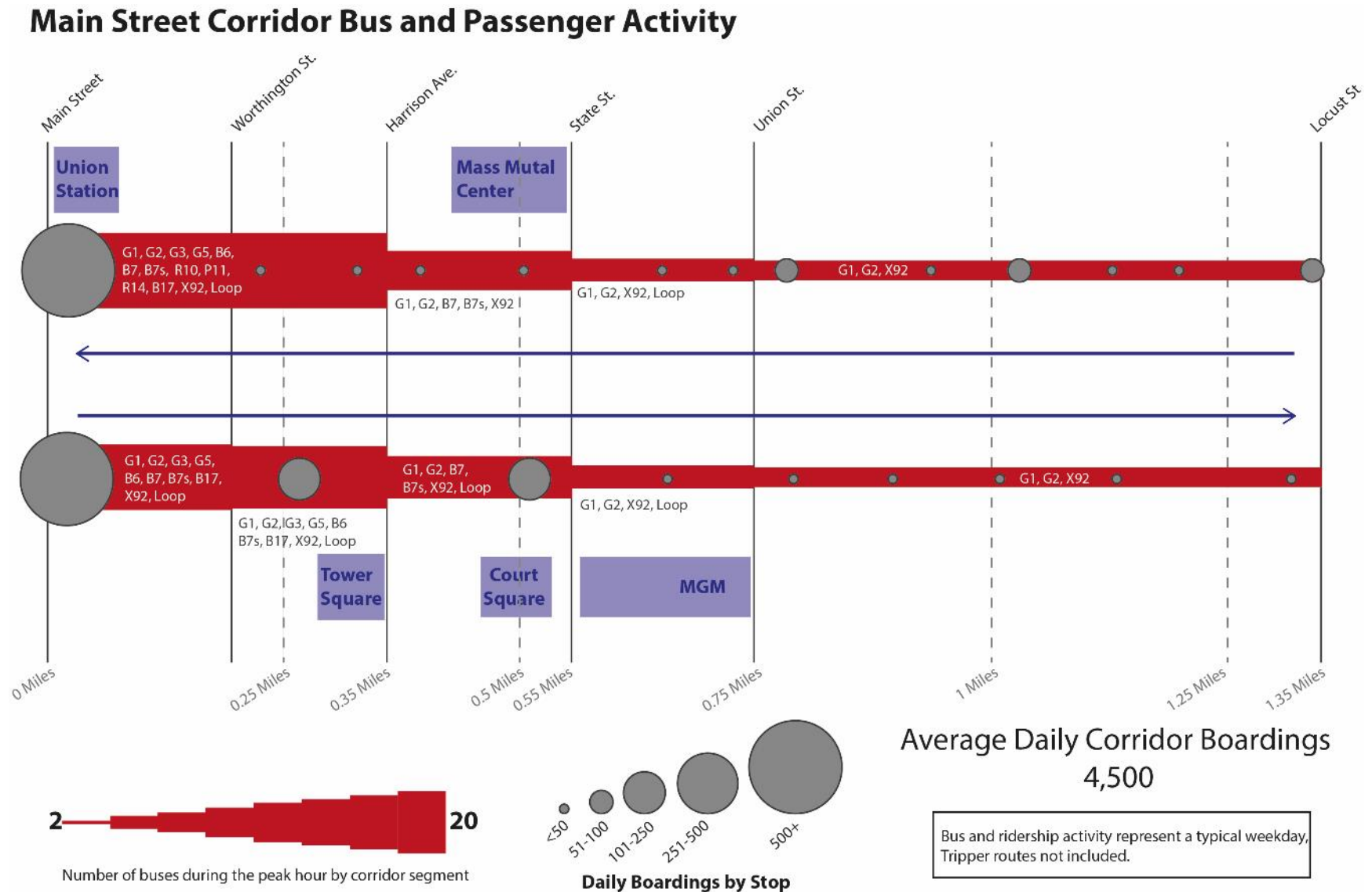
Routes have staggered arrivals at Union Station, creating more evenly spaced service along the corridor, with the largest gap being no more than 8 minutes. Nine stops in the northbound direction have average daily boardings of fewer than 50 passengers, and three stops have boardings between 51 and 100 passengers. In the southbound direction, Bridge Street and Court Street stops have the second highest number of boardings with 101 to 250 passengers getting on at each stop. The remaining stops between State Street and Locust Street in the southbound direction have average daily boardings of fewer than 50 passengers. This analysis indicates that passengers in the corridor are primarily boarding and heading toward Union Station, a major transfer hub with deboarding occurring in the opposite direction.

Figure 26 illustrates the average daily corridor boardings along the 2.65 mile Pleasant Street corridor in Amherst from the intersection of Meadow Street and Pine Street to Route 9. The Pleasant Street corridor has an average daily boarding of 7,500 passengers. The 0.35 mile long segment between Massachusetts Avenue and East Pleasant Street is the busiest corridor segment along Pleasant Street in both northbound and southbound directions, with 20 buses during the peak hour in each direction. Along North Pleasant Street on the UMass campus the routes are staggered to provide a bus every 5 minutes, with some instances of two buses with even shorter headways. The other corridor segments with high ridership in both directions include the segments between Governors Drive/Eastman Lane and Massachusetts Avenue, and between East Pleasant Street and Amity Street/Main Street.

In downtown Amherst service tends to be concentrated around four 5-minute intervals, resulting in 10 minute gaps in service. For both the northbound and southbound directions, the stops with the highest ridership are clustered between Governors Drive/Eastman Lane and Massachusetts Avenue. This 0.7 mile long segment with three stops in each direction experiences just over 5,000 daily boardings during the semester (including weekends in the average). The Amherst Post Office stop between East Pleasant Street and Amity Street/Main Street in the northbound direction also has high ridership along the corridor with more than 500 passengers boarding at the stop. The boardings are higher at these stops due to use by UMass Campus students and downtown Amherst businesses along the corridor segment. Stops along the northbound corridor between Meadow Governors Drive/Eastman Lane and Lane Street/Pine Street have the lowest boardings with fewer than 50 passengers at each stop, as these are primarily deboarding stops.

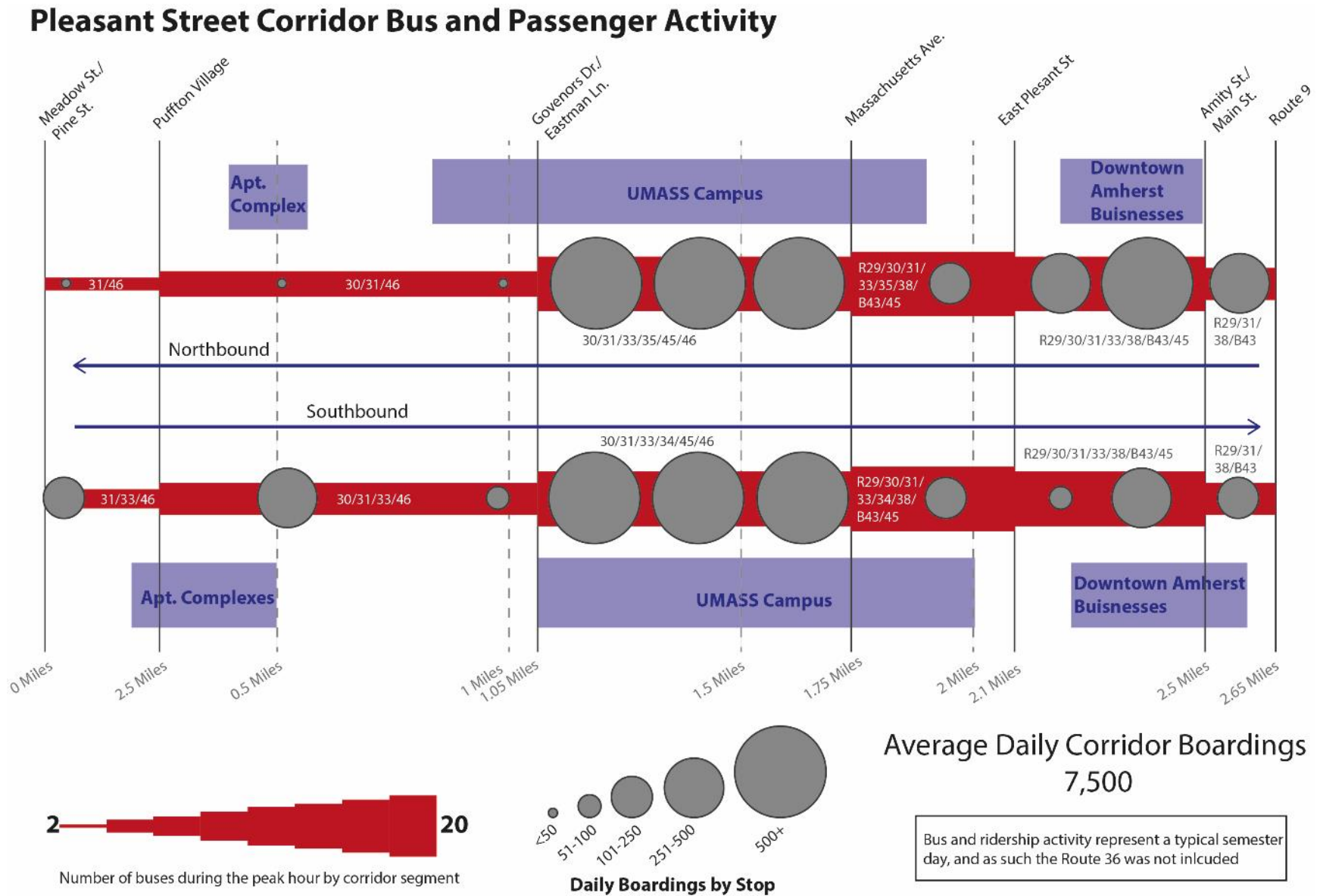
Figure 27 illustrates the average daily boardings along the 2.45 mile State Street corridor in Springfield from Main Street to Blunt Park Road. The State Street corridor has an average daily boarding of 1,300 passengers. Each direction has 17 to 18 stops, with a spacing of roughly 0.13 mile. Ridership is not concentrated at any single stop or section of the corridor but spread out. The State and Walnut bus stop has the highest daily ridership at 97 boardings. The peak number of buses on the corridor is between Chestnut Street/Dwight Street and Saint James with 11 buses. The timing of these 11 vehicles is spaced so that no two routes are scheduled to be at the same stop at the same time. Time spacing varies based on the hour and can be every 2 minutes.

Figure 25. Average Daily Boardings - Main Street Corridor



Source: PVTA FY 2019 Ridership by Stop Data

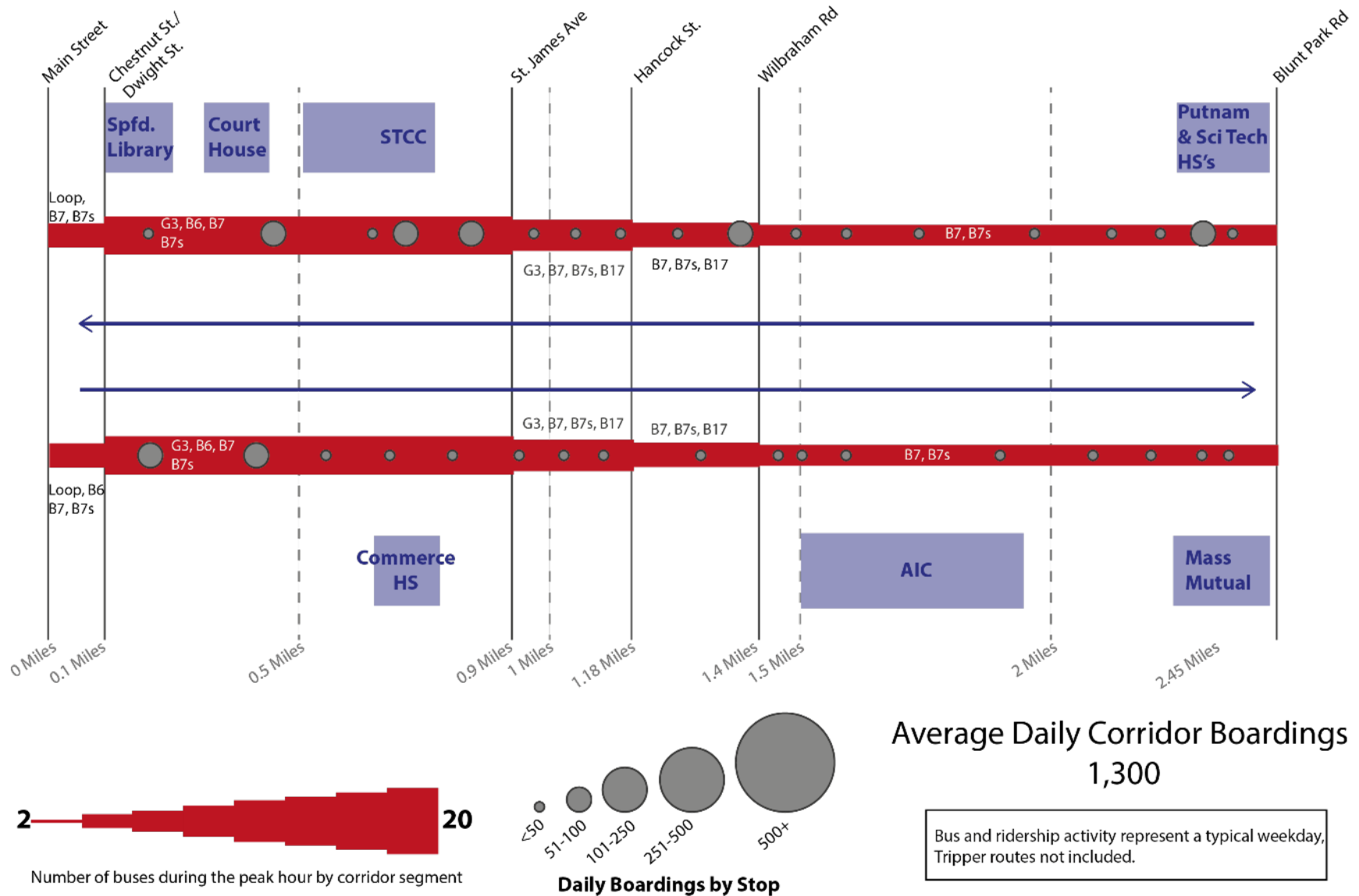
Figure 26. Average Daily Boardings - Pleasant Street Corridor



Source: PVTA FY 2019 Ridership by Stop Data

Figure 27. Average Daily Boardings - State Street Corridor

### State Street Corridor Bus and Passenger Activity



Source: PVRTA FY 2019 Ridership by Stop Data

Along the Maple Street/High Street corridor, the roads are one-way with Maple Street running east to west and High Street running west to east. The average daily corridor boardings along the Maple Street/High Street corridor in Holyoke from Lyman Street to Davis Street is 1,100 (Figure 28). The 1.15 mile long corridor has eight stops along each street with the number of buses during the peak being 13 at Holyoke Transportation Center (HTC) and 10 between Dwight Street and Cabot Street. Routes do not depart HTC in a manner that creates consistent headways along Maple Street but rather periods where there is a bus every 5 minutes followed by 10 to 15 minute gaps. Of the 16 stops along the corridor four have over 50 boardings, and all are on Maple Street. Forty percent of departures are at 0:00 or 0:30, and the remaining 36 percent are at 0:15 or 0:45. The busiest stop is HTC, which has 725 daily boardings; approximately 76 percent of departures from HTC are at 0:00, 0:15, 0:30, or 0:45, while 24 percent are at other intervals past the hour.

Figure 29 and Figure 30 show stop level boardings as they relate to the structure of the route (main route, route branch, route deviation) and show where ridership activity is located. The majority of PVRTA's routing can be classified as main routing where the route consistently serves this area and does not deviate from the primary roadway to do so.

A **route deviation** is when the bus either only occasionally serves an area or must leave the primary road to serve a location such as a shopping plaza. The 2014 CSA recommends minimizing the use of route deviations and following the thresholds listed below for implementing route deviations:

- The deviation will increase in overall route productivity.
- The number of new passengers that would be served is equal to or greater than 25 percent of the number of passengers who would be inconvenienced by the additional travel time on any particular deviated trip.
- The deviation would not interfere with the provision of regular service frequencies and/or the provision of coordinated service with other routes operating in the same corridor.

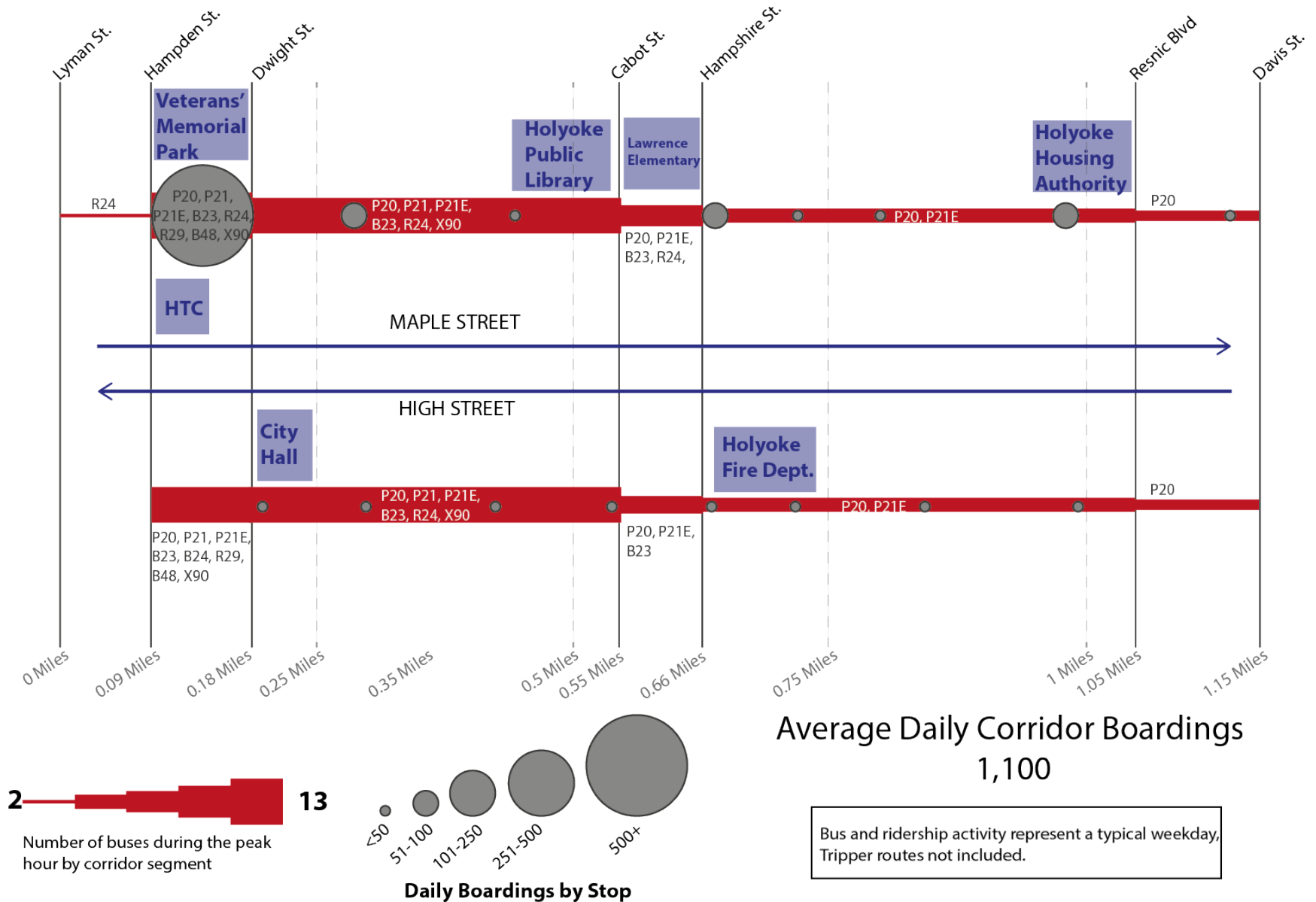
**Route branching** is when a route might take alternating paths along a section of the route in order to serve two areas with the same route. Branches are generally at the ends of the routes or along low-density sections where there is less demand and therefore the frequency can be split between the branches.

PVRTA has 57 unique deviations across 28 different routes, with some deviations being served by more than one route, equating to 69 route deviations (Table 9). Using the recommendations outlined for deviations in the 2014 CSA, 33 of the deviations meet the recommendation, 26 do not meet any of the indicators, and 10 may possibly meet one of the indicators, but either data segregation by route was not available or productivity was just slightly lower than the overall route productivity. While some deviations are not meeting the requirement, they may still be warranted if they serve vulnerable population groups or would result in increased pressures on the demand response system.

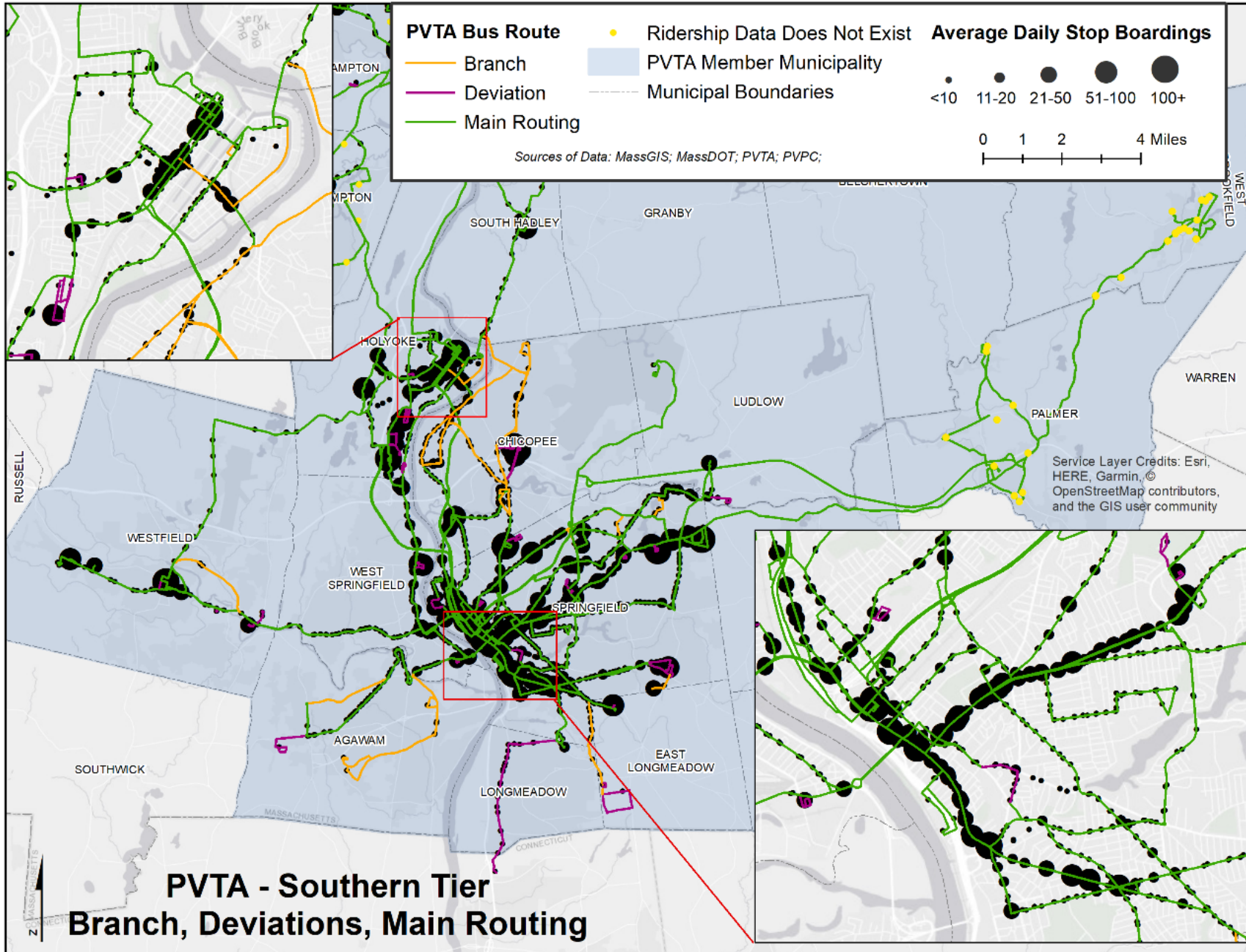
Branching is found on Routes G1, G2, B6, R14, P21, and X90 (Table 10). While PVRTA does not have a standard for branching, ridership was examined to determine the productivity of each branch. Findings include higher ridership on the Route G2 Big Y Plaza branch than the Benton via Dwight and on Route P21 higher on the Meadow Street than Chicopee Street. Branch ridership was similar for Routes B6 and X90.

Figure 28. Average Daily Boardings - Maple/High Street Corridor

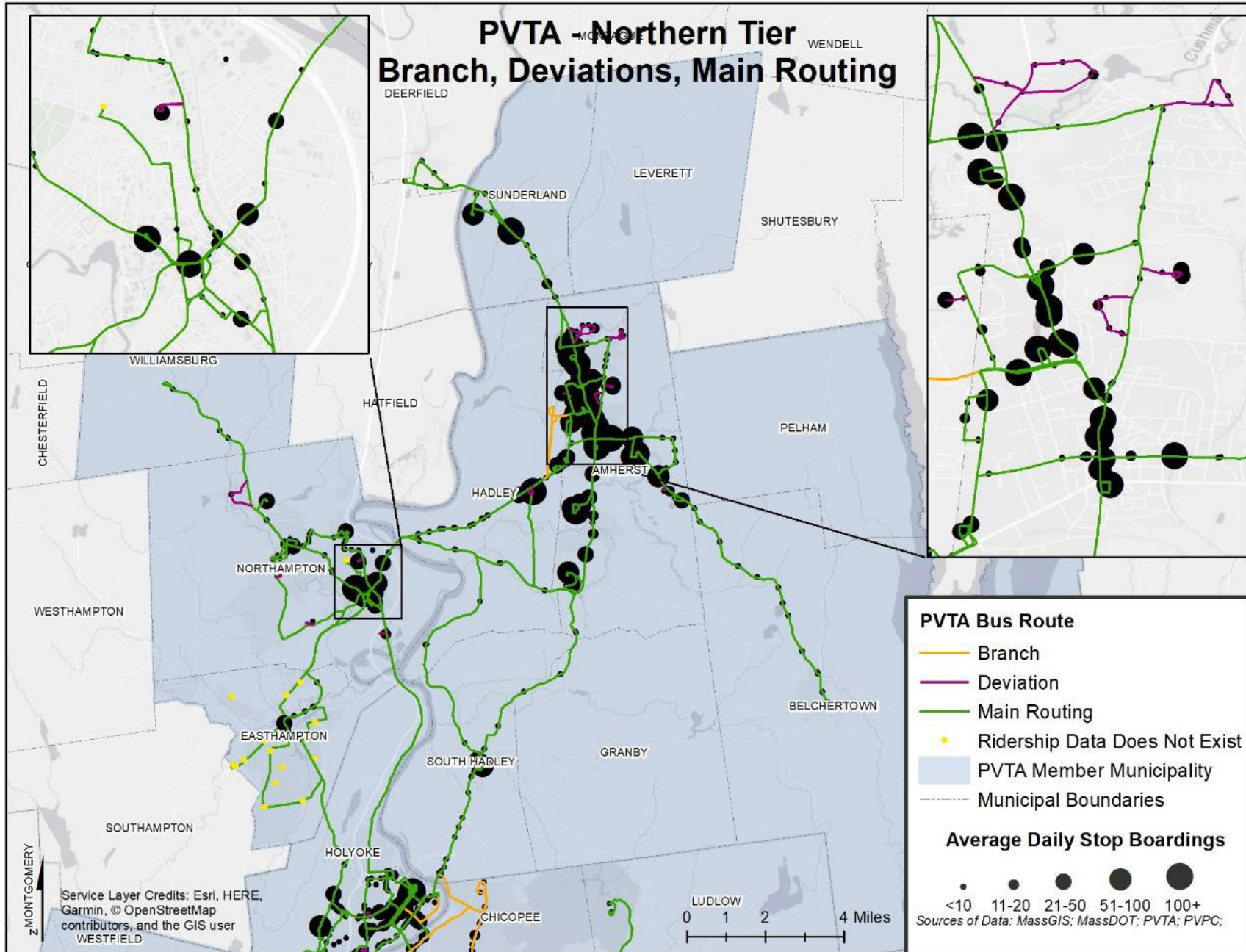
# Maple/High Street Corridor Bus and Passenger Activity



**Figure 29. Southern Tier Branch Deviations, Main Routing**



**Figure 30. Northern Tier Branch Deviations, Main Routing**





**Table 9. Route Productivity for Deviations**

<b>Route</b>	<b>Deviation</b>	<b>Deviation Productivity (Passengers/Revenue Hour)*</b>	<b>New Passengers Served Greater than 25% of Passengers On-board**</b>	<b>Increases Route Productivity</b>	<b>Meets PVTA Deviation Standard</b>
G1/X90	Walmart Plaza Chicopee	21.35	Possibly X90, Yes G1	Yes X90, Possibly G1	Yes (both)
	Fairview Shopping Plaza	39.37	Yes	Yes	Yes
G1	Five Town Plaza	65.71	Yes	Yes	Yes
	Stop and Shop	4.09	No	No	No
G2	Mercy Hospital	22.67	Possibly	Possibly	Possibly
	East Longmeadow Industrial Park	0.08	No	No	No
	Cottage Street	6.46	No	No	No
G2/X90	Stop and shop Plaza	3.00	No	No	No
G3	Registry of Motor Vehicles	8.44	No	No	No
	Saab Court	12.95	No	No	No
B4	Clyde Street	68.18	Yes	Yes	Yes
G5	Six Corners	19.71	No	Yes	Yes
	Enfield	4.20	No	No	No
B6	Health South	6.86	Possibly	No	Possibly
B7/X92	Independence House	9.87	No B7, Possibly X92	No B7, Possibly X92	No B7, Possibly X92
B7	Walmart	24.00	Yes	Possibly	Yes
	Mass Mutual	15.00	No	No	No
	Price Rite	17.00	No	No	No

Route	Deviation	Deviation Productivity (Passengers/Revenue Hour)*	New Passengers Served Greater than 25% of Passengers On-board**	Increases Route Productivity	Meets PVTA Deviation Standard
R10	Westfield Shops	12.00	No	Possibly	Possibly
	East Mt View Apartments	1.11	No	No	No
	Union Street	6.36	Possibly	No	Possibly
	Western Mass Hospital	3.75	No	No	No
	Walmart	30.00	Yes	Yes	Yes
R14	West Side Big Y	19.69	No	Yes	Yes
	Walnut Street/Maple Street	4.80	Yes	No	Yes
	Heritage Nursing Home	2.14	No	No	No
	Pheasant Hill	7.50	No	No	No
P20	Riverdale Shops	21.65	Possibly	Possibly	Possibly
	Holy Family Road	15.23	Possibly	No	Possibly
P20/R24	Holyoke Shopping Center	19.88	No	Possibly P20, Yes R24	Possibly P20, Yes R24
B23/R24	Holyoke Hospital	13.71	No	Possibly B23, Yes R24	Possibly B23, Yes R24
	Soldiers Home	4.62	No	No	No
R24	Mont Marie	-	No	No	No
R29	Providence Hospital	7.27	No	Possibly	Possibly
30	Valley Medical	2.17	No	No	No
	Colonial Village	43.97	Yes	No	Yes
33	Cushman Center	7.14	No	No	No

Route	Deviation	Deviation Productivity (Passengers/Revenue Hour)*	New Passengers Served Greater than 25% of Passengers On-board**	Increases Route Productivity	Meets PVTA Deviation Standard
	Pulpit Hill	14.29	Yes	No	Yes
34	Orchard Hill	14.90	Yes	No	Yes
35	Orchard Hill	13.33	Yes	No	Yes
34/35	Olympia Drive	26.94	Yes	No	Yes
	Lot 12	27.45	Yes	No	Yes
38/B43	Amherst College	33.89	Yes B43, Possibly 38	Yes (both)	Yes
38/39/R29	Hampshire College	18.12	Yes 39, Yes 38, Possibly R29	Yes 39 & R29, Possibly 38	Yes (all)
R42	Veteran Medical Center	16.50	Yes	Yes	Yes
	Leeds	15.00	Yes	Yes	Yes
B43	Mountain Farms	42.00	Possibly	Yes	Yes
	Hampshire Mall	66.86	Possibly	Yes	Yes
R44	Stop & Shop Northampton	31.36	No	Yes	Yes
	High Street	-	No	No	No
	Hampshire County House of Corrections	6.82	No	No	No
	Florence Heights	12.27	Possibly	Yes	Yes
	Hampshire Plaza	41.82	Yes	Yes	Yes
45	Gatehouse Road	5.71	No	No	No
B48	Atwood Drive	4.50	No	No	No
X90	Montcalm Heights Apartments	6.43	No	No	No

<b>Route</b>	<b>Deviation</b>	<b>Deviation Productivity (Passengers/Revenue Hour)*</b>	<b>New Passengers Served Greater than 25% of Passengers On-board**</b>	<b>Increases Route Productivity</b>	<b>Meets PVTA Deviation Standard</b>
x92	Senior Center	5.45	No	No	No

Source: PVTA GTFS Feed and Stop level Ridership

\*Deviation productivity was calculated by dividing the total amount of time daily devoted to performing the deviation by the daily ridership. To calculate the total deviation time, schedule data were used to determine the number of times a day the deviation occurs and the amount of time it takes to perform the deviation.

\*\* Determination was based on daily ridership data provided, where the stop fell along the route, and ridership activity at the preceding stops.

**Table 10. Branch Ridership (FY 2019)**

Route	Branch	Riders per Trip
B6	Berkshire Avenue	0.7
B6	Pasco Road	1.1
G2	Big Y Plaza	4.7
G2	Benton via Dwight Road	1.0
R14	Route 147	3.7
R14	Industrial Park	1.5
R14	North Street	0.3
P21	Meadow Street	4.6
P21	Chicopee Street	1.9
X90	A trip	2.8
X90	B trip	2.7

Source: PVTA GTFS Feed and Stop level Ridership

#### 4.2.2 Annual Revenue Hours

PVTA had 554,350 revenue hours during FY 2019 (Table 11). The majority of the hours were for fixed route bus service (67 percent, producing 98 percent of ridership) and 33 percent was generated by demand response services, producing the remaining 2 percent of ridership. Overall, PVTA revenue hours increased between FY 2015 and FY 2017 and then decreased in FY 2018 and FY 2019 (several service reductions occurred during this period due to level funding and increased operating costs). In FY 2019, the total revenue hours decreased by 5 percent compared to FY 2018. Some service changes made during this time period had an impact on hours; as one example, the Ware and Palmer shuttles were merged, and their hours drastically cut in September 2018 also as a result of level funding and increased operating costs. Overall, the revenue hours decreased by approximately 0.3 percent between FY 2015 and FY 2019; this is less than the decline in ridership during the same period, which was 16.2 percent.

**Table 11. Annual Revenue Hours (FY 2015–FY 2019)**

Service Type	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Bus	368,158 (66.2%)	392,667 (67%)	398,593 (67.1%)	383,227 (65.3%)	367,241 (66.2%)
Demand Response	188,026 (33.8%)	193,711 (33%)	195,340 (32.9%)	203,348 (34.7%)	187,109 (33.8%)
<b>TOTAL</b>	<b>556,184</b> <b>(100%)</b>	<b>586,378</b> <b>(100%)</b>	<b>593,933</b> <b>(100%)</b>	<b>586,575</b> <b>(100%)</b>	<b>554,350</b> <b>(100%)</b>

Source: NTD

### 4.2.3 Annual Revenue Miles

In FY 2019 PVTA had a total of 7,671,513 revenue miles. Revenue miles operated increased from FY 2015 to FY 2018 and then began to decrease by 4.2 percent between FY 2018 and FY 2019. Demand response has declined by 4.0 percent since FY 2015. Table 12 shows the annual trends in revenue miles over the past five fiscal years.

**Table 12. Annual Revenue Miles (FY 2015–FY 2019)**

Service Type	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Bus	4,932,766 (62.1%)	5,213,063 (62.6%)	5,266,583 (64.0%)	5,020,685 (63.2%)	4,856,166 (63.8%)
Demand Response	3,008,563 (37.9%)	3,112,275 (37.4%)	2,967,455 (36%)	2,926,913 (36.8%)	2,761,347 (36.2%)
<b>TOTAL</b>	<b>7,941,329</b> <b>(100%)</b>	<b>8,325,338</b> <b>(100%)</b>	<b>8,234,038</b> <b>(100%)</b>	<b>7,947,598</b> <b>(100%)</b>	<b>7,617,513</b> <b>(100%)</b>

Sources: NTD, RTA Service Data FY 2015 to FY 2019

### 4.2.4 Annual Operating Cost

In FY 2019, the total annual operating cost was \$54,083,176, an increase of approximately \$8 million from FY 2015. This represents an annual average increase in cost of 4.8 percent from FY 2015 to FY 2019. Although revenue hours and revenue miles have been decreasing in recent years, the operating cost did not decrease for either bus or demand response services. The largest increase was seen between FY 2018 and FY 2019. Additionally, including in PVTA annual operating costs are administrative salaries, taxes, and fringe benefits. Between FY 2015 and FY 2018 administrative costs ranged between \$4.1 million and \$4.8 million; however, in FY 2019 administrative costs increased by approximately \$900,000 from FY 2018 levels.

According to PVTA financial statements, the FY 2019 actual costs exceeded its FY 2019 budget by approximately \$4.2 million in bus service and \$900,000 in administration costs in order to account for PVTA's adjustment to its net pension and other postemployment benefit liabilities.<sup>33</sup> Table 13 shows the annual trends in operating costs over the past five fiscal years. Overall, between FY 2015 and FY 2019 the cost to operate bus service increased by 20.2 percent and demand response by 15 percent.<sup>34</sup>

**Table 13. Annual Operating Cost (FY 2015–FY 2019)**

Service Type	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Bus	\$33,217,259 (74%)	\$33,717,165 (71%)	\$34,089,216 (72%)	\$34,439,278 (73%)	\$39,934,939 (74%)
Demand Response	\$7,794,846 (17.3%)	\$8,669,159 (18.3%)	\$8,231,868 (17.5%)	\$8,646,729 (18.3%)	\$8,963,922 (16.6%)
Administration	\$4,128,474 (9.1%)	\$4,872,550 (10.3%)	\$4,700,613 (10%)	\$4,287,638 (9.1%)	\$5,184,315 (9.6%)
<b>TOTAL</b>	<b>\$45,140,579</b> <b>(100%)</b>	<b>\$47,258,874</b> <b>(100%)</b>	<b>\$47,021,697</b> <b>(100%)</b>	<b>\$47,373,645</b> <b>(100%)</b>	<b>\$54,083,176</b> <b>(100%)</b>

Sources: PVTA Audited Financial Statements FY 2015-FY 2019

<sup>33</sup> Liabilities are determined through actuarial valuations performed by financial advisors.

<sup>34</sup> Note that Massachusetts minimum wage increased significantly (by more than 50%) in this time period. At the start of FY 2015 minimum was \$8.00/hour, while today it is \$12.75. This has a particularly large impact on the cost of providing service.

Annual expenditures by PVTA operators, SATCo and VATCo, UMTS, and Hulmes are outlined in Table 14. From FY 2015 and FY 2019 expenditures by SATCo and VATCo were between 86 and 88 percent of the total expenditures by all operators. For SATCo, VATCo, and UMTS expenditures generally increased from year to year, whereas Hulmes expenditures decreased by 12 percent in the last five fiscal years (largely due to a reduction in service on routes they operate). Overall, operator expenditures increased by 14 percent, while annual revenue hours and annual revenue miles experienced an inverse effect.

**Table 14. Annual Expenditures by Fixed Route Operator (FY 2015–FY 2019)**

<b>Bus Operators</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
SATCo/ VATCo	\$26,861,601 (87%)	\$28,563,356 (88%)	\$28,304,458 (87%)	\$29,219,542 (86%)	\$30,838,186 (87%)
UMTS	\$3,788,745 (12.3%)	\$3,792,665 (11.6%)	\$3,866,851 (11.9%)	\$4,453,714 (13.1%)	\$4,412,986 (12.4%)
Hulmes (shuttles)	\$262,026 (0.8%)	\$244,921 (0.8%)	\$232,737 (0.7%)	\$242,244 (0.7%)	\$230,291 (0.6%)
<b>TOTAL</b>	<b>\$30,912,372</b> <b>(100%)</b>	<b>\$32,600,942</b> <b>(100%)</b>	<b>\$32,404,046</b> <b>(100%)</b>	<b>\$33,915,500</b> <b>(100%)</b>	<b>\$35,481,463</b> <b>(100%)</b>

Source: PVTA Budget FY 2015-FY 2019

#### 4.2.5 Annual Revenue

Each year PVTA earns between \$7.0 and \$7.9 million in farebox revenue across its bus and demand response service.<sup>35</sup> Between FY 2015 and FY 2019 fare revenue decreased by 3 percent. However, in FY 2019, PVTA increased the fares for fixed route, monthly bus pass, and paratransit service by approximately 20 percent starting July 1, 2018. As a result of this fare change, PVTA fare revenue increased by 7 percent from FY 2018. Fare revenue between FY 2015 and FY 2019 is presented in Table 15.

**Table 15. Fare Revenue (FY 2015–FY 2019)**

<b>Service Type</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Motor Bus	\$7,057,617 (90.7%)	\$7,146,956 (89.9%)	\$6,559,719 (89.9%)	\$6,294,861 (89.8%)	\$6,732,600 (89.4%)
Demand Response	\$722,680 (9.3%)	\$803,792 (10.1%)	\$734,004 (10.1%)	\$716,660 (10.2%)	\$794,068 (10.6%)
<b>TOTAL</b>	<b>\$7,780,297</b> <b>(100%)</b>	<b>\$7,950,748</b> <b>(100%)</b>	<b>\$7,293,723</b> <b>(100%)</b>	<b>\$7,011,521</b> <b>(100%)</b>	<b>\$7,526,668</b> <b>(100%)</b>

Sources: PVTA Audited Financial Statements FY 2015-FY 2019

PVTA has contracts with partner organizations including Springfield Technical Community College, Westfield State College, Holyoke Community College (HCC), Five Colleges, Springfield Public Schools, Hampden County Sherriff, UMass Amherst, and MGM Springfield (Table 16). These contracts cover the cost of fares for either the organization's members or the general public depending upon the route. In all contracts except the UMass Amherst contract, the contracting organization covers the cost of operating the route by paying PVTA. UMass Amherst holds an operating contract with PVTA and absorbs a certain value of the cost for operations, in lieu of reimbursement for service from PVTA. Table 16 shows the organizations contracted with in order of increasing contract revenue.

<sup>35</sup> Does not include contract revenue generated.

**Table 16. Operating Contract Revenue (FY 2019)**

<b>Organization Contracted With</b>	<b>Annual Contract Revenue</b>	<b>Contract Purpose</b>
Westfield State College	\$67,893.00	R10
Holyoke Community College (HCC)	\$86,346.50	UPass for students
Five Colleges	\$91,323.00	Routes B43, 39, 38, 39E
Hampden County Sheriff	\$92,573.04	Route B12
Westfield State College Owl Shuttle	\$92,893.00	OWL
Springfield Technical Community College	\$97,019.20	UPass for students
MGM Springfield	\$171,078.00	The Loop route
UMass Amherst	\$500,000.00	Covers portion of UMass Transit operating costs
Springfield Public Schools	\$576,073.00	Student passes good for Springfield routes during select times when school is in session

*Source: Email correspondence with PVTA*

### 4.3 Safety and Security

FTA rule 49 CFR 673 requires transit operators who are recipients or sub-recipients of Section 5307 funding to develop Public Transportation Agency Safety Plans (PTASP) that include the processes and procedures to implement safety management systems by December 31, 2020. PVTA established a Safety Committee that reflected the intent of the CFR 673 in August 2019. This committee included representatives from across the organization at all levels and began work on the development of the Agency Safety Plan. The final plan was approved by the Advisory Board in March 2020.

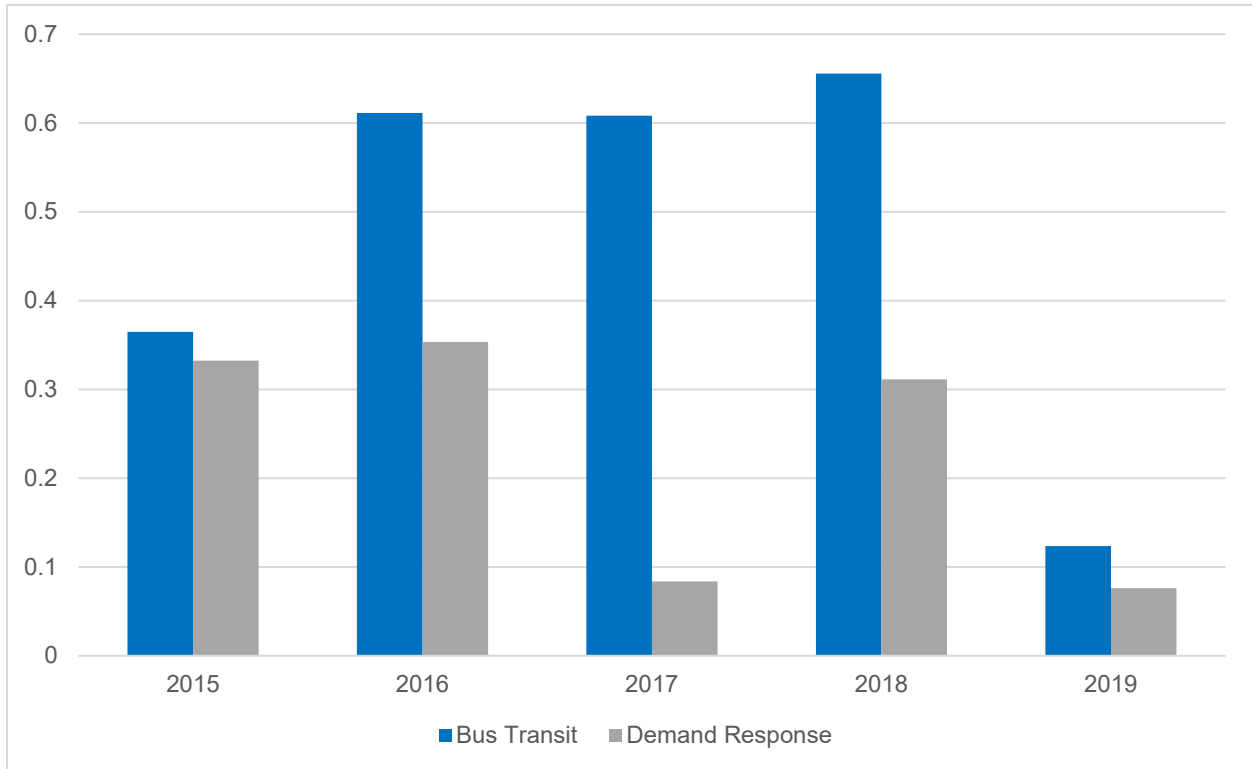
As part of the PTASP, performance targets based on safety performance measures (fatalities, injuries, safety events, system reliability) must be established in a National Public Transportation Safety Plan. PVTA adopted the following safety targets for FY 2021:

- **Fatality Rate:** 0.0058 per million vehicle miles traveled
- Rate of incapacitating injuries: 0.0437 per million vehicle miles traveled
- Target fatalities: 0
- Target for incapacitating injuries: 0

PVTA and the Safety Committee will continue to review and refine safety targets to address shortcoming and goals identified by the committee and front line employees on an annual basis. PVTA recorded zero fatalities in both bus and demand response services between 2015 and 2019. During the same time period, the number of injuries and safety events per 100,000 revenue miles for fixed route was the highest between FY 2016 and FY 2018. The number of injuries (Figure 31) and safety events (Figure 32) per revenue miles declined in 2019. PVTA is still in the process of establishing targets per PTASP.

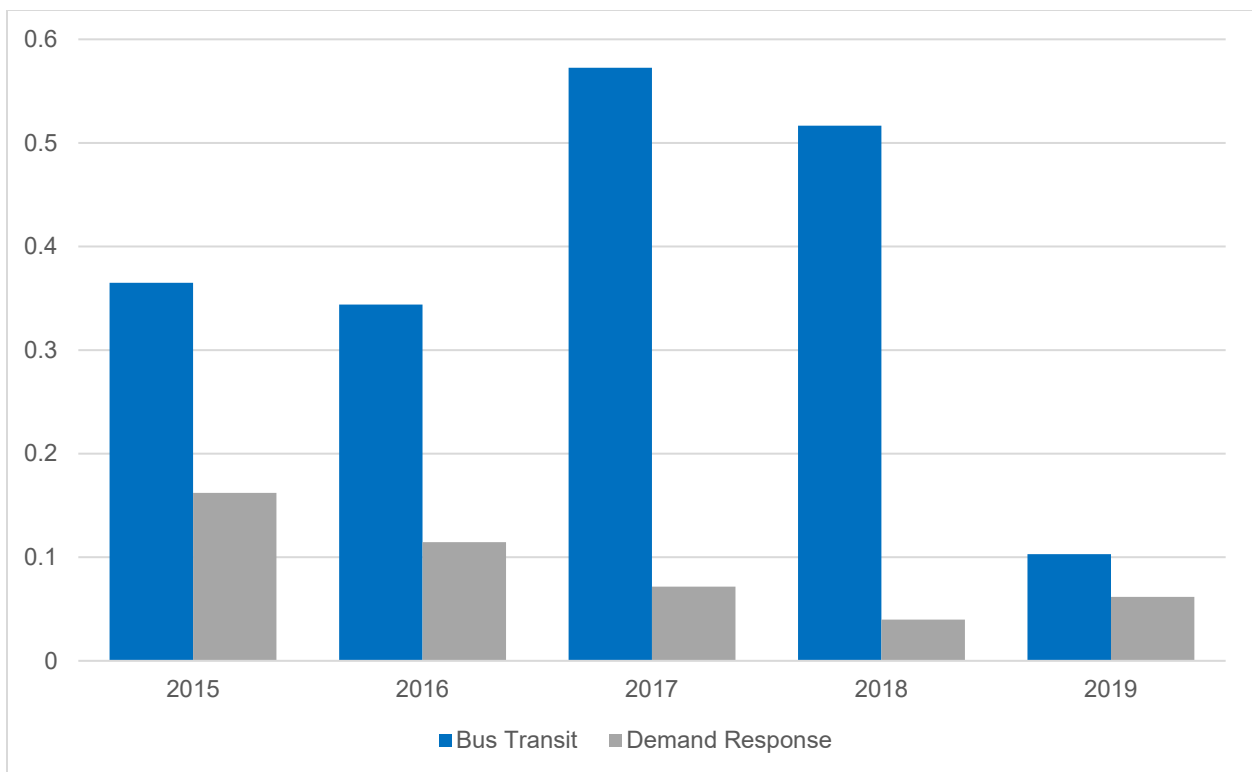


**Figure 31. PVTA Injuries by Mode (FY 2015–FY 2019)**



Source: 2019 NTD Safety and Security Time Series data for PVTA.

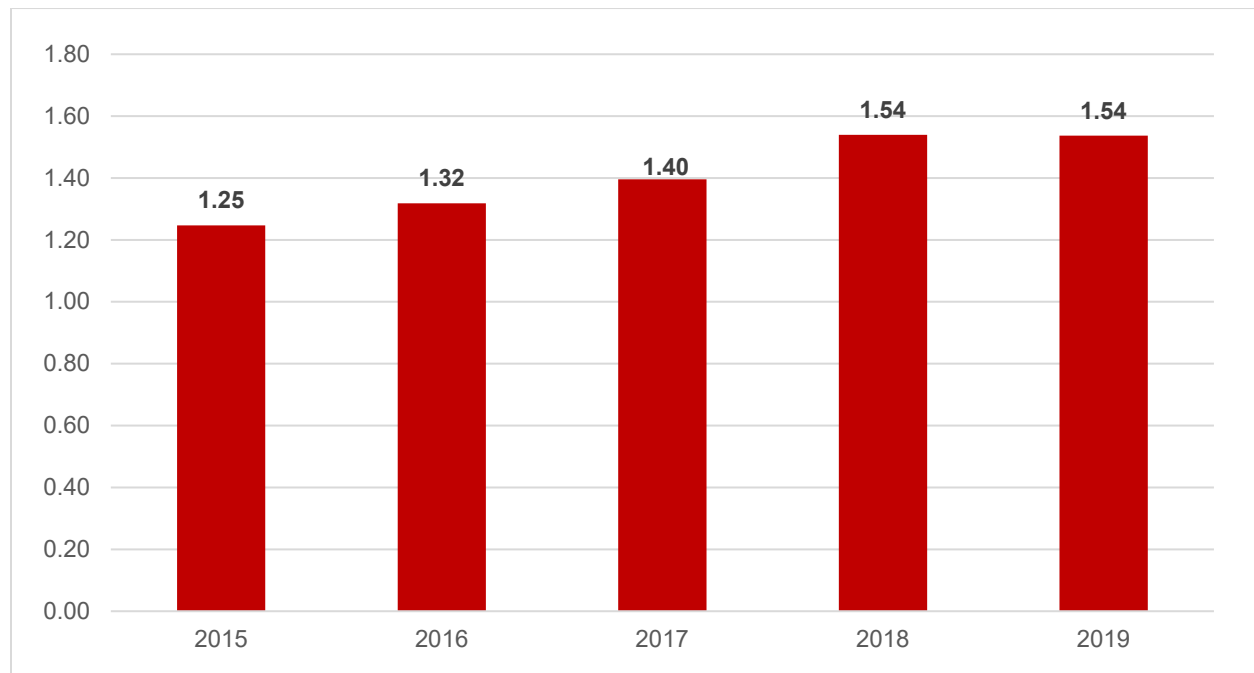
**Figure 32. PVTA Safety Events by Mode (FY 2015–2019)**



Source: 2019 NTD Safety and Security Time Series data for PVTA.

Preventable accidents are used to measure safety. An accident is considered preventable when the operator has failed to do everything reasonable to prevent the accident. Preventable accidents per 100,000 miles are calculated by dividing the number of miles by the number of preventable accidents in a given time period. Preventable accidents per 100,000 miles for PVTA increased from 1.25 in FY 2015 to 1.54 in FY 2018 and FY 2019 (Figure 33). PVTA has an internal FY 2019 goal of 1.75 preventable accidents per 100,000 miles, which PVTA was below in FY 2019.

**Figure 33. Preventable Accidents per 100,000 Miles (FY 2015–FY 2019)**



Source: PVTA

## 4.4 Asset Management

PVTA is required by FTA to develop a plan to inventory and maintain the agency's assets. Pursuant to this requirement, PVTA developed a TAM Plan in 2018. As a Tier 1 agency, PVTA's TAM Plan provides a detailed description of the current capital assets and the needs for the transit agency.

The TAM Plan also identifies PVTA's Capital Improvement Program for FY 2019 to FY 2023. The Capital Improvement Plans also aligns with the regional Metropolitan Planning Organization's Transportation Improvement Plan. The capital program specifies the type of capital investment by category: vehicles, facilities, equipment (including non-revenue vehicles), and systems. Throughout the year, PVTA may also perform additional informal prioritization processes, and re-allocate funds to address any asset needs that arise during routine quarterly facility inspections and monthly vehicle inspections. Specific capital improvements are outlined in Table 17.

**Table 17. Programmed List of Capital Investments (FY 2019–FY 2023)**

<b>Fiscal Year</b>	<b>Vehicles</b>	<b>Facilities</b>	<b>Equipment</b>	<b>Systems</b>	<b>Total Planned Capital Cost</b>
FY 2019	Replace: <ul style="list-style-type: none"> <li>• 8 Buses</li> <li>• 27 Minivans</li> </ul>	<ul style="list-style-type: none"> <li>• Cottage Street Bus O&amp;M Facility</li> <li>• PVTA Main Street Maintenance Garage (SATCo)</li> <li>• UMass Bus O&amp;M Facility/University Transit Services</li> </ul>	Replace: <ul style="list-style-type: none"> <li>• 6 Nonrevenue vehicles</li> <li>• Bus shelters</li> <li>• Other equipment*</li> </ul>	Information systems (security infrastructure, communications, monitoring, and revenue collection)	\$23,757,731
FY 2020	Replace: <ul style="list-style-type: none"> <li>• 25 Buses</li> </ul>	<ul style="list-style-type: none"> <li>• PVTA Main Street Maintenance Garage (SATCo)</li> <li>• Northampton Bus Maintenance Facility (VATCo)</li> </ul>	Replace: <ul style="list-style-type: none"> <li>• 4 Nonrevenue vehicles</li> <li>• Bus shelters</li> <li>• Other equipment*</li> </ul>	Information systems (security infrastructure, communications, monitoring, and revenue collection)	\$18,898,435
FY 2021	Replace: <ul style="list-style-type: none"> <li>• 32 Buses</li> </ul>	–	Replace: <ul style="list-style-type: none"> <li>• 2 Nonrevenue vehicles</li> <li>• Bus shelters</li> <li>• Other equipment*</li> </ul>	Information systems (security infrastructure, communications, monitoring, and revenue collection)	\$22,605,645
FY 2022	Replace: <ul style="list-style-type: none"> <li>• 25 Buses</li> <li>• 24 Minivans</li> </ul>	–	Replace: <ul style="list-style-type: none"> <li>• 7 Nonrevenue vehicles</li> <li>• Bus shelters</li> <li>• Other equipment*</li> </ul>	Information systems (security infrastructure, communications, monitoring, and revenue collection)	\$20,384,119
FY 2023	Replace: <ul style="list-style-type: none"> <li>• 25 Buses</li> <li>• 9 Minivans</li> </ul>	<ul style="list-style-type: none"> <li>• Northampton Bus Maintenance Facility (VATCo)</li> <li>• HTC</li> </ul>	Replace: <ul style="list-style-type: none"> <li>• Bus shelters</li> <li>• Other equipment*</li> </ul>	Information systems (security infrastructure, communications, monitoring, and revenue collection)	\$20,075,943

Source: PVTA TAM Plan, 2018

\*Equipment includes special tools for bus and van repairs including tires; replacing worn or damaged tools and enhancements for the paratransit maintenance shop equipment.

#### 4.4.1 Facilities

PVTA has direct capital responsibility for four O&M facilities, two transit centers, and one administration building. The new, state-of-the-art, 224,000 square-foot fixed route bus O&M facility on Cottage Street used by SATCO has been in operation since May 2019, replacing PVTA's 2840 Main Street facility, which was undersized and inadequate to serve the needs of the fixed route bus system. The new facility provides light- and heavy-duty maintenance, fueling, and indoor storage to PVTA's fleet of 189 diesel-fueled and electric-powered fixed route buses. The administration office at 2808 Main Street is over 100 years old and a former fire station. The facility adjacent to the former SATCO O&M facility at 2840 Main Street in Springfield is a satellite maintenance facility currently used for maintaining gas-powered vehicles and select functions not available at the Cottage Street facility. PVTA received a grant in 2018 to upgrade the 2840 Main Street maintenance facility to a facility that would be used for both maintenance and paratransit operations.<sup>36</sup> This upgrade was substantially complete in April 2020 and NEXT began operating out of 2840 Main Street in April.

In the northern tier PVTA owns a facility in Northampton and on the UMass campus in Amherst. The Northampton facility, located at 54 Industrial Park Drive, houses O&M for VATCO operations. The O&M facility in Amherst consists of two buildings and is in the northwest corner of campus.

PVTA operates three passenger facilities: HTC at 206 Maple Street in Holyoke, Union Station at 55 Frank B Murray Street in Springfield, and Westfield Olver Transit Pavilion at 10 Arnold Street in Westfield. HTC has seven loading bays and a public waiting/customer service area. The Westfield Olver Transit Pavilion has four loading bays and a 2,800 square foot building with a public waiting/customer service area. PVTA leases 18 bus berths; 2,300 square feet of office space, and 1,800 square feet of waiting area at the Union Station.

Table 18 summarizes the facilities, type, location, direct capital responsibility, operator, and Transit Economic Requirements Model (TERM) rating. Targets are required to be set by PVTA for each applicable asset class for the coming year. For facilities, the performance measure is the percentage of facilities rated below condition 3 on the TERM scale. The table includes the condition ratings for all facilities that PVTA has direct capital responsibility for. PVTA is required to inventory all the passenger facilities in the TAM Plan and report to NTD regardless of direct capital responsibility; however, condition assessments and targets are not required for the facilities that PVTA does not have direct capital responsibility for. PVTA does not have direct capital responsibility for facilities such as HTC Info Center, NEXT, Springfield Information Center, and Union Station Bays; therefore, PVTA is not required to provide the condition ratings for them.

As shown in the table, the two buildings at 2840 Main Street are the only facilities with a TERM rating below 3. The lower rating means the facility is in marginal condition and the asset has met its useful life, although it performs its designed function. The two new facilities, Olver Transit Pavilion and Cottage Street, have the top rating of 5.

**Table 18. Facility Inventory Summary**

Facility Name	Type	Location	Direct Capital Responsibility	Operator	TERM Rating
Administration Building	Administration office / sales office	2808 Main Street, Springfield	Yes	PVTA	3

<sup>36</sup> *Daily Hampshire Gazette*, "PVTA gets \$2.4M to upgrade garage," 10/10/2018, [https://www.gazettenet.com/PVTA-awarded-\\$2-4-million-for-improving-bus-maintenance-garage-in-Springfield-20765486](https://www.gazettenet.com/PVTA-awarded-$2-4-million-for-improving-bus-maintenance-garage-in-Springfield-20765486).

<b>Facility Name</b>	<b>Type</b>	<b>Location</b>	<b>Direct Capital Responsibility</b>	<b>Operator</b>	<b>TERM Rating</b>
HTC Bays	Passenger - bus transfer center	206 Maple Street, Holyoke	Yes	Springfield Area Transit Company	4
HTC Info Center	Administration office / sales office	206 Maple Street, Holyoke	No	PVTA	N/A
National Express Transit	General purpose maintenance facility/depot	Springfield	No	NEXT	N/A
Northampton Bus Maintenance Facility (VATCo)	Maintenance facility (service and inspection)	54 Industrial Drive, Northampton	Yes	Valley Area Transit Company	4
PVTA Main Street Maintenance Garage (SATCo)	Maintenance facility (service and inspection)	2840 Main Street, Springfield	Yes	Springfield Area Transit Company	2
PVTA Main Street Maintenance Garage (SATCo) Barn	Maintenance facility (service and inspection)	2840 Main Street, Springfield	Yes	Springfield Area Transit Company	2
Springfield Information Center	Administration office / sales office	665 Cottage Street, Springfield	No	PVTA	N/A
UMass Bus O&M Facility/University Transit Services	Maintenance facility (service and inspection)	185 Holdsworth Way, Amherst	Yes	UMTS	3
UMass Bus O&M Facility/University Transit Service - RTIC	Maintenance facility (service and inspection)	185 Holdsworth Way, Amherst	Yes	UMTS	4
Union Station Bays	Administration office / sales office	55 Frank B Murray Street, Springfield	No	SATCo	N/A
Westfield Olver Transit Pavilion	Passenger - bus transfer center	10 Arnold Street, Westfield	Yes	PVTA	5
Cottage Street Fixed Route Bus O&M Facility	Maintenance facility (service and inspection)	649 Cottage Street, Springfield	Yes	PVTA	5

Source: PVTA 2018 TAM Plan

#### 4.4.2 Vehicles

Table 19 provides a summary of the revenue vehicles (rolling stock) and non-revenue vehicles (service vehicles) asset inventory. PVTA has 362 active revenue vehicles and 54 non-revenue in its inventory. Revenue vehicles fall into six primary categories: 4 articulated buses, 175 buses (including both 40 foot and 35 foot vehicles [heavy duty]), 8 minibuses (non-cutaway less than 35 feet), 7 cutaway buses, 166 minivans, and 2 trolley buses. The average age of the revenue vehicle fleet is 6.6 years. PVTA has 54 non-revenue service vehicles that fall into two categories: 25 trucks or other non-revenue vehicles and 29 automobiles. The average age of the non-revenue vehicles is 6.1 years.

Table 19 also summarizes PVTA's vehicles' ULB and the percentage of vehicles that are at or past the ULB. The condition of each revenue vehicle is based on each vehicle's age relative to its ULB. It is important to look at the age and condition of the overall fleet as vehicles approaching their ULB are often more costly to maintain and have higher instances of road calls. Calculations for average age and ULB are based on the fiscal year of the in-service date for each vehicle. In total, PVTA currently has 67 revenue vehicles (18.5 percent of the fleet) that are at or past their ULB, including 34 buses, 8 minibuses, 1 cutaway bus, 22 minivans, and 2 trolley buses. Additionally, PVTA has 9 trucks and other non-revenue vehicles and 9 automobiles that are at or past their ULB.

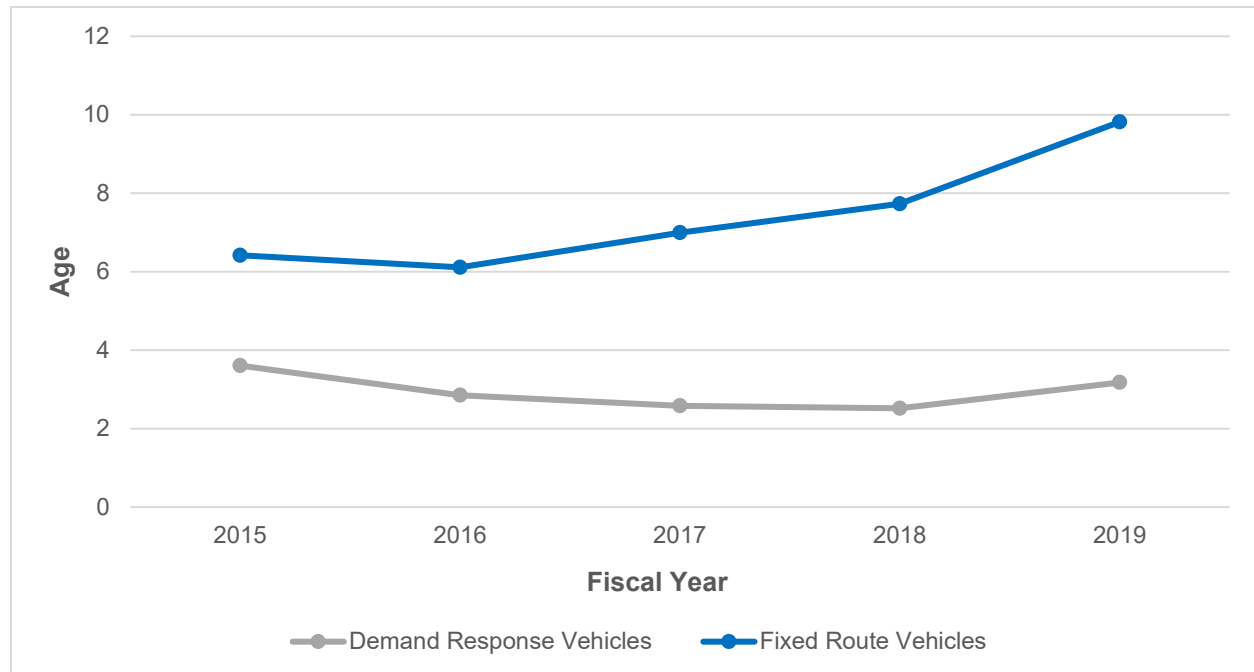
**Table 19. Equipment Inventory Summary**

<b>Vehicle Type</b>	<b>Total Number</b>	<b>Average Age</b>	<b>ULB</b>	<b>Count at Past ULB</b>	<b>% at or Past ULB</b>
Articulated bus	4	7.0	12	0	0%
Bus	175	7.2	12	34	19%
Cutaway bus	7	4.7	7	1	14%
Minibus	8	14	10	8	100%
Minivan	166	3.2	4	22	13%
Rubber-tired vintage trolley	2	19	13	2	100%
Trucks and other non-revenue	25	8.48	10	9	36%
Automobile (non-revenue)	29	4	8	9	31%
Revenue vehicles	362	6.6	—	67	—
Non-revenue vehicles	54	6.1	—	18	—

*Sources: PVTA Vehicle and Facility Inventory Audit 2019, PVTA 2018 TAM Plan*

The age of PVTA's fleet of fixed route and demand response vehicles is shown in Figure 34. Between FY 2015 and FY 2019 the age of fixed route vehicles increased, while the age of demand response vehicles declined. On average, demand response vehicles are 2.9 years, while fixed route vehicles are 7.4 years. However, vehicle age is only one component of maintaining a fleet of vehicles relative to its ULB.

**Figure 34. Fleet Age (FY 2015–FY 2019)**



Source: NTD Vehicle Inventory (FY 2015-FY 2018); FY 2019 PVTA Vehicle Audit

**4.4.2.1 Spare Ratio**

Spare ratio, expressed as a percentage, is defined as the number of spare vehicles divided by the vehicles required for annual maximum service. FTA sets a guideline that the number of spare buses in the active fleet for grantees operating 50 or more revenue vehicles should not exceed 20 percent of the number of vehicles operated in maximum service. Vehicles operated in maximum service includes the number of revenue vehicles operated to meet the annual maximum service requirement and includes the revenue vehicle count during the peak season of the year, on the week and day that maximum service is provided. The spare ratio for both fixed route and demand response is twice that of the recommended guideline (Table 20).

**Table 20. Spare Ratio for Revenue Vehicles (FY 2019)**

Vehicle Type	Total	Active	Contingent	Inactive	Maximum in Service	Spare Ratio
Fixed Route	198	196	0	2	140	40%
Demand Response	186	166	0	20	111	49.5%
Total	384	362	0	22	251	44.2%

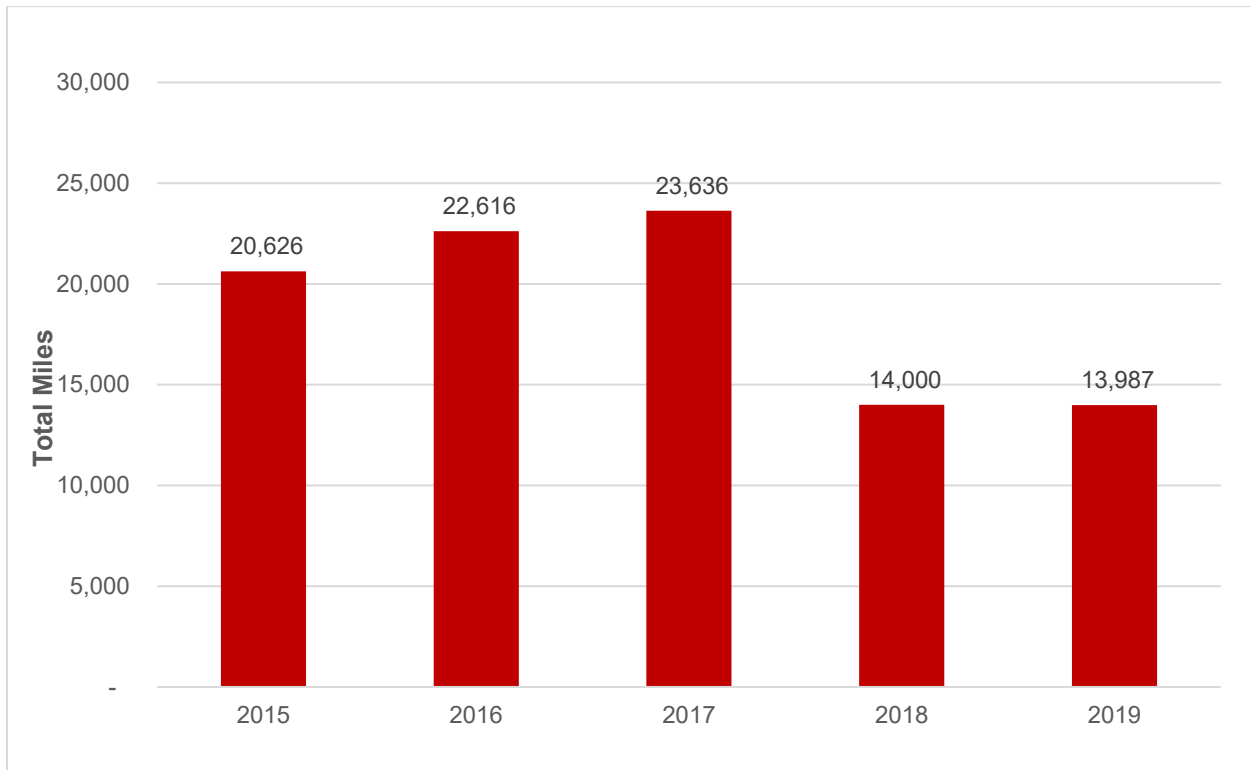
Source: PVTA 2018 TAM Plan, NTD Time Series Data

**4.4.2.2 Road Calls**

A road call is a mechanical failure of a bus in revenue service that necessitates removing the bus from service until repairs are made. Frequency of road calls is monitored to measure maintenance performance but is also an indicator of an aging fleet. Each road call disrupts service and creates an inconvenience to customers. Average miles operated between failures or road calls provide PVTA an overview of the effectiveness of their preventive maintenance programs and repair maintenance programs. The average miles between road calls show an increasing trend from FY 2015 to FY 2017. In FY 2018, miles between road calls decreased to

14,000 from 23,636 in FY 2017 and remained steady between FY 2018 and FY 2019 (Figure 35). However, road calls declined starting in FY 2018. The miles between road calls internal goal for PVTA systemwide is 20,759, which PVTA was below in both FY 2019 and FY 2018.

**Figure 35. Miles Between Road Calls (2015–2019)**

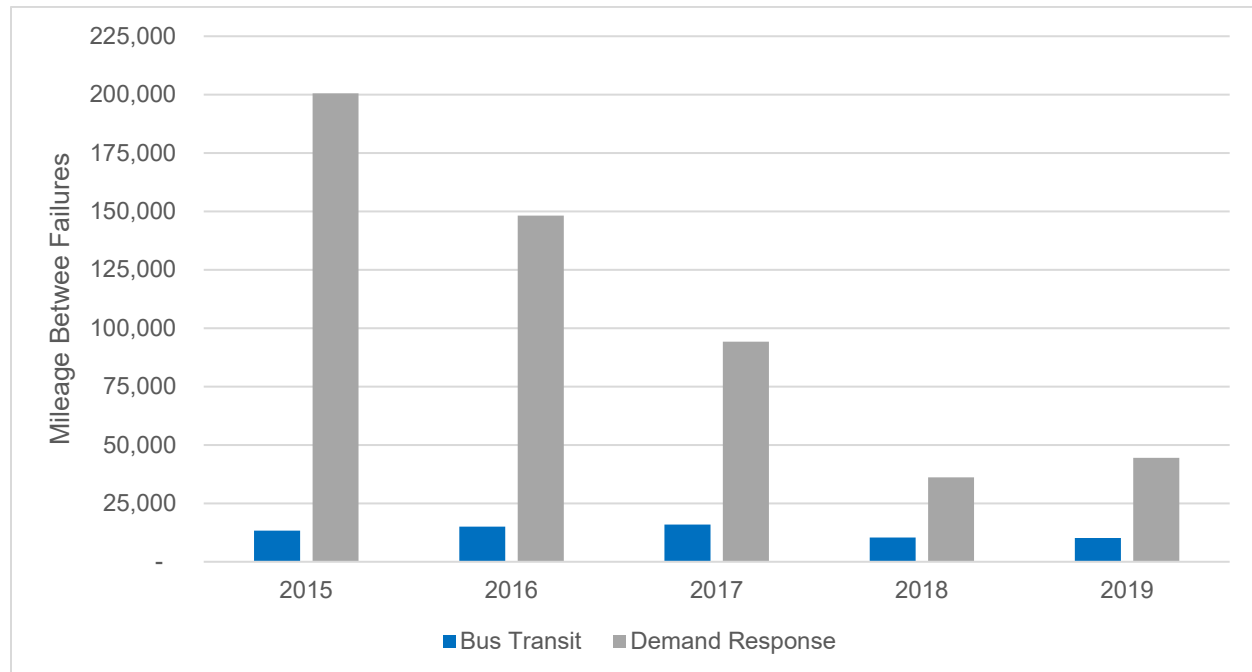


Source: MassDOT BlackCat

**4.4.2.3 Mechanical Failures**

A mechanical failure of a revenue vehicle prevents the vehicle from completing a scheduled revenue trip or from starting the next scheduled revenue trip because actual movement is limited or because of safety concerns. Mechanical failures can result in missed trips, are often tied to road call levels, and can necessitate higher spare ratios in order to maintain service. System reliability, which measures mechanical failures per vehicle revenue miles, is higher for demand response vehicles than fixed route buses for each fiscal year. In FY 2019, demand response service had one mechanical failure per 44,519 miles and fixed route buses had one mechanical failure per 10,202 miles (Figure 36). The systemwide average for fixed route bus and demand response services is 13,987 miles.



**Figure 36. Major Mechanical Failures (2015–2019)**

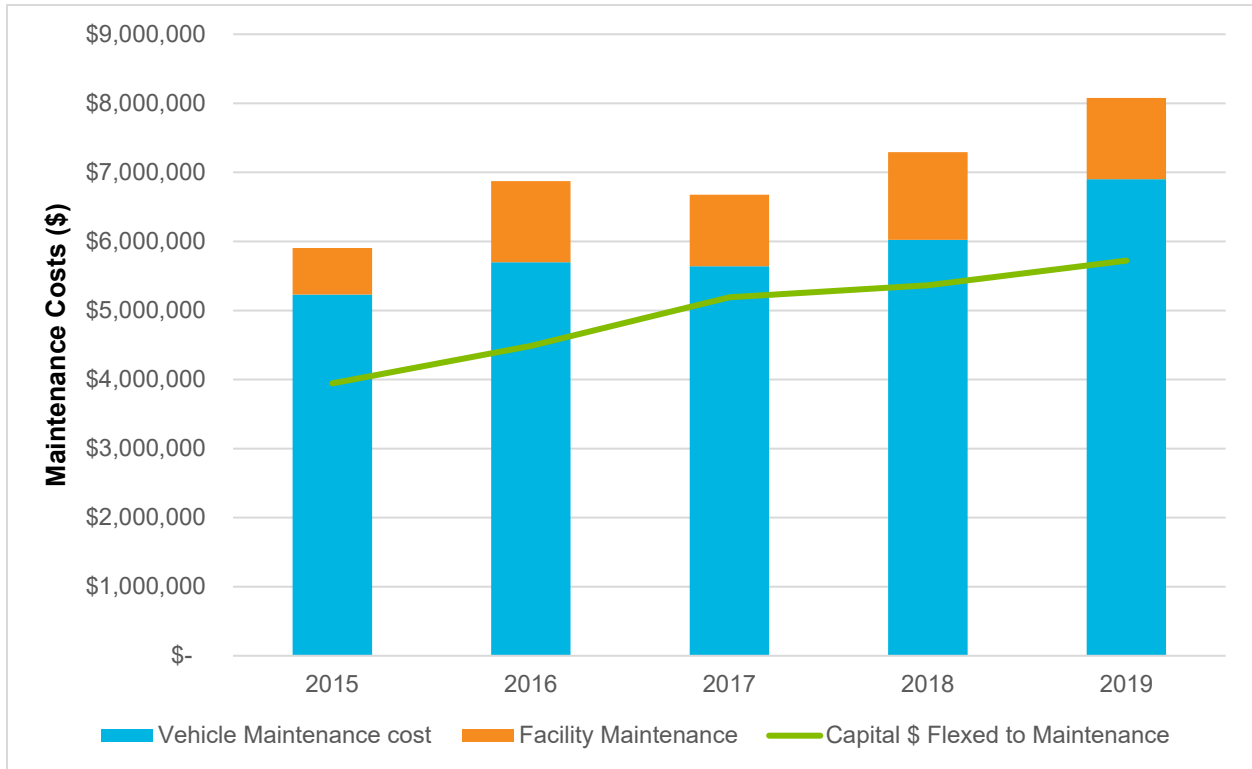
Source: MassDOT BlackCat and PVTA

#### 4.4.2.4 Maintenance Costs

The cost of maintenance for PVTA in FY 2019 was just over \$8 million, with 85 percent for vehicle maintenance and the remaining 15 percent for facility maintenance (Figure 37). Of the overall \$8 million maintenance budget, 71 percent of it is flexed over from capital, an increase of 45 percent in FY 2019 from FY 2015. The maintenance cost per revenue vehicle in FY 2019 was \$19,065, up 18 percent from FY 2015. It is anticipated that maintenance costs would rise for PVTA; the average age of the fleet has increased over time when vehicles were not replaced as they met their useful life, resulting in an older fleet.

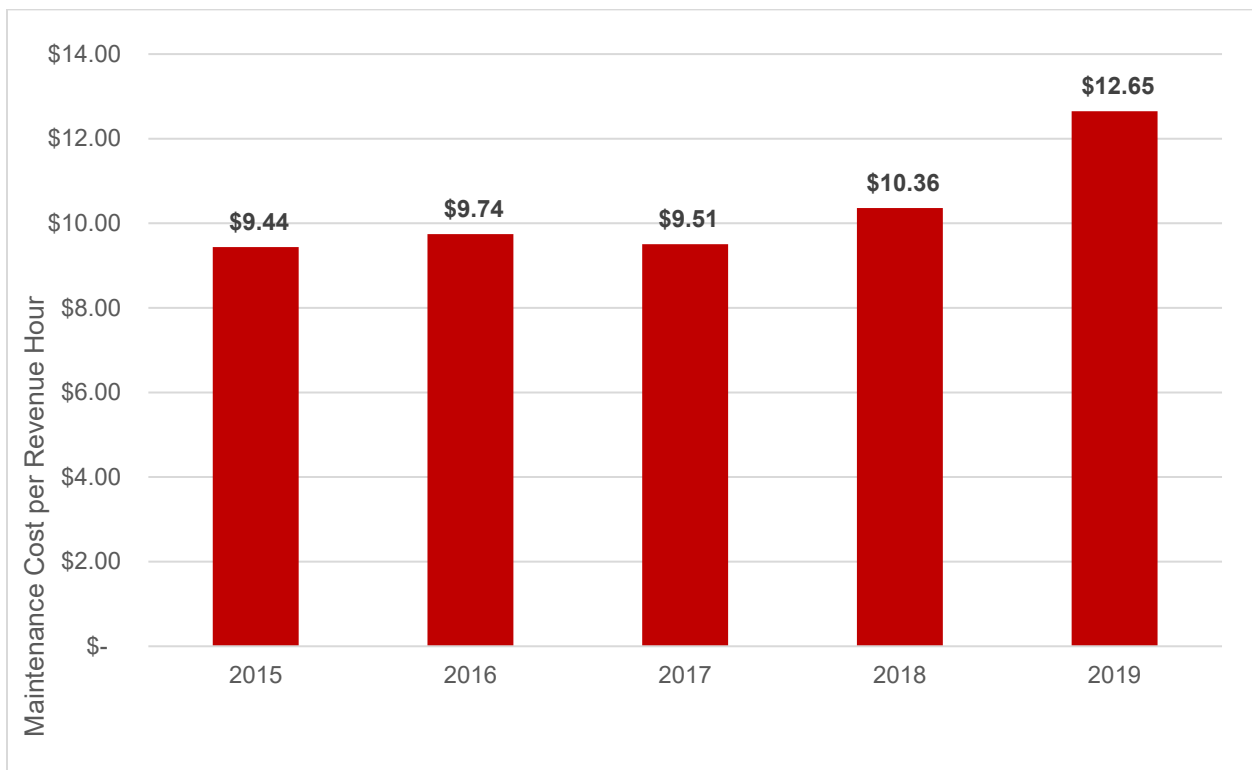
Maintenance cost per revenue hour is used to measure cost efficiency of maintaining vehicles and the effectiveness of a maintenance program. A lower cost per revenue hour generally indicates a more effective preventive maintenance program but can also be an indicator of fleet age as newer vehicles require less maintenance. The maintenance cost per revenue hour for PVTA has been increasing in recent fiscal years, which is in line with the overall cost trends (Figure 38). In FY 2019, the maintenance cost per revenue hour was \$12.65, which is an increase of 22 percent compared to FY 2018. Overall, the maintenance cost per revenue hour increased by 34 percent from FY 2015 to FY 2019. This trend is likely correlated with the aging PVTA fleet, especially for fixed route vehicles, which have increased in age from approximately 6 years in FY 2015 to 10 years in FY 2019. With 362 revenue vehicles in its inventory it is to be expected that aging vehicles would require more maintenance and thus generate higher maintenance costs.

**Figure 37. Maintenance Costs (2015–2019)**



Source: PVTA

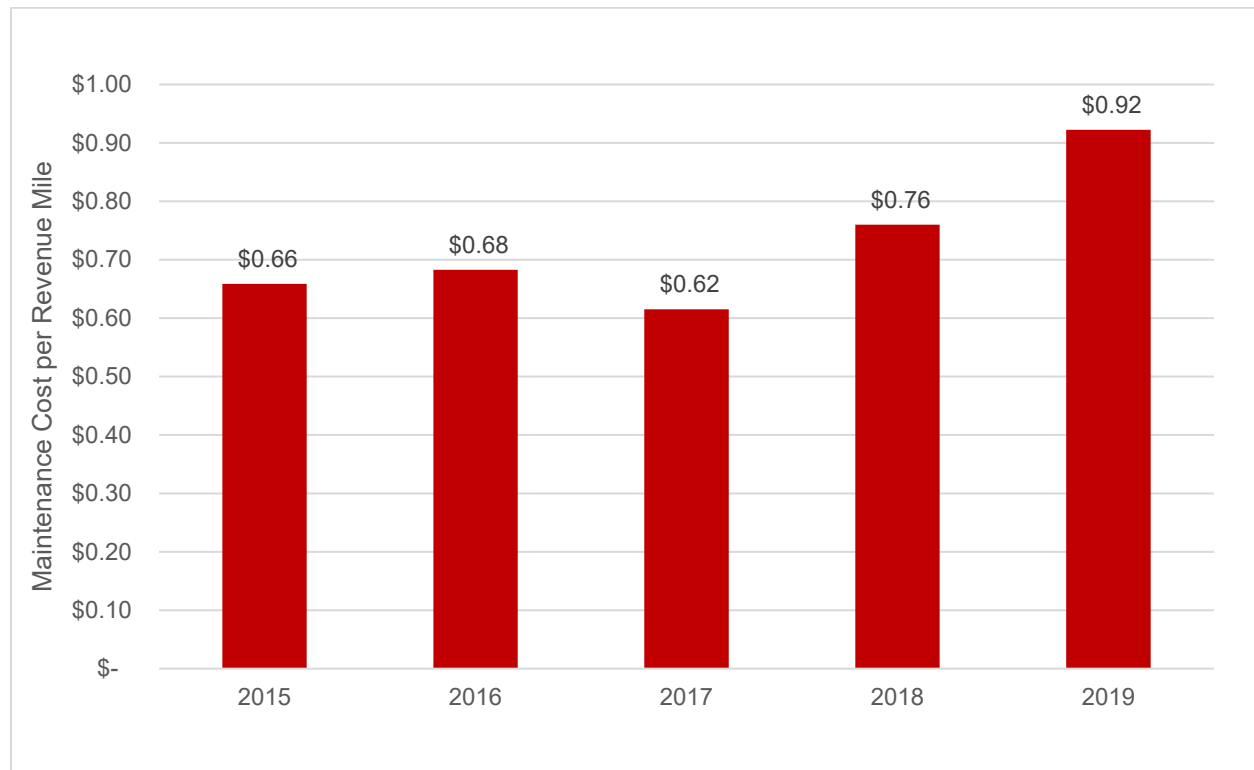
**Figure 38. Vehicle Maintenance Cost per Revenue Hour (2015–2019)**



Source: MassDOT BlackCat; PVTA

Maintenance cost per revenue mile is another cost efficiency measure used to examine the effectiveness of a maintenance program. The lower the cost per revenue mile, the more effective the preventive maintenance program. Additionally, maintenance costs correlate with increasing vehicle age. The maintenance cost per revenue mile analysis for PVTA shows an increasing trend for the past 5 years, although there was a small drop in cost during FY 2017 (Figure 39). In FY 2019, the maintenance cost per revenue mile was \$0.92, which is an increase of 21 percent compared to FY 2018. Overall, the maintenance cost per revenue mile increased by 40 percent from FY 2015 to FY 2019.

**Figure 39. Vehicle Maintenance Cost per Revenue Mile (2015–2019)**



Source: MassDOT BlackCat; PVTA

#### 4.4.3 Technology

PVTA uses the following information technology, which are divided into six categories: (1) Communications, (2) Revenue Collection Systems, (3) Safety and Security Infrastructure, (4) Operations, (5) Asset and Financial Management, and (6) Information Services.

##### 4.4.3.1 Communications

Communications technology includes radio equipment, communication towers, antennas, and related equipment, along with supporting software, hardware, and any transit signal priority (TSP) technology. Due to changes in available technology PVTA converted to cellular data communications (AT&T FirstNet) from land mobile radio. Each vehicle is equipped with a 1100IVR Cradlepoint, which acts as an onboard communication router to wirelessly transfer data to and from the vehicles. PVTA utilizes Opticom TSP system, which provides a green light when transit vehicles need to stay on time and move efficiently through traffic.

#### **4.4.3.2 Revenue Collection**

Revenue collection systems include fareboxes, money counters, and point-of-service software. PVTA utilizes the Genfare (GFI) fare collection system on fixed route buses for automatic fare collection launched on July 19, 2020. PVTA has partnered with MassDOT and Brockton Area Transit (BAT) to capitalize on a contract MassDOT has with Bytemark to provide mobile payment. The Bytemark solution is a visual validation fare system that will allow a user to set up an account and purchase a PVTA fare. When activated the fare will display on their cell phone for validation by the bus driver.

#### **4.4.3.3 Safety and Security**

Security infrastructure includes cameras, access control hardware, network video recorders, and systems. Systems include fixed route video, paratransit video, and facility video. PVTA replaced the fixed route video system in FY 2018. The new system, Safefleet MobileView, is a fully IP, high-resolution video system. Additionally, PVTA will explore the possibility of emergency live “look-in” functionality using Cradlepoint, which was installed on all fixed route vehicles as part of the project to support wireless video offload. PVTA continues to deploy the Samsung NVR, Cradlepoint, and camera solution in paratransit vehicles. All new vehicles are being equipped with the NVR and IP cameras.

#### **4.4.3.4 Operations**

PVTA uses Adept, Avail, Hastus, Trapeze, and an in-house reporting system to manage O&M. The Adept software is utilized for paratransit operations and dispatch, including client registration, client eligibility and certification tracking, scheduling, dispatch, and reporting. The software includes interactive voice response that integrates with Adept paratransit software to make night before reminders, arrival notifications, and customer information calls to PVTA paratransit clients. Currently, PVTA is using version 6.2.42. A maintenance/support agreement is in place.

The Avail ITS provides PVTA with real-time automatic vehicle locator (AVL) and operations data to facilitate the operations of daily fixed route and paratransit service. Avail tracks operations statistics, captures odometer readings, and has GPS, computer assisted dispatch (CAD), and automated passenger counter (APC) functions. PVTA utilizes Infodev Electronic Designers International Inc. APC system and has automatic audible and visual announcement systems that provide automated and next-stop announcements. PVTA uses version 6.3.6 but is planning to upgrade the software, which will allow for improved data mining and reporting through the business intelligence module, tighten data exchange integration between Hastus and Avail, and improve trigger box design. A maintenance/support agreement is in place.

Hastus is a fixed route software system used for planning, scheduling, operations, passenger information, and analysis. It is a database and software used for modeling and managing the delivery of fixed route service and used by operators for managing contractor staff leave. PVTA currently operates Hastus 2015 and anticipates upgrading to Hastus 2019 or Hastus 2020 in FY 2021. Possible feature enhancement includes self-serve, NTD reporting, and additional integration with Avail, including sending driver and vehicle assignment back to Avail. A maintenance/support agreement is in place.

Trapeze is a software system used for managing maintenance, including recordkeeping, vehicle usage, tracking and scheduling preventive maintenance, managing parts inventory, and procuring parts. PVTA is using version 14.o.x but is upgrading to a newer version soon. The latest version of Trapeze EPM will be installed into the SATCo/VATCo production environment in

FY 2020 for fleet maintenance system.<sup>37</sup> The Trapeze facility maintenance system will be deployed in FY 2020/2021.

PVTA has deployed an in-house incident reporting system that monitors and collects accident/incident data. The operator enters the report directly into a database. The supervisor adds and approves information as entered by the operator. This system eliminates the possibility of data entry error when recording a paper report into an online database. Future enhancements include pulling incident data directly into the PVTA claims database and eliminating the need for double data entry of incidents.

#### **4.4.3.5 Asset and Financial Management**

The Abila MIP Fund Accounting system is utilized to manage budgets, maximize grants, produce reports, and record van mileage. PVTA is currently using version 18.1.1.0, which is the latest version. A maintenance/support agreement is included in the subscription.

TransAM is an open-source asset management platform used to maintain an asset inventory, including condition assessment, forecasts, and NTD report generation. PVTA is currently using Build 2.2.1 powered by TransAM Ver 2.2.9, with quarterly maintenance releases being deployed per the hosting/maintenance agreement.

#### **4.4.3.6 Information Services**

PVTA utilizes a website trip planner powered by Google Maps (not in real time) for planning trips. The Avail ITS also provides customer information and a data feed to support third party application development. PVTA has mobile apps such as Transit app, MyStop mobile by Avail, and a custom UMass BusTrack app for tracking buses in real time. Transit app provides the following information for Android and iOS users: step-by-step navigation instructions, service disruption notification, departure and stop reminders, and shortcut to Uber and Lyft ride sharing services.

Real-time customer information signage is available at nine locations. PVTA is working to identify additional locations and obtain the necessary electrical infrastructure to support electronic signage. Solar-powered customer information signs are possible at locations that receive sufficient sun, but many candidate locations with high ridership are in urban areas where building shadows prevent sufficient sunlight from being captured on the panels.

## **4.5 Policies and Procedures**

This section provides an overview of PVTA's customer and service policies, including bag policy, code of conduct, wheelchair securement, service animals, bus shelter, etiquette and safety, flag stop usage, and bus stop placement.

### **4.5.1 Customer Policies**

Customer policies and procedures are outlined in Table 21.

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<sup>37</sup> Trapeze EAM Version 19 has since been deployed into production.

**Table 21. Policies and Procedures**

<b>PVTA Policy</b>	<b>Description of Policy</b>
Animals	Properly trained service animals are allowed on board, but pets are not permitted unless they are secured in fully enclosed carriers. Passengers are expected to comply with PVTA's service animals' policies and must be able to confirm that the animals are service animals if asked. Service animals must be leashed or harnessed and must not block the vehicle aisle or path of travel.
Bag Policy	<p>On fixed route buses, bags may be brought on board; however, no more than three standard grocery bags per passenger are permitted. For safety reasons all grocery bags and carry-on items must be under the passenger's control. Items brought on board such as backpacks, bags, suitcases, etc., must be stored in the passenger's lap or underneath the seat. Items must be kept out of the aisle, and these items are not allowed to be stored on other seats on the bus.</p> <p>For Senior Van Service, riders who require assistance with their bags or parcels must call only once to notify the Reservation Office that they are requesting the assistance, which will be added to the client file. Drivers are only required to assist with up to three standard size carry-on bags with a combined weight not to exceed 25 pounds. Driveways and sidewalks must be cleared of snow and/or ice if driver is required to provide door to door assistance or shopping bag assistance.</p>
Bicycle	All buses are equipped with bike racks that can hold two or three bikes. Customers must load and unload their own bike; bus drivers cannot assist. Electric and gas-powered bikes are not allowed on the bike racks due to weight restrictions. Folding bikes are allowed on PVTA buses and must be kept out of the aisle.
Code of conduct	<p>PVTA's Passenger Code of Conduct includes three tables. Table 1 (Behaviors Punishable by Suspension) lists activities and descriptions of behaviors that are either expressly prohibited or allowed on PVTA property (PVTA transit vehicles and transit centers). Unless otherwise deemed a "Major Infraction" in Table 1, behavior will be considered a "Minor Infraction. Table 2 (Disciplinary Actions) lists disciplinary actions and processes for each type of infraction. Table 3 (Suspension Return Table) lists the duration of suspension or type of infraction and the requirement for notifying PVTA and the person to be notified at PVTA. The detailed Passenger Code of Conduct is available at the PVTA official website at <a href="http://www.pvta.com/documents/customerService/codeConduct2019.pdf">http://www.pvta.com/documents/customerService/codeConduct2019.pdf</a>.</p>

PVTA Policy	Description of Policy
Etiquette and safety	<p>To create a safe and comfortable ride, PVTA has set the following etiquette and safety rules when riding the bus:</p> <ul style="list-style-type: none"> <li>• Rude, hateful, discriminatory, or derogatory language is prohibited.</li> <li>• Threatening or harassing a passenger or PVTA employee is prohibited.</li> <li>• Physical or violent behavior toward passengers or PVTA employees is prohibited.</li> <li>• Vandalism or destruction of PVTA or another passenger’s property is prohibited.</li> <li>• Any actions that result in delaying a vehicle for more than 5 minutes will be considered a serious disruption of service and are prohibited. Please stay seated to avoid falling when the bus starts or stops.</li> <li>• Any actions that result in requiring a bus to be removed from service for cleaning are prohibited.</li> </ul>
Lost & Found	<p>PVTA is not responsible for items left behind on any fixed route or paratransit bus; however, PVTA staff will make reasonable efforts to locate an item but is not responsible for finding or securing lost items. Customers should contact Customer Service to locate lost items.</p>
Strollers/Carts	<p>Strollers and grocery carts must be folded and kept out of the aisle.</p>
Scooters (electric razor type)	<p>PVTA does not have a policy for scooters.</p>
Wheelchair securement	<p>All wheelchairs must have four point securement if the passenger is in it.</p>

Source: PVTA

### 4.5.2 Service Policies

PVTA requires bus shelter placement at stops with ridership of at least 60 boardings per day in urban locations, ridership of at least 40 boardings per day in suburban locations, and ridership of at least 15 boardings per day in rural locations. Shelter placement at stops with lower ridership may be considered if the location experiences a particularly large number of transfers, development proposed for the area will likely increase ridership, or elderly or mobility challenged passengers in the area would benefit from the addition of a shelter. Bus shelter policy requires input from appropriate stakeholders (i.e., community planners, abutters, residents, and business owners), which should be solicited before final placement decisions are made. PVTA has 285 stops (15.6 percent of stops) with shelters, 66 of these have over 60 boardings per day (Figure 40 and Figure 41). Nineteen stops do not have shelters but have over 60 boardings per day, thus meeting the requirement. These stops include Main/Bridge; North Village Apartments; Cowles Lane; Amherst Glass (In); Sci Tech High School; Rolling Green Apts (In); Mill Valley Apartments (In); Maple/Suffolk; Maple/Hampshire; Commerce High School (opposite); Belmont/Beaumont; Main/Acushnet; Putnam High School (Blunt Park Road); Amherst Common (N); Springfield Library; Memorial/(Park Inn 628); Sylvan Residential (In); Walmart Chicopee; North Amherst Center (In); and Boston/Lucerne (1).

**Figure 40. Southern Tier Stops Ridership by Shelter Status**

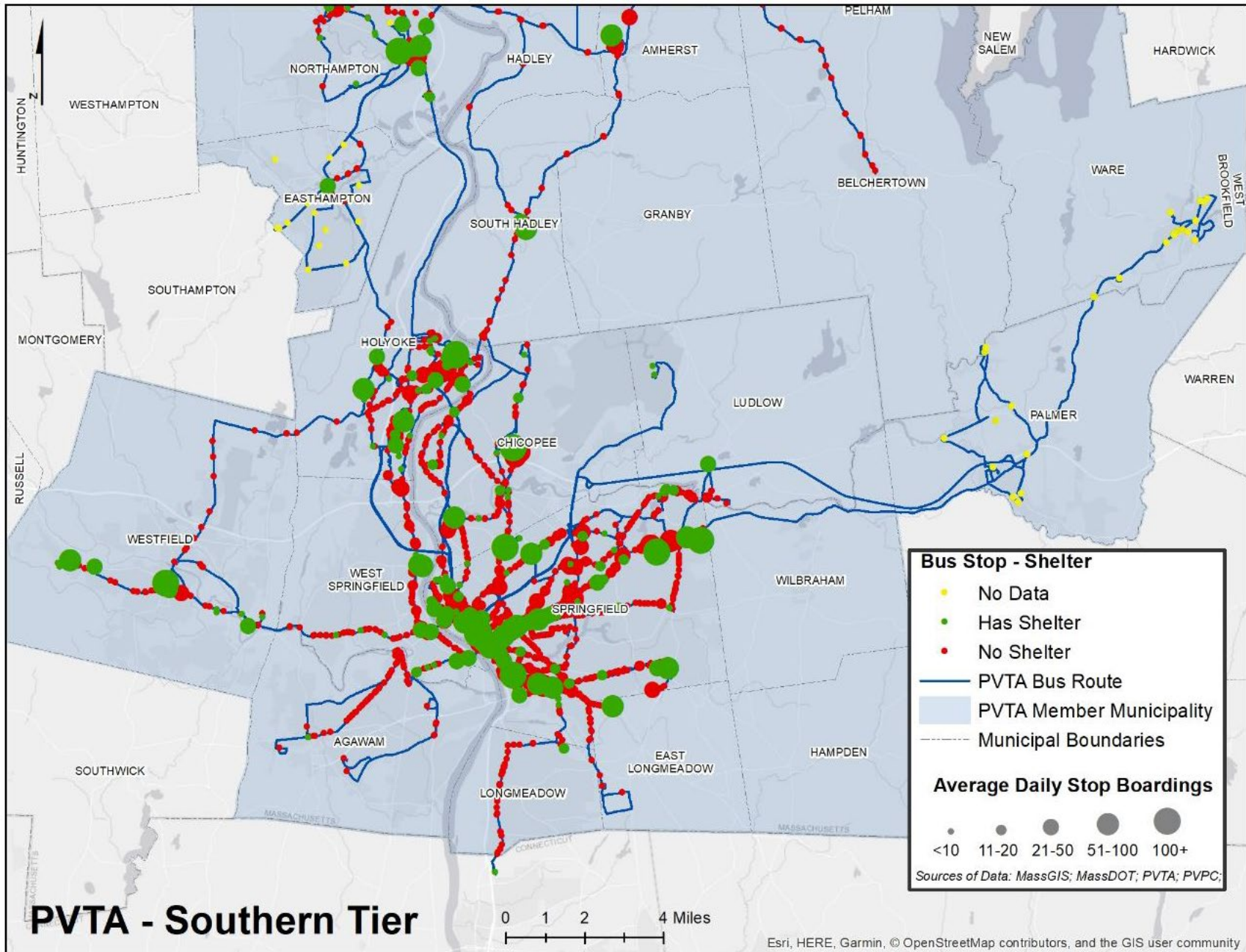
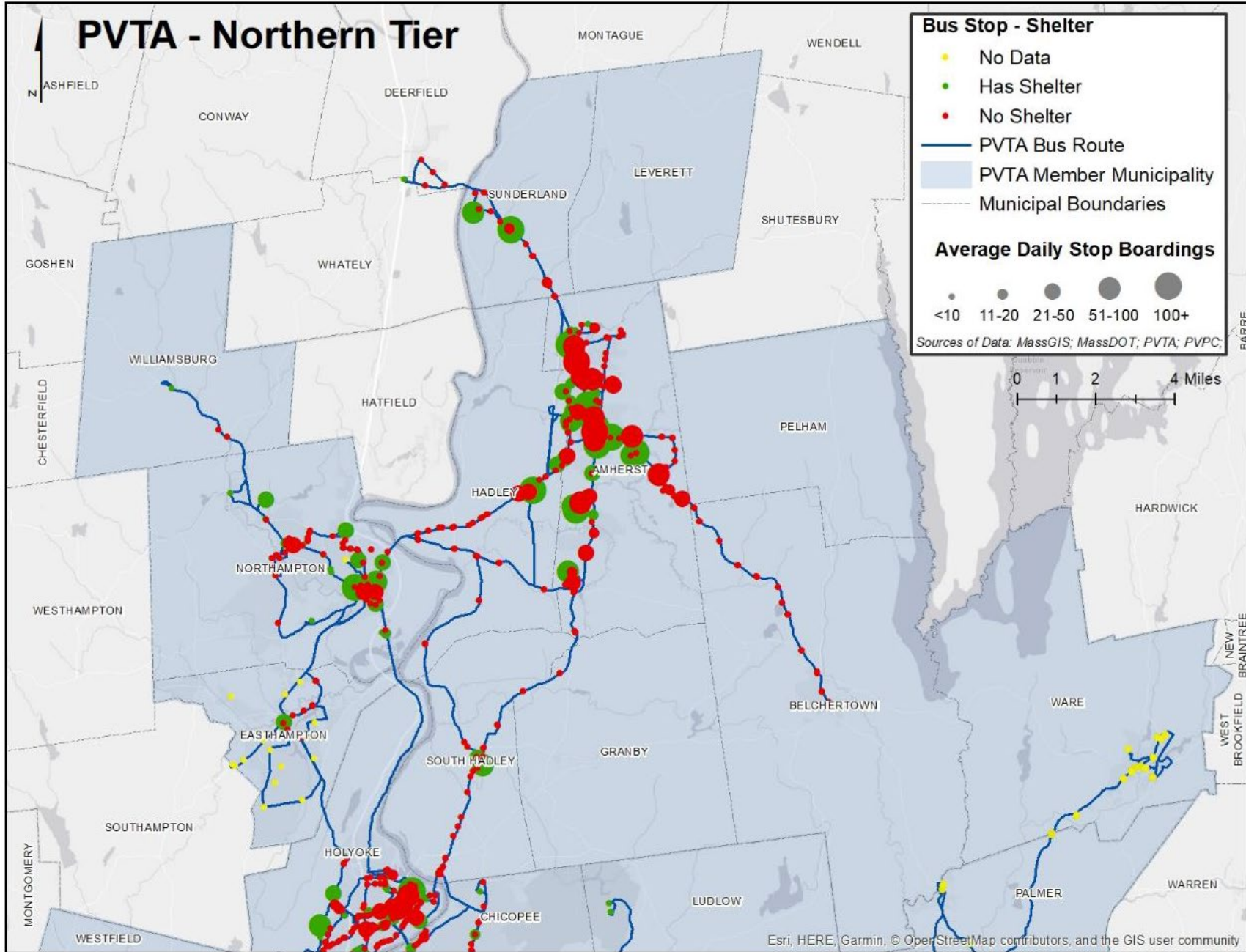




Figure 41. Northern Tier Stops Ridership by Shelter Status



PVTA does not have a policy for benches at stops. Currently, 1,549 stops do not have benches (Figure 42 and Figure 43), including 117 stops that do have shelters but no bench. While PVTA does not have a standard for shelter placement, a review of other system policies shows that in general the guideline for installing a bench is half of the standard used for shelter placement. Using this guideline and the PVTA standard for urban areas, 72 stops with over 30 passengers per day do not have seating.

PVTA does not have a policy for lighting at stops. Currently, 374 stops do not have adequate lighting (Figure 44 and Figure 45). Lighting at stops is an important factor as it improves the safety and security of the bus stops, as well as allows bus drivers to see waiting passengers and drivers of other vehicles to see passengers boarding and deboarding the bus.

Most of the bus stops are marked with PVTA bus stop signs; however, unmarked stops or flag stops are used in some areas (Figure 46). Passengers need to arrive at the stop 5 minutes or more before the expected arrival of the bus, be ready to board (with fare and any ID cards), and signal the driver as the bus approaches.

PVTA provides different types of transit services, including local and express services. Generally, services that provide more accessibility have more frequent stops that are closely spaced, and services that provide more mobility such as express or commuter services have fewer stops. PVTA follows the minimum stop spacing (or maximum stops per mile) guidelines shown in Table 22. Where multiple routes operate in the same corridor, the standard for the higher service type applies.

PVTA has changed their service tiers since the development of the 2014 CSA. There are now five tiers based on average weekday headway. The update occurred in FY 2020 in order to hold more frequent service to higher productivity standards.

**Table 22. Bus Stop Spacing Guidelines**

	<b>BRT/Key Regional Tier I</b>	<b>Key Regional Tier II</b>	<b>Urban Radial</b>	<b>Campus Shuttles</b>	<b>Five Colleges</b>	<b>Village Connector</b>	<b>Community/ Flex</b>	<b>Express</b>
<b>Minimum Stop Spacing (feet)</b>								
Moderate to high density areas	900	900	900	660	900	660	660	900
Low density areas	1,100*	1,300	1,300	1,100	1,100	1,100	1,100	1,100
<b>Maximum Stops per Mile</b>								
Moderate to high density areas	6	6	6	8	6	8	6	6
Low density areas	4	4	4	5	5	5	5	5

Source: 2014 CVA

Note: Moderate to high density = greater than or equal to 4,000 per square mile, low density = less than 4,000 persons per square mile.

\*BRT stops vary by type and the surrounding environment.



**Figure 43. Southern Tier Stops Ridership by Bench Status**

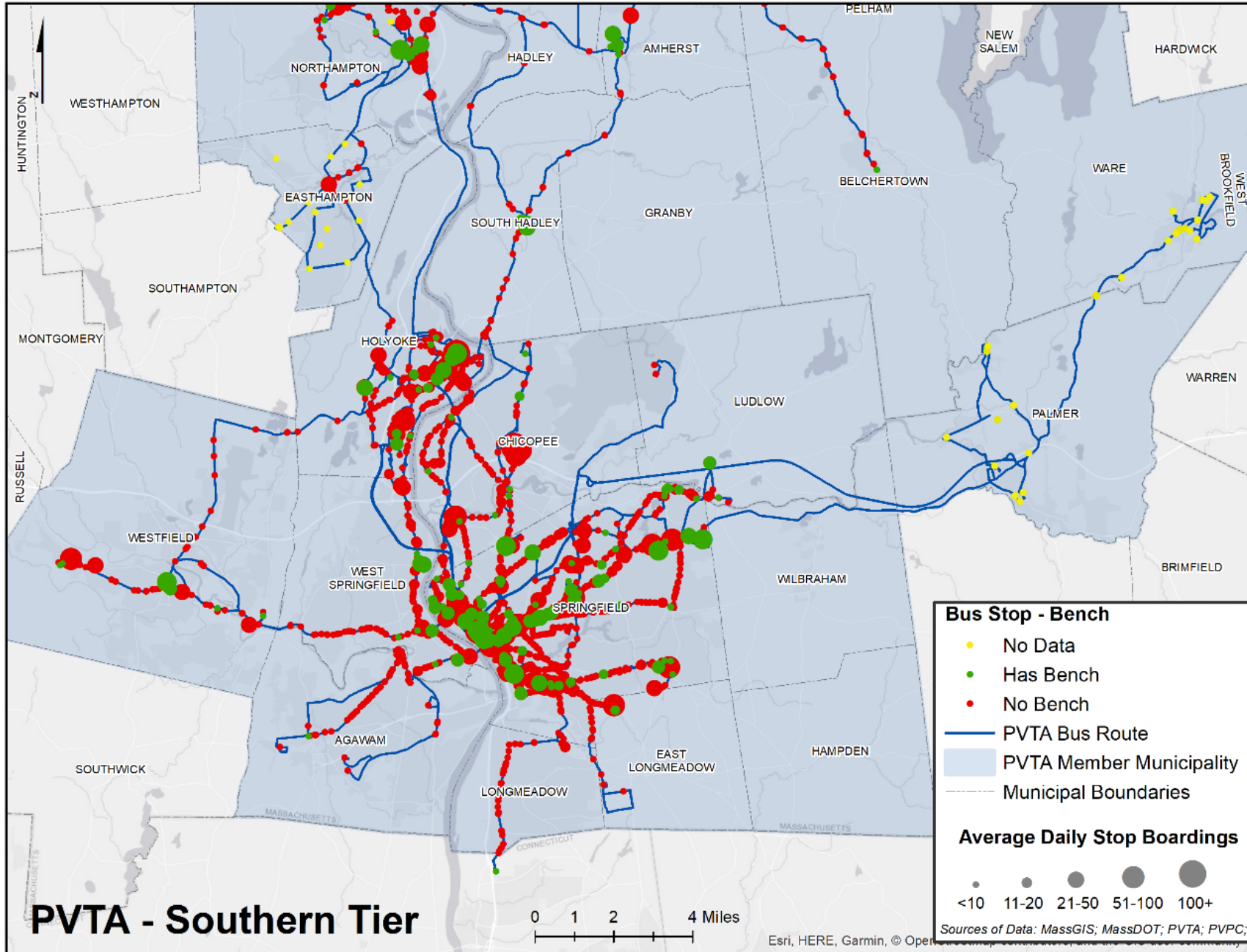


Figure 44. Southern Tier Stops Ridership by Lighting Availability

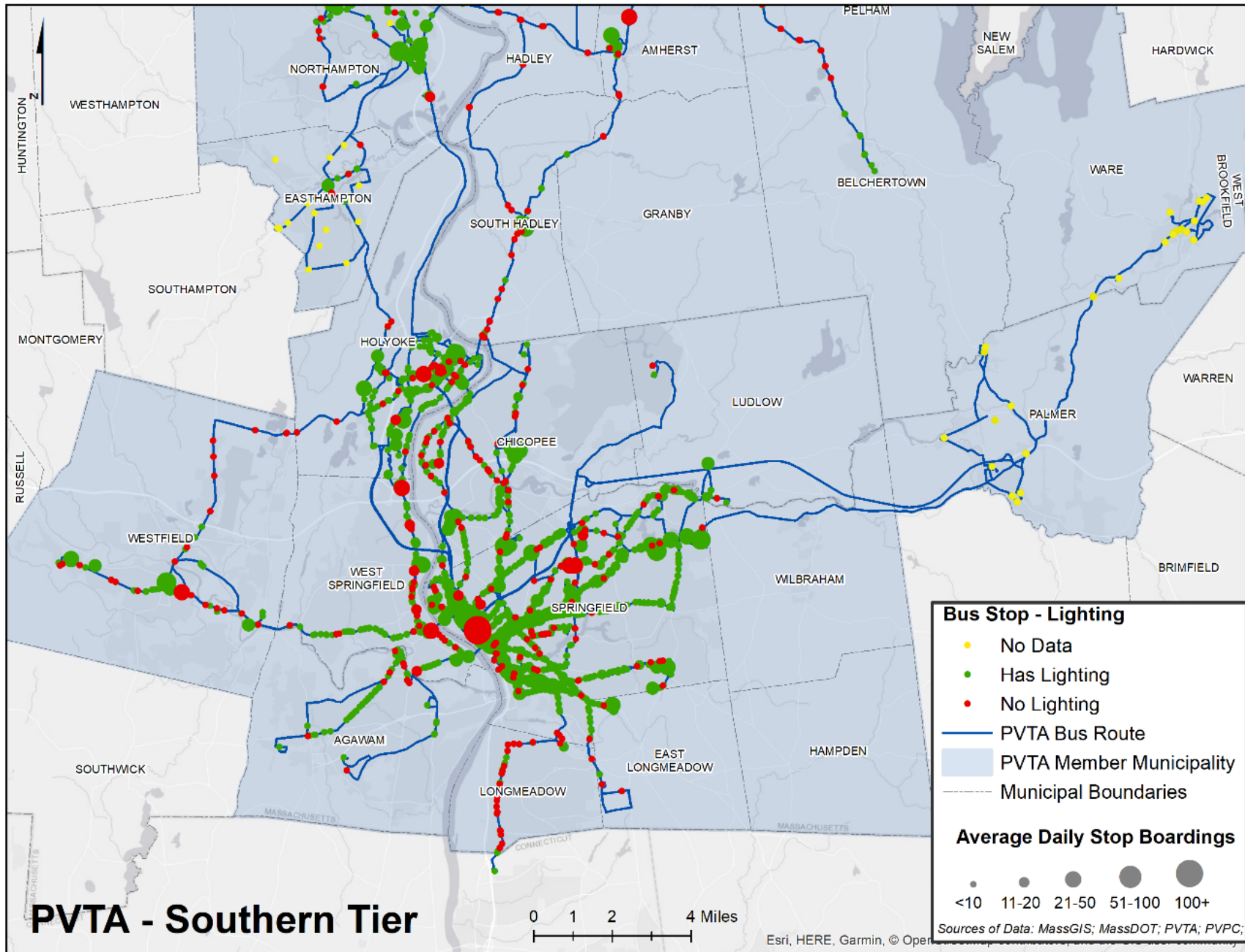


Figure 45. Northern Tier Stops Ridership by Lighting Availability

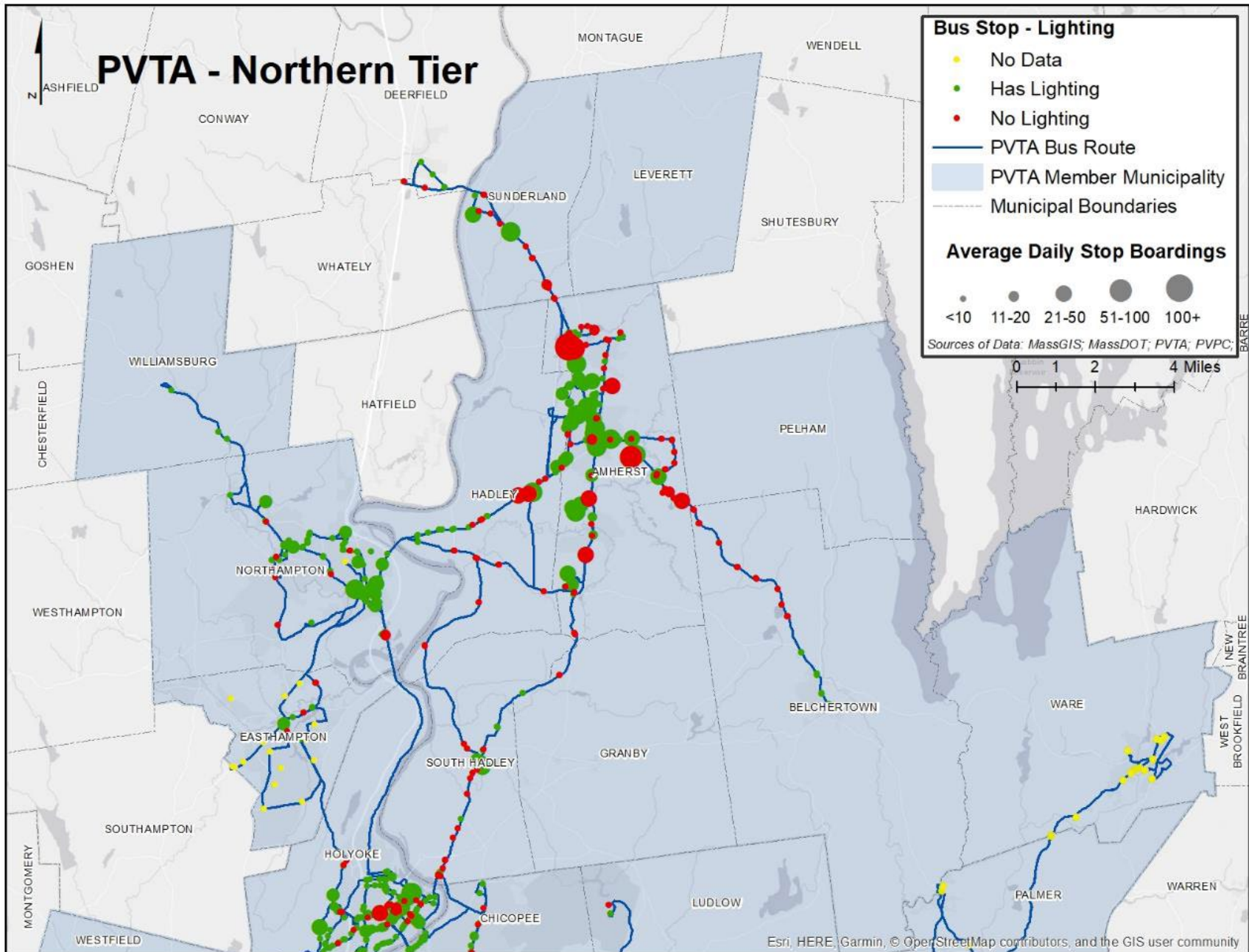
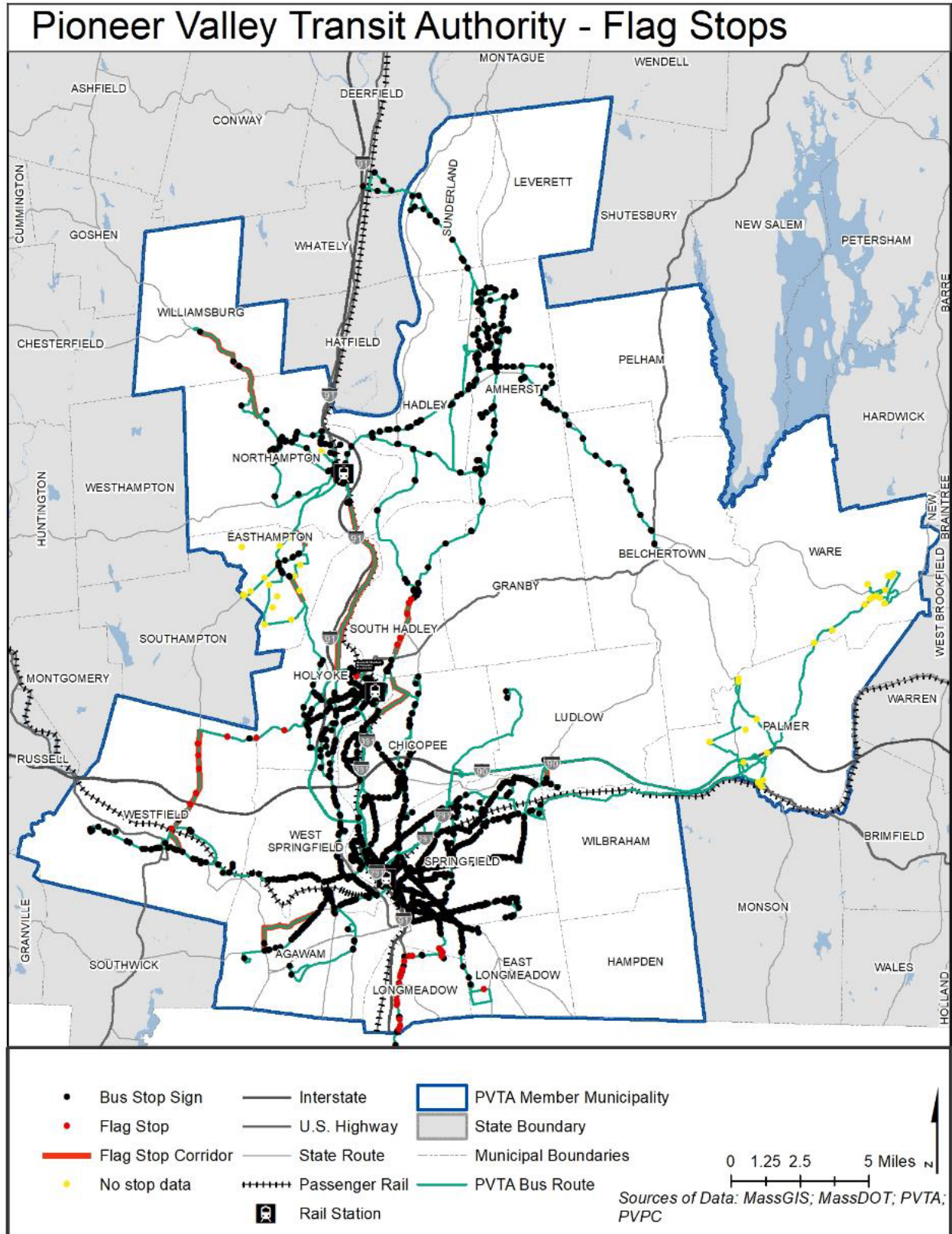


Figure 46. Location of Flag Stops



## 4.6 Regional Connections and Other Transportation Providers

PVTA routes connect to a number of other bus and rail services in and adjacent to the Pioneer Valley. Franklin Regional Transit Authority (FRTA) operates two routes in the PVTA area, providing connection to the FRTA hub in Greenfield. FRTA Route 31 (Northampton/Greenfield) provides seven round trips per weekday every 2 hours between PVTA's transfer hub at the Academy of Music in downtown Northampton and the John W. Olver Transit Center in Greenfield. Route 23 (Sunderland/Greenfield) provides six round trips per weekday between Sugarloaf Estates in Sunderland and the John W. Olver Transit Center.

One PVTA route (G5) extends outside the formal PVTA area to Enfield, Connecticut, serving a large MassMutual employment center and connecting with CTtransit's Enfield Express, which operates express to downtown Hartford. Route G5 has four trips (two in the morning and two in the afternoon) per weekday to MassMutual Bright Meadow Campus in Enfield where transfers can be made to CTtransit Routes 905 and 915.

Intercity bus connections are available at several locations served by PVTA and Peter Pan Bus Lines: Union Station, HTC, Holyoke Mall, Amherst Center, UMass, Northampton, Chicopee, Deerfield, and South Hadley. Connections can be made to Boston, Bradley International Airport in Connecticut, and New York destinations. Additionally, Greyhound provides intercity bus connections from Springfield Union Station to New York and Boston.

Five intercity rail routes serve Springfield's Union Station. Northeast Regional service provides one daily round trip from Springfield to New York City via Hartford and New Haven, Connecticut; the Vermonter provides one daily round trip from New York City to St. Albans, Vermont; the Lake Shore Limited service provides one daily round trip from Chicago to Albany with service to either New York City or Boston (via Springfield); the Valley Flyer provides two daily round trips from Springfield to Greenfield; and CT**rail** Hartford Line provides seven trips per weekday between Springfield and New Haven, Connecticut.

Since 2017, rideshare companies or TNCs, commonly Uber and Lyft, have been increasingly providing on-demand transportation throughout Massachusetts and the nation. Massachusetts state law requires TNCs to share data with the Commonwealth. Ridesharing companies have grown in popularity because passengers are quickly and easily matched with drivers who use their private vehicles to take them to and from any destination. Operating similarly to taxi services, people with their own vehicles give passengers rides to specific destinations as requested, which allows passengers to have quick and easy access to an on-demand ride at any time of day.

In 2019, TNCs provided 91.1 million rides in Massachusetts, which was a 12.8 percent increase from 2018 and 40.6 percent increase from 2017. In 2019 there were 2,104,849 TNC rides originating in the PVTA service area, which represents approximately 2 percent of all TNC rides in Massachusetts (Table 23). The majority of TNC trips originated in Springfield, Amherst, Chicopee, Holyoke, and West Springfield (more than 100,000 trips) (Figure 47). Between 2017 and 2019, East Longmeadow, Springfield, Chicopee, Palmer, and West Springfield had the greatest increase in TNC trip originations with an increase between 130 and 150 percent; however, all of PVTA's member communities have had an increase in TNC ridership since 2017 (Figure 48).



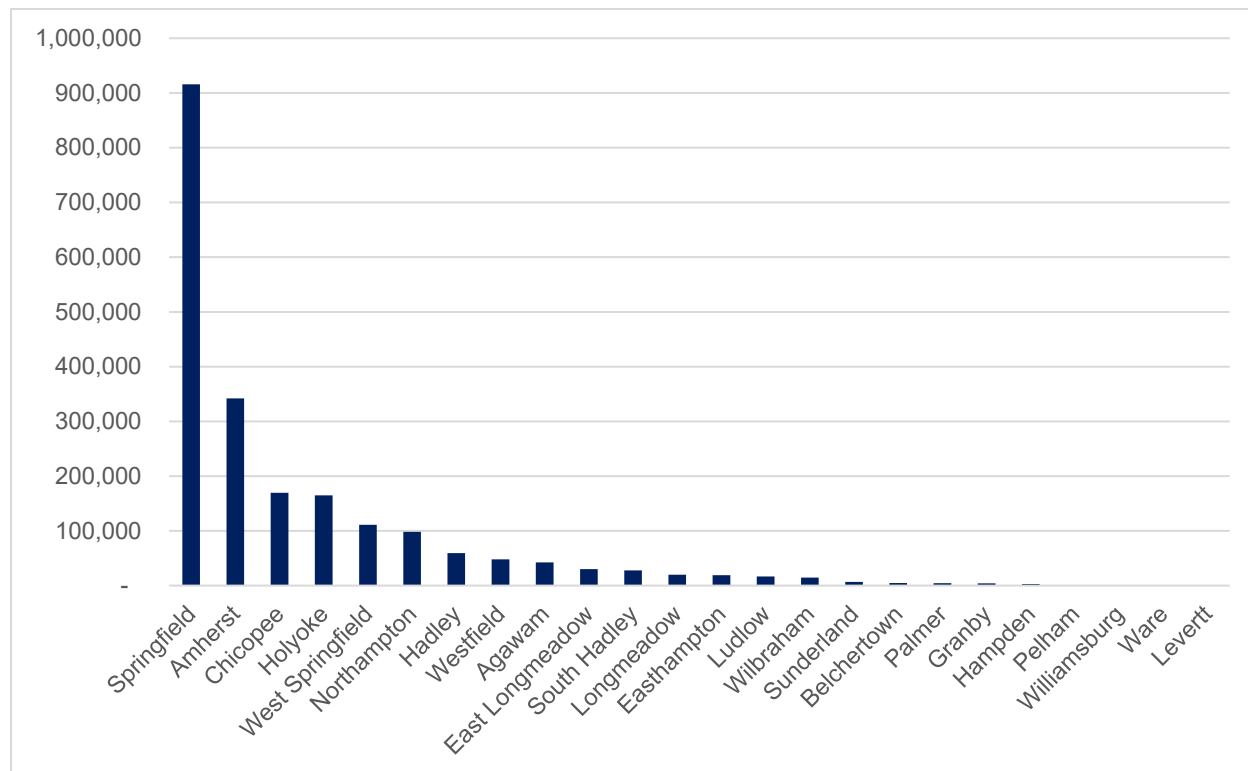
**Table 23. TNC Ridership in PVTA Member Communities (2017–2019)**

<b>PVTA Member Communities*</b>	<b>TNC Rides Started (2017)</b>	<b>TNC Rides Started (2018)</b>	<b>TNC Rides Started (2019)</b>
Agawam	20,918	31,993	42,411
Chicopee	70,278	127,167	169,518
Easthampton	11,762	15,479	19,111
East Longmeadow	11,974	23,207	29,990
Holyoke	74,232	122,924	164,750
Northampton	61,570	83,128	98,354
Springfield	378,381	682,690	915,724
Westfield	28,502	41,549	48,056
West Springfield	48,288	82,955	111,231
Amherst	284,506	338,842	342,082
Belchertown	2,754	4,062	4,628
Granby	2,490	3,371	4,092
Hadley	40,317	55,563	59,412
Hampden	1,501	2,897	2,857
Leverett	294	405	486
Longmeadow	11,785	15,606	19,945
Ludlow	7,748	12,432	16,613
Palmer	1,876	3,762	4,409
Pelham	655	852	880
South Hadley	16,742	24,713	27,754
Sunderland	5,285	6,768	6,653
Ware	258	490	559
Wilbraham	6,751	9,658	14,530
Williamsburg	552	747	804
South Hadley	20,918	31,993	42,411
Sunderland	70,278	127,167	169,518
<b>Total:</b>	<b>1,089,419</b>	<b>1,691,260</b>	<b>2,104,849</b>

Source: 2017-2019 Data Report Rideshare in Massachusetts, Mass.gov  
<https://tnc.sites.digital.mass.gov/> .

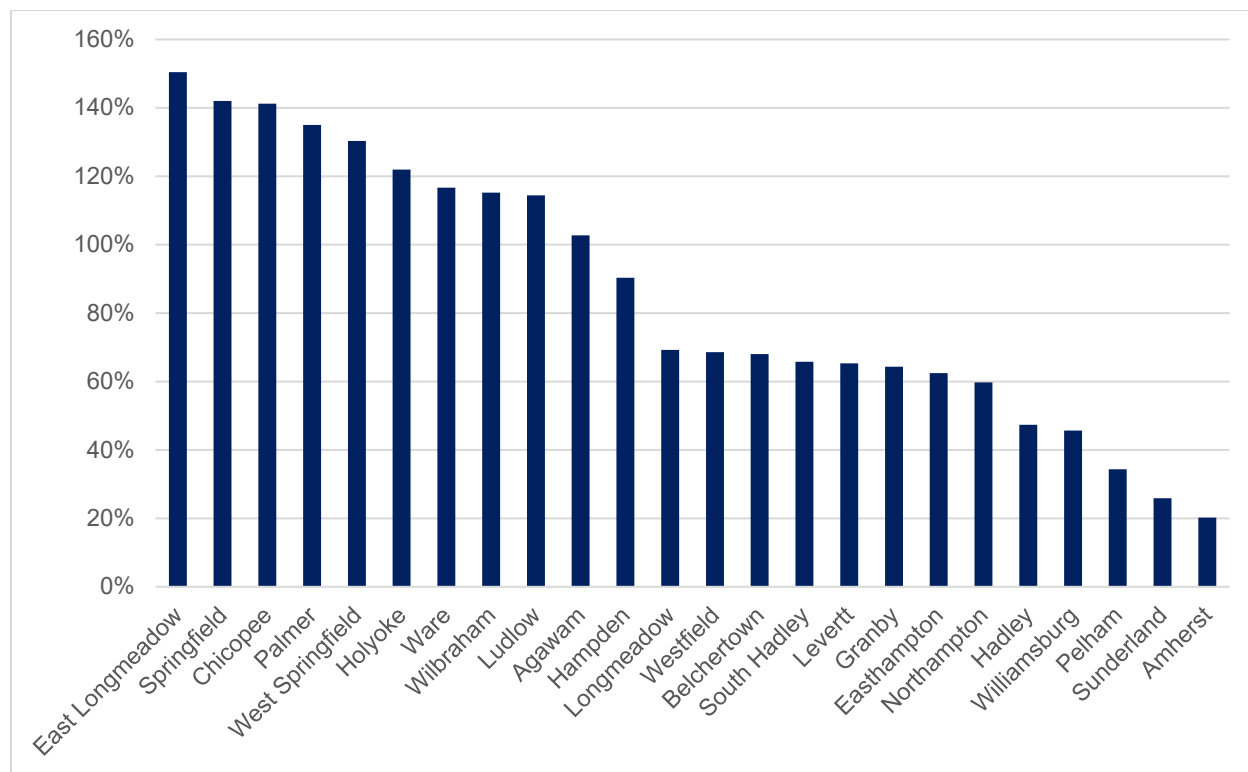
\* PVTA serves a small section of Southampton, and Deerfield and Enfield, two non-member communities, which were not included in this analysis.

**Figure 47. TNC Riders Started in PVTA Member Communities in 2019**



Source: 2019 Data Report Rideshare in Massachusetts, Mass.gov  
<https://tnc.sites.digital.mass.gov/> .

**Figure 48. Percent Change in TNC Ridership in PVTA Communities (2017–2019)**



Source: 2019 Data Report Rideshare in Massachusetts, Mass.gov  
<https://tnc.sites.digital.mass.gov/> .

## 4.7 Sustainability Initiatives

Climate change is a real and present threat and working toward a more sustainable system means addressing the role of our transportation systems in contributing toward climate change or working to combat it. Transit plays a critical role in reducing the climate impacts from transportation systems while also improving the mobility of vulnerable user groups. Under this context the study team reviewed PVTA's progress toward five key sustainability indicators: Clean Vehicles, Education, Multimodal Integration, Efficient Facilities, and Recycling. These indicators address the sustainable aspects of RTA infrastructure (clean vehicles, efficient facilities, etc.) and how their system accommodates vulnerable and multimodal users (education, multimodal integration, etc.). The following section outlines PVTA's progress toward meeting these indicators.

PVTA has a strong commitment to sustainability across all of their facilities, through their operations, and within their fleet. PVTA operates out of four facilities across its region: SATCo – Cottage Street, NEXT – 2840 Main Street, VATCo – 54 Industrial Drive, and UMTS –185 Holdsworth Way in addition to the administration offices at 2808 Main Street. Operationally the system currently uses a combination of traditional diesel as well as hybrid and electric buses and is expecting delivery of an additional four all-electric buses in December 2020. To help with the integration across modes PVTA provides bike racks on buses and bike parking at major stops or transfer points. Additionally, the Valley Bike share program is operated through much of the region, and kiosks are often coordinated with stops.

Figure 50 describes PVTA's progress toward the Efficient Facilities and Recycle categories by each of the four facilities listed above. Overall PVTA is working to integrate sustainable practices across all of these facilities to reduce their energy demands. This includes LED lighting, skylights, and either on-site solar or feasibility studies for the construction of on-site solar. Recycled products are used across all facilities where possible and single stream recycling is employed to limit contribution to landfills.

**Figure 49. Top left: New Cottage Street Facility; Top Right: Bike Part Vending Machine at the Olver Pavilion; Bottom left: PVTA Electric Bus; Bottom Right: Solar Powered Bus Stop Departure Sign**



**Figure 50. PVTA Ongoing Sustainability Initiatives**

### Efficient Facilities

- Cottage Street: Best practices stormwater management including vegetative swales/cleaning of runoff, infiltration/retention basins, etc.
- All operations facilities: LED interior/exterior lights with sensor/timer shut-offs. Natural light provided to most employee spaces and to maintenance areas. Skylights in bus maintenance for natural light and vertical windowing under roof eaves for additional natural light in bus storage.
- All operations facilities: White roof specified to reduce heat island effect.
- 54 Industrial Drive and 185 Holdsworth Way: 1 MWatt Rooftop PV Solar Array with battery storage in design by third party through PPA; planned for 2020-21 construction.
- Cottage Street: Irrigation using onsite water sources/well is being studied now.
- Cottage Street: Stormwater quality control – onsite retention.
- Olver Pavillion: Building envelope/building systems specified - exceeds building energy performance standards (LEED levels). Building managemnet system installed to optimize energy use.
- All operations facilities: Operable window for employee comfort
- 54 Industrial Drive, 2840 Main Street, and Cottage Street: Recycled and regionally produced wood and materials. Low volatile organic compounds emitting materials specified.
- Cottage Street: Building opened in 2019. Bus stop and bike racks provided. Six electric bus charging stations to be installed in 2020.

### Recycle

- Purchase recycle material products where possible
- Green/recycled materials purchased whenever possible.
- Bus wash uses reclaimed water in each lane.
- Engine oil and antifreeze are recycled using Safety-Kleen.
- Metal and plastic components from buses are recycled through Kane Scrap Iron & Metal.
- Reclaimed materials are used whenever possible (i.e., rebuilt parts).
- Single stream recycling through Mcnamara Waste.
- Paper shredded and recycled via ProShred.

### Clean Vehicles

- LED exterior and interior lightng is used on all PVTA vehicles.
- PVTA expects to receive delivery of four 40-foot electric buses from Proterra in December 2020. PVTA will be placing an order for additional electric vehicles, possibly 12 funded through VW credits, for delivery in 2021.
- Construction is currently ongoing for the installation of EV chargers at Cottage Street. A needs study is being conducted at the facilities in Northampton and Amherst to determine the steps needed to install EV chargers at those locations.

### Education

- Transit themed coloring book for children.
- Special wrapping on all-electric buses to identify them as zero emission buses.

### Multimodal Integration

- Valley Bikes (bike share program) is operated through much of the region and is often coordinated bus stops and transit hubs.
- Bike racks at major bus stops and transfer locations throughout the region.
- Union Station, Westfield Olver Pavillion, and Holyoke Transit were redevelopment projects with a transit oriented development component.
- PVTA coordinates services with CTrail (Hartford Line) and FRTA.
- Provides bike racks on all buses and participates in annual Bike to Work campaigns and events.

## 4.8 Fare Rates and Structure

### 4.8.1 Collection Methods and Media

PVTA uses four different methods for fare collection. For the routes operated by SATCo and VATCo the on-board GFI Genfare farebox system and recently launched Bytemark mobile ticketing system are used for fare collection and visual validation. Fareboxes are probed daily and vaults emptied. Farebox cash collection is reconciled with the probe data and tabulated daily, monthly, and annually. The routes operated by UMTS do not have fareboxes, allowing for all-door boarding. Routes operated by Hulmes have diamond dropboxes for fareboxes. Van drivers use fare envelopes to collect fares and tickets. These envelopes are given to the accounting clerks and audited daily against the paper manifests for accuracy.

Fares can be paid using cash, transfer tickets, tokens, magnetic stripe cards, tickets (van only), and the Fast Break smart card and online through the mobile ticketing system. PVTA requires exact change when using cash for paying fares, and the fareboxes only accept US coins, \$1, \$5, \$10 and PVTA tokens. The fareboxes do not accept pennies, and change cards are not distributed. Riders can also purchase day passes (magnetic stripe cards) and transfer tickets (magnetic stripe cards) on the bus by informing the operator that they want to purchase a day pass or transfer. PVTA is phasing out the use of tokens and no longer sells them except to the Springfield Public School system for distribution to students using the bus for after school programs.

Magnetic stripe bus passes, 1-ride tickets, and ADA and Senior Van Service tickets can be purchased at the Customer Service Center located at Union Station or HTC between 9:00 AM and 4:45 PM from Monday through Friday. ADA and Senior Van Service tickets can also be purchased at most local senior centers. Van tickets do not have an expiration date. PVTA has partnered with Big Y who sells PVTA 31 Regular and Reduced Day Passes (magnetic stripe) at all stores in the service area. Magnetic stripe cards, both those purchased from customer service and Big Y, expire in 3 years if unused.

Regular 31-day bus passes and van tickets (book of twenty \$3 tickets and book of ten \$0.50 tickets) are also available for online purchase via PayPal. Tickets and passes are mailed to confirmed addresses within the United States and the customer must pay the shipping cost. Van tickets can also be purchased by filling out the Paratransit Van Ticket Order Form and sending it to the PVTA Customer Service Center with the payment (check only); there is no cost for shipping.

In FY 2016, PVTA launched a pilot program for the Fast Break smart card technology project with the Springfield Technical Community College to test the hardware. All students not driving to campus were issued a new Fast Break Card loaded with monthly passes. Several issues were discovered during testing, which led to a soft roll out to the public for use of the Fast Break Card with 31-day passes only (magnetic stripe and Fast Break cards). Ticket vending machines (TVM) are located at Union Station, Westfield Transportation Center, and HTC, but are currently not functional. During the roll-out process functionality limitations and complexity of transactions for the farebox, such as using the card for purchasing day passes or stored value, were discovered and the project was halted. PVTA continues to work with GFI to make the TVMs operational by supporting magnetic day pass and the 31-day full and half fare smart card.

PVTA has partnered with MassDOT and BAT to capitalize on a mobile payment contract MassDOT maintains with Bytemark (from the legacy Bus Plus service). The mobile payment system uses visual validation, and when activated the fare displays on a cell phone for validation by the bus driver. PVTA and BAT have both received MassDOT discretionary grant funding in 2020 to customize the Bytemark app for their systems.

## 4.8.2 Fare Structure

### 4.8.2.1 Fixed Route Bus Service

The regular fixed route fare for patrons ages 13 and older is \$1.50 or \$1.40 if a 1-ride ticket is purchased at the Customer Service Center; transfers are available for \$0.25. Fixed route fare for children 5 years old and under is free if accompanied by an adult and for children 6 to 12 years old is \$0.90. Transfers for children are available for \$0.25. Reduced fixed route fares are available for senior citizens (60 years and older) and mobility impaired customers at \$0.75, which is half of the full-fare; transfers are \$0.10. A valid PVTA Photo ID or Statewide Transportation Access Pass is required for senior and mobility impaired discounted fares. PVTA Photo ID and Statewide Transportation Access Pass can be obtained by presenting the required documents (listed on the PVTA website) at the customer service centers at Union Station or HTC from Monday through Friday between 9:30 AM and 4:30 PM. One transfer is available per ride and must be purchased at the time of boarding for both regular and reduced fare paying customers. Transfers are valid for 90 minutes and cannot be used on the same route.

PVTA introduced a new program called "Senior Fare Free Tuesdays" in July 2019. This 2-year program will run through June 2021. Seniors aged 60 years and older can ride fixed route buses and shuttles for free every Tuesday. This program applies to PVTA buses and shuttles. It does not apply to PVTA van service. Seniors must show a valid PVTA Senior ID and Senior Pass when boarding the bus.

### 4.8.2.2 Bus Pass

PVTA offers regular 31-day and senior and mobility impaired 31-day passes, as well as regular 7- and 1-day passes. The regular 31-day pass costs \$54 and the senior and mobility impaired 31-day pass costs \$26. The regular 7-day and 1-day passes cost \$15 and \$3.50, respectively. The 31-day passes are good for 31 consecutive days from the initial use date. Regular 1-day passes are sold on the bus and must be used on the date of purchase. Day passes bought on the bus can only be purchased with cash. Day passes are also sold at the PVTA customer service centers and can be used on any single day of choice. Regular 31-day bus passes are also available for online purchase via PayPal by paying the shipping cost.

### 4.8.2.3 ADA and Senior Van Service

ADA and Senior Van Service fares range from \$3 to \$4 based on the number of transfers required if a comparable trip was made via bus. All ADA trips with an origin or destination beyond 3/4 mile of a fixed route are \$5. The Senior Van Service is not subject to federal ADA regulation, not subject to the 3/4 mile rule and thus all fares are based on the number of transfers if done on a bus. ADA and Senior Van Service tickets can be purchased at most local senior centers or at PVTA Customer Service Centers. Tickets are available in \$0.50 or \$3 denominations. Van tickets are also available for online purchase via PayPal by paying the shipping cost.

### 4.8.2.4 Fare Increase

In 2018, PVTA conducted a PVTA Fare Impact Study to better understand what would happen to PVTA's ridership and fare revenue if the prices of bus and van fares increased. The study looked at several fare increase scenarios. As a result of the study, PVTA increased the fares for fixed route, monthly bus pass, and paratransit service by approximately 20 percent starting July 1, 2018. The fixed route base fare increased from \$1.25 to \$1.50, monthly pass base fare increased from \$45 to \$54, and paratransit base fare increased from \$2.50 to \$3.00. A \$5.00 premium fare for ADA van trips that travel outside of the federally required 3/4 mile distance from a bus route was also implemented. The transfer fares remained the same.

Prior to this the last fare increase was in 2008. Additionally, a policy was approved to examine fare increases in 3-year intervals with possible increases every third year ranging from a 5 percent to 25 percent increase. Table 24 shows the current fare structure.

**Table 24. Fare Structure**

<b>Fare Type</b>	<b>Fare (One-way)</b>
<b>Fixed Route</b>	
Adult 13 and older	\$1.50 (\$1.40 if purchased at the Customer Service Center)
Adult Transfer	\$0.25
Senior 60 and older	\$0.75
Senior Transfer	\$0.10
Mobility Impaired	\$0.75
Mobility Impaired Transfer	\$0.10
Children 6 to 12 years old	\$0.90
Children Transfer	\$0.25
Children 5 years old and under	Free
<b>Bus Pass</b>	
Regular 31-Day Pass	\$54 (\$2 discounts with a Big Y card at local Big Y)
Senior and Mobility Impaired 31 Day Pass	\$26 (\$2 discounts with a Big Y card at local Big Y)
Regular 7-Day Pass	\$15
Regular 1-Day Pass	\$3.50
<b>ADA and Senior Van Service</b>	
Trip within town	\$3
Trip to a surrounding town	\$3.50
Trip beyond a surrounding town and within PVTA's service area	\$4
Paratransit van ticket beyond 3/4 mile	\$5
20 Pack of ride tickets (within town)	\$57 (one free ticket)
10 Pack of 50 cent ride tickets	\$4.75
Buying online with PayPal	
Regular 31-Day Bus Pass	\$54 + \$1.50 shipping
Van Ticket booklet of 20 (within town)	\$57 + \$0.50 shipping
Van Ticket booklet of 10 (\$0.50)	\$4.75 + \$0.50 shipping

Source: [www.PVTA.com](http://www.PVTA.com); PVTA Fare Impact Study, March 30, 2018; PVTA FY19 Annual Report

### 4.8.3 Fare Policy

On March 30, 2018, PVTA completed its Fare Impact Study to help create a better understanding of what is likely to happen to PVTA's ridership and fare revenue if prices of bus and van fares are raised. The Fare Impact Study and its results can be found on PVTA's website.<sup>38</sup>

To support the PVTA Board's Fare Policy approved on April 9, 2018, which includes a potential fare change for FY 2022, PVTA will be conducting a fare impact analysis in 2021. In addition to reviewing a fare increase scenario, the study will also include examining the benefits and disadvantages of offering a student fare and a low-income fare and examining the impacts of a fare reduction, fare elimination, and fare capping.

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<sup>38</sup> PVTA 2018 Fare Impact Study <http://www.pvta.com/documents/planning/PVTA%20Fare%20Impact%20Study%20FINAL%2003-30-18.pdf>.



## 5. Market Evaluation

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

### 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. PVTA service is essential to maintaining mobility and promoting economic activity in many communities in the Pioneer Valley. PVTA's service area has a significant low-income population that depends solely on transit. In addition, the area has a large rural population that also depends on transit for lifeline connections to work, school, medical, shopping, and other trip purposes.

The US Census Bureau's ACS and Longitudinal Employer-Household Dynamics program are the primary sources of demographic data used in this analysis and provide valuable indications of trends and projections.

### 5.2 Demographics and Socioeconomics

Demographic and socioeconomic statistics are important in transit planning to understand the potential transit markets that exist in an area. Table 25 outlines the demographic and socioeconomic summary statistics for the PVTA service area in relation to the state of Massachusetts and the United States. Transit dependency 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; people with lower incomes are more likely to need public transportation options than people with higher incomes who can afford private transportation.

The PVTA service area has a median household income of \$57,778, which is comparable to the national median but significantly lower than the state median household income (Table 25). The poverty level is high in the PVTA service area, with 25.1 percent of people living below 150 percent of the poverty level compared to the state (17.4 percent) and nation (23.7 percent). The percentage of households without vehicles in the PVTA service area is 12.8 percent, slightly higher than the state but significantly higher than the national average. The percentage of population comprising minority people in the PVTA service area is 32.9 percent, which is higher than the state average but lower than the national average. The following sections examine how these demographics and socioeconomic characteristics vary greatly among the PVTA member communities served.

**Table 25. Current Demographic and Socioeconomic Profile (2017)**

Area	Median Household Income	% People Living Below 150% of the Poverty Level	% Households without Vehicles	%	%	%
				% Seniors	% Minority	% Disabled
PVTA Service Area	\$57,778	25.1%	12.8%	15.4%	32.9%	14.8%
Massachusetts	\$74,167	17.4%	12.4%	15.5%	27.1%	11.6%
United States	\$57,652	23.7%	8.8%	14.9%	38.5%	12.6%

Source: US Census Bureau ACS 2017

### 5.2.1 Population Density

Population density maps help identify where how populations are spread throughout the region into urban, suburban, and rural areas. Population density is particularly important when evaluating a transit market and can be helpful in transit planning when considering how and where services can best meet the transportation needs of various populations as transit and density are highly correlated. Population density in the region is mapped on Figure 51. Cities that are well served by PVRTA transit routes have the densest population. The highest population density cities are located in the southern part of the PVRTA service area and include Springfield, Westfield, Holyoke, and Chicopee. In the northern part of the PVRTA region, most of the cities have low population densities except for Northampton and Amherst, which have pockets of dense population areas that are well served by the PVRTA transit routes. Colleges and Universities too are more dense concentrations of population well served by transit.

Massachusetts is the third most densely populated state in the country with an average population density of 876 people per square mile. In the PVRTA service area the population is roughly 586,000, equating to a density of 947 people per square mile. Of the 586,000 residents in the area, 83.9 percent of the population is within  $\frac{3}{4}$  mile of a PVRTA fixed bus route, served by a deviated fixed route zone, or has demand response service available. Forty-four percent of the population live within the vicinity of the PVRTA frequent corridors (defined as having 20 minute or better service).

### 5.2.2 Older Populations

According to a report by Transportation for America on mobility and the baby boom generation, life expectancies are rising, more seniors are choosing to “age in place,” and transit ridership among this cohort is rising.<sup>39</sup> Experts argue that as the average age increases, and the baby boom generation reaches 65 years and older, the percentage of the population without access to a vehicle will increase over time and these older adults will need affordable alternatives to driving in order to “age in place” and maintain independence.

Senior population typically correlates with areas of lower income levels and vehicle ownership. These individuals are often on fixed incomes, which can reduce their desire to own a vehicle. Additionally, health issues such as poor eyesight can deter them from driving. People 65 years and older make up 15.4 percent of the population in the PVRTA region. Data from the *Draft PVPC Coordinated Human Services Plan 2015 Update* shows that the senior population in the Pioneer Valley region is projected to increase by 27 percent between 2015 and 2025<sup>40</sup>. Figure 52 illustrates the senior population in the region. As shown on the figure, the highest percentages of senior populations are located in Longmeadow, Springfield, West Springfield, Chicopee, West Springfield, Agawam, Wilbraham, Easthampton, Hadley, Amherst, Belchertown, and Ware.

### 5.2.3 Youth Population

The youth population, defined as individuals under the age of 18, are less likely to have access to or own a personal vehicle. Owning and maintaining a reliable car can be expensive; therefore, it is likely that many of those under 18 depend on others or utilize public transportation to meet their mobility needs. Figure 53 illustrates the youth population in the

<sup>39</sup> “Aging in place, Stuck without Options: Fixing the Mobility Crisis Threatening the Baby Boom Generation,” Transportation for America, <https://t4america.org/docs/SeniorsMobilityCrisis.pdf>.

<sup>40</sup> PVRTA’s Coordinated Public Transit- Human Service Transportation Plan [http://www.pvpc.org/sites/default/files/Pioneer%20Valley%20Coordinated%20Public%20Transit-Human%20Services%20Transportation%20Plan%20Draft%20for%20release%202\\_4\\_2015\\_0.pdf](http://www.pvpc.org/sites/default/files/Pioneer%20Valley%20Coordinated%20Public%20Transit-Human%20Services%20Transportation%20Plan%20Draft%20for%20release%202_4_2015_0.pdf)

PVTA region. The highest concentrations of youth population are located in small pockets of Springfield, Easthampton, Agawam, and Wilbraham.

Figure 51. Population Density

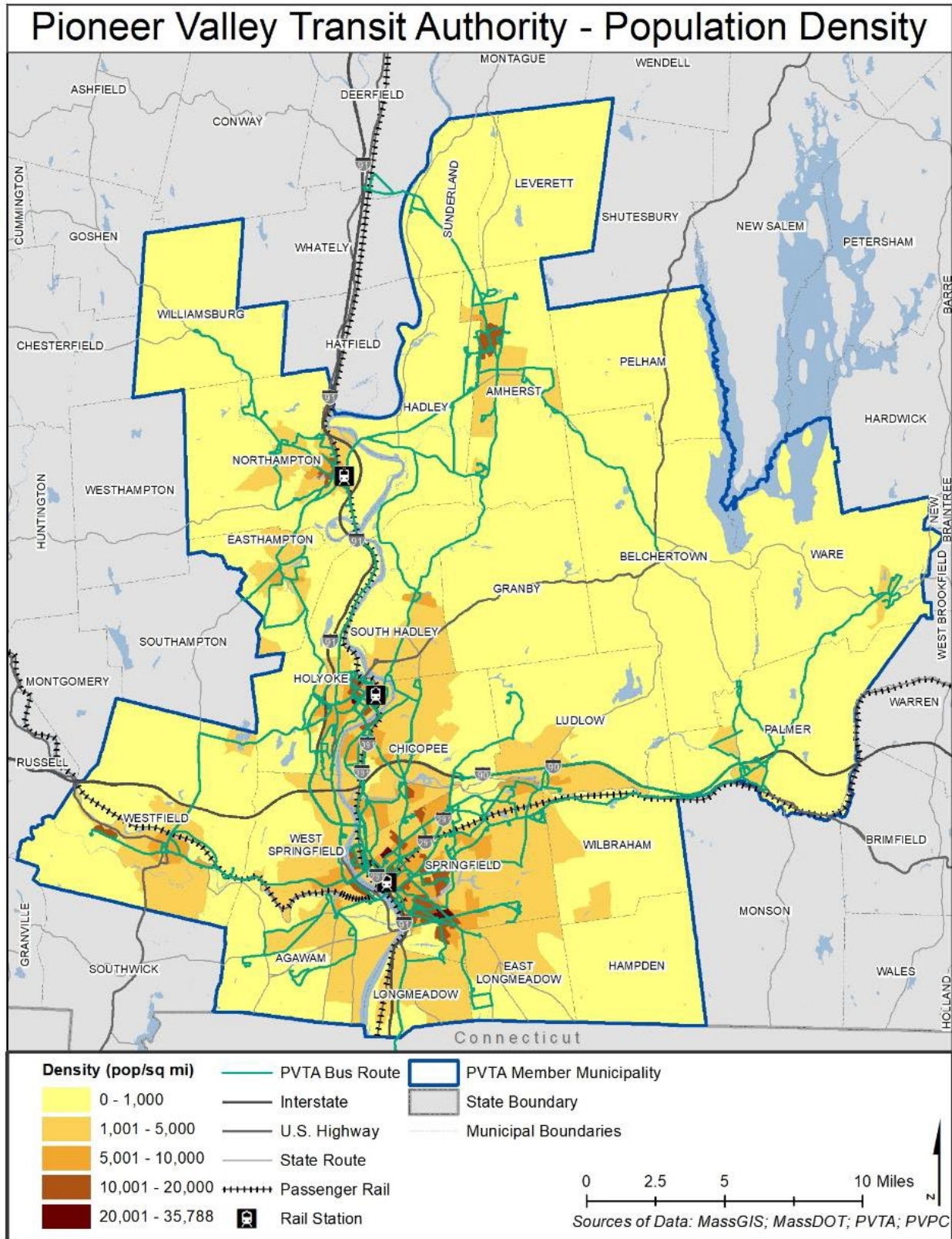


Figure 52. Senior Populations

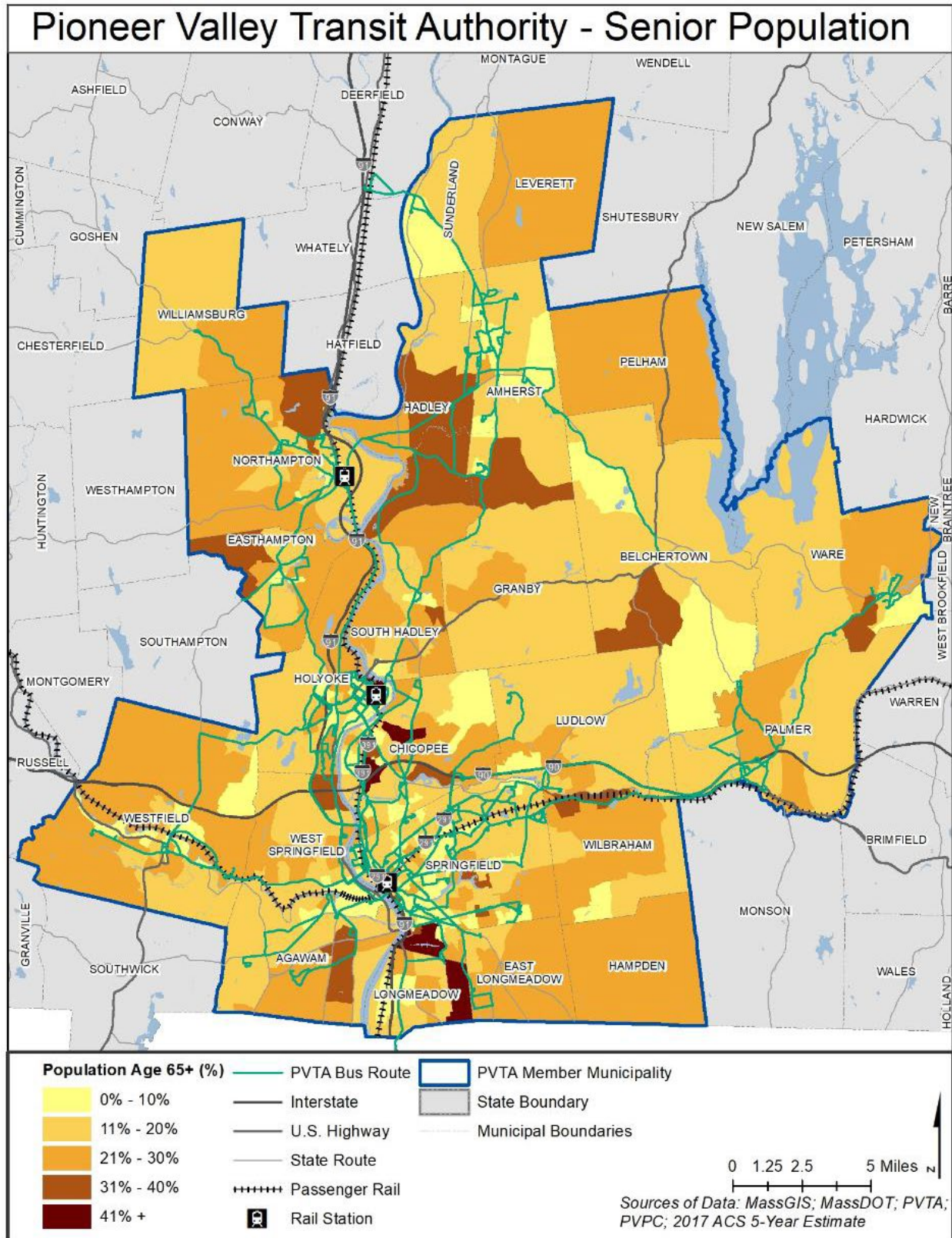
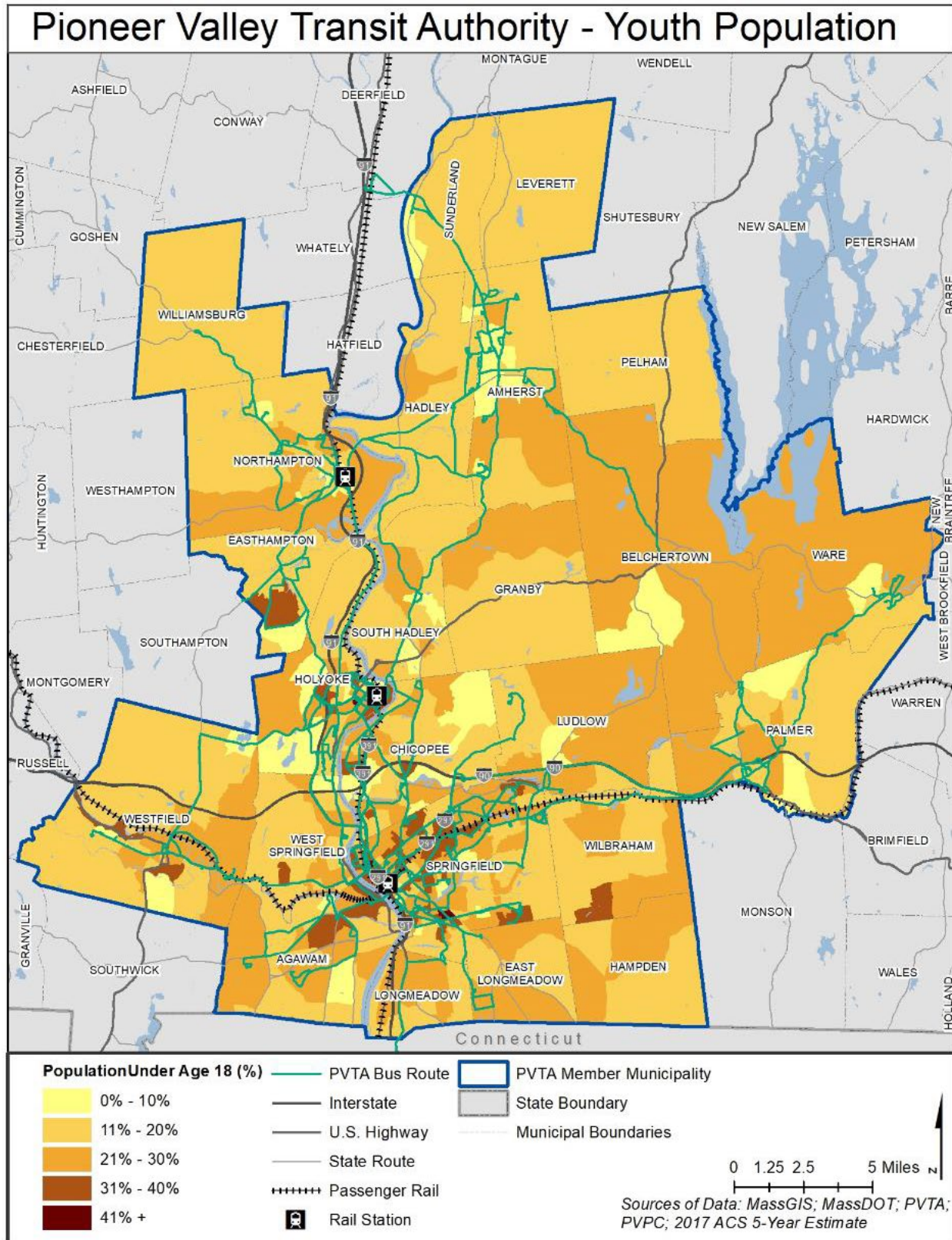


Figure 53. Youth Populations



## 5.2.4 People with Disabilities

People with disabilities are generally dependent on public transportation. The disabled population in the PVTA region is depicted on Figure 54. As shown in the figure, the disabled population in the region is highly concentrated in the City of Springfield particularly around Union Station. In the PVTA service area the percentage of those with a disability (14.8 percent) is greater than the state and national averages.

## 5.2.5 Measures of Income

Median household income and the percentage of those living below the poverty line are used as measures for propensity to use transit. Automobile ownership can be expensive, and as household incomes decline, so does the likelihood of having access to a private vehicle. Work-trip market shares from the ACS show that as income rises the percentage of people using transit decreases. Figure 55 shows the population in the PVTA service area living below 150 percent of the poverty level. In the PVTA service area, one out of four individuals are living below 150 percent of the poverty level. According to the 2019 Pioneer Valley Comprehensive Economic Development Strategy the region has experienced an increase in the number of households below the poverty level, particularly in Hampden County communities<sup>41</sup>. The percentage of people living below 150 percent of the poverty level is highly concentrated in Springfield, Holyoke, and Amherst. Northampton, Palmer, Agawam, Ware, and Westfield also have large areas with higher concentrations of persons living below 150 percent of the poverty level. Among the 24 member communities Amherst (33.6 percent), Springfield (28.7 percent), and Holyoke (26.4 percent) have the highest concentrations below 100 percent of the poverty level. The high poverty rate in Amherst may be associated with the large college community (33,500 students) with three colleges within Amherst. Furthermore, the most recent on-board customer surveys show that a disproportionate number of riders (55 percent) are below the poverty level compared to the region as a whole (25 percent) and as a result one out of every two PVTA riders is below the poverty line. While all the communities with large high poverty levels are around transit hubs or are served by PVTA bus routes, service levels vary greatly. Many of the residents who live in poverty are also vulnerable to environmental injustices and are eligible for environmental protections.

Figure 56 shows the median household income of residents in the PVTA region. The median household income in the region is \$57,778, which is slightly higher than the US median household income but lower than the state average. Several cities in the region have median household income lower than that of the regional level. The areas with the lowest median household income are mostly concentrated in Springfield, Holyoke, Chicopee, and Amherst and are served by PVTA transit routes except for Chicopee where a large area of poverty is not served by the PVTA bus route in the northeast corner of the community. The southern portion of PVTA's system, Hampden County, and especially the principal cities of Springfield, Holyoke, Chicopee, and West Springfield, have a large proportion of low-income, transit-dependent households according to the Census Transportation Planning Products 2012–2016 5-year ACS data, 47 percent of bus commuters in PVTA's service area are from households with income levels less than \$35,000. This is in line with results from the most recent on-board customer surveys, which show that among riders income is much lower than the regional average, as only 3 percent indicated having an income greater than \$50,000 and 61.2 percent had an income less than \$11,700.

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<sup>41</sup> Pioneer Valley Comprehensive Economic Development Strategy <http://www.pvpc.org/plans/comprehensive-economic-development-strategy-ceds>

Figure 54. Disabled Populations

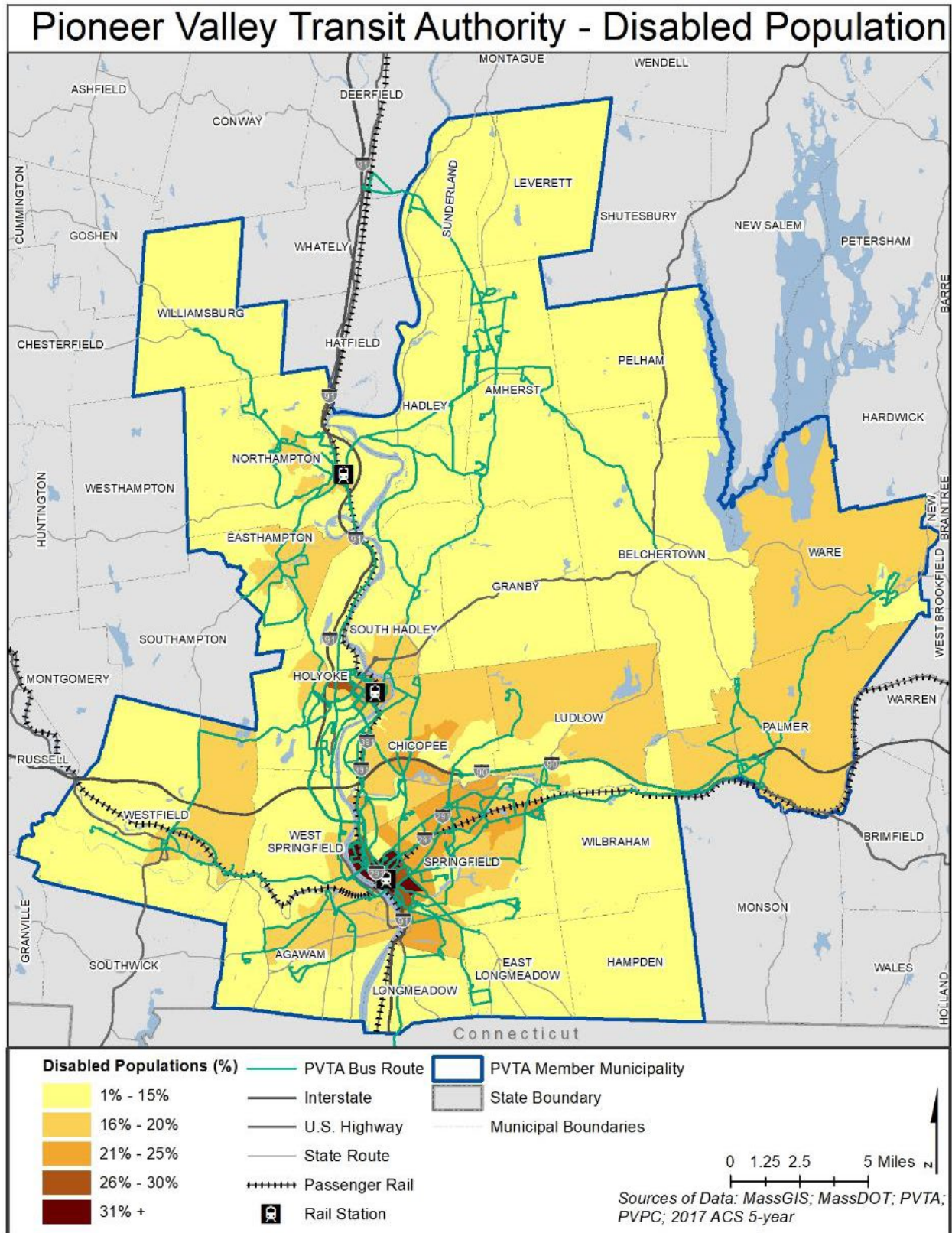


Figure 55. Persons Living Below the Poverty Level

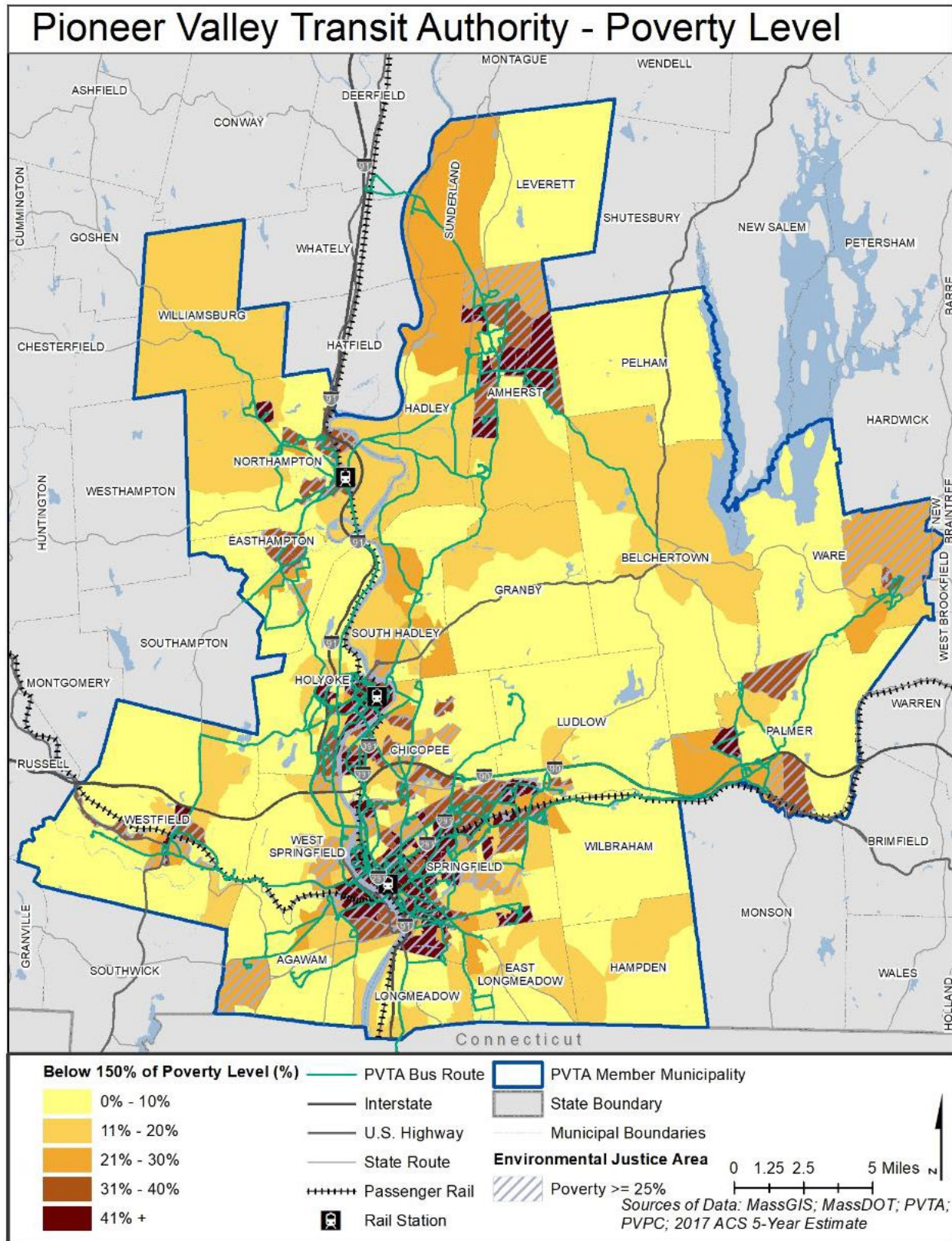
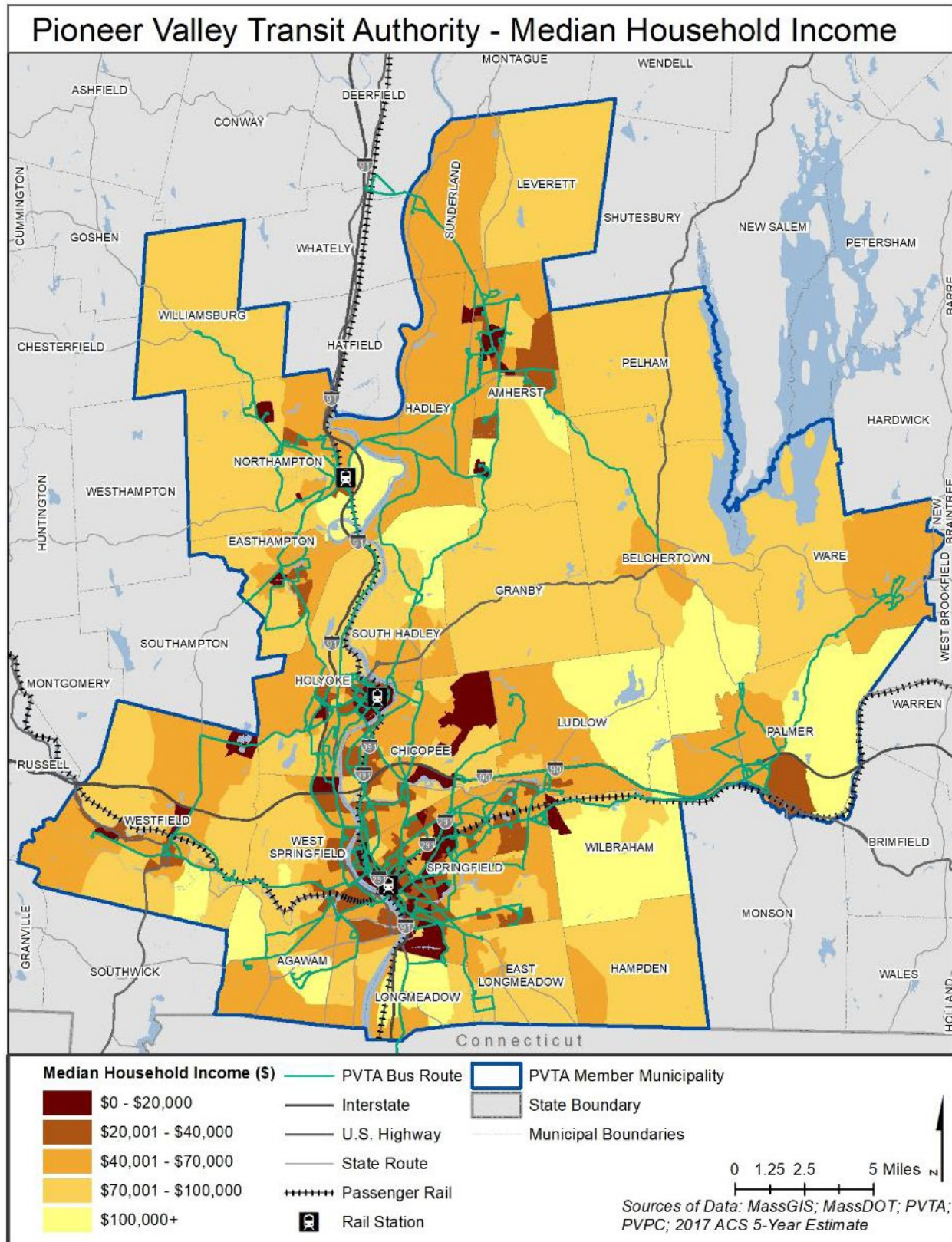




Figure 56. Median Household Income



### 5.2.6 Zero-Vehicle Households

Zero-vehicle households indicate a strong market for transit as they are considered to be entirely dependent upon alternate transportation sources, including carpooling/ridesharing, walking, bicycling, and public transportation. In the PVTA service area, 12.8 percent of the households do not have access to a personal vehicle. Zero-vehicle households are highly concentrated in Springfield, Holyoke, and Amherst where the median household income areas are also highly concentrated (Figure 57). Vehicle ownership is even lower among PVTA customers, with 59.7 percent of southern tier and 39.6 percent of northern tier users lacking access to a vehicle.<sup>42</sup>

### 5.2.7 Minority Populations

FTA defines minority persons as persons who identify themselves as American Indian and Alaska Native, Asian, Black or African American, Hispanic or Latino Populations, and Native Hawaiian and Other Pacific Islander. Minority populations, much like the youth populations, are also less likely to have access to an automobile. They also tend to live farther away from their jobs and therefore are more likely to use public transit for commuting to work.<sup>43</sup> Though any population may be subject to disproportionate impacts from a transportation project or investment, identifying minority and low-income populations is useful to understand the comparative effects throughout affected populations.

Figure 58 illustrates the minority population in the region along with the environmental justice areas where the minority population is equal to or more than the average of 32.9 percent. As shown on the map, minority populations are highly concentrated throughout the City of Springfield and in the southeastern portion of the City of Holyoke. Additionally, these areas represent environmental justice communities, defined by the United States Environmental Protection Agency as areas most impacted by environmental harms and risk. The United States Environmental Protection Agency defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income” and is entitled to equal protection from environmental harms and risks.<sup>44</sup> Currently, PVTA’s fixed route and demand response serve these key areas.

## 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 common destinations for significant numbers of people, which make them important to transit service planning.

Table 26 summarizes the major employers (greater than 500 employees) and the number of employees in the PVTA service area. Two employers in the region have over 5,000 employees, 14 have 1,000 to 4,999 employees, and 12 have 500-999 employees. Major employers predominantly reside in the southern tier region, with half of all major employers located in Springfield. Baystate Health Inc., University of Massachusetts – Amherst, and the Westover Air Reserve Base are the top three major employers with the highest number of employees in the region.

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<sup>42</sup> Per the PVTA on-board customer surveys, <http://www.pvta.com/documents/planning/PVTA%202016%20Northern%20System%20Survey%2008-12-16%20FINAL.pdf> and <http://www.pvta.com/documents/planning/PVTA%202015%20Southern%20System%20Survey%2004-20-16%20FINAL.pdf>.

<sup>43</sup> Pew Research Center, “Who Relies on Public Transit in the U.S.,” Monica Anderson, April 7, 2016.

<sup>44</sup> Environmental Protection Agency, “Environmental Justice,” accessed April 2020, <https://www.epa.gov/environmentaljustice>.

Figure 57. Zero-Vehicle Households

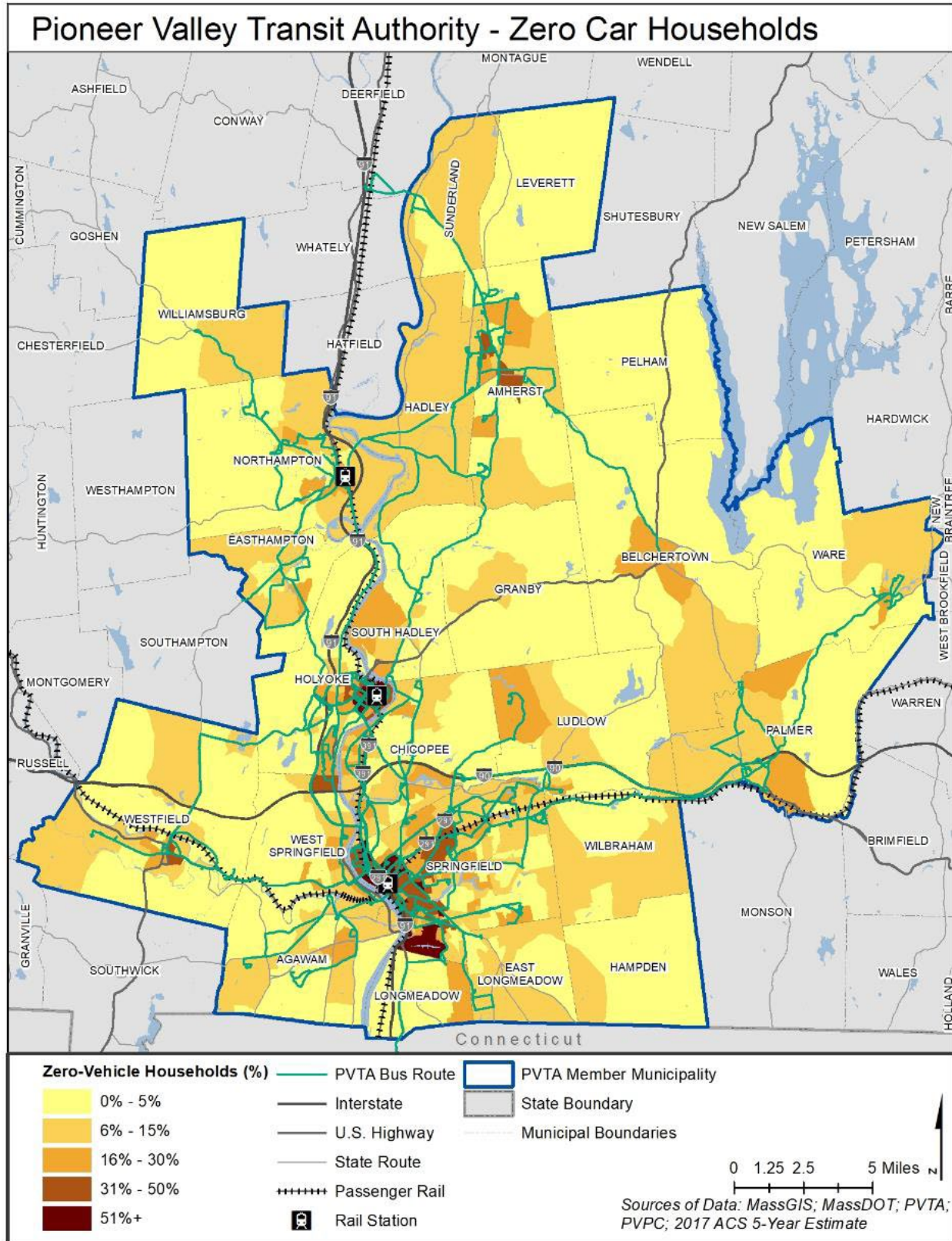
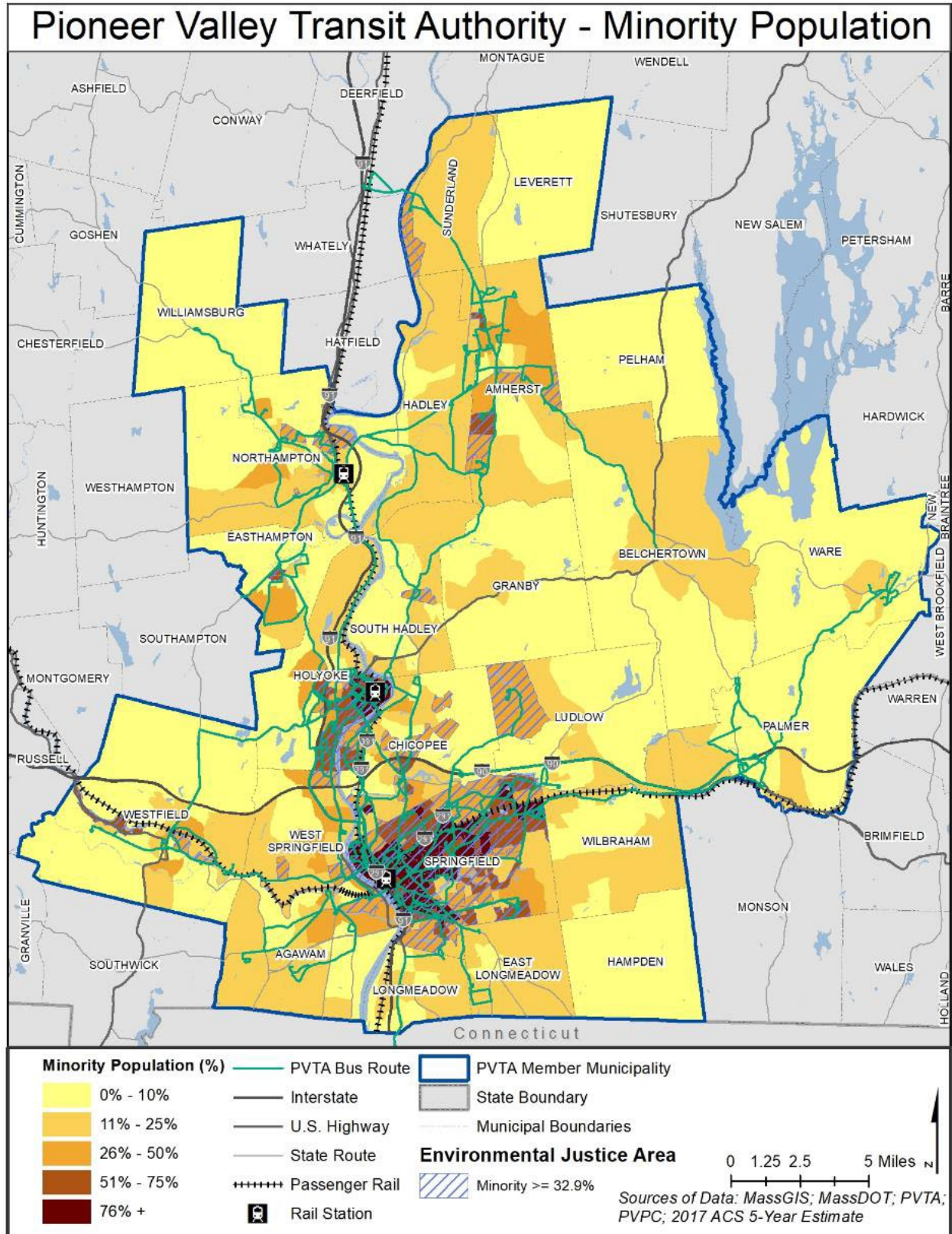


Figure 58. Minority Population



**Table 26. Major Employers in the PVTA Service Area in 2017**

<b>Employer</b>	<b>Municipality</b>	<b>Number of Employees</b>
<b>5,000–9,000 Employees</b>		
Baystate Health Inc.	Springfield	8,859
Massachusetts University – Amherst	Amherst	8,440
<b>1,000–4,999 Employees</b>		
Westover Air Reserve Base	Chicopee	4,600
Massachusetts Mutual Life Ins	Springfield	3,500
Mercy Medical Center	Springfield	3,415
MGM Springfield	Springfield	3,000
Cooley Dickinson Hospital	Northampton	1,899
ServiceNet Inc	Northampton	1,750
Westfield State University	Westfield	1,550
Center for Human Development	Springfield	1,500
American Outdoor Brands Corp (formerly Smith and Weston)	Springfield	1,480
Holyoke Medical Ctr	Holyoke	1,416
Smith College	Northampton	1,200
Mt Holyoke College	South Hadley	1,000
Springfield College	Springfield	1,000
Verizon	Springfield	1,000
<b>500–999 Employees</b>		
Holyoke Community College	Holyoke	939
J Polep Distribution Svc	Chicopee	925
Baystate Wing Hospital	Palmer	913
Western New England University	Springfield	855
Springfield Technical Community College	Springfield	792
Peter Pan Bus Lines	Springfield	750
Lenox	East Longmeadow	650
ISO New England Inc	Holyoke	580
TD Bank	Springfield	575
Baystate Noble Hospital	Westfield	564

<b>Employer</b>	<b>Municipality</b>	<b>Number of Employees</b>
Hampshire College	Amherst	500

Source: 2019 Pioneer Valley Comprehensive Economic Development Strategy, page 91, <http://www.pvpc.org/sites/default/files/FINAL%202019%20CEDS%20Report%20web%20optimized.pdf>

Figure 59 depicts the employment density in the PVTA region. Employment density in the region is 298 jobs per square mile. The areas with the highest concentration of employment density are located in Springfield, West Springfield, Amherst, and Northampton. This is as expected in Springfield, Amherst, and Northampton given the numerous large employers listed in Table 26. In West Springfield the area with high employment density is along Riverdale Street, a corridor with several shopping plazas and big box retail stores. Of the 270,000 jobs approximately, 90.6 percent are within ¼ mile of a PVTA fixed route, served by a deviated fixed route zone, or have demand response service available to all residents. Fifty-seven percent of the jobs are within the vicinity of a PVTA frequent corridor (defined as having 20 minute or better service).

## 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 municipal buildings, schools and universities, places of worship, hospitals and medical centers, and retail and shopping areas. These generators must be considered when evaluating transit service for a region. Figure 60 illustrates major trip generators in the PVTA service area. As shown on the figure, schools and colleges are the two major trip generators in the region followed by shopping centers. Many of the major trip generators are along PVTA bus routes.

## 5.5 Land Use and Growth

The 2020 Update to the Regional Transportation Plan (RTP) for the PVPC provides population and employment forecasts for the Pioneer Valley region<sup>45</sup>. According to the RTP, population is projected to grow by approximately 6 percent from 621,570 people in 2010 to 656,992 people in 2040, and employment in the region is projected to grow by approximately 3 percent from 252,156 jobs in 2010 to 260,838 jobs in 2040 (Table 27).

**Table 27. Population and Employment Forecasts for the Pioneer Valley Region**

	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>% Growth 2010–2040</b>
Population Forecast	621,570	632,012	647,277	656,992	6%
Employment Forecast	252,156	261,527	260,253	260,838	3%

Source: 2020 Update to the Regional Transportation Plan (RTP), 2019

<sup>45</sup> 2020 Update to RTP for PVPC <http://www.pvpc.org/projects/2020-regional-transportation-plan-update>

Figure 59. Job Density

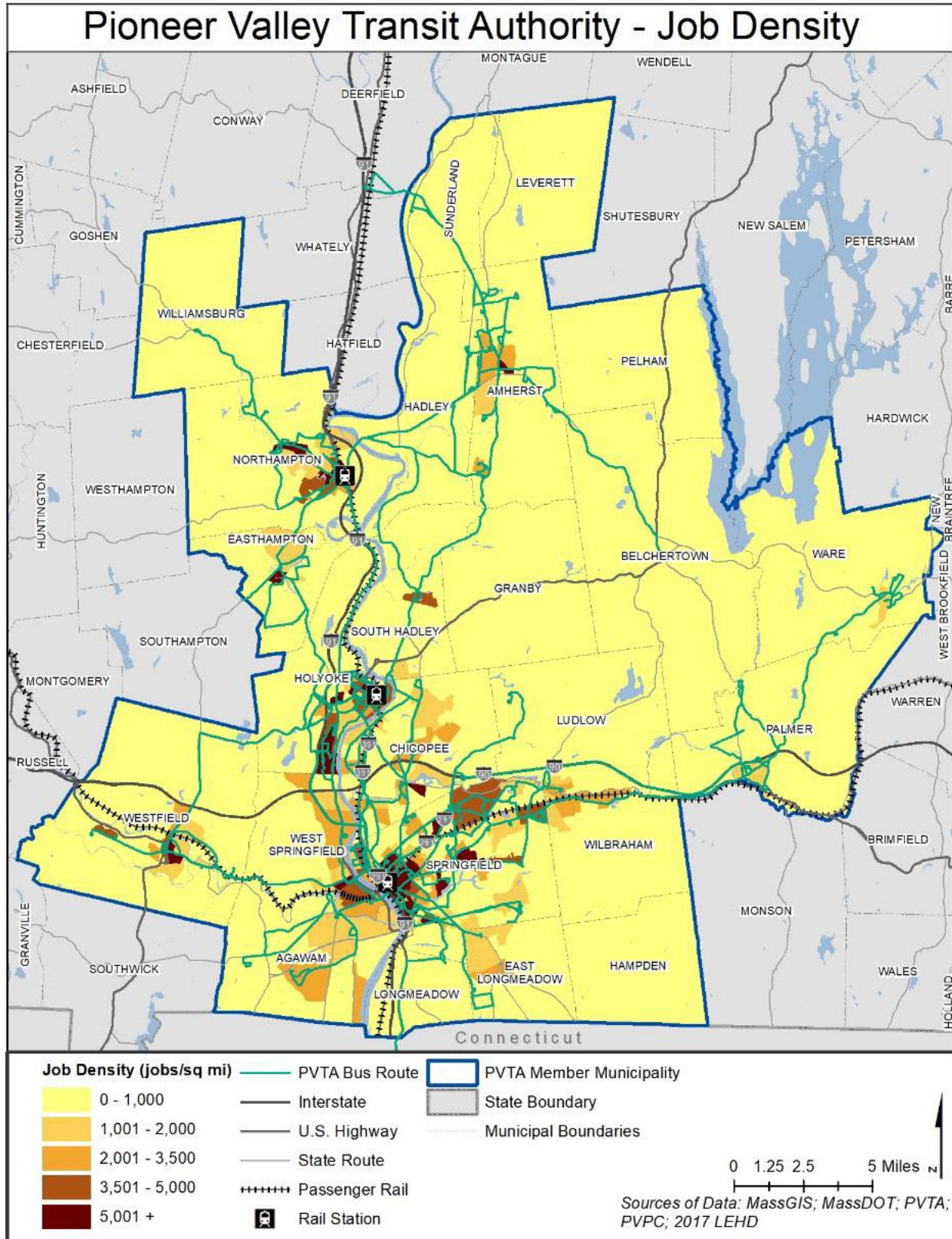
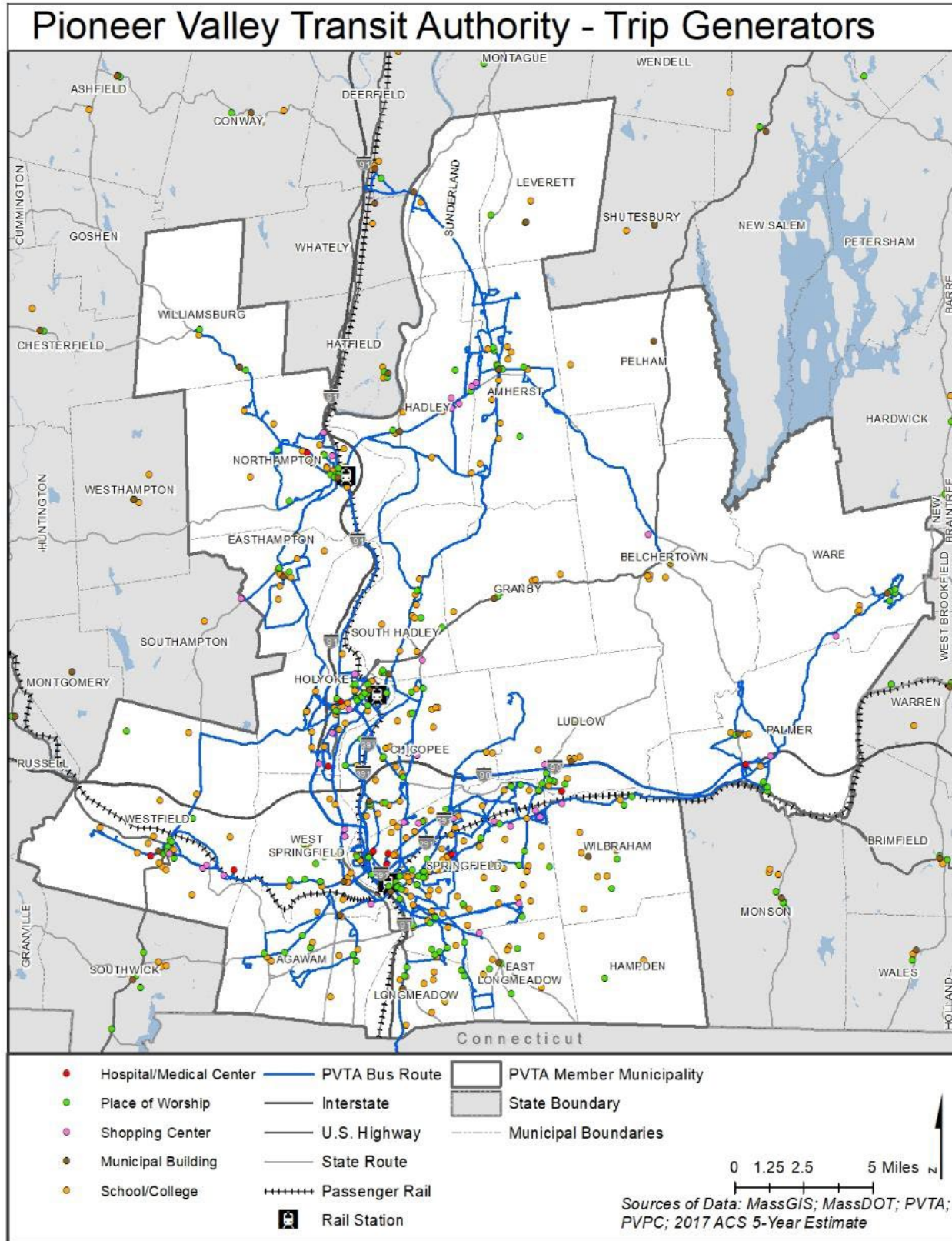


Figure 60. Major Trip Generators





The 2014 PVPC Valley Vision 4: The Regional Land Use Plan for the Pioneer Valley<sup>46</sup> recommends the following strategies that promote land uses complementary to a multimodal transportation system:

- Encourage transit oriented developments (TODs) and traditional neighborhood developments. TOD zones are within walking distance of major transit lines in urbanized areas and allow for higher density and mixed-use. TODs typically consist of a mixed-use core commercial area adjacent to the transit stop.
- Build an intermodal pedestrian and bicycle network. Bike paths should be designed to link the region's urban centers, shopping, and employment areas. Transportation Enhancement funds can support construction of bike paths.
- Promote improved transportation land use connections with complete streets policy and trip reduction strategies.
  - Complete streets are roadways designed and operated to enable safe, attractive, and comfortable access and travel for all users, and include the following features: bike lanes; sidewalks; traffic calming devices; pedestrian crosswalks and features; street furniture; bus shelters; bike racks; trees; sidewalk pavers; interconnected streets.
  - Adopt local zoning, within the Site Plan Approval process, to require trip reduction strategies for large commercial uses, including carpooling and vanpooling programs, transit access, bicycle facilities, flexible work hours, and on-site housing or services.

## 5.6 Transit Score

The transit score map is created 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 and 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<sup>47</sup>
- Percentage of the Population Living Below the Poverty Level
- Percentage of Zero-Car Households

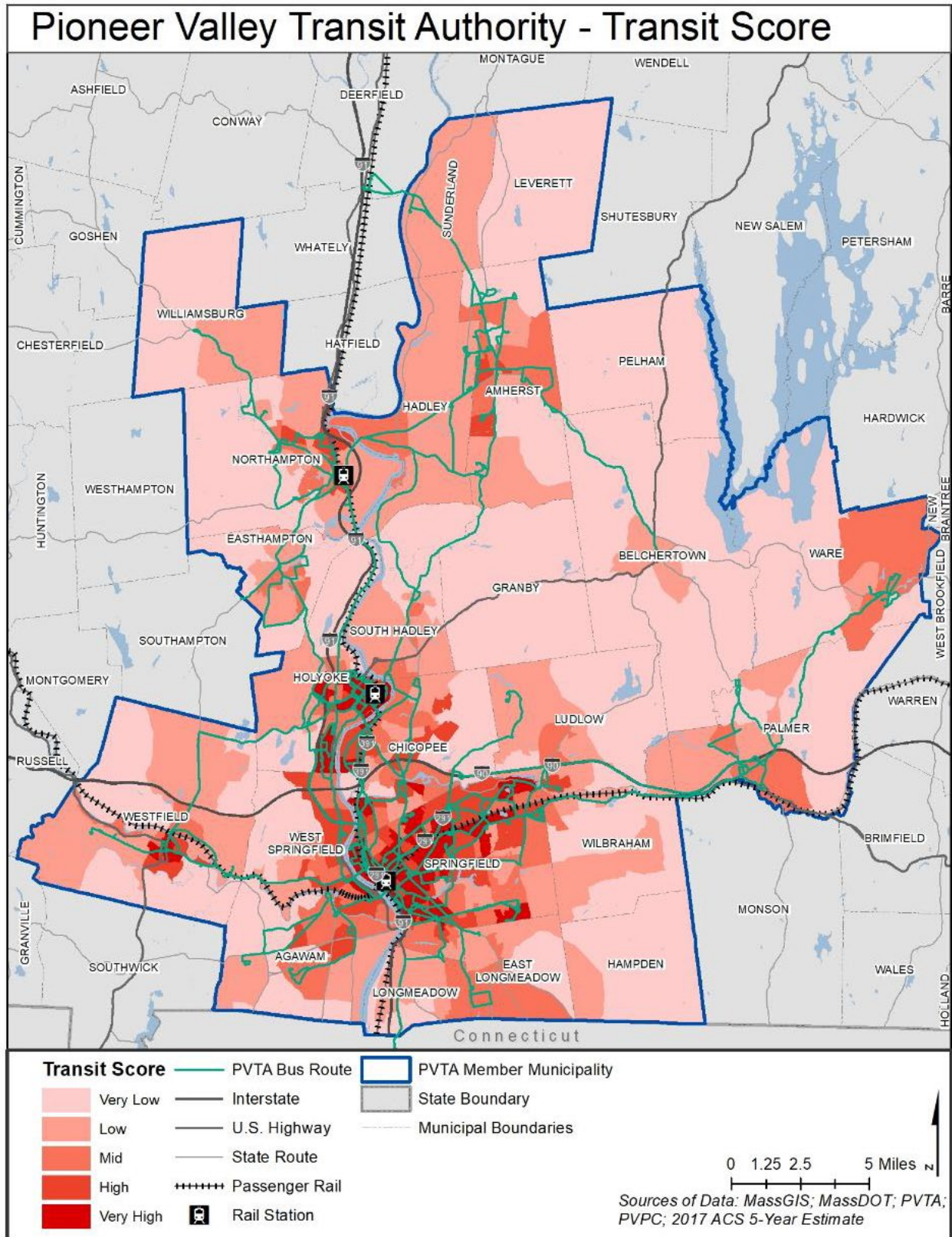
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<sup>46</sup>2014 Valley Vision 4 <http://www.pvpc.org/plans/valley-vision-4-land-use>

<sup>47</sup>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 61 illustrates the transit score in the PVTA service area. Certain areas of a community have very low to very high transit scores based on the existing transit routes. As shown on the figure, transit scores are very high in the communities that are served by many PVTA bus routes and are served by rail stations. The communities with very high transit scores include Springfield, Holyoke, Amherst, and Northampton. As shown on the figure, areas that are not served by any PVTA bus routes have very low transit scores.

Figure 61. Transit Score



## 6. Performance

Performance-focused management is a critical priority for the Commonwealth and 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 the importance of having a strong enterprise-wide, data-driven and transparent performance management framework as the foundation for making decisions, particularly in the service planning and financial areas, is especially relevant to the RTAs as they work to sustain success in the face of the challenges of COVID-19 and other market uncertainties.

The purpose of this chapter is to outline PVTA's current performance practices, track performance results for the PVTA/MassDOT Bilateral MOU that the Authority monitors and make recommendations to enhance the PVTA's performance framework to support data-driven performance-focused decision-making.

### 6.1 Current Performance Measurement Practices

PVTA's performance management system includes reporting a broad range of performance results to its Advisory Board, federal and state funding partners, transparent sharing of performance results with the public, and a commitment to tracking and reporting key metrics to MassDOT under the bilateral 2-year MOU that PVTA signed with MassDOT in August 2019.

PVTA also conducts weekly internal performance monitoring based on data-driven, industry best practices to support management and planning decisions. Although PVTA has a base to build on, it will be very beneficial for the Authority to continue to strengthen their performance management practices to support data-driven enterprise-wide decision-making. Recommendations for improving PVTA performance management practices are provided at the end of this chapter and in Chapter 8.

#### 6.1.1 State and Federal Monitoring Requirements

Besides using performance monitoring to inform service planning, PVTA is required to report a variety of performance metrics to both FTA and the Commonwealth on a monthly, quarterly, and annual basis as part of their funding agreements. FTA requires transit providers that receive federal funding to submit data (including service, financial, and asset inventory and condition) both monthly and annually to be posted on the National Transit Database (NTD).

The Commonwealth also requires PVTA and other RTAs to report service and asset data through the state's GrantsPlus system. The Commonwealth has taken other steps in recent years to promote industry best practices, including a more data-driven approach to service planning. In 2019, MassDOT convened a stakeholder group, including RTA administrators, to develop a performance measurement strategy that could be tailored to each RTA's needs and challenges. The results of this effort were laid out in individual MOUs signed by MassDOT and the RTA administrators.

In addition to reporting to meet federal and state requirements, PVTA operators report monthly data to show annual trends that PVTA compiles into a year-over-year spreadsheet for the board. Each monthly operator report also includes performance metrics for the month and trend lines for year-to-date. For each route PVTA monitors monthly ridership, farebox revenue, revenue hours and miles, missed trips, road calls, and preventable accidents. This data feed into annual Microsoft Excel spreadsheets that PVTA use to monitor passengers per hour at the route level. For demand response PVTA organizes data into annual spreadsheets to monitor by operator at the monthly level the number of unlinked passenger trips by town, registered passengers,

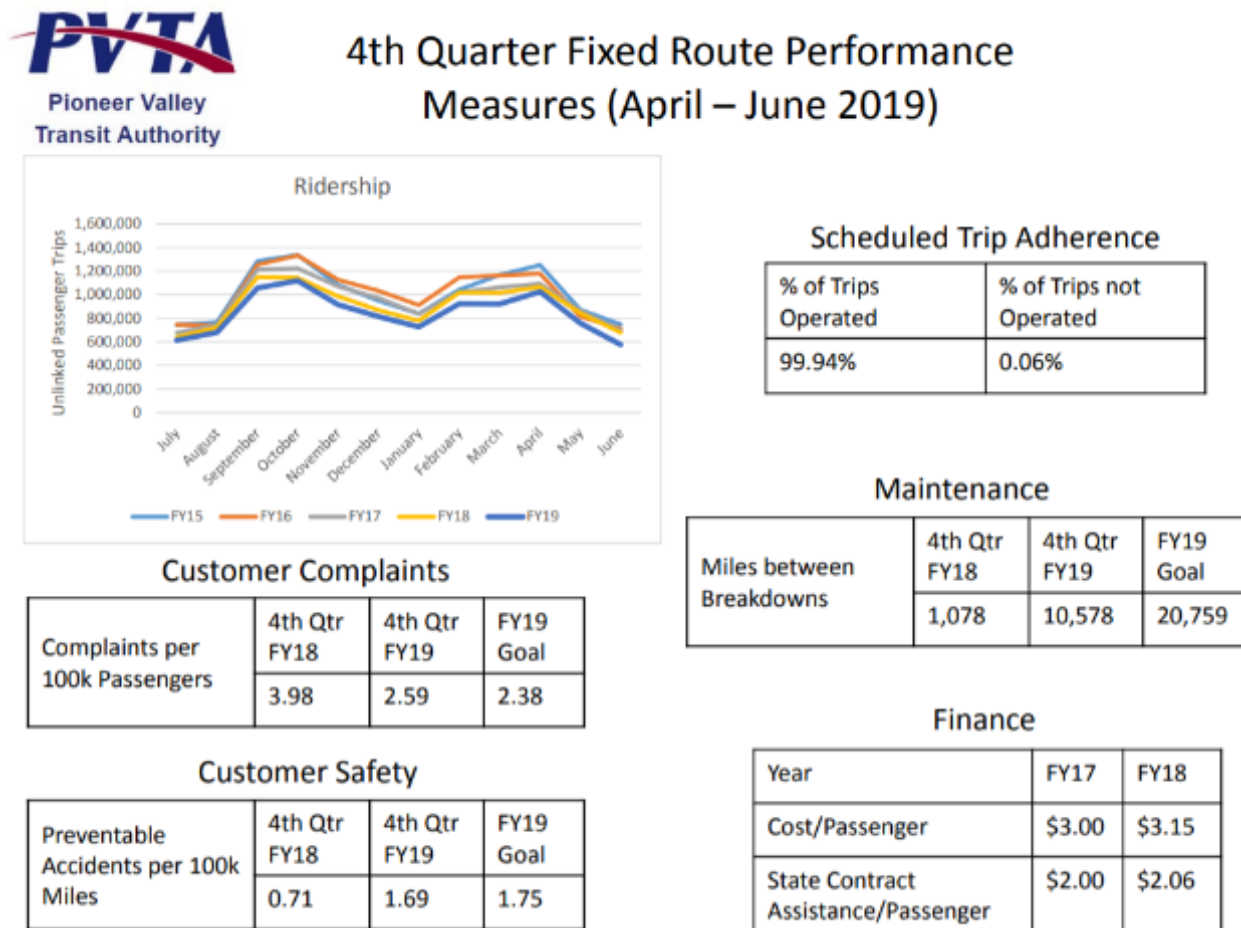
revenue miles and hours, costs, fare revenue, contract/grant funds, number of trip denials, lates, cancellations, preventable accidents, and number of road calls.

PVTA has determined that it must use its resources effectively and all routes should achieve a minimum level of productivity. A route’s productivity is measured in terms of passengers per revenue vehicle hour for most service and passengers per trip for regional and express services that typically carry passengers for long distances with little passenger turnover. PVTA performance measures are outlined in the Authority website under Performance and Efficiency and outlines performance measures by fiscal year (by month) and by quarter of the fiscal year (Figure 62).<sup>48</sup> PVTA also provides website links to historical performance measures.

Additional performance measures that PVTA tracks systemwide are the following:

- Ridership by fiscal year and month of the year
- Customer complaints
- Customer safety (preventable accidents per 100,000 miles)
- Scheduled trip adherence (percent of trips operated and percent of trips not operated)
- Maintenance (miles between breakdowns)
- Finance (cost per passenger and state contract assistance per passenger)

**Figure 62. Example of PVTA’s Quarterly Systemwide Performance Measures as Posted on the Website**



<sup>48</sup> PVTA Performance Measures <http://pvta.com/performanceEfficiency.php>

Aside from collecting, monitoring, and reporting systemwide and modal data, PVTA has established route level goals for passengers per hour based on the route classification type (Table 28). These were revised in 2019 from the 2014 CSA suggested classifications to better reflect what is operated.

**Table 28. PVTA Service Tiers and Productivity Goals**

<b>Service Tier</b>	<b>Passenger per Revenue Hour Goal</b>
1 (Every 15 Minutes)	30
2 (Every 20 Minutes)	20
3 (Every 30 Minutes)	15
4 (Every Hour)	10
5 (More than Hourly)	5

### 6.1.2 Performance Metrics and Targets from MassDOT Memorandum of Understanding

New to the PVTA's performance monitoring obligations is a commitment to monitor and report on a selection of performance metrics, baselines, and targets established by PVTA 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 PVTA and MassDOT in August 2019. The MOU states that PVTA's performance in FY 2020 and FY 2021 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 PVTA MOU, along with their baselines and targets, are in Table 29 and Table 30 for FY 2020 and FY 2021, respectively.

**Table 29. FY 2020 Performance Measure Targets in the MOU**

<b>Metric</b>	<b>Fixed Route</b>	<b>Demand Response</b>	<b>Systemwide</b>
Unlinked Passenger Trips (UPT)	10,600,000	261,007	10,831,626
UPT/ Vehicle Revenue Mile (VRM)	2.08	0.09	1.38
UPT/ Vehicle Revenue Hour (VRH)	27.89	1.38	19.07
Farebox Recovery Ratio	20.20%	8.68%	17.85%
Operating cost/ VRM	\$6.86	\$3.23	\$5.58
Operating cost/ VRH	\$92.11	\$47.39	\$77.22
Net cost per vehicle service hour	\$73.50	\$43.28	\$63.44
On-time performance	80%	90%	85%
Trips within peak load standards	85%	100%	92.5%
Vehicle service hours/complaint	1,310.3	1,415.1	1,560.6
ADA calls answered in 2 minutes	N/A	95%	N/A
Abandoned calls	N/A	2.15%	N/A

<b>Metric</b>	<b>Fixed Route</b>	<b>Demand Response</b>	<b>Systemwide</b>
Miles between mechanical failures	11,000.0	45,000.0	14,621.2
Mean miles between preventable accidents	44,348	185,387	68,529

Source: MassDOT MOU with PVTA

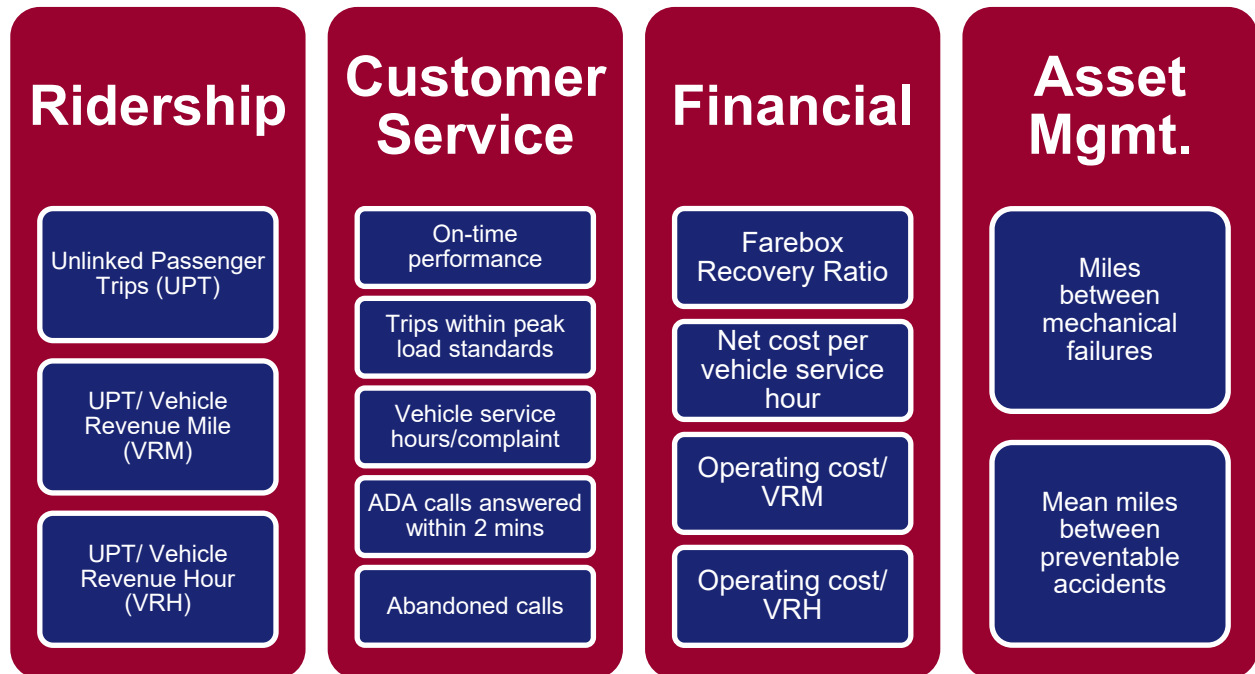
**Table 30. FY 2021 Performance Measure Targets in the MOU**

<b>Metric</b>	<b>Fixed Route</b>	<b>Demand Response</b>	<b>Systemwide</b>
Unlinked Passenger trips (UPT)	10,706,000	258,397	10,964,397
UPT/ Vehicle Revenue Mile (VRM)	2.19	0.09	1.44
UPT/ Vehicle Revenue Hour (VRH)	28.29	1.39	19.48
Farebox Recovery Ratio	19.97%	8.33%	17.65%
Operating cost/ VRM	\$7.36	\$3.27	\$5.89
Operating cost/ VRH	\$94.87	\$48.65	\$79.73
Net cost per vehicle service hour	\$75.92	\$44.59	\$65.66
On-time performance	85%	90%	87.50%
Trips within peak load standards	87.0%	100%	93.5%
Vehicle service hours/complaint	1,381.8	1,380.6	1,637.7
ADA calls answered in 2 minutes	N/A	95.00%	N/A
Abandoned calls	N/A	2.00%	N/A
Miles between mechanical failures	11,000.0	45,000.0	14,711.5
Mean miles between preventable accidents	49,000	183,333	66,522

Source: MassDOT MOU with PVTA

Figure 63 outlines the four categories identified by MassDOT and the 14 metrics within the categories as chosen by PVTA. PVTA elected to use a 2-year average of FY 2018 and FY 2019 data for unlinked passenger trips (UPT) and UPT/vehicle revenue mile (VRM) metrics and a 3-year average of FY 2017 through FY 2019 data for the remaining metrics as a baseline, as these measures are the most representative of PVTA's current performance and allow for more accurate forecasting. The trips within peak load standards and ADA calls answered within 2 minutes are new metrics and do not have identified baselines.

**Figure 63. MOU Metrics by Category**



The performance measures included in the MOU, along with their baselines, targets, and PVRTA's progress (through the third quarter of FY 2020), are included in the following sections. Given that the COVID-19 pandemic did not significantly impact operations until the last two weeks of the third quarter, the data suggest that PVRTA appeared to be on track to meet some of these goals before transit operations were interrupted.

When developing performance targets, it is typical to take into account external factors that are influencing performance, but it is not common practice to consider unforeseen disruptions that have the potential to greatly upset the status quo, like COVID-19. When PVRTA and MassDOT developed the performance targets in the MOU, they developed baselines against which to measure PVRTA's performance between FY 2019 and FY 2021. With few exceptions, these baselines are averages of data collected in FY 2017 to FY 2019. MOU targets reflected the reasonable expectation that PVRTA could improve upon these baselines for the next 2 years. Since the outbreak of the pandemic, all parties acknowledge that meeting ridership and service efficiency goals will be challenging.

As MassDOT notes in their July 2020 *Annual Report on the Regional Transit Authority Performance Management Program*, the Performance Management Program will be a valuable tool in identifying progress, best practices, and innovative adaptations to the inevitable challenges the RTAs may face. In that report MassDOT states that, "the Q4 data submittal will provide MassDOT and the RTA stakeholders with a better understanding of the depth of impact the COVID-19 pandemic has had on public transportation in Massachusetts." PVRTA will use FY 2021 as a time to reevaluate targets and performance metrics as transit demand stabilizes and PVRTA and MassDOT continue to discuss how to best reflect the impact of the pandemic on ridership, operations, and efficiency. This is discussed in greater detail below.

**6.1.2.1 Ridership Measures**

The following performance measures are calculated on a monthly and annual basis using farebox data, scheduling software, and operations data recorded by drivers and dispatchers. Prior to the pandemic PVRTA was meeting or close to meeting the ridership targets for FY 2020 but was ultimately unable to meet the targets due to a loss in ridership associated with the pandemic.



- **Total Ridership (Unlinked Passenger Trips):** This measures passenger trips taken on PVTA vehicles (transfers counted as individual trips, rather than one multi-segment trip). These data are collected from PVTA's fareboxes for fixed route, through the Adept dispatch software for demand response and monthly reports from the COAs.
- **Unlinked Passenger Trips per Vehicle Revenue Hour:** This is calculated by the number of total trips divided by the corresponding revenue hours. Revenue hours are calculated through the Hastus and Adept software in addition to the monthly COA reports.
- **Unlinked Passenger Trips per Vehicle Revenue Mile:** This is calculated by the number of total trips divided by the corresponding revenue miles. Revenue miles are calculated through the Hastus and Adept software in addition to the monthly COA reports.

**Table 31. MOU Ridership Measures**

Operating Statistic	Baseline (FY 2016–FY 2018 Average)	Target FY 2020	FY 2020 (First Quarter–Third Quarter)	FY 2020 (Full Year)
<b>Total Ridership (Unlinked Passenger Trips)</b>				
Fixed Route	10,570,619	10,600,000	7,361,499	8,131,759
Demand Response	261,007	261,007	183,491	196,590
Systemwide	10,831,626	10,861,007	7,544,990	8,328,349
<b>Unlinked Passenger Trips per Revenue Mile</b>				
Fixed Route	2.10	2.08	2.02	1.81
Demand Response	0.09	0.09	0.09	0.09
Systemwide	1.39	1.38	1.35	1.27
<b>Unlinked Passenger Trips per Revenue Hour</b>				
Fixed Route	27.83	27.89	26.61	23.92
Demand Response	1.38	1.38	1.36	1.31
Systemwide	19.02	19.07	18.32	17.00

Source: PVTA and MassDOT MOU (2019), PVTA

### 6.1.2.2 Customer Measures

The following performance measures are calculated on a monthly and annual basis using phone data, scheduling software, customer service calls reported, and operations data recorded by drivers and dispatchers. Prior to the pandemic PVTA was exceeding the target for peak load standards, and was able to meet this target for FY 2020 systemwide and for fixed route. Answered ADA calls and abandoned calls are specific to demand response. At the end of the third quarter PVTA was meeting the target for answered calls but not abandoned calls. These trends did not change at the end of FY 2020. OTP between the end of the third quarter and the end of FY 2020 improved slightly systemwide and for fixed route and demand response. Ultimately the target was met for demand response only. Vehicles hours per complaint decreased across the system between the end of quarter three and the fiscal year. While the

target was being met for demand response at the end of the third quarter, the value decreased by 43 percent and the target was not reached.

- **Trips Operated within Peak Load Standards:** This measures the average number of trips operated within peak load standards. Peak is defined as 120 percent of seating capacity and 100 percent of seating capacity if off-peak. Seating capacity varies by bus size.
- **ADA Request Calls Answered within 2 Minutes:** This measures the percent of ADA telephone calls answered within 2 minutes. ADA passengers are required to call and reserve a trip.
- **Abandoned Calls:** This measures the percent of calls that are abandoned, which is when a customer calls the call center and decides to hang up before a conversation occurs.
- **On-Time Performance:** This measures the percentage of fixed route trips that operate late or are missed.
- **Vehicle Service Hours Per Verified Complaint:** This measures the average number of vehicle revenue hours per number of valid complaints.

**Table 32. Customer Service Measures**

Operating Statistic	Baseline (FY 2016–FY 2018 Average)	Target FY 2020	FY 2020 (First Quarter–Third Quarter)	FY 2020 (Full Year)
<b>Trips Operated within Peak Load Standards</b>				
Fixed Route	New Activity	85.00%	97.33%	97.98%
Demand Response	New Activity	100%	100%	99.99%
Systemwide	New Activity	92.50%	98.26%	98.68%
<b>ADA Request Calls Answered within 2 Minutes</b>				
Demand Response	New Activity	95%	98.17%	98.17%
<b>Abandoned Calls</b>				
Demand Response	2.23%	2.15%	7.78%	7.78%
<b>On-Time Performance</b>				
Fixed Route	77.33%	80.00%	75.76%	77.04%
Demand Response	82.00%	90.00%	92.14%	93.66%
Systemwide	79.67%	85.00%	81.43%	81.98%
<b>Vehicle Service Hours Per Verified Complaint</b>				
Fixed Route	1,273	1,310	1,197	1,114.5
Demand Response	1,415	1,415	1,735	991.1
Systemwide	1,505	1,561	1,333	1,279

Source: PVTA and MassDOT MOU (2019), PVTA

### 6.1.2.3 Financial Efficiency Measures

These measures are calculated on a monthly and/or annual basis using data from fareboxes, pass sales, contracted service agreements, schedule data, and operations data recorded by drivers and dispatchers. Prior to the pandemic PVTA was meeting or close to meeting the financial targets for FY 2020. Due to cost increases associated with the pandemic and temporary suspension of fares, PVTA was unable to meet the financial targets.

- **Farebox Recovery Ratio:** This metric is the percentage of operating costs covered by fares, calculated by the fares collected divided by the cost to operate the route.
- **Operating Expenses per Revenue Hour:** This is the cost of service divided by revenue hours.
- **Operating Expenses per Vehicle Revenue Mile:** This is the cost of service divided by revenue miles.
- **Net Cost Per Vehicle Service Hour:** This is the total operating cost minus farebox revenue divided by total number of vehicle revenue hours.

**Table 33. MOU Financial Efficiency Measures**

Operating Statistic	Baseline (FY 2016–FY 2018 Average)	Target FY 2020	FY 2020 (First Quarter–Third Quarter)	FY 2020 (Full Year)
<b>Farebox Recovery Ratio</b>				
Fixed Route	20.03%	20.20%	18.5%	14.59%
Demand Response	8.68%	8.68%	8.3%	7.03%
Systemwide	17.70%	17.85%	16.47%	13.21%
<b>Operating Expenses per Vehicle Revenue Hour</b>				
Fixed Route	\$91.73	\$92.11	\$92.11	\$104.88
Demand Response	\$47.39	\$47.39	\$49.24	\$53.08
Systemwide	\$76.97	\$77.22	\$81.18	\$89.02
<b>Operating Expenses per Vehicle Revenue Mile</b>				
Fixed Route	\$6.93	\$6.86	\$7.34	\$7.95
Demand Response	\$3.23	\$3.23	\$3.43	\$3.80
Systemwide	\$5.62	\$5.58	\$5.98	\$6.63
<b>Net Cost Per Vehicle Service Hour</b>				
Fixed Route	\$73.35	\$73.50	\$72.94	\$82.54
Demand Response	\$43.28	\$43.28	\$41.38	\$43.95
Systemwide	\$63.34	\$63.44	\$62.52	\$70.44

Source: PVTA and MassDOT MOU (2019), PVTA

### 6.1.2.4 Asset Measures

FTA has developed national standards for rating the condition of transit equipment and facilities. FTA categorizes vehicles, equipment, and facilities into asset classes and those classes have either a ULB or a condition rating on the TERM scale. While FTA has default ULBs for expected service years for vehicle classes, agencies are permitted to submit their own ULBs for approval from FTA if they choose. Although the MOU lists the following asset management metrics and targets, PVTA set ULB goals for their rolling stock, equipment, and facilities in their FY 2018 TAM Plan, while the targets for the metrics in the previous sections were set in the MOU.

- **FTA Reportable Revenue Vehicles Asset Class Meeting FTA TAM Plan ULB:** This metric is the percentage of vehicles within a particular asset class that have met or exceed their ULB. This target was met for all vehicle classes.
- **FTA Reportable Equipment Asset Class Meeting FTA TAM Plan ULB:** This metric is the percentage of equipment within a particular asset class that has met or exceed their ULB. This target was met for trucks and other rubber vehicle tires but not for automobiles. The target was for 25 percent, but 60 percent met or exceeded their ULB.
- **FTA Reportable Facilities Asset Class Meeting FTA TAM Plan ULB:** This metric is the percentage of facilities with a condition rating below 3.0 on the FTA TERM scale. This target was met.

In addition to the asset measures developed as part of the TAM Plan, PVTA has created additional metrics that pertain to asset management and vehicles as identified in the MOU. At the end of the third quarter PVTA was meeting all targets except that for demand response preventable accidents. At the end of FY 2020 the same held true despite a decrease across the individual mode metrics for all but fixed route mechanical failures.

- **Mean Miles Between Mechanical Failures:** This metric measures the mean distance or actual vehicle miles between mechanical failures.
- **Mean Miles Between Preventable Incidents:** This metric measures the mean distance or actual vehicle miles between preventable incidents.

**Table 34. MOU Asset Measures**

Operating Statistic	Baseline (FY 2016–FY 2018 Average)	Target FY 2020	FY 2020 (First Quarter–Third Quarter)	FY 2020 (Full Year)
<b>Mean Miles Between Mechanical Failures</b>				
Fixed Route	10,298	11,000	17,646	23,322
Demand Response	40,643	45,000	67,048	57,170
Systemwide	13,792	14,621	22,268	23,265
<b>Mean Miles Between Preventable Accidents</b>				
Fixed Route	41,995	44,348	69,383	57,130
Demand Response	101,120	185,387	160,513	150,175

Operating Statistic	Baseline (FY 2016– FY 2018 Average)	Target FY 2020	FY 2020 (First Quarter–Third Quarter)	
			FY 2020 (Full Year)	
Systemwide	60,048	68,529	84,343	85,808

Source: PVTA and MassDOT MOU (2019), PVTA

### 6.1.3 How PVTA's Market Has Been Affected by COVID-19

Months into the COVID-19 pandemic, Americans are still 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 vehicle in particular) has increased significantly since March 2020.

Since the outbreak became widespread in Massachusetts in mid-March 2020, many institutions and industries that fuel the region's economy, and therefore PVTA's ridership, have been severely altered for the foreseeable future. Some of the most significant include:

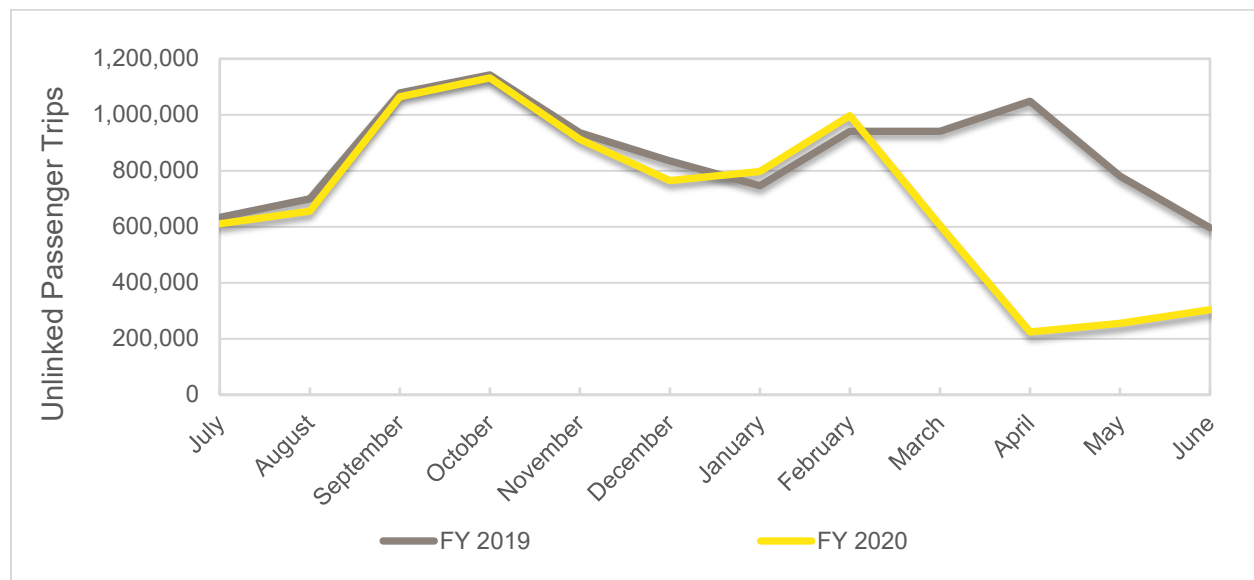
- Virtual classes at the region's public schools, and at the University of Massachusetts Amherst, Amherst College, Smith College, Mount Holyoke College, Hampshire College, Holyoke Community College, Springfield Technical Community College, Westfield State University, other local colleges and communities
- Decline in customers and workforce at restaurants and retail/shopping outlets
- Industry/business closures
- Increase in remote working resulting in less transit trips
- Reduction in commuter rail services or intercity bus
- Government mandates on gathering capacity
- Promotion of essential trips only via transit
- Executive Office of Health and Human Services regulations regarding transportation to Adult Day Health and other human services programs
- Reduction of on-site human service programs
- Discouraging seniors and immunocompromised individuals from traveling

These institutions and services are not only major trip generators, but they also contribute to area employment and sales tax receipts that impact PVTA's 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, PVTA will need to continue to be flexible in its ability to adjust service according to demand and funding availability.

When the pandemic hit in March 2020, ridership dropped sharply to just 22 percent of FY 2019 levels in April (Figure 64). Overall, PVTA experienced a 20 percent decline in fixed route ridership between FY 2019 and FY 2020 and 24 percent for demand response (Table 35). Revenue hours and miles dropped in line with changes in demand response ridership. However, ridership in January and February was up by 6.8 percent and 5.9 percent, respectively. Interestingly, ridership in the first two weeks of March was significantly higher than the same weeks in FY 2019. In fact, by the second week in March, the cumulative ridership increased from calendar year 2020 had already offset the losses from the first half of FY 2020.

At the onset of the pandemic, fixed route revenue miles were decreased by almost 40 percent in response to the ridership decline. PVRTA adjusted their service on many routes by operating a modified Saturday schedule and suspended service on a number of routes. However, as ridership began to recover, and to ensure adequate social distancing and safety of drivers and essential workers who were still riding the bus, revenue miles and hours on some routes were increased. Comparing FY 2020 to FY 2019, fixed route revenue miles were decreased by 10 to 11 percent compared to the 20 percent decline in ridership as a result of the pandemic (Table 36).

**Figure 64. PVRTA Monthly Ridership (FY 2019 versus FY 2020)**



**Table 35. PVRTA Service Changes (FY 2019 and FY 2020)**

	FY 2019	FY 2020	Percent Change (FY 2019 to FY 2020)
<b>Unlinked Passenger Trips</b>			
Fixed Route	10,120,344	8,127,931	-20%
Demand Response	259,978	196,581	-24%
<b>Total</b>	<b>10,380,322</b>	<b>8,324,512</b>	<b>-20%</b>
<b>Revenue Hours</b>			
Fixed Route	367,241	330,100	-10%
Demand Response	187,109	150,038	-20%
<b>Total</b>	<b>554,350</b>	<b>480,138</b>	<b>-13%</b>
<b>Revenue Miles</b>			
Fixed Route	4,856,166	4,344,719	-11%
Demand Response	2,761,353	2,095,563	-24%
<b>Total</b>	<b>7,617,519</b>	<b>6,440,282</b>	<b>-15%</b>

**Table 36. PVTA Service Changes in Response to COVID-19 Pandemic**

Route/Service	Change
<b>Modified Service</b>	<p>March 23, 2020: Instituted modified Saturday service levels on the fixed route and paratransit systems</p> <p>Fall 2020 Updates:</p> <ul style="list-style-type: none"> <li>• UMass Routes: <ul style="list-style-type: none"> <li>– Modified schedules: R29, 30,31,33,34,35,38,45,46</li> </ul> </li> <li>• Springfield Area Routes: <ul style="list-style-type: none"> <li>– G1: Revised weekday schedule with modified departure times and updated travel times.</li> <li>– G3: Early morning departures modified</li> <li>– R10: Weekday No School schedule will be used on all weekday service days</li> <li>– P11: Will not operate during Holyoke Community College’s fall semester.</li> <li>– R14: Revised weekday timetable, select weekday trips will skip certain stops, some service eliminated, and street deviations occurring.</li> </ul> </li> <li>• Northampton Area Routes: <ul style="list-style-type: none"> <li>– B48: Due to overcrowding modified stops are in place.</li> <li>– B43: Ends on Monday-Wednesday times on all weekday service days, and ends earlier on Saturdays</li> <li>– B43 Express trips are now their own Route B43E.</li> </ul> </li> </ul>
<b>Service Discontinued</b>	<p>Route 10s service eliminated.</p> <p>The Loop will not operate until further notice.</p> <p>Survival Center Shuttle will not operate until Survival Center resumes normal operation.</p> <p>Routes 39 and 39E not operating for fall 2020.</p>
<b>Capacity Restrictions</b>	<p>PVTA implemented 10 passengers per bus policy. Instead of drivers bypassing riders at stops, riders are asked to make a choice if they want to ride on a bus that already has 10 people onboard or wait for the next bus (which may or may not have already 10 people onboard).</p>
<b>Demand Response Policy</b>	<p>ADA eligibility determination is conducted via phone.</p>

**Route/Service****Change**

<b>Passenger Policies</b>	<p>Passengers riding at the end of the line will be asked to deboard the bus.</p> <p>PVTA recommends passengers wear a mask.</p> <p>PVTA vehicle board using only the rear doors. Seniors and people with disabilities who need to use the front doors may continue to do so. Social distancing is recommended and passengers to only use transportation for essential services.</p> <p>July 19, 2020: Front door boarding resumes in Springfield and Northampton service areas. Rear door boarding remains in the UMass service area.</p>
<b>Facility Modifications</b>	<p>Customer service window at Union Station and HTC were modified and are open from 11:00 AM to 2:00 PM.</p> <p>Fall 2020: Customer service window at Union Station and HTC were modified and are open from 9:00 AM to 2:00 PM.</p>
<b>Fleet Modifications</b>	<p>Cleaning and disinfecting vehicles daily before being placed into service.</p> <p>Acquired new disinfecting systems to disinfect vehicles more frequently</p> <p>Drivers clean high contact areas of the vehicle throughout their shifts.</p> <p>Driver space and fareboxes disinfected daily.</p> <p>Area where wheelchair accessible seats are located have been cordoned off to provide the driver with the minimum 6 feet of distancing.</p> <p>Driver barriers are installed, and drivers are provided with sanitizer, gloves, and disinfecting wipes to use on the vehicle.</p>
<b>Fares</b>	<p>PVTA stops enforcing fare collection.</p> <p>July 19, 2020: PVTA resumes enforcement of fare collection. PVTA riders encouraged to use mobile fare payment app-MassDOT BusPlus.</p>

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

Building on the PVTA's current performance management practices, there are some critical enhancements in the areas of data and performance measurement that the PVTA should adopt over the next 5 years. These changes will support enterprise-wide, and data-driven performance-based decision making by PVTA, and aid in the navigation of the uncertainties brought on by COVID-19 and other market trends. Ultimately, adopting a data-driven performance-focused decision-making framework will sustain continued success.



## 6.2.1 Data

The first critical need that PVTA should fulfill to enhance performance management is in the area of data collection and evaluation. While PVTA 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 PVTA 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 PVTA decisions, particularly in the service planning, cost control, and financial business lines.

Principles for data collection and 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 are 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 both inform operations, service, and financial planning and facilitate the RTA's reporting requirements. PVTA already has data collection systems as vehicles are equipped with AVL systems, including mobile data terminals, validated APC, and farebox data that are being collected.
- **Data Analysis:** Transit operators have ample data produced on a daily or even hourly basis from the systems used in delivering 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. PVTA already has a strong data foundation to build on as vehicles are equipped with AVL systems, including mobile data terminals. This information is used in a mobile app that provides customers with information about PVTA and next bus information. PVTA already has APCs installed on their vehicles and regularly analyzes ridership and performance data in Microsoft Excel, SQL, R, and GIS to support data-driven management and planning decisions.

## 6.2.2 Performance Metrics

PVTA should continue to assess its performance metrics and identify a select group of key enterprise-wide measures that evaluate important service, cost, and financial indicators. It is important for PVTA to keep in mind that these key performance measures should be:

- Easily measurable with realistic, aspirational targets that will lead to successful outcomes
- Identifiable thresholds for corrective actions
- 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
- 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

PVTA has quantitative thresholds and actionable guidelines for these key performance metrics:

- Passengers per hour
- Subsidy per passenger
- Cost per revenue hour
- Farebox recovery ratio
- Cost per revenue hour
- Late trips
- Service/road calls
- Accidents per 100,000 miles

### 6.2.3 Service Guidelines

One of the critical performance metrics that PVTA should utilize in making service decisions is service guidelines. PVTA established service guidelines as part of their 2014 CSA. The following sections outline the established service guidelines, and the recommendations are a combination of existing practices and new guidelines.

#### 6.2.3.1 Service Delivery Guidelines

In order to establish service guidelines in the pursuit of establishing a monitoring program in the future, service must first be monitored and data collected. Routes should be defined by the function they service in order to accurately measure the health of a route. PVTA classifies routes using a tier system based on the headway. Table 37 provides an overview of the service tier, definition, and routes.

**Table 37. PVTA Route Classifications**

Service Tier	Definition	Routes
1	Frequency of 15 minutes or less	B7, 30, 31, 34, 35, OWL
2	Frequency of 20 minutes	G1, B6, P20, B43
3	Frequency of 30 minutes	G2, G3, B4, B7S, 10S, P20E, P21, X90, Loop, 30R, 30R, 33, 38, 39, B43ns, B48
4	One-hour frequency	36, G2E, G5, R10, P11, R14, B17, P21E, B23, R24, 39 R, 39E, R41, R42, R44, X92, S
5	More than hourly	B12, R29, 398R, 39R, 45, 46, R44A, R44B, NE, WP

Six guidelines are used by PVTA in determining when service should be provided, at what level, and how; they include (1) service spans, (2) principles of design, (3) service coverage, (4) vehicle loading factors, (5) stop amenities, and (6) stop spacing.

## Service Spans

It is important to establish minimum levels of service for each route type. These include service span and frequency. Table 38 outlines suggested minimum service spans for each route type. Service can begin earlier or end later if demand warrants. Adjustments to the times can also be made based on the hours of centers served and the passengers' needs but should be within the financial capacity of PVTA.

**Table 38. Minimum Service Spans**

Day Type	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Express Routes
Weekday	6:00 AM- 11:00 PM	6:00 AM- 10:00 PM	7:00 AM- 9:00 PM	8:00 AM- 6:00 PM	8:00 AM- 5:00 PM	7:00 AM- 7:00 PM
Saturday	6:00 AM- 10:00 PM	6:00 AM- 9:00 PM	7:00 AM- 8:00 PM	9:00 AM- 6:00 PM	---	---
Sunday	9:00 AM- 9:00 PM	9:00 AM- 7:00 PM	9:00 AM- 7:00 PM	10:00 AM- 5:00 PM	---	---

## Principles of Design

The 2014 CSA outlines the following principles and service design guidelines. PVTA should continue to follow these guidelines when evaluating routes:

- Service should be simple: Service should be easy to understand, intuitive, and logical.
- Service should be fast and direct: To remain competitive with the automobile routes service should be direct and speed maximized.
- Route deviations should be minimized: Routes should stay on the direct path unless it meets the requirement for a deviation listed below.
- Stops should be spaced appropriately: Stops spaced too closely decreases speed, but spaced too far apart can deter riders, especially in areas with poor pedestrian access.
- Routes should be symmetrical: Routes should operate along the same alignment in both directions, unless it is a loop route.
- Major routes should operate along arterials: Express routes and Tier 1 and 2 routes should operate along major roadways, deviating only when passenger activity signals a deviation.
- Routes should serve well-defined markets: Routes should serve areas with defined demand.
- Service should be consistent: Headways should be consistent where possible and routes should operate along consistent alignments.
- Service should be well-coordinated: Often routes operate through the same corridor but are traveling to different destinations. Timing of the routes should be coordinated to minimize redundancy.
- Service design should maximize service: Service should be designed to maximize revenue hours and minimize non-revenue hours.
- Vehicle type should be appropriate for service: PVTA has a range of vehicle sizes, the size vehicle utilized on the route should match the demand.

### Service Coverage

Population and employment densities are the strongest indicators of potential transit demand and can be used to evaluate demand as denser areas often warrant higher levels of service. Table 39 outlines the different levels/types of transit services that may be warranted given the density.

**Table 39. Transit Supportive Densities**

<b>Job &amp; Population per Acre</b>	<b>Type of Transit</b>
30 households / 50 jobs	Light Rail
20 households / 50 jobs	Rapid Street car
20 households / 25 jobs	Commuter Rail
10 households / 20 jobs	Bus Rapid Transit
5 households / 15 jobs	Frequent Bus
3 households / 6 jobs	Fixed Route

### Vehicle Loading Factors

PVTA has set vehicle load factors as a target in their MOU. This was also established as part of the service delivery guidelines. The load factors are based on the size of the vehicle and the time of day with a 100 percent load factor in the off-peak and 120 percent during the peak (Table 40).

**Table 40. Vehicle Load Factors from 2014 CSA**

	<b>60 foot Articulated Bus</b>	<b>40 foot Bus</b>	<b>35 foot Bus</b>	<b>30 foot Bus</b>	<b>24 foot Mini-Bus</b>
100% of Seating Capacity	55	40	32	23	18
120% of Seating Capacity	66	50	39	28	22

### Stop Amenities

PVTA requires bus shelter placement at stops with ridership of at least 60 boardings per day in urban locations, ridership of at least 40 boardings per day in suburban locations, and ridership of at least 15 boardings per day in rural locations (Table 41). Shelter placement at stops with lower ridership may be considered if the location experiences a particularly large number of transfers, development is proposed for the area that will likely increase ridership, or elderly or mobility challenged passengers in the area would benefit from the addition of a shelter. Benches should be placed at stops meeting half of the guideline for shelters.

**Table 41. Guidelines for Bus Stop Amenities**

<b>Amenity</b>	<b>Urban</b>	<b>Suburban</b>	<b>Rural</b>
Shelter	60+ boardings per day	40+ boardings per day	15+ boardings per day
Bench	30+ boardings per day	20+ boardings per day	8+ boardings per day

### Stop Spacing

The following bus stop spacing guidelines should be used based on the environment for which the route is operating in.

**Table 42. Stop Spacing Guidelines**

	Urban Core	Urban Core Adjacent	Suburban	College/ University Campus	Village Connector	Rural	Express
<b>Minimum Stop Spacing (feet)</b>							
Moderate to high density areas	900	900	900	660	660	900	900
Low density areas	1,100	1,300	1,300	1,100	1,100	1,100	1,100
<b>Maximum Stops per Mile</b>							
Moderate to high density areas	6	6	6	8	8	6	6
Low density areas	4	4	4	5	5	5	5

**6.2.3.2 Service Benchmarks**

The aforementioned performance measures can be used to create benchmarks for service operation. The benchmarks help PVTA track progress and set goals for the performance of the route. These benchmarks should be seen as short-term goals that should be re-evaluated at set intervals to ensure that the expectations for the route are consistently evolving. If a specific benchmark is greatly exceeded, the criteria should be changed to provide a progressive target for the service. The following route level benchmarks for PVTA are used (Table 43): passengers per revenue hour and farebox recovery. These benchmarks were determined by the base type of service, national best standards, existing policies, best practices, and historical performance.

**Table 43. Service Benchmarks**

Service Tier	Passengers Per Revenue Hour	Farebox Recovery
1 (every 15 minutes)	30	20% Weekdays/15% weekends
2 (every 20 minutes)	20	20% Weekdays/15% weekends
3 (every 30 minutes)	15	20% Weekdays/15% weekends
4 (every hour)	10	20% Weekdays/15% weekends
5 (less than hourly)	5	5% Weekdays/5% weekends

In addition to the route level metrics previously described, PVTA should continue to monitor system and modal level performance per the MOU and consider adding the following measures for internal tracking purposes and to drive the evaluation of mode-level performance:

- **Subsidy per Passenger:** The cost per passenger after accounting for fare revenue and any contract revenue. It is recommended for quarterly and annual reports.
- **Percentage of Fares Covered by Contracts and Partnerships:** This is an internal measurement to track the true farebox recovery as PVTA holds contracts with several organizations who pay a portion of the operating cost or fares for passengers.

### 6.2.3.3 New Service Warrants

PVTA often receives requests for new service; new service warrants will help PVTA evaluate proposals and determine service levels. The development of the new services should follow the new service warrants and after 2 years be able to meet or exceed the performance measures outlined in Section 6.2.3.2. Once a new route or service has been implemented, it should be monitored for an initial period to evaluate its performance. At the onset the route may not meet the benchmarks set forth for existing routes, but as the service becomes more popular it may. New services should be implemented for a period of at least 1 year in order to garner ridership and monitor monthly fluctuations. While minor changes such as timing can be made to the route within the initial period, large changes should be avoided. On-time data should be checked randomly to ensure that performance remains acceptable; a new service that has low on-time performance will have a difficult time attracting ridership. Approximately halfway through the initial period (6 months) a passenger survey of the route should be conducted to understand the effectiveness of the route. The route should continue to be monitored as a new route beyond 1 year if ridership has had continual growth. Once ridership has plateaued the route can be evaluated against the aforementioned benchmarks with the other routes.

When analyzing new service requests and proposals the following should be considered:

- **Area Coverage:** When service is proposed the new route should be evaluated for its ability to connect to other routes, meet service thresholds, and operate cost effectively. Routes that extend the service area may have a demand, but the increased miles per hours may cause the subsidy to be greater than those recommended in the performance measures.
- **Transit-Dependent Populations:** The presence of transit-dependent populations should be considered when evaluating new service proposals. If there is a high but remote transit-dependent population, alternative service types such as Dial-A-Ride or flex routes might be warranted.
- **Special Markets:** New service is often proposed for special markets such as a new shopping center, island gateways, or employment centers. These markets often produce demand but the cost to service them can be high and ridership potential undetermined. PVTA should work with these destinations to secure some dedicated funding, which can help bring down the cost of the route.

A **route deviation** is when the bus either only occasionally serves an area or must leave the primary road to serve a location such as a shopping plaza. The 2014 CSA recommends minimizing the use of route deviations and following the thresholds listed below for implementing route deviations:

- The deviation will increase in overall route productivity.
- The number of new passengers that would be served is equal to or greater than 25 percent of the number of passengers who would be inconvenienced by the additional travel time on any particular deviated trip.
- The deviation would not interfere with the provision of regular service frequencies and/or the provision of coordinated service with other routes operating in the same corridor.

### 6.2.3.4 Actions for Low Performing Routes

The 2014 CSA recommended that in cases where routes do not meet minimum performance guidelines, changes should be made to improve route performance. These changes can include a variety of measures, including reconfiguring the route alignment to attract more passengers, targeted marketing, eliminating particularly unproductive segments, and reducing service levels. If no changes can be identified that improve performance, steps may be taken to discontinue

the route unless it serves a demonstrable critical need that is not served by other routes or services (including paratransit service). In cases where service expansion is considered, ridership and productivity estimates should be developed that indicate that there is a reasonable certainty that the new service will meet the performance guidelines within 24 months of implementation. As post-pandemic ridership stabilizes, implementing thresholds for when actions such as more extended analysis or service changes are warranted would simplify service planning and boost transparency if PVTA shared the guidelines with the public.

#### 6.2.4 Public Transparency

PVTA's website includes an "Open Government" page, which includes annual payroll and audited financial statements from 2010 to 2020. Advisory Board meeting minutes are located under PVTA's "Governance – Meeting Minutes" page. Quarterly performance metrics (system, and mode) are located under the "Performance & Efficiency" page. The purpose of providing this information is to boost public trust in PVTA and allow the public to better understand the service and key decision making. The PVTA website also includes links to planning documents (such as the 2014 CSA and other reports) under the "Planning at PVTA" page. PVTA should consider the following options for presenting key route-level operating statistics in one location 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 PVTA staff burden in creating the publicly 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, PVTA 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.

## 7. Transportation Service Needs

Transportation needs were identified for the PVTA service area through discussions with PVTA staff, review of previous studies and relevant documents, analysis of the transit services operated during the period of FY 2015 to FY 2019, and an outreach effort conducted as part of this plan development process. As previously noted, this plan was developed in 2020 when the COVID-19 pandemic began to be widespread across the United States, thus impacting transit agencies and their provision of service. In order understand the immediate impact of the pandemic on PVTA's service, transportation needs and their accompanying recommendations consider the early portions of FY 2020 in addition to the original FY 2015–FY 2019 review. Transportation needs are discussed in context of ridership rebound in response to the change in ridership faced by PVTA and other RTAs. Core needs are needs that are important regardless of how fast ridership rebounds, and ridership needs are those needs that are dependent on the level of ridership rebound before it is logical for PVTA to address.

### 7.1 Needs Identification Process

Transportation needs that have been identified for PVTA are documented in this section. This includes the review of existing conditions, relevant previous documents, and outreach, including the public survey findings, stakeholder correspondence, and a driver survey.

To identify needs the team began by examining the existing conditions to determine opportunities for improvement and the enhancement of service. This included a review of routes and whether the performance data indicated a need for expansion or reduction of service (hours, days, frequencies), alignment changes, or mode shift. Assets were analyzed to determine the fleet condition and constraints, whether there was a need for facility expansions or upgrades, or technology that would improve service delivery, customer service, operations, safety, or the ability to monitor performance. Existing policies/procedures were analyzed to determine gaps, inconsistencies, and adherence. Peers were evaluated to understand PVTA's performance relative to similar systems and whether any had implemented practices/services that PVTA might consider. The market analysis was used to identify regional trends, service gaps, and service saturation levels.

#### 7.1.1 Review of Previous Studies

In addition to the existing conditions analysis the team reviewed other existing documents/resources that were published within the last 5 years, including the 2014 CSA, to identify previously identified mobility and transit needs for the region. This work supplemented the existing conditions analysis, and the documents reviewed can be identified in Table 44.

**Table 44. Existing Documents Reviewed**

<b>Document Title</b>	<b>Year Published</b>
Intercity Bus Study-Stakeholder Survey (Intercity Bus Study)	2020
Palmer Ware Outreach	2020
Pioneer Valley Long Range Transportation Plan (Regional Transportation Plan)	2019
Transit Mobility Alternatives – Northampton, Hadley, and Amherst (Route 9 BRT Study)	2018
Transit Asset Management Plan (TAM Plan)	2018



<b>Document Title</b>	<b>Year Published</b>
ADA Paratransit Survey Results	2017
PVTA Bus Rapid Transit Alternative Analysis (State Street BRT Study)	2016
PVTA Onboard Customer Survey Northern Service Region (PVTA Northern Tier)	2016
PVTA Onboard Customer Survey Southern Service Region (PVTA Southern Tier)	2016
PVTA Comprehensive Service Analysis (Previous RTP)	2014
Pioneer Valley Coordinated Public Transit-Human Services Transportation Plan (HST Plan)	2015
PVTA Paratransit Service Analysis Study (PVTA Paratransit Study)	2014

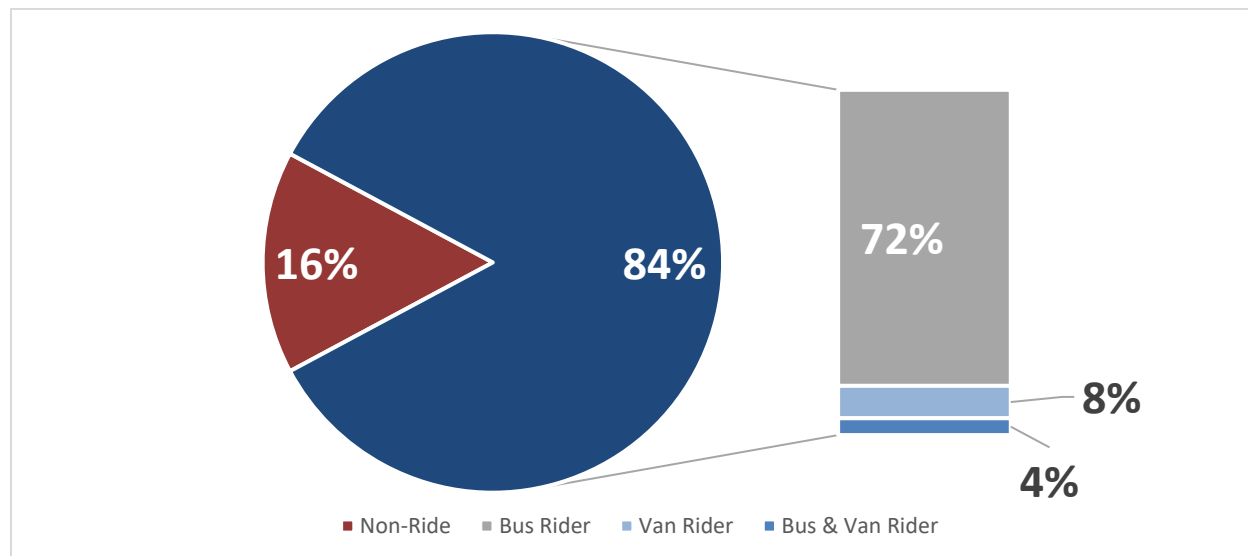
### 7.1.2 Outreach Effort

Public outreach was conducted through an online public survey, stakeholder correspondence, and driver survey to better understand the needs for the Pioneer Valley region. Due to COVID-19, no in-person outreach was possible. A summary of the outreach results can be found below; a more detailed report of the outreach findings can be found in Appendix C.

#### 7.1.2.1 Public Survey

Due to the pandemic, in-person outreach was not possible and instead an online survey was conducted and a call-in number was provided, which allowed individuals to leave a message about how they would like to see service improved. While efforts were made to reach the public, note that PVTA has traditionally relied upon in-person outreach to gather feedback, in particular those without access to technology. As such, these individuals and those who were not riding due to the pandemic may have been missed. The online survey began on June 15, 2020, and was available through August 3, 2020, in English and Spanish. Due the pandemic, the survey was conducted during a period when many of the typical riders were not riding, and college students and staff, who are the majority of northern riders, were not in the area. The survey was open to all individuals who live, work, or visit the PVTA service area and was open to both riders and non-riders. To promote the survey a flyer was posted on all vehicles, an email blast was sent to stakeholders, car cards were printed and put on buses, information was distributed through social media, press releases sent out, and automatic calls sent out to all register demand response individuals. A total of 643 individuals responded to the survey and 84 percent were PVTA riders, while the remaining 16 percent were not (Figure 65). Of the riders who responded the majority, 72 percent, use the fixed route bus system, 8 percent use the demand response, and the remaining 4 percent use both.

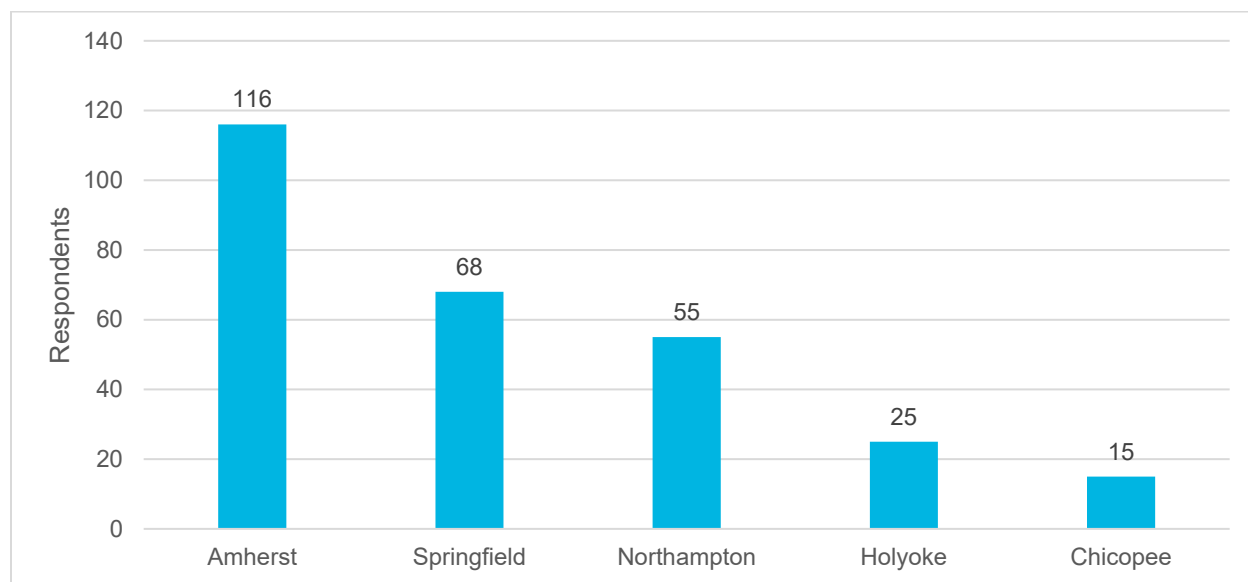
**Figure 65. Survey Responses**



**Bus Riders**

Responses were received from 25 different communities with 48 percent of the respondents living in the northern tier, 34 in the southern, 7 outside the PVTA area, and the remaining 11 percent did not indicate. The greatest number of responses from bus riders were from Amherst followed by Springfield (Figure 66). The top three places individuals travel to most correlates to the top places individuals reside and include Amherst, Northampton, Springfield, Holyoke, and Hadley. Note that the distribution of the survey respondents are skewed to the northern tier, but that is not uncommon for PVTA.

**Figure 66. Top Five Respondent Towns - Bus Riders**



Bus riders were asked what routes they use, the improvements they would like to see on those routes, systemwide improvements, and a series of trade-off questions about how they would like PVTA to invest in service. The routes individuals used did correspond to the town they lived in, and as such, northern tier routes had a higher response rate as there were a greater number of respondents in these communities (Figure 67). The top towns that bus riders traveled to are shown in Figure 68. In Springfield, bus riders travel to Metro Center and Boston Road most frequently. In Amherst, bus riders travel to Amherst neighborhood and UMass most frequently. The routes used most often were Routes B43, 38, and P20 (Figure 69) and on average individuals use 5.7 different PVTA routes. Every route had at least five individuals who use it. The routes that had the highest response rate by ridership tended to be the routes with lower ridership, with 1 response per 500 passengers or less carried (Routes S, W, B7S, G2E, 46, 39E, P20E, and R29).

**Figure 67. Northern versus Southern Tier Users**

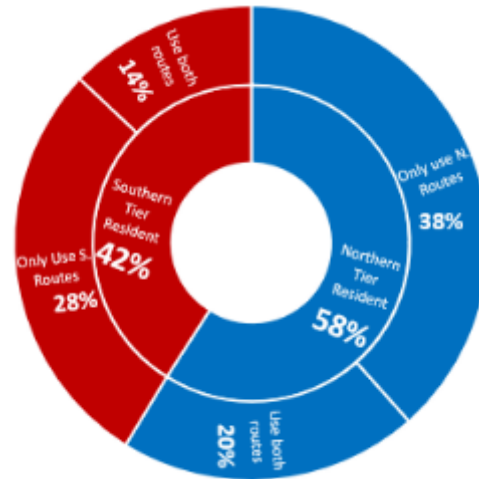
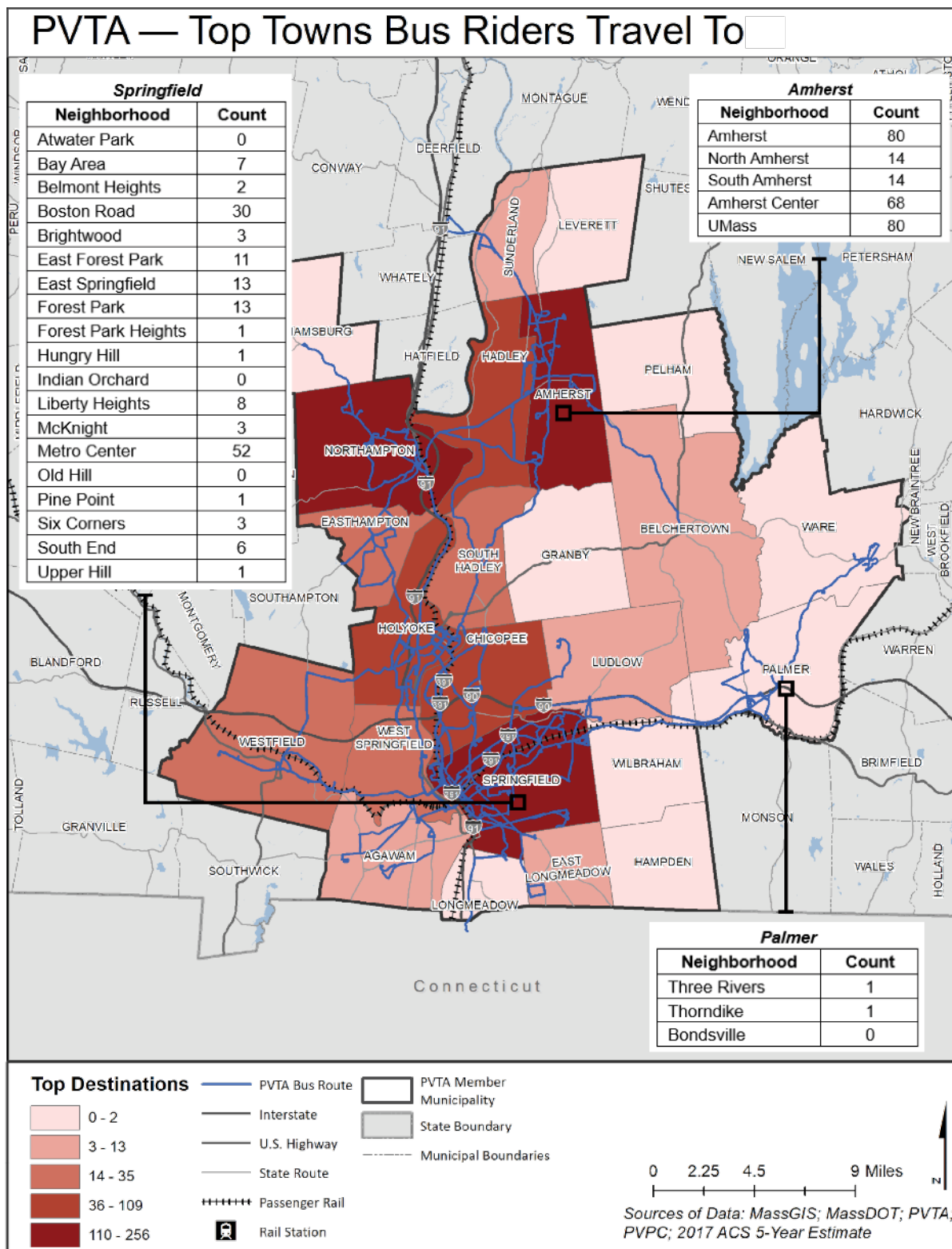
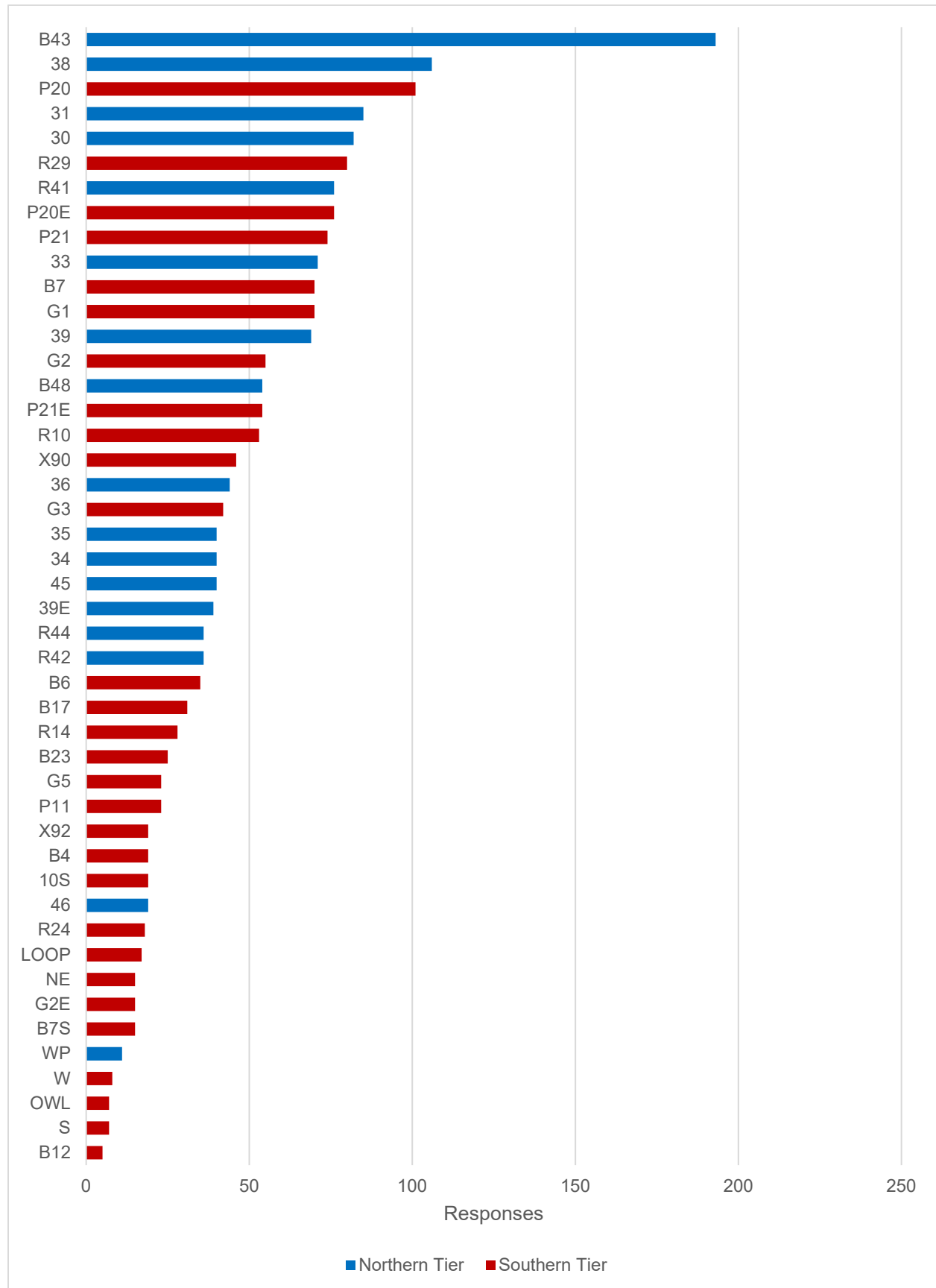


Figure 68. Top Towns Bus Riders Travel To

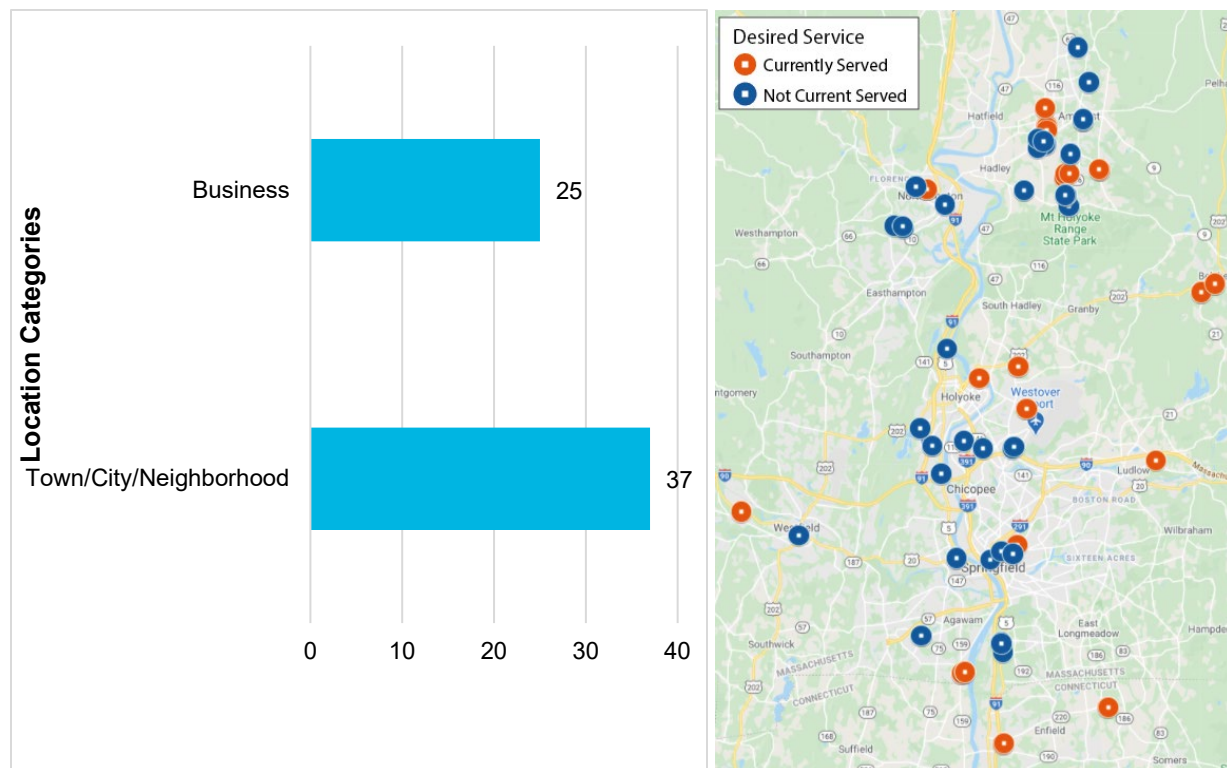


**Figure 69. PVTA Routes Used by Survey Respondents**

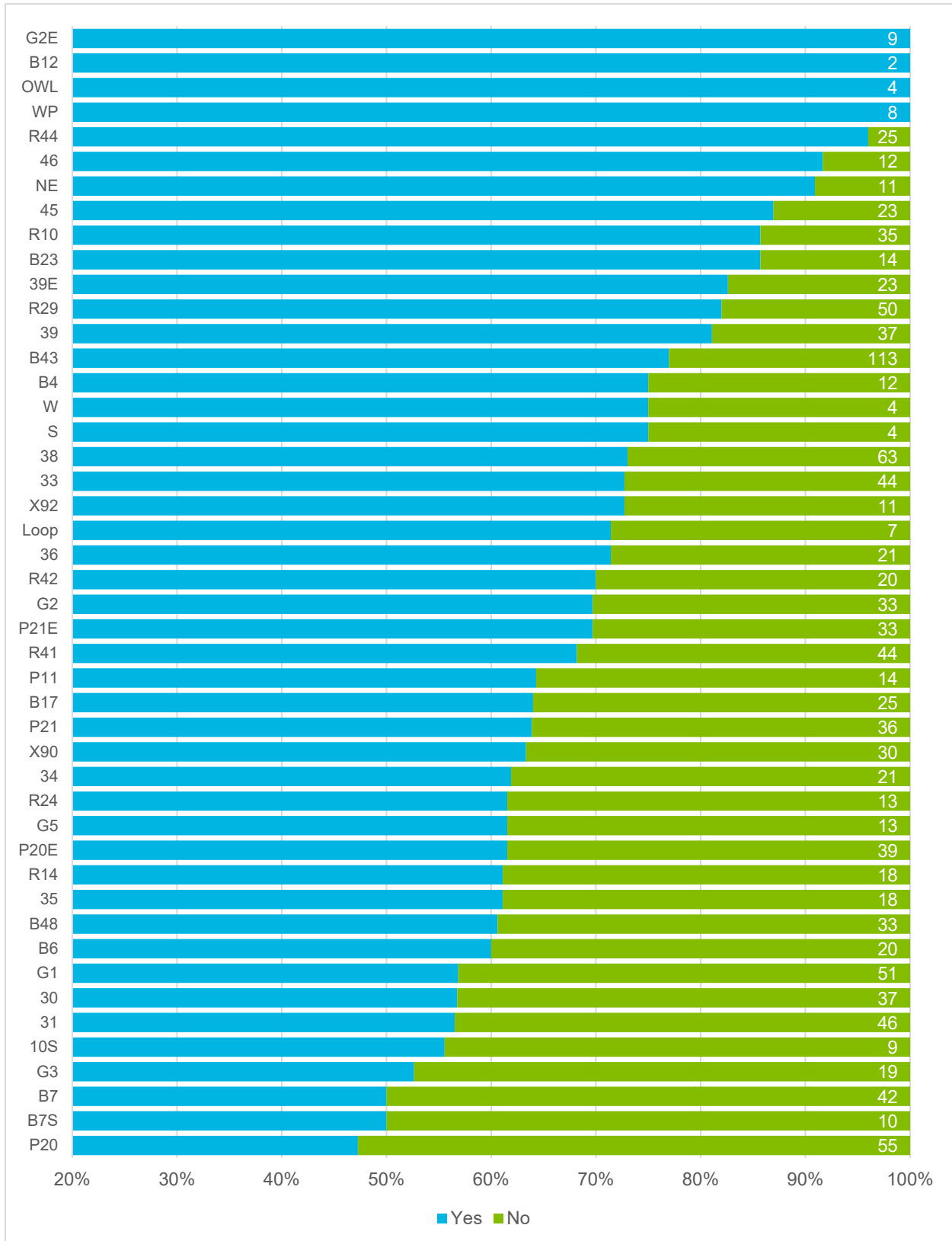


The survey found that on most routes there was a desire for increased frequency; in particular for Tiers 3,4, and 5, which have headways that are 30 minutes or greater. Other desires were for longer service hours on both weekdays and Saturdays for the southern tier routes that end earlier than those of the northern tier; and weekend service on routes that do not currently operate on weekends (Figure 71). Riders were also asked whether there are locations they wish PVTA would go that it currently does not, and 96 individuals provided responses. Responses were categorized and over half were to locations outside of the PVTA service area with the top response being Greenfield. Specific businesses were cited as shown in Figure 70. Most of these locations are within PVTA member communities and 57 percent are currently served by at least one route. The top business cited that currently does not have PVTA bus service was Six Flags.

**Figure 70. Left: Types of Places Individuals Would Like PVTA to Serve; Right: Specific Locations Individuals Would Like PVTA to Serve**



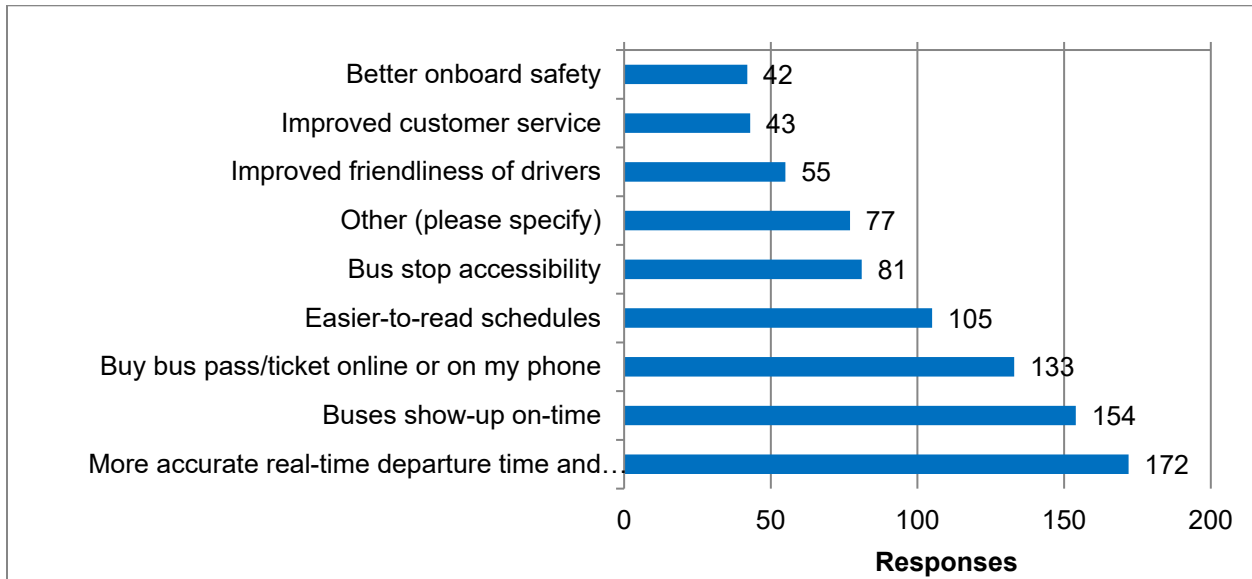
**Figure 71. Route Desired Frequency Improvements**



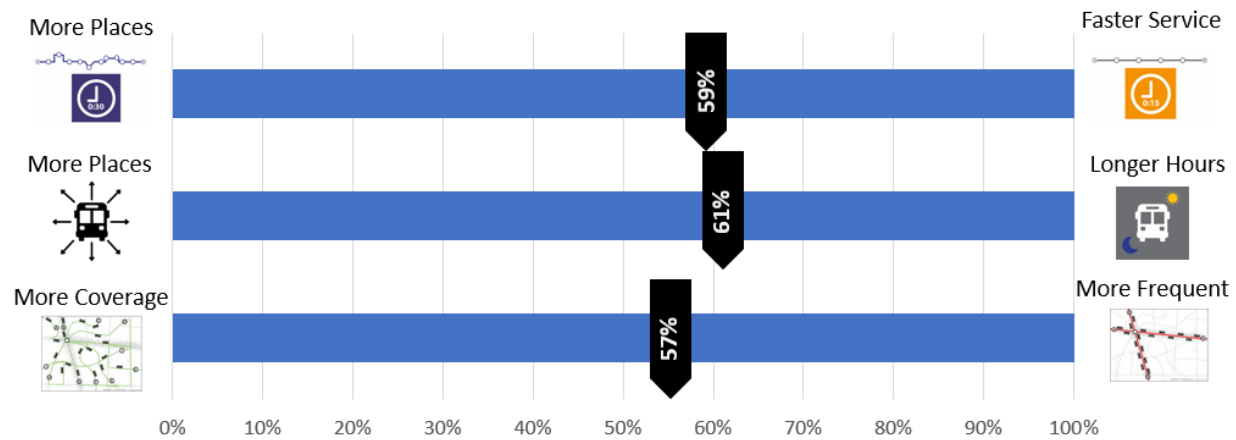
The number on the far right column denotes the total number of responses for that route.

The top two non-service-related improvements were more accurate real-time departure information and better OTP (Figure 72). Fixed route riders were asked three trade off-questions regarding how they prefer PVTA invest in the system and about 60 percent of the survey respondents indicated they prefer faster, direct, and more frequent service. Conversely, 40 percent of respondents indicated that they would prefer the bus went to more places and had wider coverage. (Figure 73).

**Figure 72. Non-Service-Related Improvements**



**Figure 73. PVTA Trade-off Questions**

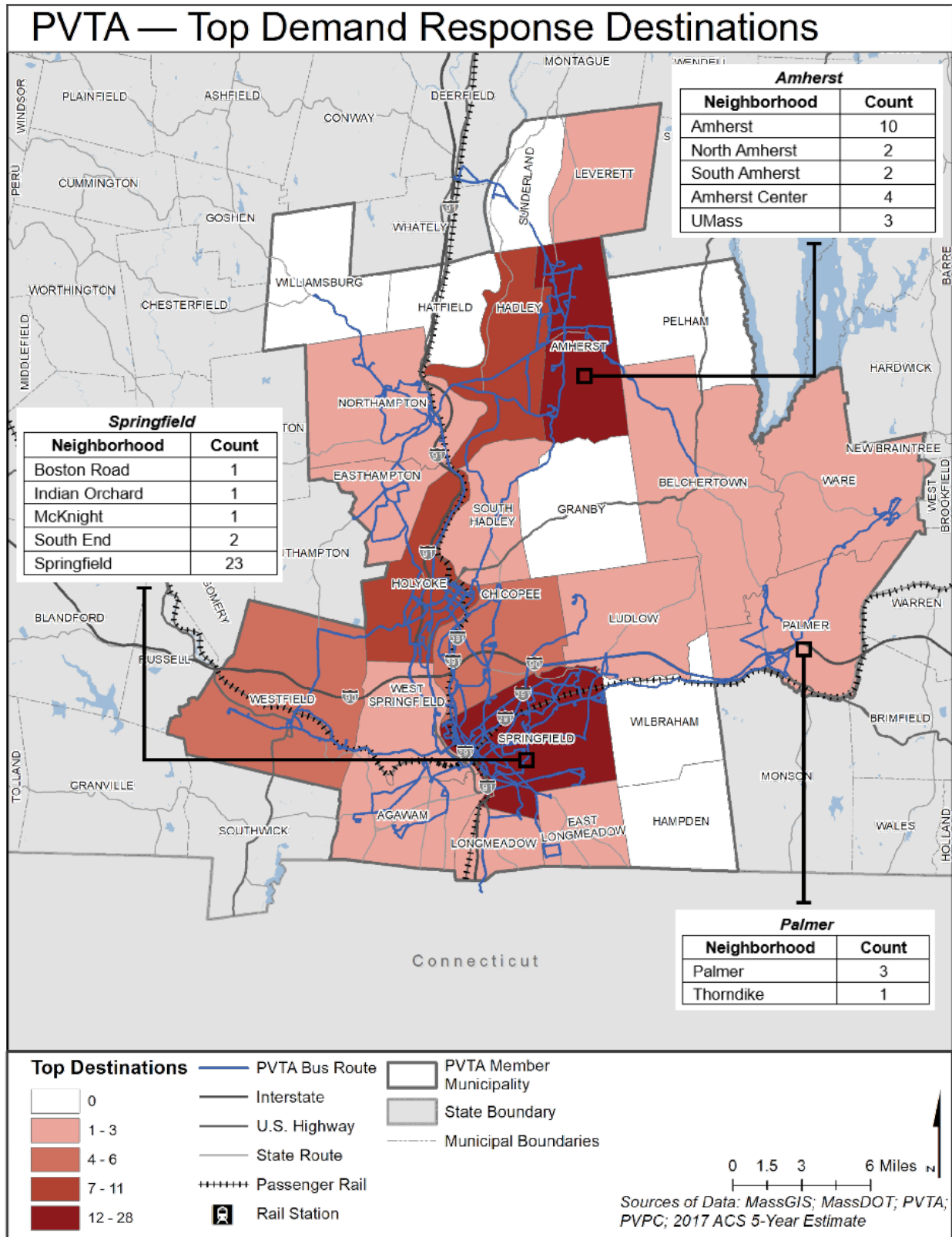


**Demand Response**

Demand response users responded from 16 different communities and were asked what services they use, how they pay their fare, and the improvements they would like to see. The greatest number of responses were from Springfield followed by Holyoke, Chicopee, and Amherst (Figure 74). The top three places individuals travel to most often were Springfield, Amherst, Holyoke, and Hadley.

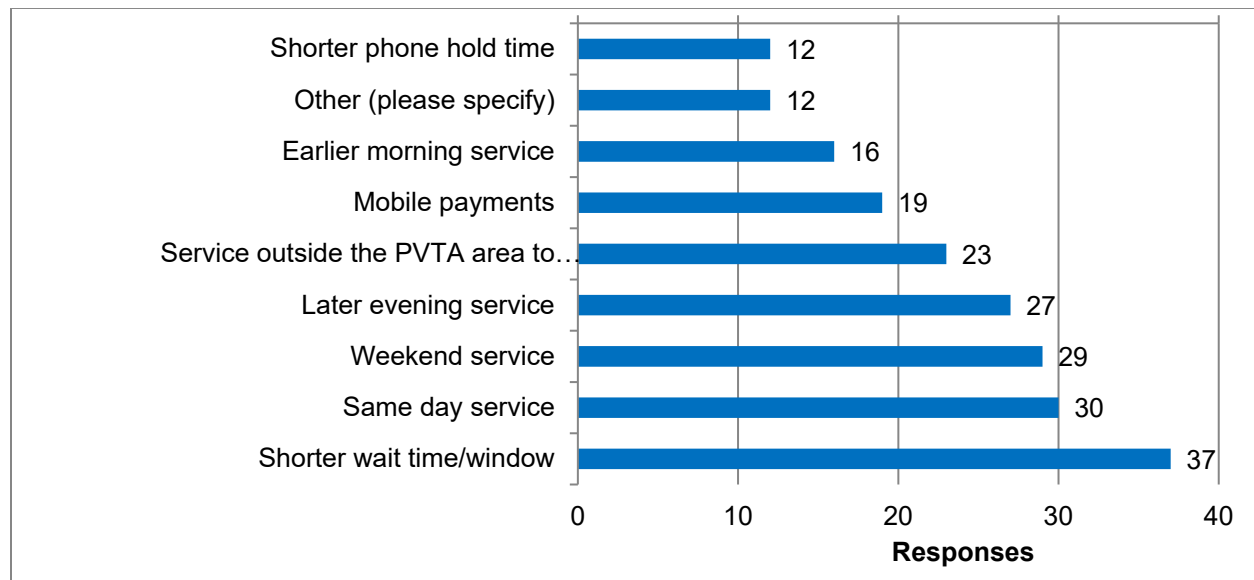


Figure 74. Top Towns Demand Response Van Riders Travel To



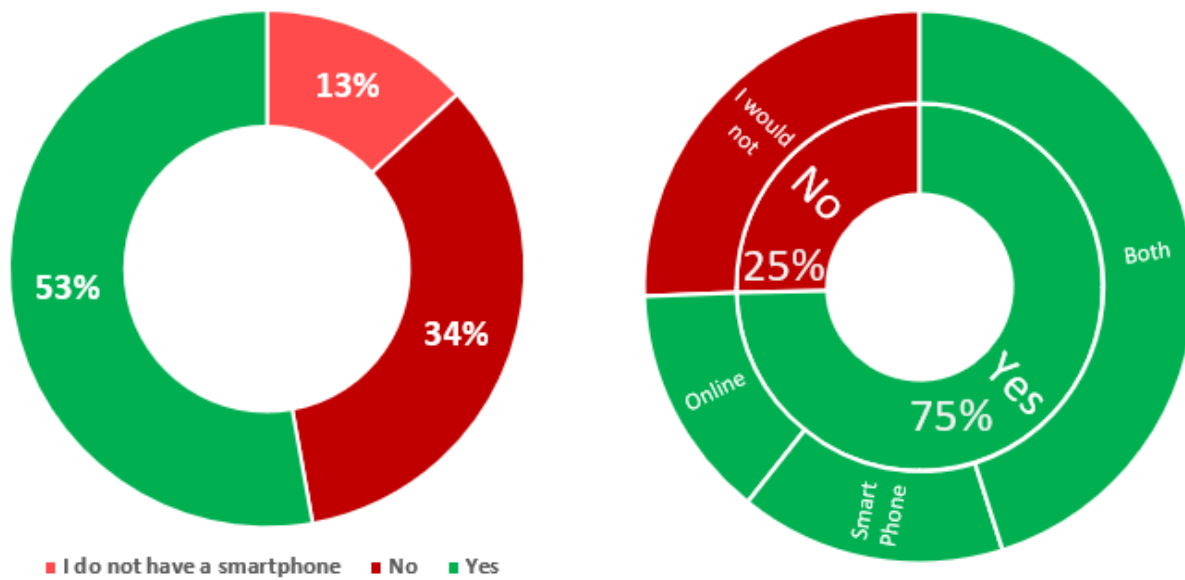
Demand response riders were asked what service they use; the improvements they would like and what they were willing to pay for service improvements; their experience using the service; the future use of technology; and any other unmet needs. Twenty-one responses were received from senior van users and 55 responses from ADA users. The top improvement desired was for a shorter wait time window followed by same day service (Figure 75). Those who desired service improvements were asked if they would pay a higher fare for the service. Approximately half would pay a higher fare (\$5 to \$6) for later evening service, 43 percent for earlier morning service, 62 percent for same day service, 57 percent for weekend service, and 60 percent for service beyond ¾ mile of a fixed route. An even greater percentage (approximately 72 percent) indicated that they would pay a higher fare to be able to have same day service and were willing to pay more than \$6.00.

**Figure 75. Top Demand Response Improvements Desired**



Respondents gave PVTA a 7.4 out of 10 regarding their experience riding PVTA, and a 7.5 out of 10 for booking their trip. Seventy-nine percent of individuals are able to book a trip for the time and days that they need. Regarding improvements, 75 percent of respondents would schedule their trip online or through their smart phone if the technology was made available and 53 percent would also use mobile payments to pay their fare (Figure 76).

**Figure 76. Right: Use of Online Trip Scheduling; Left: Use of Mobile Payments**

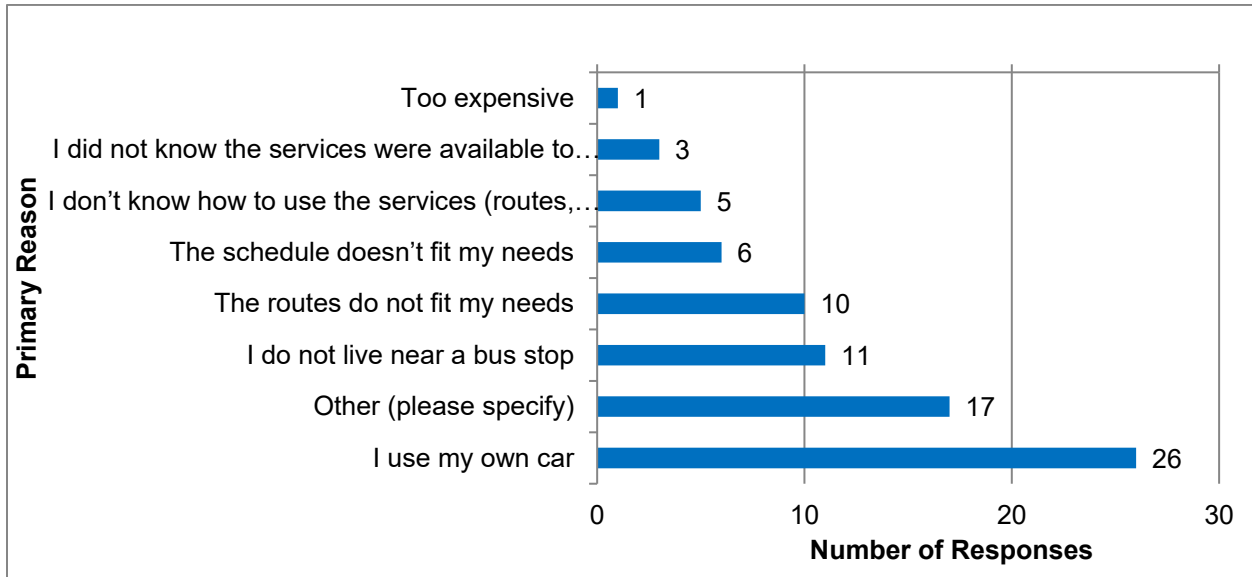


Respondents were asked to explain any additional concerns they may have about using the PVTA paratransit service, and 31 respondents provided feedback. A total of eight respondents stated they do not have additional concerns. The remaining respondents submitted concerns that include enough time to board/sit down, running late, van arrival times, no same-day service, no access to Hatfield, connections with PVTA, staff training, flexible pick-up/drop-off times, payment options, long wait time for return trips, high fares, use of texts instead of calling, efficient booking and scheduling, limited service area/destinations, and mobile tickets and payment options.

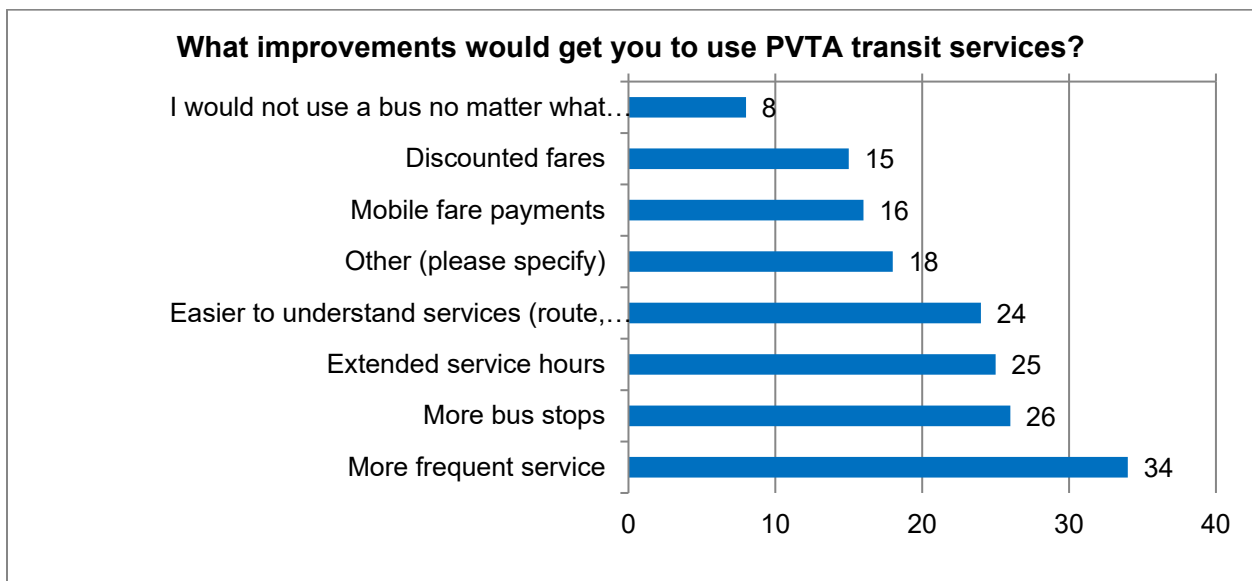
**Non-Riders**

Non Riders were asked how they currently get around, the value PVTA brings to the region, why they do not use PVTA, and what changes would get them to begin riding. Despite not currently using PVTA, non-riders understand the importance it plays in the community as 93 percent indicated that it is a valuable resource. One-third of respondents stated that the primary reason they do not use PVTA is because they have access to their own personal vehicles, 13 percent stated that the routes do not fit their schedule, 14 percent do not live near a bus stop, and 13 stated the routes do not fit their need (Figure 77). When asked what improvements would get them to use PVTA, 42 percent said if the service was more frequent, 32 percent said if there were more bus stops, and 31 percent said if service hours were extended (Figure 78). This indicates that if improvements were made current non-riders might begin using PVTA. However, 10 percent stated they would not use PVTA regardless of improvements made. When asked for reasons they would use PVTA, the top two reasons respondents selected were if it was convenient followed by if they did not have access to a vehicle (Figure 79).

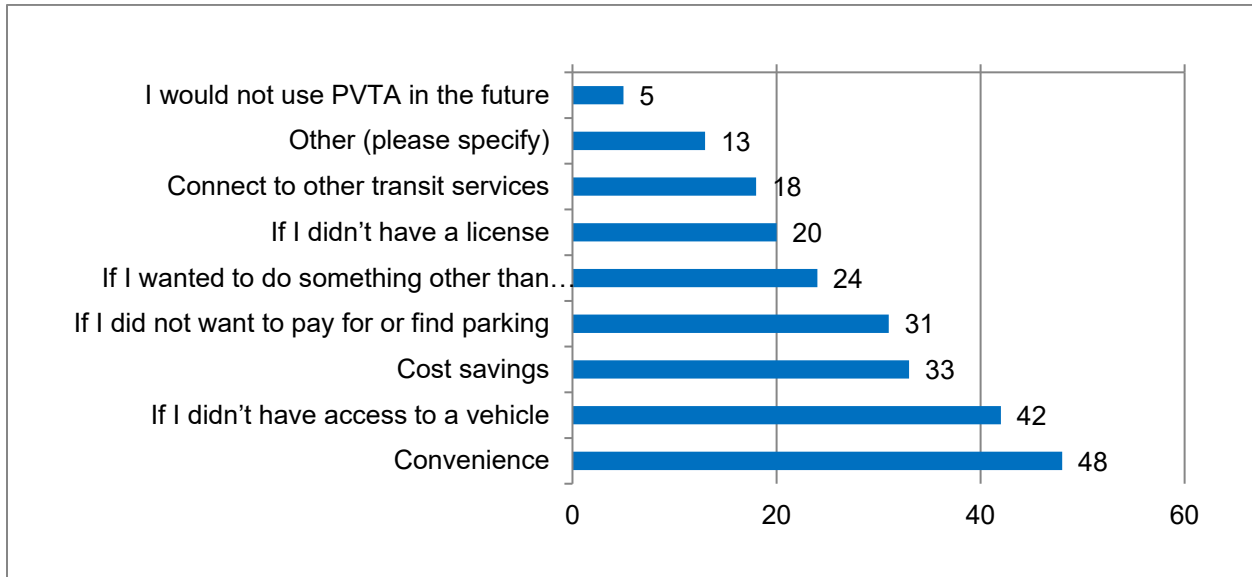
**Figure 77. Reasons Non-Riders do Not Use PVTA**



**Figure 78. Improvements PVTA Could Make**



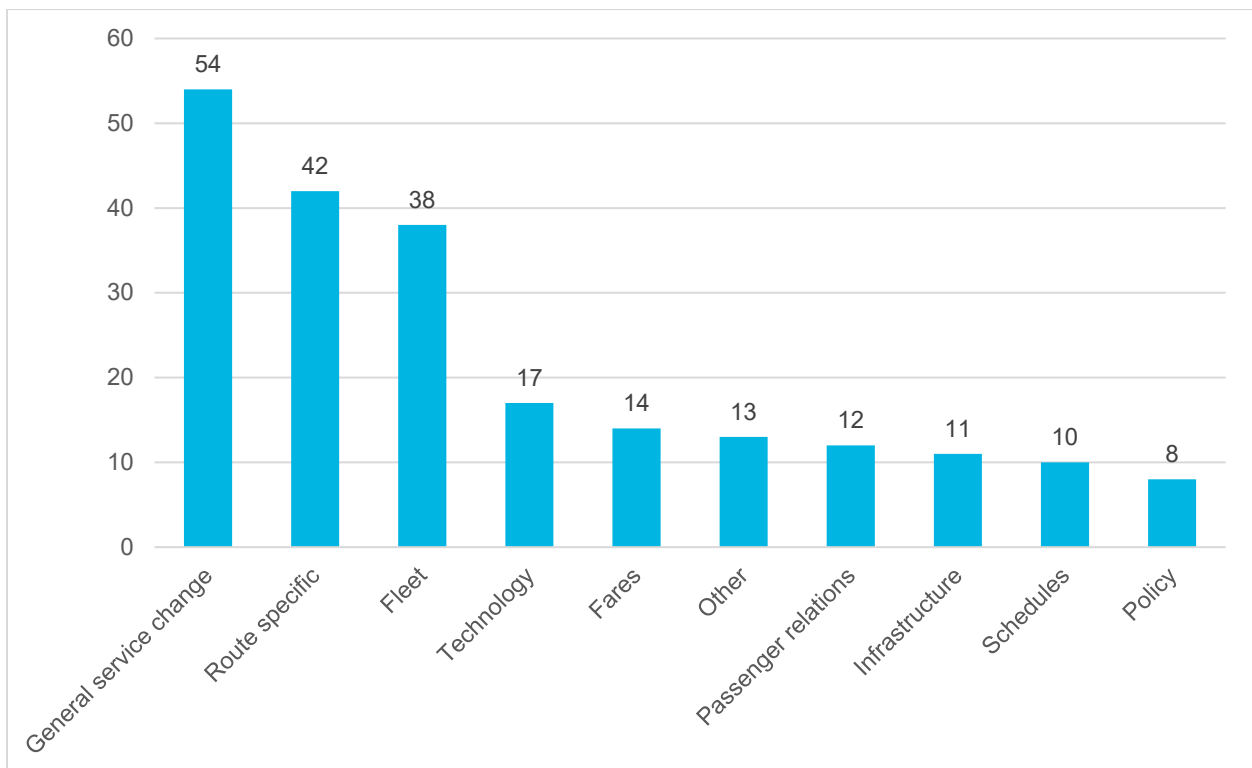
**Figure 79. Reasons Non-Riders Would Use PVTA**



**7.1.2.2 Driver Survey**

A survey was sent out to all PVTA operators. Responses were received from 132 operators. Fixed route operators identified specific route changes that should be made, fleet issues, new connections that should be made, and technology and infrastructure improvements that would benefit all. They also provided information on some of the daily challenges they face such as tight timing between stops, the need for consolidated bus stops, passenger difficulties, tight turns, and issues with technology functioning properly.

**Figure 80. Top Service Changes Identified by Fixed Route Operators**



Demand response operators reported that the top issues they hear from customers are that they are picked up too early for appointments, they are unable to get the trip time requested and must negotiate a time within the 1-hour window, and will-call return pick-ups have excessive wait times. Operators face operational challenges such as tight schedules, radio dead zones, and poor vehicle handling in winter weather.

### 7.1.2.3 Stakeholder Interviews

Two interviews were held with members of the PVTA paratransit council who elected to participate. The findings from the two interviews were as follows:

- The changes in schedules because of the colleges impacts the ADA users as the hours are shortened and in some cases, service does not operate when school is not in session. This makes the service unreliable to use year-round.
- There is a need to connect to the rural areas in the hilltowns.
- The ability to schedule a trip online is desirable.

## 7.2 List of Identified Needs

Through the needs identification process, which included reviewing previous documents, the existing conditions analysis, and the outreach process, 197 needs were identified. The list was presented to PVTA and then workshopped to identify recommendations to address the need<sup>49</sup>. An overview of recommendations can be found in Chapter 8, with details in Appendix E.

Needs were grouped into 11 categories as follows: existing fixed route, demand response, new service, bus stop, fleet, infrastructure, fare, policy, operational, technology, and other (Figure 81). The largest category of need was for modifications to existing fixed routes. The following sections outline the needs by category. Additional information on why each was identified can be found in Appendix D.

**Figure 81. Category of Needs**



<sup>49</sup> The initial list of needs included broad systemwide needs that were further developed into specific fixed route, demand response and new service needs.

## 7.2.1 Existing Fixed Route Needs

Service improvements were identified for 27 of PVTA's fixed routes from the performance analysis and outreach effort (Table 45). The improvements include the need for later evening service, improved frequency, earlier morning service, and service on routes that do not currently operate on weekends. Improvements to existing routes were identified through the public outreach and driver surveys and then verified by examining APC data, which show stop, route, and time of day data. Expanded hours were identified primarily on southern tier routes, where frequency improvements were identified throughout the system.

**Table 45. Existing Fixed Route Needs: Service Improvement**

Need	Weekday	Saturday	Sunday
Expanded evening hours	G1, G2, P21, 34, R41, B48	G3, G5, B6, P20E, P20, P21, R41	G1, G2, P20, P21, B7, B6, R44
Improved daytime frequency	G1, G2, B17, P20, P21, R44, B48, 30, 31, 33, 35	G1, G2, R29, B48, 30, 31, 33	G1, G2, R29, 30, 31
Improved AM and/or PM peak frequency only	X92, 45, 46,	—	—
Improved evening frequency	30, 31	30, 31	30, 31
Consistent frequencies	G3, R10	—	B6
Earlier service	P11, B48, 30, 31	P20E, P21, B48	G2, B6, B7, R10, P20, P21, R44, 30, 31
New service	—	B23, R24, W, WP, 34	G5, B17, X92, P20E, W, R41, R42, WP

Drivers identified poor performing route segments; ridership data were examined to confirm their reporting. Table 46 outlines proposed reductions in service in order to better meet demand on 15 routes. No routes are proposed for elimination but rather conversion to a new service model, a reduction in frequency, or a shortened span of service.

**Table 46. Existing Fixed Route Needs: Service Reductions**

Need	Weekday	Saturday	Sunday
Earlier service end	LOOP, 38, 39, B43(F)	39	LOOP, 30, 38
Reduced frequency all day	B6, 39	—	—
Reduced evening frequency	G1, G2, G3, B6, B7, R10, P20, P21, 38	—	—
Reduced morning frequency	G3	—	—
Conversion to on-demand	B12	B12	—

There are 19 routes for which changes to the alignment were proposed based on feedback from the operators and public. The proposed changes would eliminate unused deviations, convert low ridership areas to microtransit, streamline routing, and discontinue special variants that only occur on the weekends (Table 47).

**Table 47. Existing Fixed Route Needs: Alignment Changes**

<b>Route</b>	<b>Alignment Change</b>
G1	Serve the Chicopee Big Y and Marketplace Plazas on all trips.
G2	Eliminate the Dwight Road variant and deviation to industrial park and replace with on-demand feeder service; all trips to service Big Y.
G3	Remove the Sunday only Chicopee Falls deviation; on the eastern section of the route convert to a loop using Wilbraham Road instead of an out and back.
G5	Eliminate Enfield/Longmeadow deviation; replace with Enfield Express Route and microtransit.
B6	Eliminate Sunday only service to Eastfield Mall; convert Health South to by-request only.
B7	Discontinue Express via I-90 weekend variant; separate route into two routes, a local route that serves all stops and deviations, and a limited stop route that ends at Walmart, does not deviate and services specific stops only. Limited stop service and stops to be rebranded.
R10	Service WSU on all trips, eliminate different school schedules; convert Hospital and East Mt. View Apartments to on-request only; eliminate Union Street; service Walmart on all trips in all directions during open hours.
R10s and OWL	Combine into one route.
R14	Convert the Industrial Park variant and North Street to a microtransit zone. Service Big Y and Pheasant Hill on all trips.
B23	Remove Soldier Home deviation; extend route to Big Y in Westfield.
X90	Eliminate Montcalm deviation; replace with South Hadley microtransit; access Holyoke via Willimansett Bridge; extend to HTC on Sundays.
R42	Discontinue service to Nash Hill.
B43	Convert express trips back to non-express trips and reestablish Route M40.
R44	Convert High Street deviation to on-demand only; eliminate circular routing on weekdays and use Saturday routing instead; serve Rocky Hill Co-housing on-request using Route NE.
B48	Create express trip variants via I-91.
30	Convert Valley Medical to on-demand.
33	Eliminate Cushman Center deviation; Saturdays extend to Hampshire Mall.
39	Eliminate evening and weekend trips to Hampshire Mall.



Route	Alignment Change
WP	Provide additional trips to Springfield; break the route into two routes with each servicing the Ware Walmart to create transfers.

In addition to changes in headways, hours of service, and alignment three other needs are specific to a route or corridor as listed below:

- Conduct an on-board rider study for the northeast area to better understand travel patterns and needs. Redesign route accordingly.
- Conduct further research on the need to connect South Amherst to Route 9.
- Update the B4 schedules to add Wason and Plainfield timepoints.

### 7.2.2 Demand Response Needs

As outlined in Figure 82, four demand response service needs were identified. Three of the needs focus on creating connections to areas outside of the PVTA service area and the fourth would introduce technology that would allow individuals to schedule their trips online. By creating connections with FRTA, whose service area borders western and northern PVTA communities, it will improve mobility through the region, allowing individuals in the rural FRTA communities better access to services in the PVTA urban areas. The Quaboag Connector serves towns in the Quaboag region that are members of PVTA or Worcester Regional Transit Authority (WRTA). This service provides the needed connection between PVTA and WRTA municipalities.

**Figure 82. Demand Response Needs**



### 7.2.3 New Service Needs

Fourteen new service needs were identified as shown in Table 48. These needs include express service between major municipalities; methods to bridge the first-mile/last-mile gap so that everyone has access to transit; a way to serve second and third shift workers and others who need to travel outside of PVTA's current service hours; connections to areas outside of PVTA such as Connecticut and for out-of-area medical trips; and more localized service in communities including Agawam, Palmer, Ware, South Hadley, Westfield, and East Longmeadow. As the demand increases there may also be a need for more community circulators or demand response service in additional towns and neighborhoods in order to meet the needs of residents.

**Table 48. New Service Needs**

**New Service Needs**

- 
- First-mile/last-mile service

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  - Late night service

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  - Same day demand response service

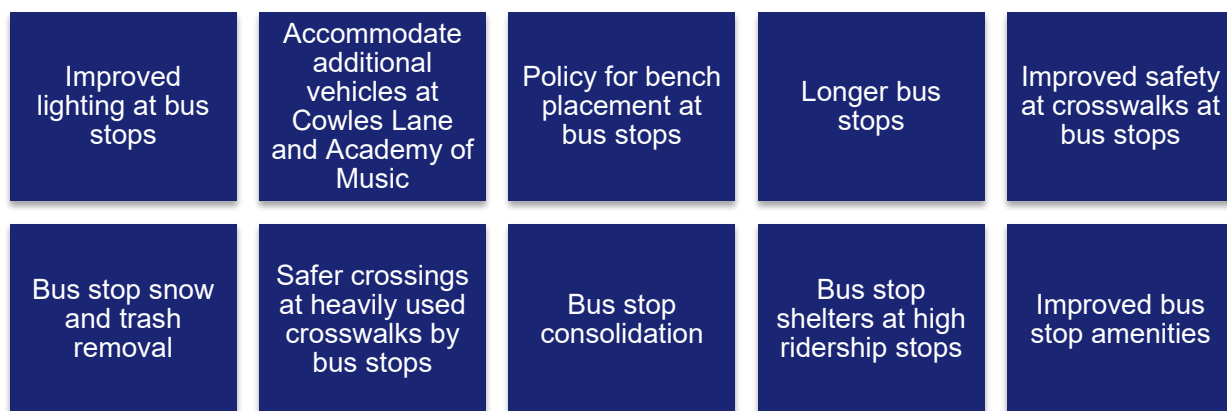
**New Service Needs**

Service to Six Flags
Connection to CTtransit
Out of service area medical trips
Service to Venture Way, Hadley
Express service between Northampton and Springfield
Express service between Amherst and Springfield
Service deeper into East Longmeadow
Transit service in South Hadley Falls
Connection between Westfield neighborhoods and industrial area
Additional Agawam service
Additional service in Palmer and Ware

**7.2.4 Bus Stop Needs**

To improve bus stops, 10 needs have been identified (Figure 83). Improving the bus stops would create safe, inviting, and usable spaces where individuals could wait. This would include installing shelters and benches, improving lighting, and removing snow and trash in a timely manner. It also includes the need for policies for amenities and guidelines PVTA can share with member municipalities on how to construct safe, ADA compliant, and useable bus stops during infrastructure projects. In high pedestrian areas such as urban cores and the UMass Campus, a need was identified for improved safety at crosswalks, in particular those that are heavily utilized. Lastly, drivers identified a need for longer bus stops in the areas served by articulated buses and at Cowles Lane and the Academy of Music.

**Figure 83. Bus Stop Needs**



**7.2.5 Fleet Needs**

Five needs for PVTA’s fleet have been identified and are described in Figure 84. Vehicles with increased capacity are needed to accommodate the large loads on the UMass campus. Given the current pandemic and recommendation for air flow, vehicles that have windows that open

are needed. Electric buses would reduce the carbon footprint in the Valley but would require significant investments in facility infrastructure first.

**Figure 84. Fleet Needs**



### 7.2.6 Infrastructure Needs

To improve or enhance PVTA's infrastructure, eight needs have been identified (Table 49). The infrastructure needs require coordination with member municipalities or university campuses as well as MassDOT. Roadway treatments that would speed up travel time are needed in high ridership corridors such as State Street in Springfield, North Pleasant Street on the UMass campus, and Route 9 in Hadley. Minor roadway improvements such as improving curb radii or adding protected left turns would also improve the travel time on several routes. As UMass infills the campus with buildings and removes parking, and increases enrollment, there will be a need for additional parking either off-campus or on the periphery. Park and ride lots may be needed. PVTA's maintenance facilities in the northern tier are not structured to properly and safely maintain the articulated bus fleet purchased in 2013. The facilities need to be expanded and upgraded to accommodate a longer vehicle fleet as well as electric buses.

**Table 49. Infrastructure Needs**

**Infrastructure Needs**

BRT infrastructure on Route 9
BRT infrastructure on State Street
Protected left turns in order to increase OTP
Improved curb radii in order to reduce the need to use the oncoming lane or rubbing the tire on the curb
Elimination of regular car traffic on North Pleasant Street on campus. Allow buses, emergency, and university plated vehicles only on weekdays during the day.
Expansion of the UMass Maintenance Facility and the VATCo Maintenance Facility
Additional park and rides throughout the region
reduced number of crosswalks on North Pleasant Street, UMass Campus

### 7.2.7 Fare Needs

Four needs have been identified to improve PVTA's fare process (Figure 85). These needs focus on reducing cash handling through promoting mobile and smart card fare payments. PVTA would need a new fare collection system to achieve this, including accepting Elderly & Disabled (E&D) cards.

**Figure 85. Fare Needs**



### 7.2.8 Policy Needs

Four policy needs are outlined in Figure 86. These are operational policies.

**Figure 86. Policy Needs**



### 7.2.9 Operational Needs

To improve PVTA’s operations 10 needs are outlined in Table 50. These needs are adjusting timing on routes, improving communications, coordinating service, and creating a safer environment.

**Table 50. Operational Needs**

**Operational Needs**

UMTS: Improved timing on route segments
Additional road supervisors
Improved communication between drivers and drivers/management and PVTA
Improved transfer communication
Continually monitoring OTP
Improved cleanliness of vehicles
Coordinated service along State Street
Adjusted timing on routes
30/31/45/ Additional time from UMass Graduate Research Center (GRC) to Cowles Lane
Improved travel time and OTP through the center of Amherst

### 7.2.10 Technology Needs

Ten technology needs are highlighted in Table 51. Upgrading systems and deploying technology uniformly across the operators would benefit both PVTA and the customers.

**Table 51. Technology Needs**

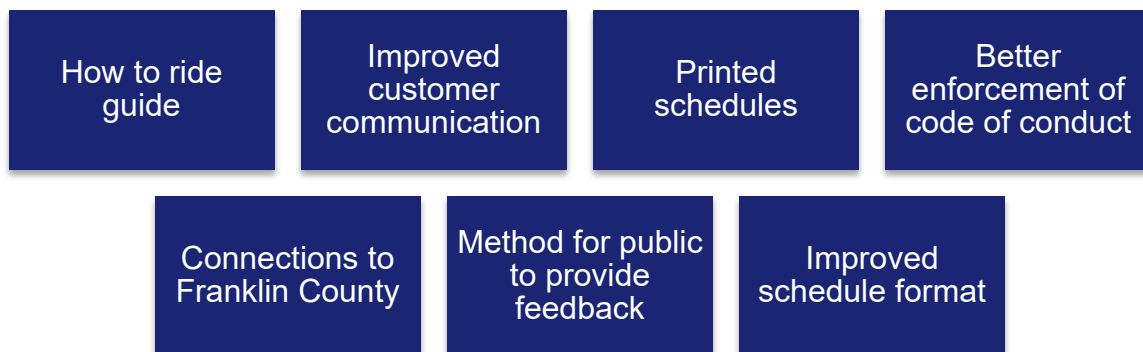
**Technology Needs**

New AVL software
Improved real-time information at stations
AVL and APC data for the community shuttles
Transit signal priority
New demand response scheduling and CAD software
New fixed route scheduling software
Route planning software
Upgraded parts management and maintenance work order software
Integrated service alert system with social media
Vehicle-mounted collision warning and tracking systems

**7.2.11 Other Needs**

Seven other needs that do not fit into the previous categories are highlighted in Figure 87. These include measures that would improve customer relations and education on how to use the system.

**Figure 87. Other Needs**



## 8. Recommendations

The recommendations for this 5-year plan are based on a holistic process that takes into account historical operational data, stakeholder input, industry best practices, Commonwealth-wide goals, and RTA priorities. The strategy for generating these recommendations embraces the uncertainty introduced by the COVID-19 pandemic and considers a spectrum of recommendations depending on ridership demand in the region. These recommendations provide a decision-making framework for pursuing strategic service changes, capital enhancements, and policy approaches, and prioritize maximizing mobility options for those living, working, and visiting the PVTA service area.

### 8.1 Guiding Principles

As PVTA prepares for the next 5 years, several looming questions face operators across the country: When will ridership return? How might the transit market be permanently changed by the pandemic? How can new technology be used to accommodate these changes to the transit market? How might new housing preferences impact transit demand?

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 PVTA's needs are analyzed and recommendations are made.

- **Safety:** The pandemic has underscored the incredible importance of safety as the number one priority for PVTA. Before the pandemic, safety included considerations such as driver training, security systems, security guards at key locations, and enforcement of the Drug and Alcohol Program. In the context of the COVID-19 pandemic, safety considerations have been expanded to include issues such as routine cleaning, sanitizing, enforcing mask and social-distancing mandates, and removing benches and other amenities that may encourage congregation at transit facilities.
- **Top-Notch Customer Experience:** A primary guiding principle is the commitment to the best customer experience possible. The entire purpose of a transit agency is to move people efficiently to their desired destinations, and the efficiency of the system depends on robust ridership. Ensuring a high-quality customer experience is the best way to acquire and retain a loyal ridership base, especially during times of uncertainty.
- **Equity Responsibility /Title VI:** Equity is an organizational responsibility for PVTA in addition to being a requirement of state and federal regulations for transit. Federal guidance requires that service supported by federal funding must not be provided in a way that places undue burdens on minority populations or those living in low-income households. Equity considerations are codified in the Authority's Public Participation Plan and Language Access Plan, both of which ensure that major service decisions are done in consultation with the public.
- **Fiscal Considerations:** Public transit agencies rely on local, state, and federal funds to operate transit as a public amenity. As a result, transit providers have a responsibility to taxpayers to ensure efficient use of public funding to meet local and statewide goals. While providing usable service that would maximize ridership is one metric for assessing efficient use of funding, there are numerous other fiscal goals public transportation operators must consider.
- **Environmental Stewardship:** PVTA and the Commonwealth of Massachusetts have both made a commitment to environmental stewardship, and this commitment must guide decisions even in an uncertain future. This ongoing commitment to reducing environmental impacts must be reflected in transit priorities, with a recognition that one








of the most meaningful environmental goals is primarily shifting single-occupancy car trips to common carrier modes such as fixed route bus trips.

- Regional Land Use and Economic Development Goals:** There are numerous land use and economic development goals at the regional and local level that should guide PVTA's decisions. This includes the *2014 PVPC Valley Vision 4: Regional Land Use Plan for the Pioneer Valley* developed by PVPC and various area municipal plans, and local initiatives.
- Data Driven and Performance Based Decision Making:** PVTA service and fiscal decisions should be made within a data-driven and performance-based framework that is the foundation for management of PVTA and provides accountability and transparency.

## 8.2 Key Recommendations

The needs identified by examining existing conditions and during the outreach effort conducted between June and August 2020 and outlined in Chapter 7 drove the development of recommendations presented in the following sections. The recommendations are broken down by category. For each of the 197 needs, 173 recommendations were developed based on the findings in order to address the need. Given the complexity and cost of some of the needs and the 5-year timeline for this CRTP, the recommendation is to explore or monitor the status as implementing any change is likely beyond the 5-year span of this plan.









**Table 52. Recommendation Categories**

Category	Icon	Description
Existing Fixed Route		Existing fixed route recommendations deal with specific routing or other operational considerations of day-to-day provision of service.
Demand Response		Demand response recommendations deal with specific improvements to demand response service or the operational considerations of day-to-day provision of service.
New Service		New service recommendations deal with the new provision of service to enhance existing PVTA service.
Bus Stop		Bus stop recommendations are regarding changes at bus stops and can include policy and/or capital investments
Fleet		Fleet recommendations deal with the purchase or management of equipment, rolling stock, facilities, or other assets.
Infrastructure		Infrastructure recommendations are roadway and facility projects
Fares		Fare recommendations deal with the administration structure, collection, or advertisement of fares.










Category	Icon	Description
Policy		Policy recommendations are needed changes to state and local policy that would improve the PVTA operating environment
Operational		Operational recommendations are procedural changes that one or more operator should make
Technology		Technology recommendations deal with new or updated technology that would improve data collection and the customer experience
Other		Other recommendations deal with issues not handled by the other categories.

As part of PVTA's ongoing service improvements, they had already identified and implemented some of the recommendations proposed in the CRTP, PVTA began implementing some of the proposed recommendations as outlined in Table 53. Since they have been implemented or included in constrained capital plans already to implement in the next 5 years they were not scored and ranked in the following sections.

**Table 53. Needs and Recommendations Already Implemented**

Type	Need	Implemented
	Route 30: Reduced service to Valley Medical	Converted to on-request only; implemented on 8/24/2020
	Route 30: Adjustment of Sunday service level to meet demand	Ending Sunday service an hour earlier; implemented on 8/24/2020
	Route 30: Additional Sunday service	Added additional Sunday service from 10:45 AM to 7:00 PM by adding another bus and increasing frequency to 30 minutes; implemented on 8/24/2020
	Route 30: Additional Saturday service	Added additional Saturday service from 10:45 AM to 7:00 PM by adding another bus and increasing frequency to 30 minutes; implemented on 8/24/2020
	Route 31: Additional Sunday service	Added additional Sunday service from 11:00 AM to 7:00 PM by adding another bus and increasing frequency to 30 minutes; implemented on 8/24/2020
	Route 31: Additional Saturday service	Added additional Saturday service from 11:00 AM to 7:00 PM by adding another bus and increasing frequency to 30 minutes; implemented on 8/24/2020
	Route 31: Additional travel time to go from Sunderland to UMass	Adjusted travel time; implemented on 8/24/2020
	Route 33: Additional mid-day service on Saturdays	Added a second bus creating 45 minute headways; implemented on 8/24/2020



Type	Need	Implemented
	G3: Consistent routing	Removed the Sunday Chicopee Falls deviation; implemented June 2020
	B6: Consistent routing and improved Sunday frequency	Eliminated the deviation to the Eastfield Mall and created 45 minute frequencies; implemented June 2020
	B7: Consistent Saturday routing	Discontinued the Eastfield Mall express variant on weekends; implemented June 2020
	R10: Consistent routing	School schedule eliminated; implemented fall 2020
	Cashless fare options in addition to magnetic stripe cards	Deployed a mobile payment option summer 2020
	Road supervisor - UMTS	Implemented in fall 2020
	New AVL software	Avail upgrade underway
	New fixed route scheduling software	Hastus upgrade underway
	Route planning software	Hastus Planning module added to Capital Investment Plan (CIP)

## 8.3 Prioritization

Each recommendation was scored based on the scenario it would fall under and what the complexity, impact, and cost would be for each using the aforementioned methodology. The recommendations and results of the prioritization process are presented in the following sections by category (see Appendix E for full scoring list).

### 8.3.1 Methodology

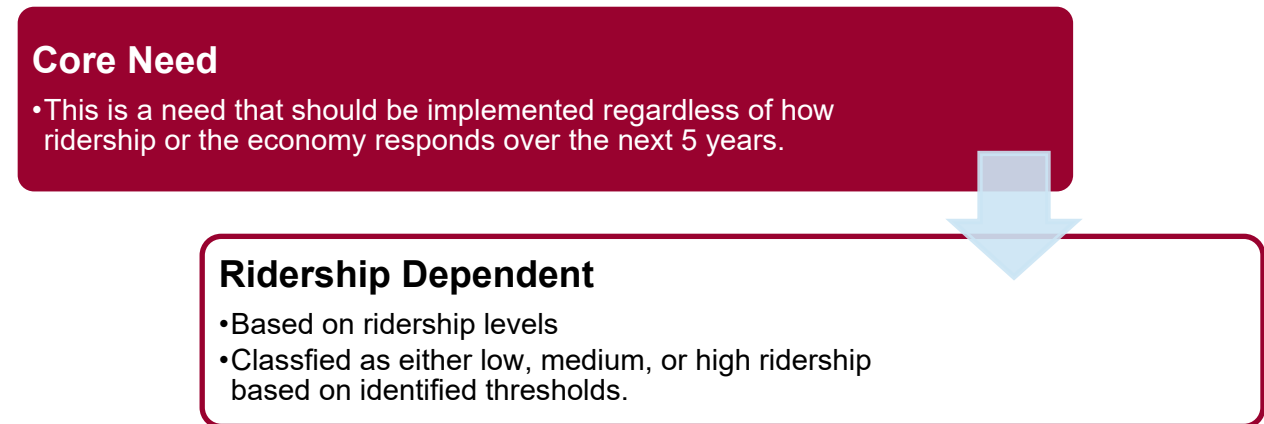
A two stage process for categorizing and prioritizing recommendations was developed in conjunction with PVTA and designed to meet its needs and requirements for making changes. The first stage involves determining under which scenario the recommendation falls. In the second stage each recommendation is scored based on the complexity to implement, overall impact it would have, and a category for estimated costs of implementing the recommendation.

#### 8.3.1.1 Recommendation Scenarios

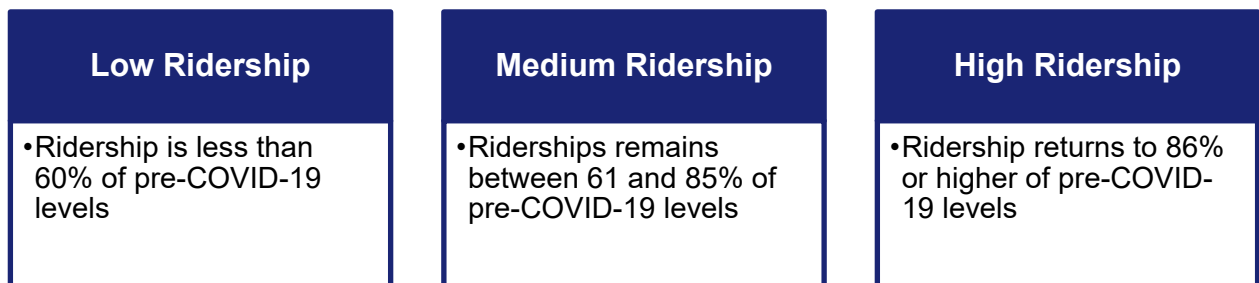
Each need is categorized as either a core need or ridership dependent (Figure 88). If it is ridership dependent then low, medium, and high ridership scenarios are used. Ridership level is relative to the recommendation and can be route or systemwide (Figure 89). Ridership is considered low if it remains at less than 60 percent of pre-COVID-19 levels if primary and

secondary educational institutions continue largely via virtual learning, tourism remains low, many businesses remain closed, and a high number of people continue to work remotely. Medium ridership assumes ridership rebounds to 60 to 85 percent of pre-COVID-19 levels as primary and secondary educational institutions implement a hybrid learning approach, tourism picks up, more businesses open or expand hours, and remote workers shift to a hybrid of in-person and remote work. High ridership scenario corresponds to when the economy rebounds and ridership returns to 86 percent or higher of pre-COVID-19 levels.

**Figure 88. Recommendation Scenarios**



**Figure 89. Recommendation Scenarios: Ridership Thresholds**



**8.3.1.2 Recommendation Scoring**

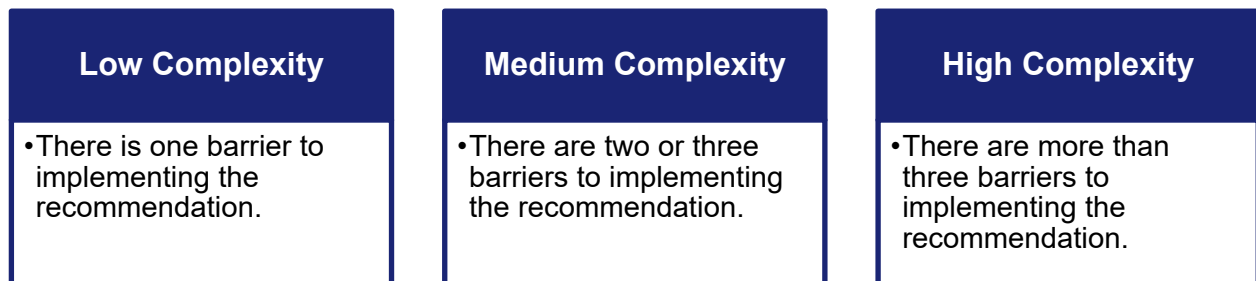
Scoring is based on two categories: complexity of implementation and impact.

**Category 1:** Complexity of implementation factors include the factors outlined in Table 54. Thresholds for complexity are highlighted in Figure 90.

**Table 54. Complexity of Implementation Factors**

<b>High Cost</b>	Considers both capital and/or operating. Annual operating cost greater than \$50,000 or capital cost greater than \$150,000
<b>Difficulty implementing</b>	<p>Need to hire more operators</p> <p>Do not have the current technology to do so</p> <p>Would require procuring additional vehicles</p> <p>Potential union contract or operating issues</p> <p>Logistics: a detailed plan is needed first in order to figure out how it will operate, roles, responsibilities and needs</p> <p>RFP/Procurement process needed</p>
<b>Political Consensus</b>	An issue that requires state or local approval and/or political consensus
<b>Board Consensus</b>	Service extends beyond PVTA boundaries
<b>Coordination with other Agencies</b>	<p>Agencies include:</p> <ul style="list-style-type: none"> <li>• Other RTAs</li> <li>• Funding partners</li> <li>• Human service agencies</li> <li>• Others</li> </ul>

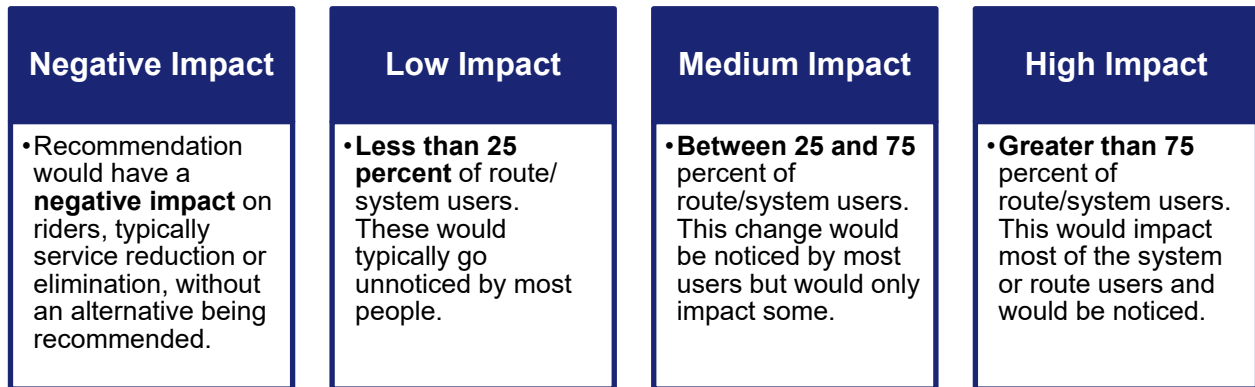
**Figure 90. Recommendation Complexity Thresholds**



**Category 2:** The impact is relative to the recommendation level (route/community specific or systemwide) and factors include both rider impact (Figure 91) and operational impact (Figure 92).

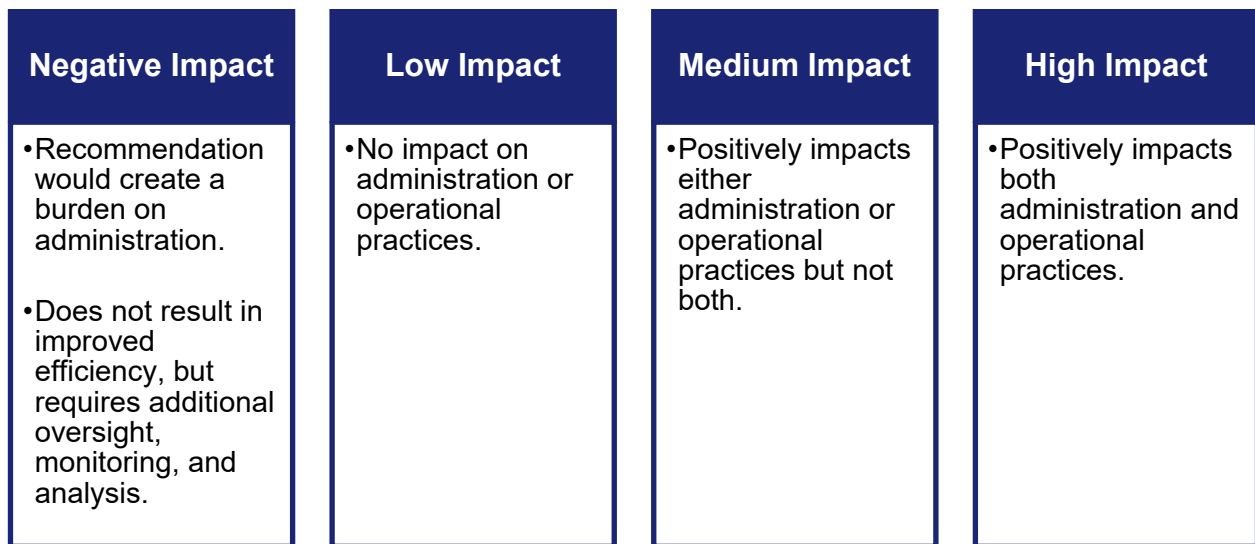
Thresholds for rider benefits fall into four categories: negative impact, low impact, medium impact, and high impact.

**Figure 91. Recommendation Impact Thresholds: Rider Impact**



Thresholds for operational impacts are highlighted in Figure 92. These are typically operational or administration policies and procedures. Route changes that would impact operations and create a less stressful environment such as improving OTP so drivers have layover time are included but those that are purely alignment, frequency, or span changes with no benefit to operations are not. There are four thresholds: negative impact, low impact, medium impact, and high impact.

**Figure 92. Recommendation Impact Thresholds: Operational Benefit**



### 8.3.2 Recommendation Summary

A total of 177 recommendations were identified (Figure 93). The majority (62 percent) of the recommendations are route specific. A complete list of priorities for recommendations is provided in Appendix E.

**Figure 93. Recommendations Summary**



**8.3.2.1 Existing Fixed Route**

Existing fixed route recommendations are outlined in Table 55 by route and proposed scenario, the priority for which is in parenthesis after the recommendation. Overall core needs are recommendations that should be established immediately and are not based on ridership levels due to the pandemic, whereas ridership-based changes depend on how ridership responds with the pandemic. In general, improvements that would make a route more efficient are core needs, adjusting weekend service varies based on FY 2019 ridership and load levels, frequency changes are based on ridership, span increases are in the medium and low ridership scenarios, and frequency changes are in the high or medium ridership scenarios.

**Table 55. Fixed Route Recommendations**

Route	Core Need	Low-Ridership Recovered	Recommendation	
			Medium-Ridership Recovered	High-Ridership Recovered
G1	Extend route to the Chicopee Plaza on all trips (3)	Add one additional weekday evening trip (2)	Improve Saturday headway to 20 minutes (1)	Improve weekday headway to 15 minutes (3)
		Add one additional Sunday evening trip (2)	Improve Sunday headway to 20 minutes (2)	Reduce weekday evening frequency (3)
G2	Eliminate Dwight Road variant and service to industrial park (3)  Establish microtransit (3)	N/A	Improve Saturday headway to 20 minutes (1)	Improve weekday headway to 20 minutes (3)
			Improve Sunday headway to 45 minutes (1)	Reduce weekday evening frequency (3)  Add one additional weekday evening trip (2)  Operate Sunday service 8:00 AM to 8:00 PM (2)
G3	Adjust alignment – create loop in Old Hill (3)	N/A	Reduce weekday morning frequency (3)	Create consistent 30 minute headways (3)  Extend service to 9:00 PM on Saturday (1)
G5	Eliminate Mass Mutual deviation (2)  Implement Sunday service (1)  Establish microtransit (2)	N/A	Add two additional Saturday evening trips (2)	N/A
B6	Add one additional Saturday evening trip (1)	Add one additional Sunday evening trip (1)	N/A	Change headway to 30 minutes on weekdays (3)
	Convert Health South to on-request only (2)	Add One additional Sunday morning trip at 8:30 AM (1)		Reduce weekday evening frequency (3)

Route	Core Need	Recommendation		
		Low-Ridership Recovered	Medium-Ridership Recovered	High-Ridership Recovered
B7	N/A	Add an 8:00 AM Sunday trip (2) Add two additional Sunday evening trips (2)	N/A	Implement BRT light along the State Street Corridor (3) Reduce weekday and Saturday evening frequency (3) Reduce Saturday morning frequency before 8:00 AM (3)
R10	Eliminate Hospital and East Mt. View Apartments deviation (3) Eliminate Union Street (3) Service Walmart on all trips (2) Create consistent 30 minute headways (3) Reduce weekday evening frequency (3) Establish microtransit (3)	Add one additional Sunday morning trip (2)	N/A	N/A
10s/OWL	N/A	N/A	Combine into one route (2)	N/A
P11	N/A	N/A	N/A	Add additional morning trip (2)
B12	Eliminate route and serve via on-demand (4)	N/A	N/A	N/A

Route	Core Need	Recommendation		
		Low-Ridership Recovered	Medium-Ridership Recovered	High-Ridership Recovered
R14	Eliminate Industrial Park and North Street service (3)  Service Big Y and Pheasant Hill on all trips (3)  Establish microtransit (3)	N/A	N/A	N/A
B17	Implement Sunday service (2)	N/A	Improve weekday mid-day headway to 30 minutes (3)	N/A
P20	N/A	Add one additional Sunday morning trip (2)  Add two additional Saturday evening trips (2)	Improve weekday headway to 15 minutes (3)  Reduce weekday evening frequency (3)	Add one additional Saturday evening trip (2)
P20E	N/A	N/A	N/A	Add one additional Saturday morning trip (2)  Add one additional Saturday evening trip (2)
P21	N/A	Add one additional Sunday morning trip (2)  Add two additional Sunday evening trips (2)	Improve weekday headway to 20 minutes (3)  Reduce weekday evening frequency (3)	Add one additional Saturday morning trip (2)  Add one additional Saturday evening trip (2)
B23	Implement Saturday service (1)  Remove Soldiers Home deviation (4)  Extend to Silver Street Big Y (2)	N/A	N/A	N/A
R24	Implement Saturday service (1)	N/A	N/A	N/A



Route	Core Need	Low-Ridership Recovered	Recommendation	
			Medium-Ridership Recovered	High-Ridership Recovered
R29	N/A	N/A	Add mid-day weekend trip (1)	N/A
X90	Extend route to HTC on Sunday (1)  Add two additional Sunday evening trips (1)  Eliminate Montcalm and South Hadley Falls – serve via microtransit program (4)	N/A	N/A	N/A
X92	Implement Sunday service (1)	N/A	N/A	Improve weekday headway to 30 minutes during the peak (3)
LOOP	End weekday service earlier (3)  Shorten Sunday service hours (3)  Eliminate if there is no funding partnership (3)	N/A	N/A	N/A
W	Add weekend service (1)	N/A	N/A	N/A
R41	Add Sunday service (1)	Add one additional Saturday evening trip (3)	N/A	Add one additional weekday evening trip (1)
R42	Add Sunday service (1)  Eliminate Nash Hill (2)	N/A	N/A	N/A

Route	Core Need	Recommendation		
		Low-Ridership Recovered	Medium-Ridership Recovered	High-Ridership Recovered
B43	N/A	N/A	N/A	Eliminate last trip on Fridays (2) Convert B43 Express trips to non-express (2) Reestablish Route M40 (2)
R44	Expand Sunday service hours (2) Convert High Street to on-request only (2)	Operate Saturday service routing on weekdays (1) Serve Rocky Hill Co-housing on-request with Route NE (1)	N/A	N/A
B48	N/A	Add a weekday 6:00 AM trip (3) Add a Saturday 8:00 AM trip (3)	N/A	Create express variant that uses I-91 (2) Extend service to 9:00 PM on weekdays (1) Create 30 minute weekday headways all day until 6:00 PM (2) Improve Saturday headway (1)
30	Begin Sunday service earlier (2)	N/A	Improve weekday early evening headway to 15 minutes (4)	Improve weekday headway to 12 minutes (3) Start weekday service earlier (3) Increase Thursday and Friday evening headway to 20 minutes (2)

Route	Core Need	Low-Ridership Recovered	Recommendation	
			Medium-Ridership Recovered	High-Ridership Recovered
31	Begin Sunday service earlier (3)	N/A	N/A	Improve weekday headway to 12 minutes (3) Start weekday service earlier (3) Increase Thursday and Friday evening headway to 20 minutes (3) Research how to connect South Amherst to Hadley Malls (5)
33	N/A	N/A	Eliminate Cushman Center deviations (3) Improve weekday headway to 30 minutes (2)	On Saturdays extend to the mall and create 45 minute headways (2)
34	N/A	N/A	N/A	Extend service to 10:00 PM (4) Add weekday trippers for overloads (3) Establish Saturday service (2)
35	N/A	N/A	N/A	Improve weekday headway to 12 minutes (3)

Route	Core Need	Low-Ridership Recovered	Recommendation	
			Medium-Ridership Recovered	High-Ridership Recovered
38	End service earlier Monday to Thursday (3) Change weekday headway to 90 minutes (3) Eliminate last Sunday trip (3) Continually monitor Saturday evening ridership (3)	N/A	N/A	N/A
39	Change weekday headway to 60 minutes (3) End weekday service at 9:00 PM (3) Eliminate Hampshire Mall service (3) End Saturday service at 8:00 PM (3)	N/A	N/A	N/A
45	N/A	N/A	N/A	Add a morning trip (3)
46	N/A	N/A	N/A	Add one AM and one PM trip (4)
NE	Conduct ridership study (1)	N/A	N/A	N/A
WP	Provide weekend service (3)	N/A	Add more trips to Springfield (1) Coordinate with Quaboag Connector on microtransit (3) Work with Quaboag Connector to reestablish as two routes (1)	N/A

### 8.3.2.2 Demand Response Recommendations

The four demand response recommendations are outlined in Table 56 and all are identified as core needs. The recommendations are to update the Adept scheduling software to allow passengers to book trips online or through their smart phones and to increase coordination with other transit operators to create connections to neighboring areas.

**Table 56. Demand Response Recommendations**

Priority	Recommendation	Scenario
2	Work with Quaboag Connector to better promote services on the PVTA website and include information on the Route WP schedule	Core Need
3	Allow for demand response trips to and from the senior center as long as the other end is within a PVTA member community. This location can also be used to transfer passengers wishing to access other FRTA communities via FRTA demand response.	Core Need
3	Add online trip scheduling for demand response.	Core Need
4	Work with FRTA to identify locations to transfer passengers.	Core Need

### 8.3.2.3 New Service Recommendations

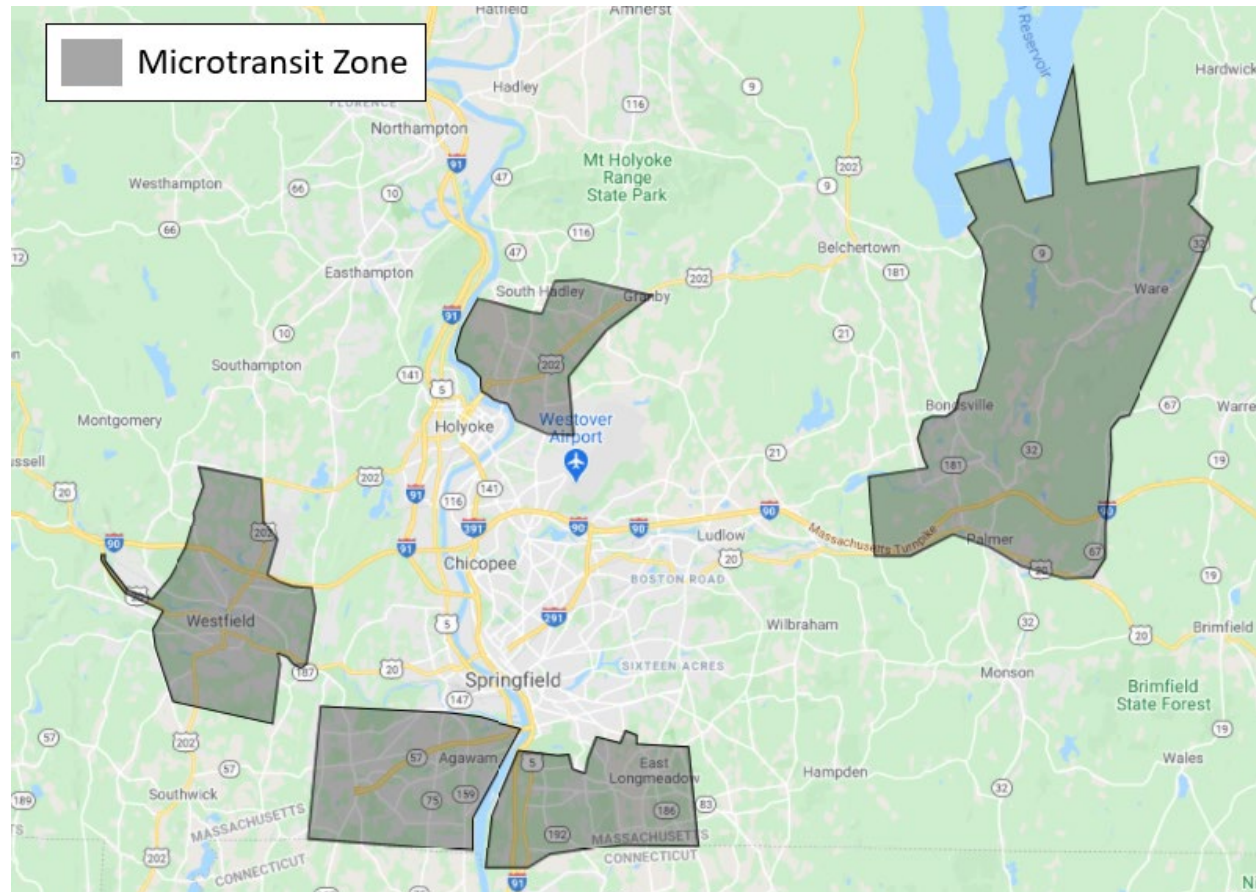
There are 12 recommendations for new service (Table 57), this includes establishing microtransit zones, creating express routes, developing a TNC/taxi, and servicing new areas. Microtransit zones in South Hadley, Agawam, Westfield, Palmer and Ware, and East Longmeadow/Longmeadow would replace underperforming fixed route segments with same day on-demand service (Figure 94). This is a core need but in the future, there may be a need for a similar type service in other communities. With a TNC/taxi partnership PVTA would subsidize a portion of the fare for trips that meet the required parameters. A taxi/TNC program would create first-mile/last-mile connections, provide service beyond the current operating hours/days, and establish a same-day service option for demand response customers. However a sustainable funding source and framework would need to be identified for this as high utilization would mean higher costs for PVTA.

**Table 57. New Service Recommendations**

Priority	Recommendation	Scenario
1	Create an express route from Northampton to Union Station via I-91.	High Ridership
3	Create an express route from Amherst to Union Station via Route 116 and HTC with 2-hour headways that depart Amherst at half past on the even hours to create 1 hour headways between Amherst and HTC between the new route and Route 29. Depart HTC on the hour, staggering service to Union Station with Route P21E.	High Ridership
3	Establish a microtransit zone that extends from South Hadley falls to Granby that connects to the South Hadley Big Y.	Core Need
3	Establish a microtransit zone in Agawam.	Core Need

Priority	Recommendation	Scenario
3	Establish a microtransit zone in Westfield.	Core Need
3	Establish a microtransit zone in Palmer and Ware in conjunction with the Quaboag Connector.	Medium Ridership
3	Establish a microtransit zone in East Longmeadow/Longmeadow.	Core Need
3	Develop a TNC/taxi feeder program for first-mile/last-mile service to connect people to bus stops, to provide same day service for demand response, provide options for service outside of PVRTA's hours and days.	High Ridership
4	When Six Flags is open, operate a route that is direct from Union Station to Six Flags. Five trips daily, 7 days a week.	High Ridership
4	Create an express route from Union Station to the Enfield Park and Ride Route, which will create connections to CTtransit and the local Enfield Magic Carpet Route. Trips should align to make connection with CTtransit. Four trips daily.	Core Need
5	Establish a volunteer driver program in conjunction with FRTA to serve Hampshire and Hampden Counties.	High Ridership

**Figure 94. Proposed Microtransit Zones**



New Express routes are needed to connect Amherst to Springfield and Northampton to Springfield. The proposed express route connecting Northampton to Union Station could proceed to Enfield on a select number of trips. The route would not serve Holyoke as the proposed express variant of Route B48 would provide this service. The Express route from Amherst to Springfield would travel via Rt 116 but unlike Route R29 would stop only at a limited number of locations and would serve Union Station not the Holyoke Mall. Between Holyoke and Union Station it would follow the P21E routing, but the timing would be as such that it does not overlap. Figure 95 shows a map of the proposed express routes including Route M40.

Two new routes are proposed (Figure 96). The first route would service Six Flags when it is open. The hours would be geared toward workers, with two morning trips, one mid-day trip, and two evening trips. The second new route would provide service from Union Station to the Enfield Mall park and ride lot. The route would be timed to create connections with the Enfield Magic Carpet Blue Route, which circulates around town. This location is also served by CTtransit express buses to Hartford. Several different options were examined as ways to connect PVTA to CTtransit, including Union Station to Hartford, Union Station to Bradley Airport, Union Station to Hartford, and Northampton to Enfield. It was found that the Union Station to Enfield was the most logical option (Table 58)

**Figure 95. New Express Routes**

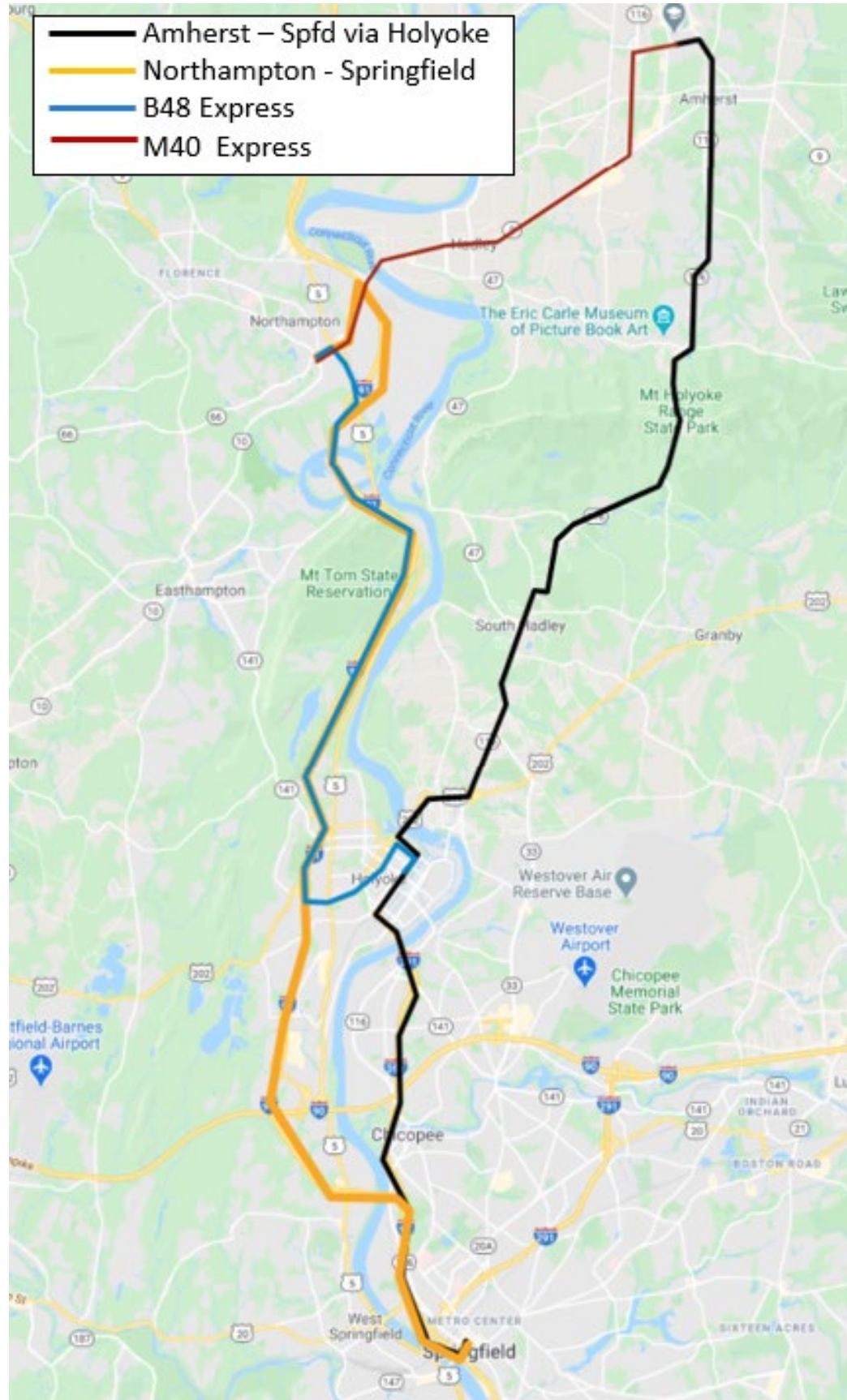
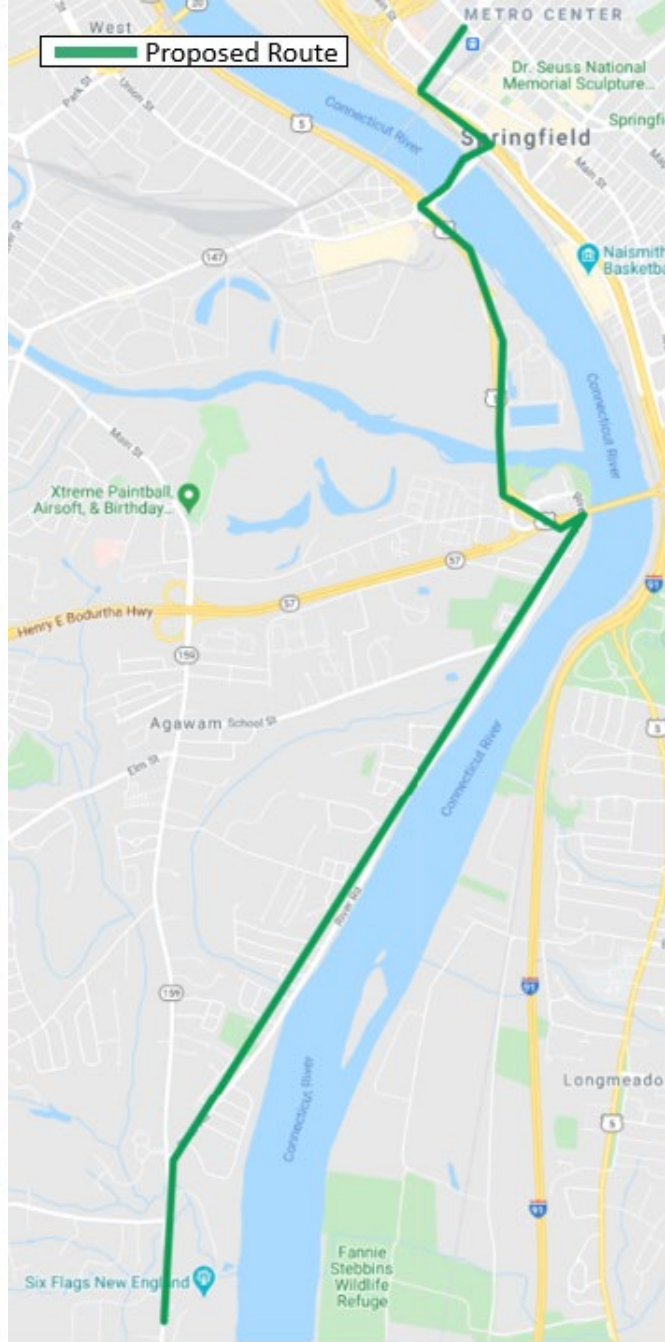
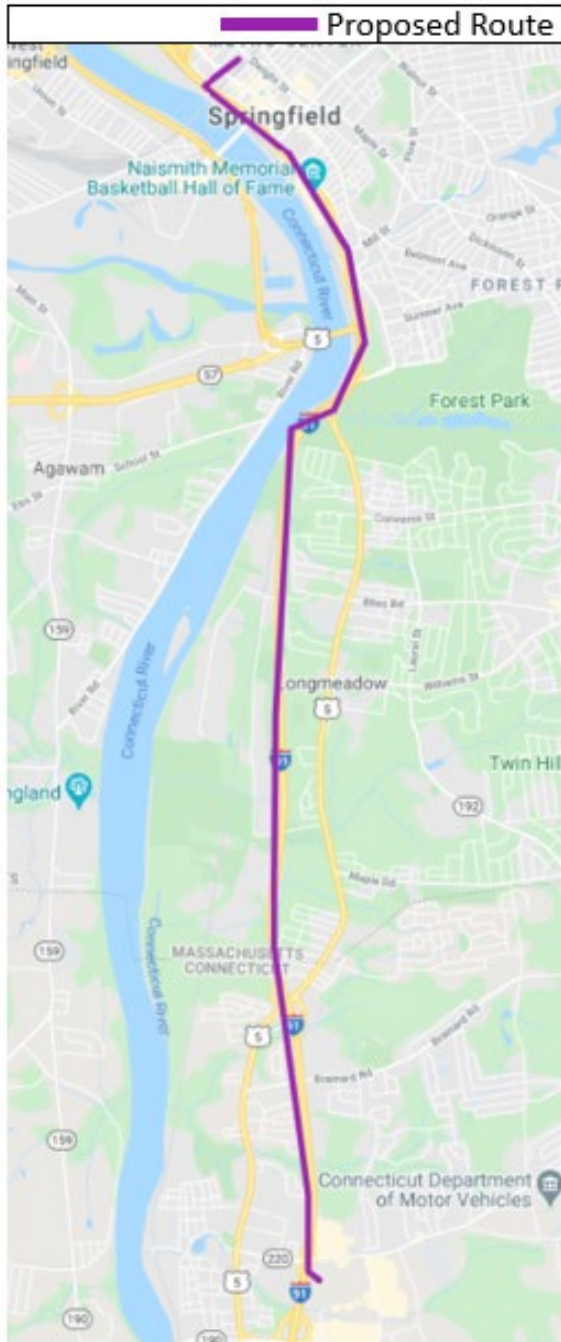




Figure 96. Left: Proposed Route to Enfield; Right: Proposed Six Flags Route



**Table 58. Options to Serve Connecticut**

Service Option	Findings
Union Station – Hartford	Service is currently provided via CTRail and Peter Pan. CTRail operates seven trips (\$6.00 per trip) and Peter Pan four daily (\$9 to \$10.5 per trip). If PVTA were to operate a similar route 75% of the miles would be outside of PVTA member communities and no local assessment would be recouped.
Union Station – Bradley Airport	Currently individuals must travel to Hartford and then take the Bradley Flyer (\$1.75 way fare). If PVTA were to operate a similar route 65% of the miles would be outside of PVTA member communities and no local assessment would be recouped. The train station in Windsor Locks Connecticut is being relocated to the downtown and the state is exploring ways to provide connecting service between the station and airport.
Union Station – Enfield	Service to Enfield should focus on the Enfield Mall park and ride and creating connections to local routes. While CTtransit does serve the location via an express route it is unlikely that individuals would take a PVTA route to connect to the CTtransit express route if they were heading to Hartford as the CTtransit fare plus PVTA fare is only \$0.40 less than taking rail.
Northampton – Enfield	There was no specific need identified to connect Northampton to Connecticut but the Northampton to Union Station Express route could continue on to Enfield on select trips providing the connection. This may also allow for operational efficiencies.

**8.3.2.4 Bus Stop Recommendations**

Ten bus stop recommendations are proposed (Table 59). Installing solar powered lights at stops that lack lighting and have sufficient sun would improve visibility and safety. To improve amenities at bus stops PVTA should develop bus stop guidelines, which will help identify priority stops for benches and shelters that can be used to create a capital investment plan. The guidelines can also be used to work with landowners, municipalities, and MassDOT on needs for bus stops. For example, these could be used to work with the town of Amherst to extend the length of the Cowles Lane<sup>50</sup> bus stop or Northampton at the Academy of Music<sup>51</sup> to accommodate longer and additional vehicles. Additionally there are stops with pullouts such as at the Townhouses in Amherst, which were designed to accommodate 40-foot buses but are now served with 60-foot buses, resulting in the bus blocking traffic to serve the stop.<sup>52</sup>

**Table 59. Bus Stop Recommendations**

Priority	Recommendation	Scenario
1	Create exterior announcements drivers can play reminding people to cross behind the bus.	Core Need

<sup>50</sup> This stop is approximately 52 feet in length and served frequently by 60 feet articulated buses. During the peak hour 18 buses serve this location, routes are timed to minimize multiple routes at this location at once but is not always feasible given traffic. Design guidelines vary but recommend at least 70 feet (30 foot taper, 40 foot loading zone) for far side bus stops and 90 feet if served via 60-foot buses. An additional 50 feet is needed for each additional bus.

<sup>51</sup> This stop is approximately 150 feet in length enough for three buses. There can be up to six routes here at once.

<sup>52</sup> Design guidelines vary but many recommend a minimum bus pullout length of 120 feet (including a 30 foot taper on either end) for use by 40-foot buses or 140 feet for use by 60-foot buses. And additional 50 feet of length is needed for each additional 40-foot bus.

Priority	Recommendation	Scenario
2	Remove parking at Cowles Lane and Academy of Music to increase the number of buses.	Core Need
2	Create a list of priority stops to add shelters and work with landowners to install shelters.	Core Need
2	Establish a policy for bench placement at stops.	Core Need
2	Create an adopt a stop program where individuals and organizations can adopt a stop to empty trash bins on a weekly basis and remove snow in the winter. Offer a set amount of free one trip tickets in exchange.	Core Need
3	Provide solar powered lights at stops with poor lighting; in particular, Aspen Chase inbound and North Amherst Center Inbound.	Core Need
3	Crossing guard at Integrated Learning Center (ILC) Crossing like at Southwest.	High Ridership
4	Work with the municipalities that have not undergone a bus stop consolidation study to conduct one where stop spacing is closer than recommended in PVTA guidelines.	Core Need
4	Identify stops where length should be increased and work with municipalities to expand.	Core Need
4	Prioritize list of capital improvements based on bus stop guidelines developed.	Core Need

### 8.3.2.5 Fleet Recommendations

Fleet recommendations are to procure more articulated buses, require that windows open in future procurements, conduct facility audits for electric bus capacity, replace vehicles at their ULB, and place educational stickers on the rear of buses (Table 60).

**Table 60. Fleet Recommendations**

Priority	Recommendation	Scenario
1	Procure buses in the future that allow windows to open.	Core Need
2	Replace vehicles at their ULB.	Core Need
2	Place stickers/signs on the back of the bus that state buses do not turn on red and stop frequently.	Core Need
4	Conduct a facility audit at the VATCo and UMTS garages to better understand the upgrades needed to accommodate electrical vehicles. Analyze the schedules in Hastus to determine which vehicle schedules are candidates to deploy electric vehicles.	Core Need
4	Procure articulated buses.	High Ridership

### 8.3.2.6 Infrastructure Recommendations

Infrastructure recommendations include roadway improvements and facilities (Table 61). Roadway improvements such as improving curb radii and traffic signals with protected left turns would make taking turns easier for operators. BRT treatments such as branded stops, TSP, queue jumps, and dedicated busways on select corridors would speed up travel time. As campus enrollment increases, there may be a need for additional parking and potentially park and ride locations served by transit. A facility study is the first step needed to better understand what is needed and how to do it in order to safely maintain articulated buses at the UMass facility.

**Table 61. Infrastructure Recommendations**

Priority	Recommendation	Scenario
2	Work with Amherst to determine signal warrants for protected left turns: North Pleasant Street to Main Street, Southeast Street to Main Street, Russell Street to University Drive, Elm Street/ West Street.	Core Need
2	Work with municipalities to improve curb radii: Meadow Street - North Pleasant Street; Main Street to South East Street; Route 116 to Meadow Street, right into Big Y Plaza Route 33; Smith College turn around; right onto Amity Street.	Core Need
3	Serve new bus pullouts with the re-established M40 express route along Route 9. Install TSP technology on Route B43 and M40 vehicles.	High Ridership
3	Eliminate regular car traffic on North Pleasant Street on campus and create a bus only roadway. Allow buses, emergency and university plated vehicles only on weekdays during the day.	Core Need
3	Conduct a feasibility study to determine the cost for upgrading maintenance facility at UMass and VATCo.	Core Need
3	Work with the city of Springfield to implement BRT measures along State Street as proposed in the BRT State Street study. This should include queue jumps, TSP, and branding.	Core Need
5	Work with municipalities and MassDOT and UMass to identify future locations of park and rides and incorporate bus service. Increase bus service to the Whately park and ride.	High Ridership

### 8.3.2.7 Fare Recommendations

There are three recommendations for fares (Table 62). Northern tier residents must travel to Holyoke or Springfield in order to obtain a reduced fare card. PVTA should partner with a location in the north that allows individuals to apply for the card. A new fare system is needed, as the current GFI system is outdated and smart card system is inoperable. PVTA has deployed mobile payments through the Bus Plus App for fixed route and should extend the fare options to include demand response.

**Table 62. Fare Recommendations**

Priority	Recommendation	Scenario
1	Expand the mobile fare payment to include demand response.	Low Ridership
3	Establish a regular schedule where a customer service representative is available at a central location such as senior center or town hall to process applications and take pictures for reduced fare IDs. The IDs can then be mailed to the individual once printed.	Core Need
3	The RTAs should do a joint procurement for a new fare system that includes a mobile payment option, with items such as fare capping and multiple outlets to procure smart cards.	Core Need

### 8.3.2.8 Policy Recommendations

Four policies are recommended (Table 63). The service classification minimum span guidelines should be updated as outlined in chapter 6.2.3.1 to reflect the new route tier classifications. PVTA has a few corridors that do not have designated stops but instead are flag stop, which could be indicated on the maps to let passengers know. As micro-mobility increases there has been an increase in the use of two-wheeled electric scooters, particularly in high tourist areas and on university campuses. PVTA does not currently have a policy on accommodating these vehicles but should establish one.

**Table 63. Policy Recommendations**

Priority	Recommendation	Scenario
2	Adjust minimum span of service guidelines to match new route classification structure.	Core Need
2	Indicate flag stop corridors on route maps.	Core Need
2	Establish a two-wheeled electric scooter policy.	Core Need
2	Use enhanced performance management system to support an enterprise-wide data-driven and performance-focused management and decision-making framework.	Core Need

### 8.3.2.9 Operational Recommendations

Operational recommendations focus on adjusting route timing to improve OTP and reduce bus bunching, procedures to collect operator feedback, and vehicle cleanliness (Table 64).

**Table 64. Operational Recommendations**

<b>Priority</b>	<b>Recommendation</b>	<b>Scenario</b>
1	Examine timing and OTP on Route 35 from Fine Arts Center (FAC) to the stadium, Route 33 Library to Big Y, Route 30 Colonial Village to Old Belchertown Road, Route 30 Studio Arts Building to Puffton, and Route 45 evening to Rolling Green.	Core Need
1	Continually monitor OTP.	Core Need
1	Increase cleaning (interior and exterior) of the buses daily and provide automatic announcements reminding passengers to remove their belongings.	Core Need
1	Adjust route departure/arrival times to Union Station that serve State Street in order to spread out service and reduce bus bunching.	Core Need
2	Establish a locked driver's comment box in the driver breakroom. Create an online form that individuals can anonymously (or by name) report issues.	Core Need
2	Adjust timing on Route G1 outbound from Union Station; Union Station to Mason Square; HTC to Union Station on Route P21E; Union Station to Route X; Saturday Route P20 Kmart to Riverdale Shops.	Core Need
3	Hire additional road supervisors.	Core Need
4	Upgrade the radio/communication equipment to shorten the time it takes to conduct transfers. All requests should still go through dispatch.	Core Need
4	Improve travel time and OTP in Amherst Center by installing TSP.	High Ridership

### 8.3.2.10 Technology Recommendations

Six of the seven technology recommendations are core needs (Table 65). Implementing or upgrading these technologies would improve data collection and customer service, allowing PVTA to make even more informed decisions. New technologies procured could be done jointly with other RTAs.

**Table 65. Technology Recommendations**

<b>Priority</b>	<b>Recommendation</b>	<b>Scenario</b>
1	Continue working with Union Station to diagnose and fix problems as they arise. Each hour a customer service representative can walk around the bus bays to identify any screens that are out. At HTC develop a way to quickly identify screens with errors using internal controls.	Core Need
1	Upgrade Adept software and add the Passenger app that allows them to request, manage, and track trips.	Core Need

Priority	Recommendation	Scenario
2	Procure AVL technology for the community shuttles (Route NE and WP). Turn on and test the APC technology.	Core Need
2	Roll out and test the new maintenance software.	Core Need
2	Provide alert feature in a centralized location where supervisors can post ongoing and in the moment service updates that posts to the PVRTA Twitter account, Facebook account, Banner of PVRTA webpage, and Transit App.	Core Need
4	Work with municipalities to correct any issues with existing TSP systems. As new roadway projects are developed work with the state DOT and local municipality to determine whether TSP can be deployed.	High Ridership
5	Procure technology. Consider a joint procurement with MART, FRTA, VTA, CCRTA, and MVRTA who are also looking to add this technology to their fixed route and demand response fleets.	Core Need

### 8.3.2.11 Other Recommendations

Six other recommendations do not fall into one of the aforementioned categories (Table 66). Four of these focus on schedules, educational material, and marketing. The fifth is a way to garner feedback from the public outside of complaints. The last recommendation is to work with FRTA when making changes to routes that connect to their routes in order to facilitate transfers.

**Table 66. Other Recommendations**

Priority	Recommendation	Scenario
1	Create a how to ride guide or promotional video that teaches people how to use the service. These videos could play at transit stations and on-board the buses. MVRTA has a series of well-produced how to ride videos on how to pay your fare, etiquette, reading schedules, and using their apps. Videos are in four languages.	Core Need
1	Update the contact form introduction with language that lets people know you are looking for any and all feedback. Update where they select why they are contacting PVRTA to encourage them to select. Monitor social media for PVRTA related hashtags and provide responses where warranted.	Core Need
1	Print a limited number of schedules and redesign them to use minimal space.	Core Need
2	On schedules, indicate the days that service will end early and the approximate time.	Core Need
2	Have drivers go through annual passenger relations refresher trainings. Create education videos on PVRTA etiquette and code of conduct that can play on-board the buses. Work with operators so that they report incidents and PVRTA can investigate and properly handle problem passengers	Core Need

Priority	Recommendation	Scenario
4	Increase service on Route 46 with timed connections. Work with FRTA when updating connecting schedules to facilitate transfers. Include FRTA schedule information on the Academy of Music schedule screen.	Low Ridership

### 8.3.3 Recommendation Ranking

Each recommendation was assigned a priority (1 through 5) based on the complexity to implement and its projected impact (Figure 97) and based upon the three ridership scenarios. Priority 1 actions are recommendations that have a low complexity to implement (one barrier to implementing the recommendation) but would have a high impact (greater than 75 percent of route/system users are impacted and/or positively impacts both administration and operational practices). Priority 5 should be implemented last as these are the most complex (more than three barriers to implementing the recommendation) and have the lowest impact (less than 25 percent of route/ system users are impacted and no impact on administration or operational practices). Priority 3 has the greatest number of recommendations; these have a mid-level complexity and impact (between 25 and 50 percent of route/system users are impacted and positively impacts either administration or operational practices but not both).<sup>53</sup>

**Figure 97. Recommendation Priorities**



Coordination will be needed with various parties as outlined in Table 67 in order to implement recommendations. Several recommendations require consultation with funding before changes can be made. Changes that will provide connections outside of the PVRTA service area will require coordination with the transit provider in that area. Many of the infrastructure recommendations will require coordinating with municipalities, MassDOT, UMass, or some combination thereof. Lastly any joint procurements will require RTA coordination. Overall, the recommendations would require coordination with at least 10 agencies or municipalities.

**Table 67. Coordination with Others**

Recommendation	Additional Information
Coordinate with UMass to determine what departments are moving to Venture Way and if there would be a demand for people to travel between here and campus	Coordination with UMass needed
Implement changes to Route 10s/OWL.	Coordination with WSU needed
Implement changes to Route P11.	Coordination with HCC needed

<sup>53</sup> Priority level of each recommendation can be found in Appendix E.



<b>Recommendation</b>	<b>Additional Information</b>
Implement changes to the LOOP.	Coordination with MGM needed
Implement changes to Route B12.	Coordination with Hampden County Sherriff Office needed
Implement changes to Route 38 or Route 39.	Coordination with Five Colleges
Implement microtransit in Palmer and Ware, split the PW route into two routes.	Coordination with the Quaboag Connector
Remove deviation to Soldiers Home on Route B23 and serve via Route R24 as a scheduled stop and not via request.	Coordination with the Soldiers Home
Work with Quaboag Connector to better promote services on the PVTA website and include information on the Route WP schedule.	Coordination with the Quaboag Connector
Coordinate with UMass to determine what departments are moving and whether there would be a demand for people to travel between Venture Way and campus.	Coordination with UMass needed
Remove parking at Cowles Lane and the Academy of Music to increase the number of buses.	Coordination with Amherst and Northampton needed
Install crossing guard at ILC Crossing like at Southwest.	Coordination with UMass needed
Work with the municipalities that have not undergone a bus stop consolidation study to conduct one where stop spacing is closer then recommended in PVTA guidelines.	Municipal coordination needed
Identify stops where length should be increased and work with municipalities to expand.	Municipal coordination needed
Create an adopt a stop program where individuals and organizations can adopt a stop to empty trash bins on a weekly basis and remove snow in the winter. Offer a set amount of free one trip tickets in exchange.	Coordination with adopt a stop organizations
Establish a regular schedule where a customer service representative is available at a central location such as senior center or town hall to process applications and take pictures. The IDs can then be mailed to the individual once printed.	Coordination with facility to occur
Serve new bus pullouts with the re-established M40 express route. Install TSP technology on the Route B43 and M40 vehicles.	Coordination with MassDOT needed
Work with Amherst to determine signal warrants for protected left turns: North Pleasant Street to Main Street, Southeast Street to Main Street, Russell Street to University Drive, Elm Street/ West Street	Coordination with Amherst needed

<b>Recommendation</b>	<b>Additional Information</b>
Work with municipalities to improve curb radii: Meadow Street - North Pleasant Street; Main Street to South East Street; Route 116 to Meadow Street, right into Big Y Plaza Route 33; Smith College turn around; right onto Amity Street.	Coordination with Amherst and Northampton needed
Eliminate regular car traffic on North Pleasant Street on campus and create a bus only roadway. Allow buses, emergency and university plated vehicles only on weekdays during the day.	Coordination with Amherst and UMass needed
Conduct a feasibility study to determine the cost for upgrading maintenance.	Coordination with UMass needed
Work with municipalities and MassDOT to identify future locations and incorporate bus service. Increase bus service to the Whately park and ride.	Coordination with Municipalities and MassDOT needed
Work with UMass to reduce the number of crosswalks and to funnel pedestrians.	Coordination with UMass needed
Continue working with Union Station to diagnose and fix problems as they arise. Each hour a customer service representative can walk around the bus bays to identify any screens that are out. At HTC develop a way to quickly identify screens with errors using internal controls.	Coordination with Union Station needed
Work with the city of Springfield to implement BRT measures along State Street as proposed in the BRT State Street study. This should include queue jumps, TSP, and branding.	Coordination with Springfield needed
The RTAs should do a joint procurement for a new fare system that includes a mobile payment option, with items such as fare capping and multiple outlets to procure smart cards.	Coordination with other RTAs
Install TSP in Amherst and Northampton Center, in particular Cowles Lane.	Coordination with Amherst and Northampton needed
Work with FRTA when updating connecting schedules to facilitate transfers. Include FRTA schedule information on the Academy of Music schedule screen.	Coordination with FRTA
Work with FRTA to identify locations to transfer demand response passengers.	Coordination with FRTA
Work with municipalities to correct any issues with existing TSP systems. As new roadway projects are developed work with the state DOT and local municipality to determine whether TSP can be deployed.	Municipal coordination needed

Additional operators are needed to implement many of the recommendations (Table 68). An additional operator is needed if the service change would add 10 or more hours of weekly

service for routes operated by Hulmes or UMTS or 25 or more hours if operated by SATCo, VATCo, or NEXT.<sup>54</sup>

**Table 68. Hiring Additional Operators**

Recommendation	Additional Information*
<b>Route 30-Increased frequency mid-day weekdays during the semester:</b> Add service mid-day to create 12 minute headway from 8:00 AM to 5:00 PM.	UMTS – 45 hours per week
<b>Route 30-Increased frequency during the early evening:</b> Add service from 6:00 PM to 8:00 PM, improve headway to 15 minutes.	UMTS – 20 hours per week
<b>Route 31-Increased frequency mid-day weekdays during the semester:</b> Add service mid-day to create shorter 12 minute headways from 9:00 AM to 3:00 PM.	UMTS – 60 hours per week
<b>Route 31-Connect Route 31 with shopping centers on Route 9:</b> Conduct further research before implementing any service to determine potential ridership levels.	UMTS – 120 hours per week
<b>Route 34-Weekday evening service:</b> Extend service to 10:00 PM.	UMTS – 10 hours per week
<b>Route 34-Increased frequency weekdays:</b> Capacity issues appear to be at discrete times. Establish a tripper for this time.	UMTS – 10 hours per week
<b>Route 34-Saturday service:</b> Provide service from 12:00 PM to 10:00 PM.	UMTS – 10 hours per week
<b>Route 35-Increased frequency weekdays:</b> Improve headway to 12 minutes on weekdays from 9:00 AM to 6:00 PM.	UMTS – 45 hours per week
<b>Route 45-Increased peak hour service:</b> Add a trip during the morning peak that arrives on campus in time for the 10:00 and 10:10 AM class schedule block.	UMTS – 10 hours per week
<b>Route 46-Additional trips:</b> Add back the morning and evening trips eliminated as part of the FY 2019 service reductions.	UMTS – 20 hours per week
<b>WP Weekend Service:</b> Establish a microtransit that operates on weekends from 8:00 AM to 5:00 PM. Include access to the Eastfield Mall for transfer opportunities to Springfield.	TBD – 18 hours per week
<b>M40:</b> Convert Route B43 express trips back to non-express trips and reestablish Route M40 with morning trips heading toward UMass and afternoon toward Northampton. Vehicle schedules can be interwoven with Route B43 to reduce deadhead and increase efficiency.	VATCo – 50 hours per week
<b>G1:</b> Improve weekday frequency to 15 minutes from 8:00 AM to 4:00 PM, from 6:00 PM to 8:30 PM, reduce to 30-40 minutes and after 8:30 PM reduce to 60 minutes.	SATCo – 85 hours per week
<b>G1:</b> Extend route to the Chicopee Plaza on all trips.	

<sup>54</sup> Hulmes and UMTS use part-time operators; SATCo, VATCo, and NEXT use full-time operators.

Recommendation	Additional Information*
<b>G1:</b> Between 8:00 AM and 5:00 PM Sunday, improve headway to 20 minutes.	SATCo – 36 hours per week
<b>G2:</b> Improve frequency to 20 minutes from 7:00 AM to 6:00 PM, from 6:00 PM to 8:00 PM reduce to 30 minutes, and after 8:00 PM 60 minutes.	SATCo – 130 hours per week
<b>R10:</b> Create consistent 30 minute headways on this route on weekdays from 5:30 AM to 6:00 PM, then decrease to 60 minutes. Serve the Westfield shops in both directions on each trip.	SATCo – 105 hours per week
<b>B17:</b> Improve mid-day weekday frequency from 9:00 AM to 5:00 PM to 30 minutes.	SATCo – 40 hours per week
<b>P20:</b> Improve weekday frequency from 9:00 AM to 5:00 PM to 15 minutes and then decrease to 30 minutes from 5:00 PM to 8:00 PM and hourly after 8:00 PM.	SATCo – 85 hours per week
<b>P21:</b> Improve weekday frequency from 9:00 AM to 4:00 PM to 20 minutes and then decrease to 30 minutes from 4:00 PM to 7:00 PM and hourly after 7:00 PM. Add additional evening trip to end service at 10:30 PM.	SATCo – 78 hours per week
<b>X92:</b> Implement 20 minute service during the peaks (7:00 AM to 9:00 AM and 3:00 PM to 5:00 PM) on weekdays.	SATCo – 60hours per week
Establish a microtransit zone between Westfield neighborhoods and industrial area.	TBD – 81 hours per week
Establish a microtransit zone in Palmer and Ware in conjunction with the Quaboag Connector.	TBD – 106 hours per week
Establish a microtransit zone in Agawam.	TBD – 65 hours per week
Establish a microtransit zone that extends from South Hadley Falls to Granby that connects to the South Hadley Big Y.	TBD – 82 hours per week
Create an East Longmeadow/Longmeadow microtransit zone.	TBD – 55 hours per week
Create an express route from Amherst to Union Station via Route 116 and HTC. Two hour headways that depart Amherst at half past on the even hours to create 1 hour headways between Amherst and HTC between the new route and Route 29. Depart NTC on the hour staggering service to Union Station with Route P21E.	TBD – 60 hours per week
Create an express route from Northampton to Union Station via I-91.	TBD – 60 hours per week
When Six Flags is open, operate a route that is direct from Union Station to Six Flags. Five trips daily, 7 days a week.	TBD – 50 hours per week
Create an express route from Union Station to the Enfield Park and Ride Route, which will create connections to CTtransit and the local Enfield Magic Carpet Route. Trips should align to make connection with CTtransit. Four trips daily.	TBD – 40 hours per week

*\* Hours are approximate and would need to be precisely calculated by operators using scheduling software.*

Additional vehicles are needed to implement many of the recommendations (Table 69) as it would increase the number of vehicles operated in maximum service. By garage, UMTS would need 8 additional buses, VATCo would need 2, and SATCo would need 17. Additionally, six vans would be needed to operate the microtransit service and three buses for the new routes. Additional vehicles and revenue hours and miles operated would also require additional mechanics.

**Table 69. Expanding Fleet**

Recommendation	Additional Information
<b>Route 30:</b> Add weekday service mid-day to create 12 minute headway from 8:00 AM to 5:00 PM.	1 bus; UMTS
<b>Route 31:</b> Add weekday service mid-day to create shorter 12 minute headways from 9:00 AM to 3:00 PM.	2 buses; UMTS
<b>Route 31:</b> Further research would be needed to implement any service to determine potential ridership levels.	2 buses; UMTS
<b>Route 34:</b> Capacity issues appear to be at discrete times. Establish a tripper for the morning.	1 bus; UMTS
<b>Route 35:</b> Improve weekday headway to 12 minutes on weekdays from 9:00 AM to 6:00 PM.	1 bus; UMTS
<b>Route 46:</b> Add back the morning and evening trips eliminated as part of the FY 2019 service reductions.	1 bus; UMTS
<b>M40:</b> Convert Route B43 express trips back to non-express trips and reestablish Route M40 with morning trips heading toward UMass and afternoon toward Northampton. Vehicle schedules can be interwoven with Route B43 to reduce deadhead and increase efficiency.	2 buses; VATCo
<b>G1:</b> Improve weekday frequency to 15 minutes from 8:00 AM to 4:00 PM, from 6:00 PM to 8:30 PM reduce to 30 to 40 minutes, and after 8:30 PM reduce to 60 minutes.	3 buses; SATCo
<b>G1:</b> Extend route to the Chicopee Plaza on all trips.	
<b>G2:</b> Improve frequency to 20 minutes from 7:00 AM to 6:00 PM, from 6:00 PM to 8:00 PM reduce to 30 minutes, and after 8:00 PM 60 minutes.	3 buses; SATCo
<b>R10:</b> Create consistent 30 minute weekday headways on this route from 5:30 AM to 6:00 PM, then decrease to 60 minutes. Serve the Westfield shops in both directions on each trip.	2 buses; SATCo
<b>B17:</b> Improve mid-day weekday frequency from 9:00 AM to 5:00 PM to 30 minutes.	1 bus; SATCo
<b>P20:</b> Improve weekday frequency from 9:00 AM to 5:00 PM to 15 minutes and then decrease to 30 minutes from 5:00 PM to 8:00 PM and hourly after 8:00 PM.	3 buses; SATCo

<b>Recommendation</b>	<b>Additional Information</b>
<b>P21:</b> Improve weekday frequency from 9:00 AM to 4:00 PM to 20 minutes and then decrease to 30 minutes from 4:00 PM to 7:00 PM and hourly after 7:00 PM. Add additional evening trip to end service at 10:30 PM.	2 buses; SATCo
<b>X92:</b> Implement 30 minute service during the peaks (7:00 AM to 9:00 AM and 3:00 PM to 5:00 PM).	3 buses; SATCo
Establish a microtransit zone connecting Westfield neighborhoods and industrial area.	1 van
Establish a microtransit zone in Palmer and Ware in conjunction with the Quaboag Connector.	2 vans
Establish a microtransit zone in Agawam.	1 van
Establish a microtransit zone that extends from South Hadley Falls to Granby that connects to the South Hadley Big Y.	1 van
Create an East Longmeadow/Longmeadow microtransit zone.	1 van
When Six Flags is open, operate a route that is direct from Union Station to Six Flags. Five trips daily, 7 days a week.	1 bus
Create an express route from Northampton to Union Station via I-91.	1 bus
Create an express route from Union Station to the Enfield Park and Ride Route, which will create connections to CTtransit and the local Enfield Magic Carpet Route. Trips should align to make connection with CTtransit. Four trips daily.	1 bus

To implement recommendations PVTA would have to issue six RFP/RFQs to acquire a vendor, do construction, or conduct a study (Table 70). This does not include potential joint procurement opportunities with other RTAs for which PVTA may or may not be the lead.

**Table 70. RFP Procurement**

<b>Recommendation</b>
Install BRT light infrastructure on State Street.
Acquire additional vehicles to expand service.
Develop a TNC/taxi feeder program for first-mile/last-mile service to connect people to bus stops, to provide same day service for demand response, and to provide options for service outside of PVTA’s hours and days.
Procure articulated buses.
Hire consultant to conduct a facility audit at the VATCo and UMTS garages to better understand the upgrades needed to accommodate electrical vehicles. Perform an analysis on the schedules in Hastus to determine on which vehicle schedules to deploy electric vehicles.
Eliminate regular car traffic on North Pleasant Street on the UMass Campus and create a bus only roadway. Allow buses, emergency and university plated vehicles only on weekdays during the day.

Fourteen of the recommendations would have a negative impact on riders due to reductions in service hours or frequency without an alternate being provided (Table 71). The reduction in service is because the route or route segments carry very little riders and is inefficient to operate. Bus stop consolidation can have a negative impact on customers if a stop they use is eliminated and they must walk farther to access the route.

### Table 71. Negative Rider Impact

#### Recommendation

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**Route 38:** Monday through Thursday end service by 11:00 PM and reduce frequency after 8:00 PM to 90 minutes.

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**Route 38:** On Fridays, reduce frequency after 10:00 PM.

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**Route 38:** On Sundays, eliminate the last trip.

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**Route 39:** Reduce to 60 minute headways on weekdays.

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**Route 39:** End service earlier in the evening on weekdays with the last trip departing for Smith College around 9:00 PM.

---

**Route 39:** Eliminate trips to the Hampshire Mall.

---

**Route 39:** End Saturday service at 8:00 PM.

---

**Route G3:** Reduce frequency in the morning.

---

**Route B6:** Reduce frequency to 30 minutes with 45 minute frequency from 5:00 PM to 7:00 PM and hourly after 7:00 PM. This should allow for increased cycle time, which will help with OTP.

---

**Route B7:** Reduce to 30 minutes after 5:00 PM and 45 to 60 minutes after 7:00 PM.

---

**Route B7:** Before 8:00 AM reduce headway to 30 minutes. Reduce headway to 30 minutes starting at 6:00 PM.

---

**LOOP:** End weekday service at 8:30 PM.

---

**LOOP:** Operate service from 11:18 AM to 3:53 PM only on Sundays.

---

Work with the municipalities that have not undergone a bus stop consolidation study to conduct one where stop spacing is closer than recommended in PVTA guidelines.

Three recommendations have negative impacts on administration (Table 72). These require additional work but would not result in efficiency improvements. They are largely geared toward improving the experience for customers.

### Table 72. Negative Operational/Administration Impact

#### Recommendation

---

Establish a volunteer driver program in conjunction with FRTA to serve Hampshire and Hampden Counties.

---

Establish a regular schedule where a customer service representative is available at a central location such as senior center or town hall to process applications and take pictures. The IDs can then be mailed to the individual once printed.

Update the contact form with language that lets people know you are looking for any and all feedback. Update where they select why they are contacting to encourage them to select. Monitor social media for PVTA-related hashtags and provide responses were warranted.



## Appendix A PVTA Service Changes (2014–2019)

### Service Adjustments – Effective June 22, 2014

- Add 7 trips to G1 Sundays to extend evening hours.
- Add 6 trips to G2 Sunday to extend morning hours.
- Add 4 trips to G3 Saturday to extend morning hours and extend Sunday route to serve area from SBT to Westford Circle (Sunday previously ran northern portion of route only).
- Update B6 routing in Ludlow, add 8 weekday trips to/from Health South, extend Sunday service to Eastfield Mall.
- Add 3 trips to B7 Sunday to extend evening hours.

### CSA I – Effective August 24, 2014

- Discontinue Routes G1E, G8, B13, and B15.
- Simplify routing/eliminate deviations on Routes G2, G3, G5, R14, B17, P20, P21, B23, and R24.
- Add new Routes R10s, R14E, R29, X90, and X92.
- Add new route X98 from Salvo House to River Valley Coop (VATCo).
- Eliminate Routes 32 and 37 (UMTS).
- Add new Routes 33 and 36 (UMTS).

### CSA I Continued – Effective December 7, 2014

- Add trips and/or running time to portions of Routes G5, B6, R14, and P21E.
- Discontinue Routes G19, R22, and R25.
- Add Route C52 (Tiger Trolley) and expand Route X90 into Holyoke.
- Simplify P21 routing in Holyoke.

### CSA II – Effective August 30, 2015

- Separate Routes P20E and P21E into their own schedules.
- Update routing on G1 (eliminate double loops in Canon Circle/5 Town Plaza area), B4 (service Wason Medical Offices), B7 (use State and Main), P21 (use Willimansett Bridge), and P11 and B23 (to use Doyle Drive).
- Decrease frequency of Route 10s from 20 minutes to 30 minutes. Increase frequency of Route P20 from 30 minutes to 20 minutes on weekdays and Saturdays. Increase frequency of Route P21 from 45 minutes to 30 minutes on weekdays and Saturdays.
- Add running time to Route R14 on Saturdays.
- Add running time to Route B4 weekdays, reducing frequency from 30 minutes to 40minutes (effective December 20, 2015).

### Other Adjustments of Significance

- Run Route B7 weekday at consistent 15-minute frequency all day (effective March 20, 2016).
- Relocate central hub from SBT to Union Station (effective June 25, 2017).

- Modify Route 36 to serve North Pleasant Street stops at UMass on southbound trips.
- Modify Route X98 to terminate at Big Y instead of River Valley Coop.

#### **Minor Service Reductions – Effective August 27, 2017**

- Re-write Route G3 weekday and Route G5 weekday and Saturday schedules.
- Eliminate Route R14E, Route P20E weekday, Route B23 Saturday, Tiger Trolley, Route R27, and five weekend trips on Route R29. Eliminate Holyoke portion of Route X90 on Sundays. Eliminate early morning trips from Routes B4 and X90.
- Incorporate Agawam Industrial Park trips into Route R14 schedule. Incorporate one Wilbraham trip into Route B17 schedule.
- Update Route P21E routing to receive grant funding.
- Eliminate last trip on Route B12 (effective December 17, 2017).
- Eliminate Route M40, add express trips to Route B43.
- Reduce Route X98 to three round trips per day.
- Eliminate weekend service on Routes 45 and 46, reduce weekday trips on Route 46.
- Modify Route 39 due to detour on Bay Road (temporary).

\*Fare increase effective July 1, 2018\*

#### **Minor Service Reductions – Effective August 26, 2018**

- Eliminate service to Wilbraham.
- Reduce span of service by 3 hours on Route R24 and update routing; eliminate Route R24 Saturday service.
- Reduce frequency of Route X92 from 45 minutes to 60 minutes and add service to R.J. Senior Center.
- Reduce service level from Saturday service to Sunday service on Columbus Day and Veterans Day.
- New MGM Shuttle (The Loop) operates Wednesday through Sunday. Funded by MGM.
- Combine Ware and Palmer shuttles into new Ware-Palmer service.
- Reduce weekday trips on Route 46 (now interlined with Route 31).
- Add Hampshire Mall stop to Route 39 (limited trips).
- Add Wilbraham Shuttle.
- Replace Route X98 with Survival Shuttle.

#### **Service Adjustments and New Garage opening on Cottage Street – Effective April 14, 2019**

- New timetable and routing on The Loop
- G2 longer running times in the afternoon and decreased frequency from 20 minutes to 30 minutes.
- New Route G2E runs on weekdays

#### **Service Improvements due to DOT Grant – Effective June 23, 2019**

- New Route B7s runs on weekdays.

- Re-write Route G1 weekday schedule to allow longer running times.
- Add trips to weekday Route P20E.
- Modify Route R44 to operate as a loop route via Rocky Hill Cohousing (weekdays only).
- Temporary reduction in frequency for Routes 33, 34, and 35 due to UMTS driver shortage (September to December 2019).

## Appendix B Illustrative FY 2015–FY 2019 Performance Results and Peer Review

### Performance Evaluation

To provide historical context for PVTA performance since the PVTA 2014 CSA, this appendix provides information on PVTA systemwide 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 PVTA/MassDOT MOU discussed in Chapter 6.) Although prior to FY 2020 PVTA did not have a bilateral MOU with MassDOT with mutually agreed upon key performance metrics, baselines, and targets, the FY 2015-FY 2019 data are presented here in comparison to the FY 2020-FY 2021 MOU baselines and targets for illustrative purposes. A brief performance comparison with peer transit systems is also included in this appendix.

This section evaluates the performance of the system and each route.<sup>55</sup> Five data sets were collected from FY 2019 records to analyze route diagnostics for service effectiveness and financial performance: ridership, revenue hours, revenue miles, operating cost, and revenues (Table 73). In FY 2019, PVTA had a systemwide ridership of 10,381,520, revenue hours of 556,042, revenue miles of 7,643,208, operating cost of \$43,281,904, and revenue of \$7,752,485.<sup>56</sup> Fixed route and paratransit revenue increased due to fare increases that went into effect on July 1, 2018 (as outlined in Table 15). Shuttle service income decreased due to the impact of service reductions.

**Table 73. Operating Data by Route (FY 2019)**

Route	Ridership	Revenue Hours	Revenue Miles	Operating Cost	Revenue Generated
G1	888,976	34,013	407,018	\$3,194,779	\$880,086
G2	745,671	25,252	279,559	\$2,194,323	\$738,215
G2E	3,017	342	5,550	\$43,555	\$2,987
G3	287,376	12,364	117,421	\$921,664	\$271,222
B4	130,504	4,698	47,759	\$374,864	\$123,717
G5	85,531	5,258	58,963	\$462,822	\$77,533
B6	390,373	18,080	247,613	\$1,943,564	\$391,979
B7	971,620	29,181	301,215	\$2,364,314	\$961,904
B7S	1,825	75	693	\$5,440	\$1,807
10S	17,368	1,583	19,563	\$153,555	\$17,194
R10	126,527	7,230	110,876	\$870,377	\$125,262
P11	38,747	1,764	38,815	\$304,698	\$38,360

<sup>55</sup> Routes that operate different service levels during regular and reduced/summer service are analyzed as separate routes. If it is a reduced service route, an R or ns has been placed after the number to denote it.

<sup>56</sup> Data may differ from previous tables as this is aggregated based on individual route data reported and does not include school helper routes.

<b>Route</b>	<b>Ridership</b>	<b>Revenue Hours</b>	<b>Revenue Miles</b>	<b>Operating Cost</b>	<b>Revenue Generated</b>
B12	5,662	780	19,401	\$152,259	\$98,178
R14	86,472	5,668	88,792	\$696,949	\$85,607
B17	130,056	6,700	84,966	\$666,910	\$128,755
P20	807,847	30,422	377,533	\$2,963,352	\$813,048
P20E	20,835	1,259	30,040	\$235,791	\$20,627
P21	448,059	14,945	187,191	\$1,469,305	\$449,060
P21E	105,677	3,545	76,914	\$603,724	\$104,620
B23	93,698	6,328	94,303	\$740,198	\$99,904
R24	31,572	2,246	36,661	\$287,745	\$25,746
R29	38,961	4,523	75,464	\$592,334	\$38,571
30	792,310	10,231	109,140	\$428,920	\$78,353
31	695,205	10,249	169,836	\$667,455	\$78,491
33	140,757	3,561	37,312	\$146,247	\$27,271
34	275,285	4,836	47,095	\$185,083	\$37,036
35	418,963	6,058	62,705	\$246,431	\$46,394
36	28,379	1,634	23,903	\$93,939	\$12,514
38	221,530	8,474	145,878	\$573,301	\$64,897
39	52,547	4,569	74,620	\$293,257	\$34,991
39E	10,327	1,218	27,271	\$214,229	\$11,582
R41	85,951	6,048	104,547	\$820,606	\$85,091
R42	62,777	4,755	87,615	\$687,703	\$62,149
B43	410,239	10,945	148,283	\$1,164,022	\$460,069
B43ns	129,608	5,281	69,089	\$542,349	\$128,312
R44	86,995	8,592	83,686	\$656,871	\$86,125
51	8,776	343	1,835	\$7,215	\$2,627
45	33,125	1,372	26,187	\$72,937	\$10,507
46	1,395	143	3,513	\$17,237	\$1,095
B48	122,192	5,841	124,213	\$974,977	\$120,970
X90	274,094	23,691	323,560	\$2,539,697	\$271,353

Route	Ridership	Revenue Hours	Revenue Miles	Operating Cost	Revenue Generated
X92	121,675	6,543	74,136	\$581,911	\$120,458
Loop	13,041	2,009	13,642	\$107,071	\$171,078
NE	11,997	2,953	45,921	\$164,748	\$10,218
OWL	34,637	738	11,070	\$86,883	\$127,184
S	1,216	552	1,833	\$35,093	N/A
WP	12,581	2,834	66,778	\$158,109	\$9,321
R10 R	89,195	6,359	89,293	\$700,950	\$88,303
P11 R	1,511	141	2,953	\$23,181	\$1,495
31 R	201,895	4,167	71,303	\$280,221	\$32,081
30 R	203,977	4,128	48,639	\$191,151	\$31,781
45 R	15,487	947	18,559	\$72,937	\$7,291
46 R	1,831	178	4,386	\$17,237	\$1,370
38 R	14,435	686	11,947	\$46,952	\$6,871
39 R	3,612	475	8,455	\$33,228	\$5,904
33 R	86,159	3,237	33,805	\$132,854	\$24,921
ADA and Senior Van	251,101	179,973	2,710,566	\$8,963,922	\$794,068*
W	561	N/A	N/A	\$12,083	N/A
Northampton Senior Van	3,571	1,687	16,512	\$26,900	N/A
Agawam Senior Van**	299	109	1,323	\$1,765	N/A
Tri-Town Trolley Senior Van	5,910	4,229	35,489	\$69,710	N/A
<b>Total System</b>	<b>10,381,520</b>	<b>556,042</b>	<b>7,643,208</b>	<b>\$43,281,904</b>	<b>\$7,752,485</b>

Source: PVRTA Financial FY 2019 Monthly Ridership, Hours, and Miles by Route

\*Revenue generated includes all demand response senior vans (region-wide, Northampton, Agawam, and Tri-Town Trolley).

\*\* Service was implemented at the end of FY 2019 (June) and is not inclusive of the entire fiscal year.

## On-Time Performance

PVTA defines the OTP/schedule adherence metric for fixed routes as “on-time” if the bus departs within 5 minutes of scheduled departure time and not more than 1 minute early from scheduled timepoints (also known as time points) along a route. PVTA routes have at least two timepoints, the termini at either end<sup>57</sup> as well as to other major stops on the route. While some transit agencies calculate route OTP only at one location along the route, this can make performance look better than it is because it does not account for intermediate stops’ performance. It is frequently monitored at a termini where layover time is built into the schedule to account for traffic and allow drivers to take short breaks. By evaluating OTP at several timepoints along routes it allows PVTA to better monitor performance and adjust schedules. As a result it can show lower OTP as intermediate timepoints often lack layover built in.

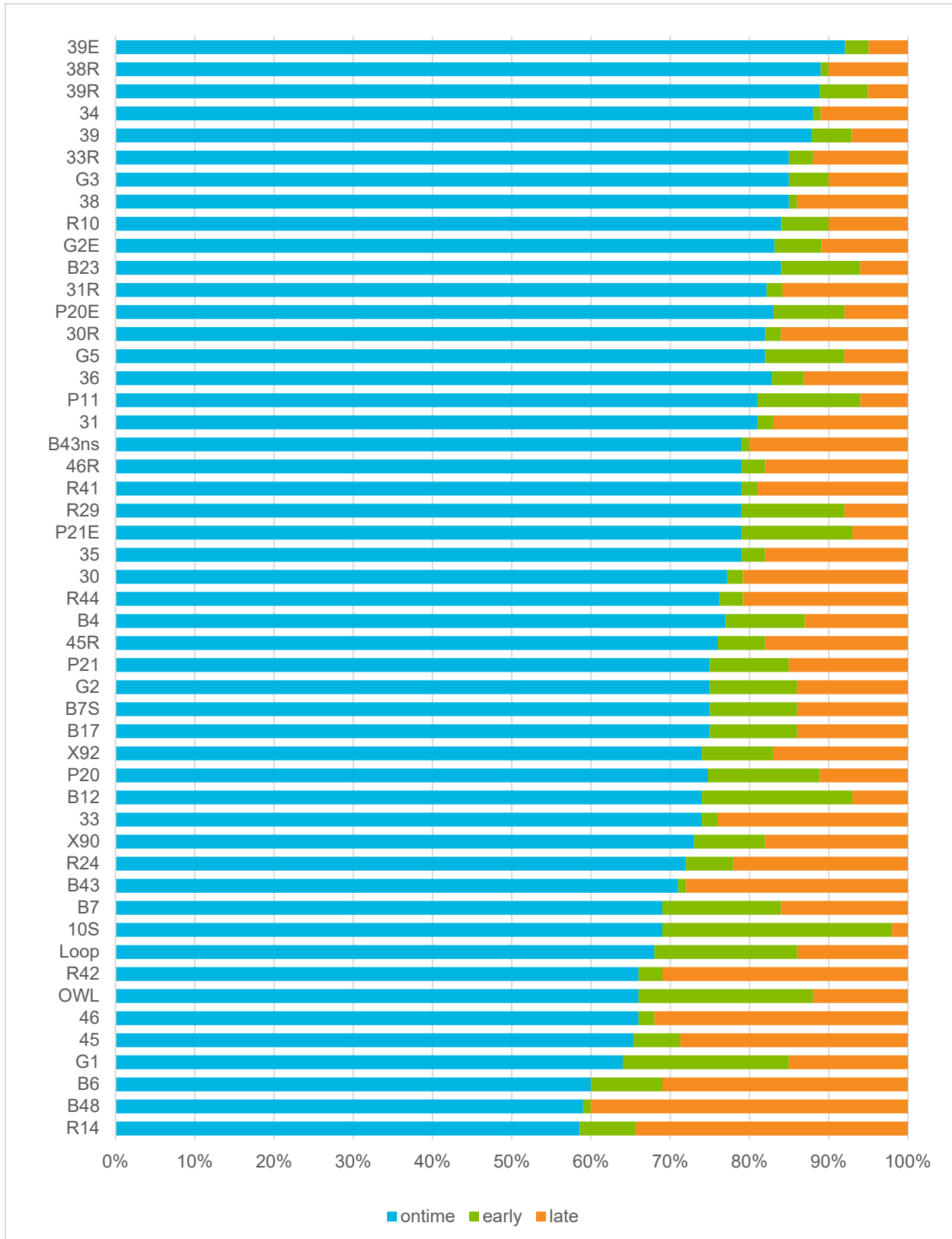
Figure 98 through Figure 100 illustrate the OTP for each fixed route (including reduced service routes) on weekdays, Saturdays, and Sundays. OTP data are not available for Routes NE and WP as these routes operate with vehicles that are not equipped with the needed technology. On weekdays the average OTP is 73 percent (10 percent early, 17 percent late). Saturdays have a slightly higher OTP average of 75 percent, and Sundays at 78 percent. The average percent of early arrivals on weekdays is 10 percent, with three routes having over 20 percent early arrivals. Routes R14, B48, B6, 45, 46, R42, and B43 on weekdays have over 25 percent of trips as late arrivals. On weekends the percentage of late arrivals decrease by over 5 percent on Routes 35, B6, B48, P21, R14, and R42, causing an increase in OTP. Overall weekend OTP is better than on weekdays with the exception of Routes 30, 39, B43ns, and R10, which have over a 10 percent decrease in OTP.

PVTA defines the OTP/schedule adherence metric for demand response service (including both ADA paratransit and non-ADA demand response services) as “arrives within a 20-minute arrival window, defined as up to 20 minutes before and up to 20 minutes after a requested drop-off time.”

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<sup>57</sup> For non-linear routes there are at least two timepoints evenly spaced.

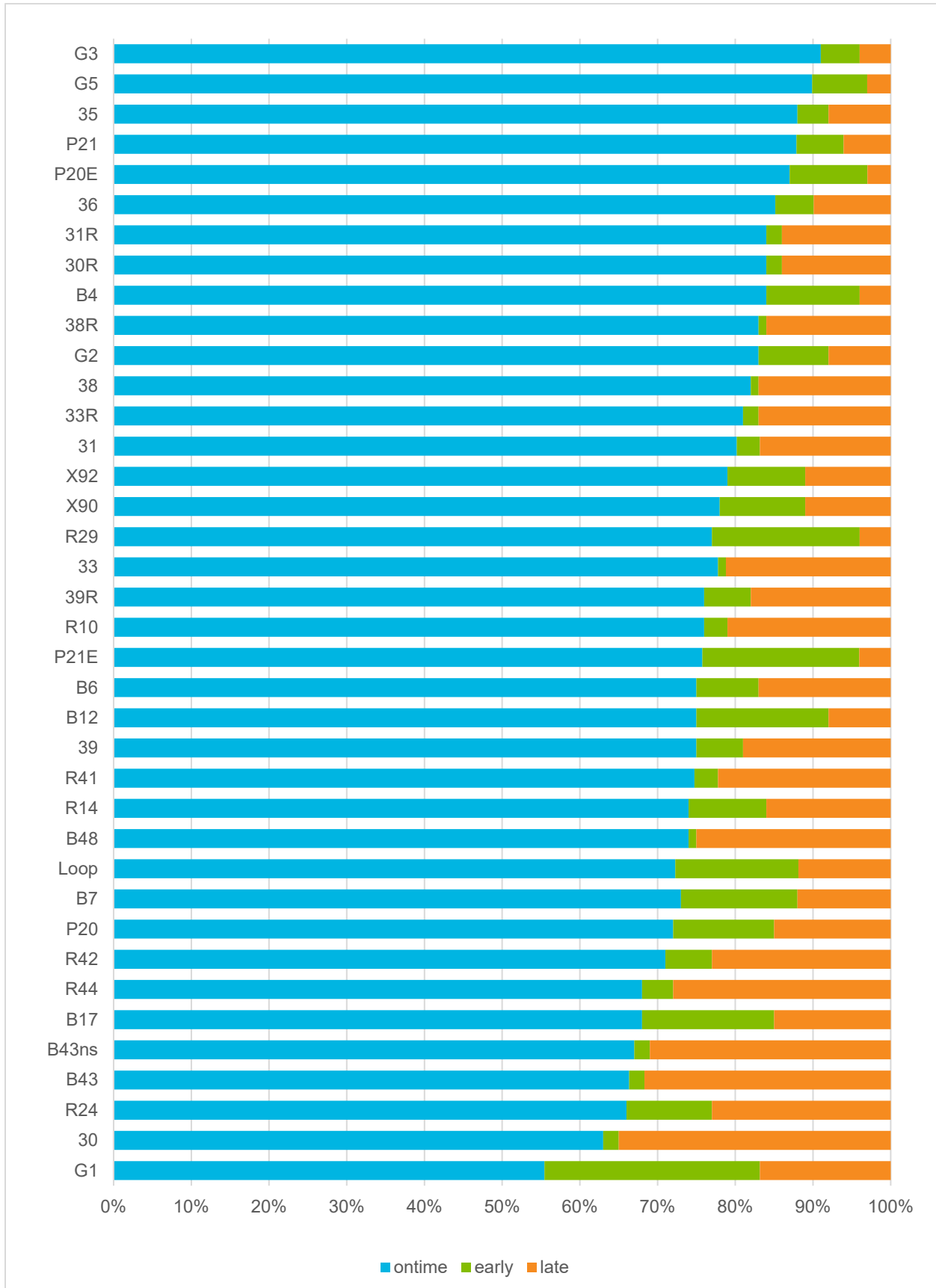
**Figure 98. Fixed Route Weekday On-Time Performance by Route (FY 2019)**



Source: PVTA OTP Data

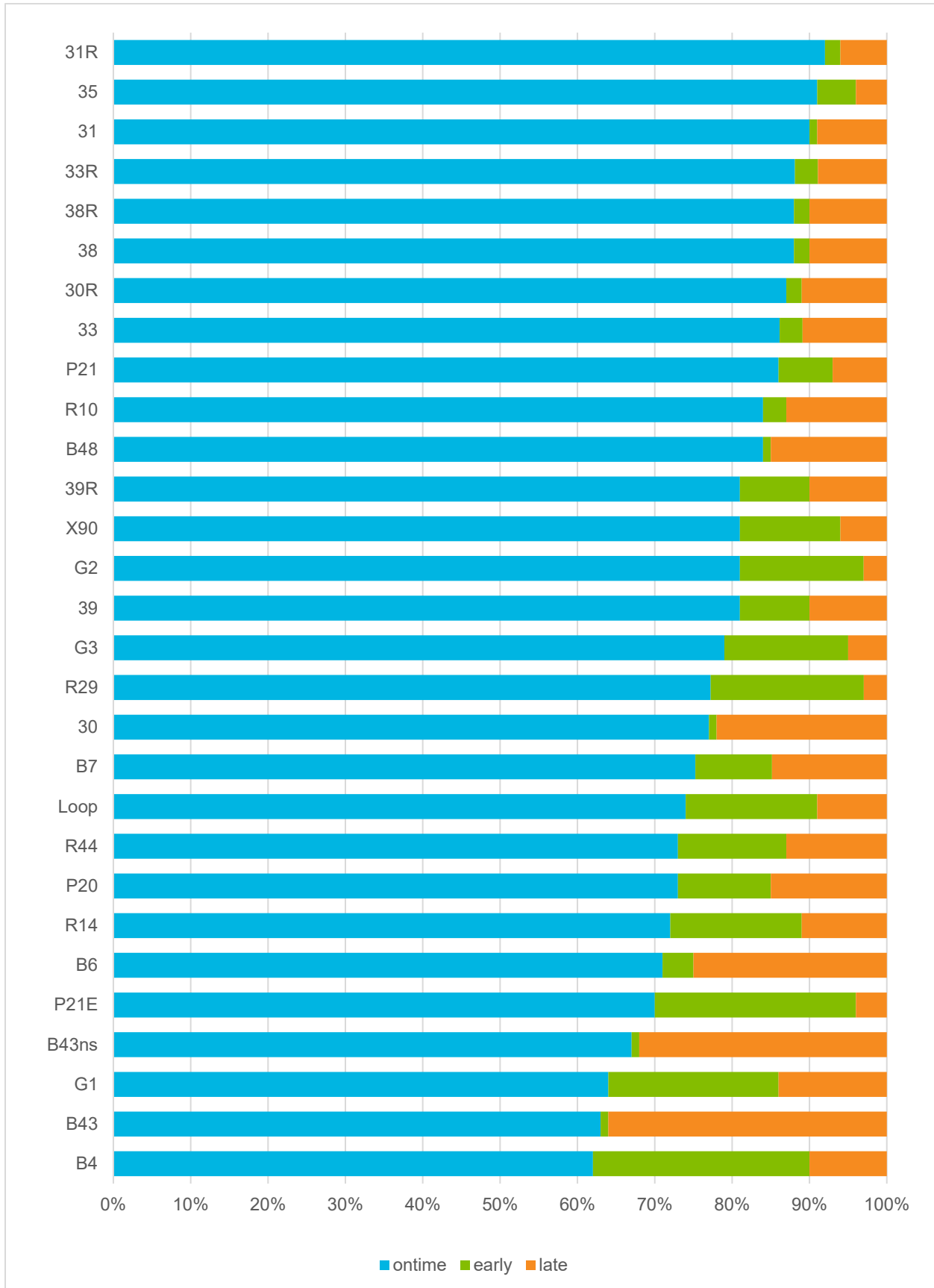


**Figure 99. Fixed Route Saturday On-Time Performance by Route (FY 2019)**



Source: PVTA OTP Data

**Figure 100. Fixed Route Sunday On-Time Performance by Route (FY 2019)**



Source: PVTA OTP Data

In FY 2019, 83 percent of the ADA paratransit and non-ADA demand response services arrived on time (i.e., within a 20-minute arrival window), which is a slight improvement over FY 2018 (80 percent) (Table 74). Eight percent of the ADA paratransit and non-ADA demand response services arrived early in FY 2019 (i.e., before the 20-minute arrival window), which is better than FY 2018 (14 percent), and 9 percent arrived late in FY 2019 (i.e., after the 20-minute arrival time), which is slightly worse than FY 2018 (5 percent). OTP data are not available prior to 2018, nor separated out by demand response service.

**Table 74. Demand Response On-Time Performance (2018–2019)**

<b>On-Time Performance</b>	<b>2018</b>	<b>2019</b>
Early	14%	8%
On-time	80%	83%
Late	5%	9%

Source: PVTA On-time Performance Data

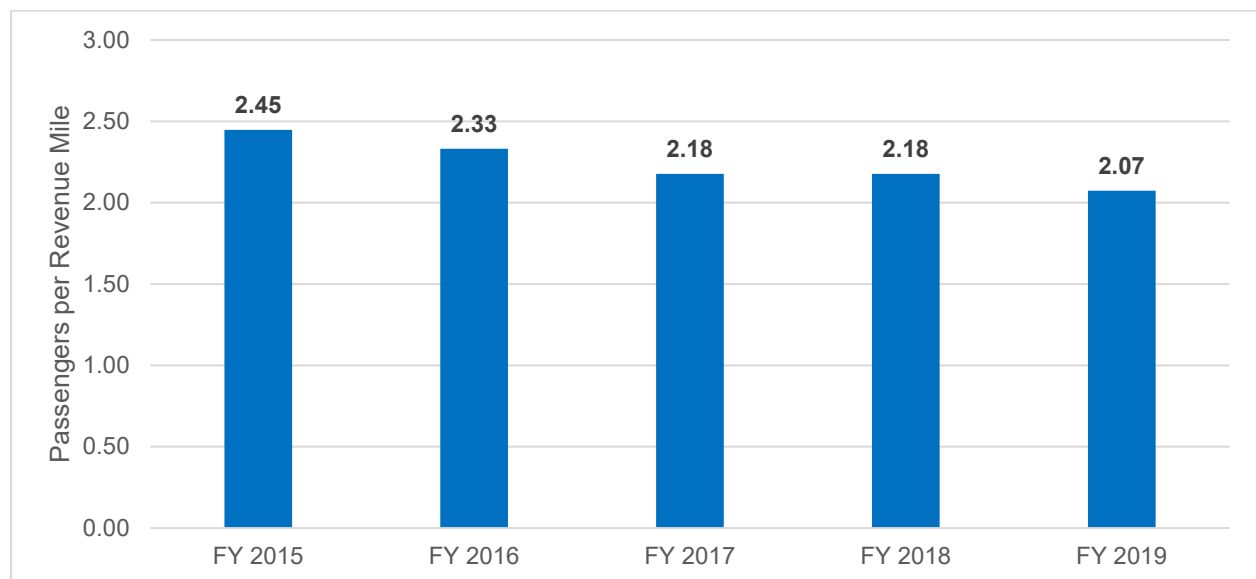
The percentage of scheduled trips operated for fixed route services was 99.97 percent in FY 2019. The scheduled trips operated for fixed route services was generally consistent from FY 2015 to FY 2019 at around 99.9 percent. The percentage of scheduled trips operated for ADA paratransit and non-ADA demand response services was 100 percent from FY 2015 to FY 2019.

### Service Effectiveness

#### Fixed Route 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. From FY 2015 to FY 2019, the number of passengers per mile declined by 16 percent from 2.45 in FY 2015 to 2.07 in the most recent fiscal year (Figure 101).

**Figure 101. Fixed Route Productivity: Passengers per Mile (FY 2015–FY 2019)**



Source: NTD and PVTA

In FY 2019, PVTA's fixed route systemwide average passengers per revenue mile was 2.07 passengers, which was its lowest in the past five fiscal years. However, at 2.07 PVTA's passenger per revenue mile was 50 percent above the state average of 1.37 passengers per revenue mile and 9 percent below the national average of 2.26 passengers per revenue mile (Table 75).

**Table 75. Fixed Route Productivity (FY 2019)**

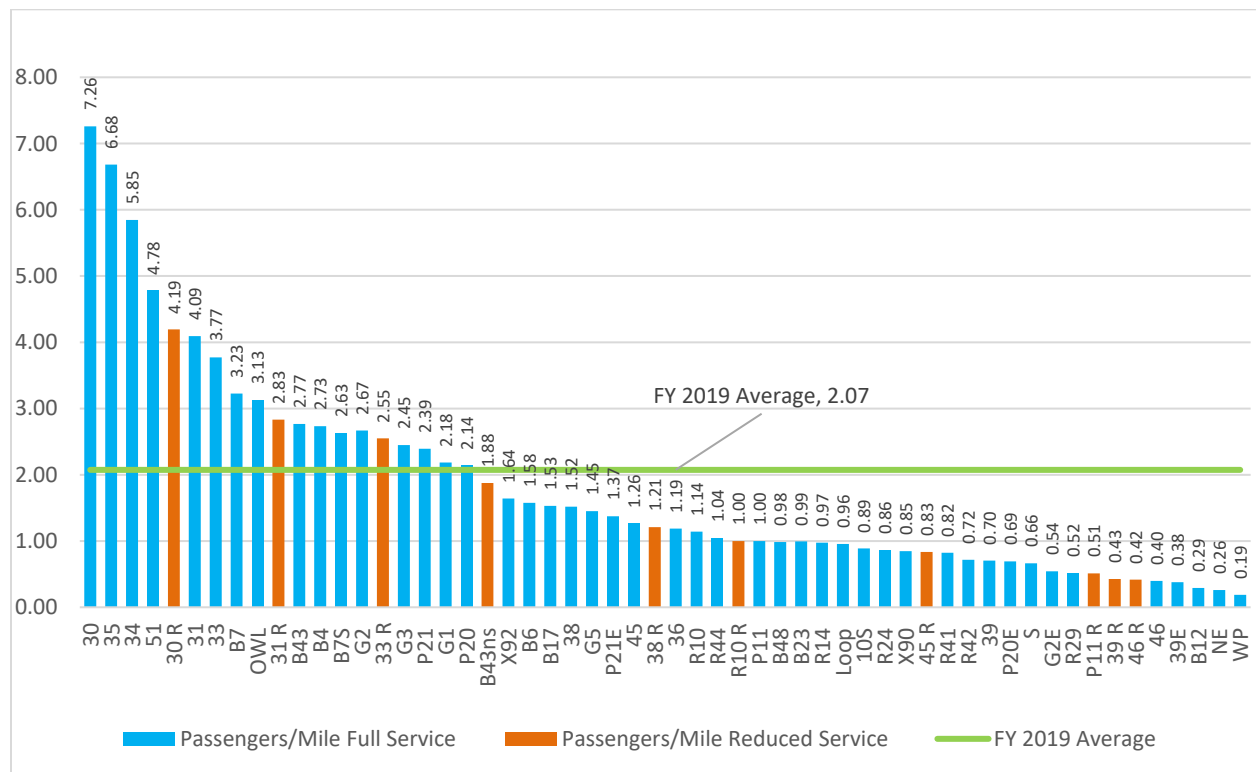
Route	Passengers/Mile
PVTA System Average	2.07
Massachusetts Average*	1.37
National Average	2.26

Source: NTD and PVTA

\* Massachusetts average excludes MBTA service.

As shown on Figure 102, 19 fixed routes performed well with passengers per revenue miles higher than the fixed route system average. The top performing routes are those serving a college or university. The lowest performing routes are Routes B12, 39E, NE, and WP; however, this is likely attributed to the operating conditions of these routes. For example, Route B12 runs express to Stonybrook and is paid for by the correctional department. Route 39E connects two colleges with very little ridership activity on intermediate stops and paid for by Five Colleges. Routes NE and WP are community circulator shuttles that typically carry lower passenger loads, and as such, smaller vehicles are utilized.

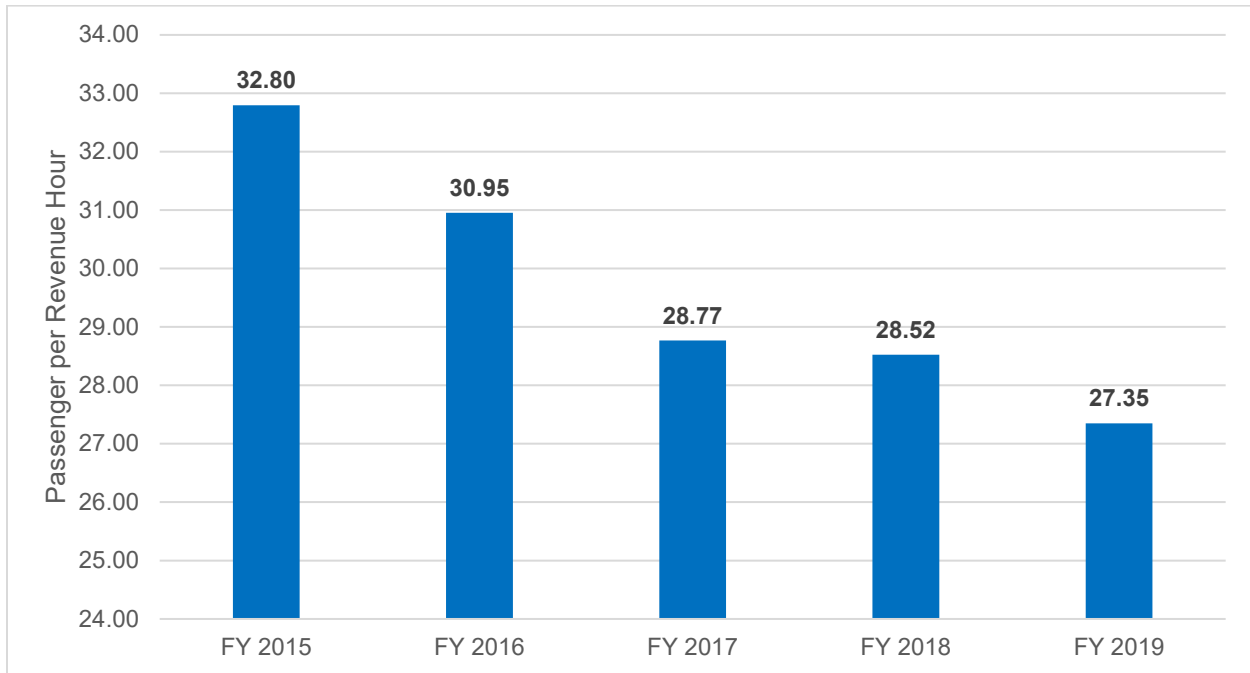
**Figure 102. Fixed Route Passengers per Revenue Mile (FY 2019)**



Source: PVTA FY 2019 Monthly Ridership, Hours, and Miles by Route

Passengers per hour is the second measure of service productivity. Passengers per revenue hour measures ridership as a function of the amount of service provided and varies based on the geographic spread of the area and average operating speed. Higher numbers indicate a more effective system. As shown in Figure 103, the number of passengers per revenue hour declined steadily since FY 2015 at 32.80 to its lowest at 27.35 in FY 2019.

**Figure 103. Fixed Route Productivity: Passengers per Revenue Hour (FY 2015–FY 2019)**



Source: NTD and PVTA

PVTA's fixed route systemwide average productivity was 27.35 passengers per revenue hour in FY 2019, which is just slightly higher than the national average of 27.21 passengers per revenue hour and is 47 percent greater than the state average of 18.39 (Table 76).

**Table 76. Passengers per Hour (FY 2019)**

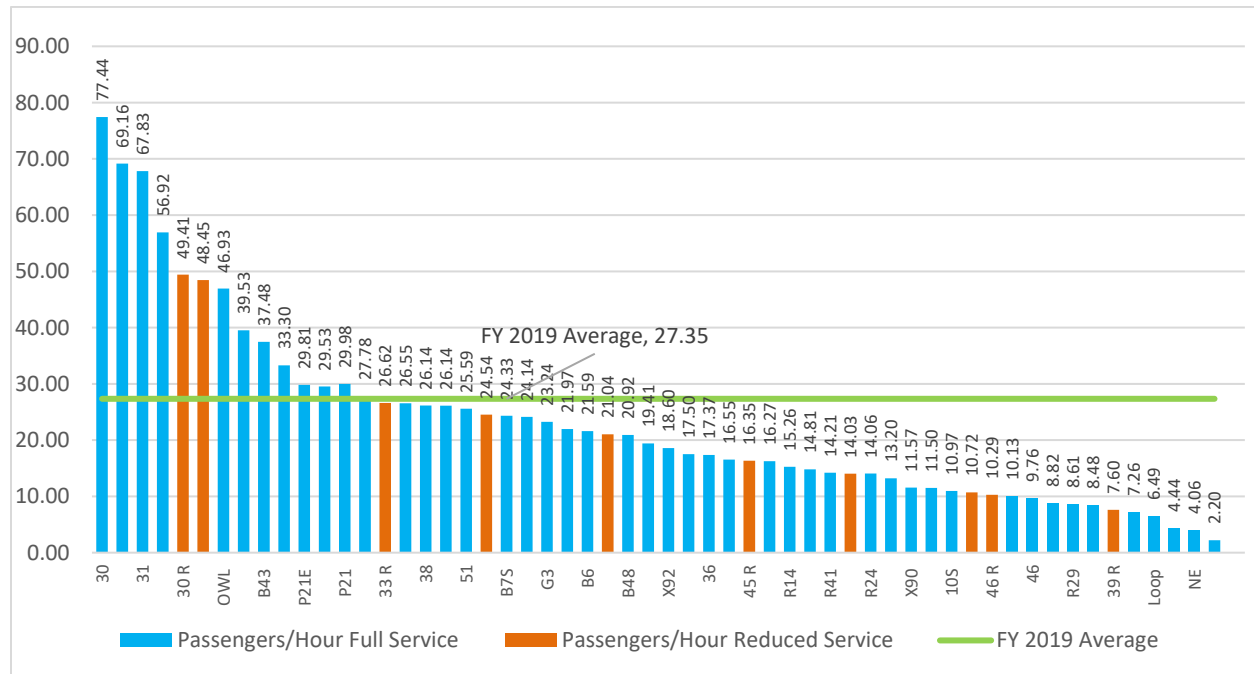
Route	Passengers/Hour
PVTA System Average	27.35
Massachusetts Average*	18.39
National Average	27.21

Source: NTD and PVTA

\*Massachusetts average excludes MBTA service.

As shown on Figure 104, 14 fixed routes were more productive than the passengers per revenue hour fixed route national average and 29 above the state average. The top performing routes are typically Tier 1 routes with service frequency every 15 minutes and located in college communities. Routes S, WP, NE, and Loop are the lowest performing routes with the lowest passengers per revenue hour. Excluding the Loop, these are all shuttle routes.

**Figure 104. Fixed Route Passengers per Revenue Hour (FY 2019)**



Source: PVTA FY 2019 Monthly Ridership, Hours, and Miles by Route

PVTA has classified all fixed routes into a tier system based on their frequency and set standards. All Tier 1 and tier 2 routes are meeting their standard. While 46 routes perform at or above the target PVTA plans to achieve in FY 2020, nine routes in Tiers 3, 4, and 5 perform below the target (Table 77). Notably, 34 of PVTA routes are exceeding the standards for the tier above or if a Tier 1 have a PPRH greater than 50. In the MOU with MassDOT tiers and standards were adjusted. Routes indicated in bold met their standard; however, routes denoted in italics did not exist under the FY 2019 standards.<sup>58</sup>

**Table 77. PVTA Service Tier Standards Performance**

Service Tier	Standard	Routes Meeting Target	Routes Not Meeting Target
1 (every 15 minutes)	30	<b>B7, 30, 31, 34, 35, OWL</b>	—
2 (every 20 minutes)	20	<b>G1, B6, P20, B43</b>	—
3 (every 30 minutes)	15	<b>G2, G3, B4, B7S, P20E, P21, 33, 38, B48, 31 R, 30 R, 33 R</b>	10S, 39, X90, Loop, S
4 (every hour)	10	<b>G2E, G5, R10, P11, R14, B17, P21E, B23, R24, 36, R41, R42, B43ns, X92, R10R</b>	39E, 39 R
5 (less than hourly)	5	B12, R29, R44, <b>45, 46, P11R 45R, 46R, 38R</b>	NE, WP

<sup>58</sup> [http://www.pvta.com/documents/performEff/Route%20by%20route%20PMs\\_FY19Q4.pdf](http://www.pvta.com/documents/performEff/Route%20by%20route%20PMs_FY19Q4.pdf)

**Demand Response Productivity**

Table 78 outlines the service effectiveness for PVTA demand response routes/services. PVTA's demand response average productivity was 0.09 passengers per revenue mile (Figure 105) and 1.41 passengers per revenue hour in FY 2019 (Figure 106). Demand response productivity is below the national and state averages; on a service level only the ADA and senior van service is below the state and national averages for both measures. Productivity values tend to decline as service area size increases. The Agawam Senior Van and the Northampton Senior Van have the highest passengers per mile and passengers per hour. Data were not available for the Wilbraham Eastfield Mall demand response.

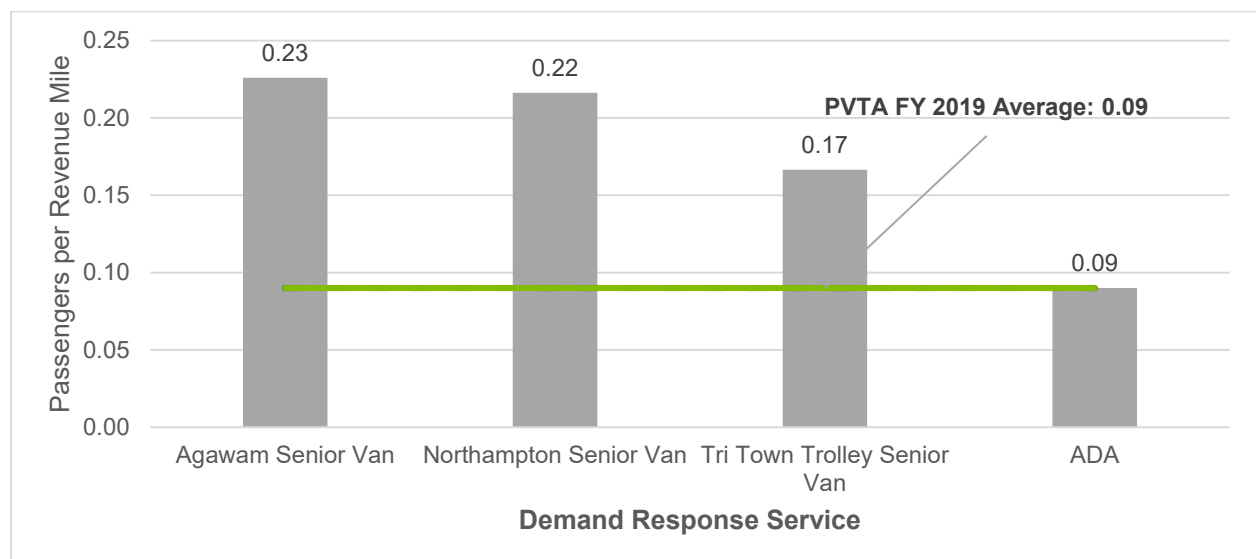
**Table 78. Demand Response Productivity (FY 2019)**

<b>Route</b>	<b>Passengers/Mile</b>	<b>Passengers/Hour</b>
ADA & Senior Van ( <i>region wide</i> )	0.09	1.40
Wilbraham Eastfield Mall (Route W)	N/A	N/A
Northampton Senior Van	0.22	2.12
Agawam Senior Van	0.23	2.74
Tri-Town Trolley: East Longmeadow/Longmeadow/Hampden	0.17	1.40
<b>PVTA Demand Response System Average</b>	<b>0.09</b>	<b>1.41</b>
<b>Massachusetts Average*</b>	<b>0.15</b>	<b>2.30</b>
<b>National Average</b>	<b>0.13</b>	<b>1.97</b>

Source: NTD and PVTA

\*Massachusetts average excludes MBTA, CCRTA, and MART. CCRTA and MART data are skewed as they report a portion of the HST trips operated to the NTD.

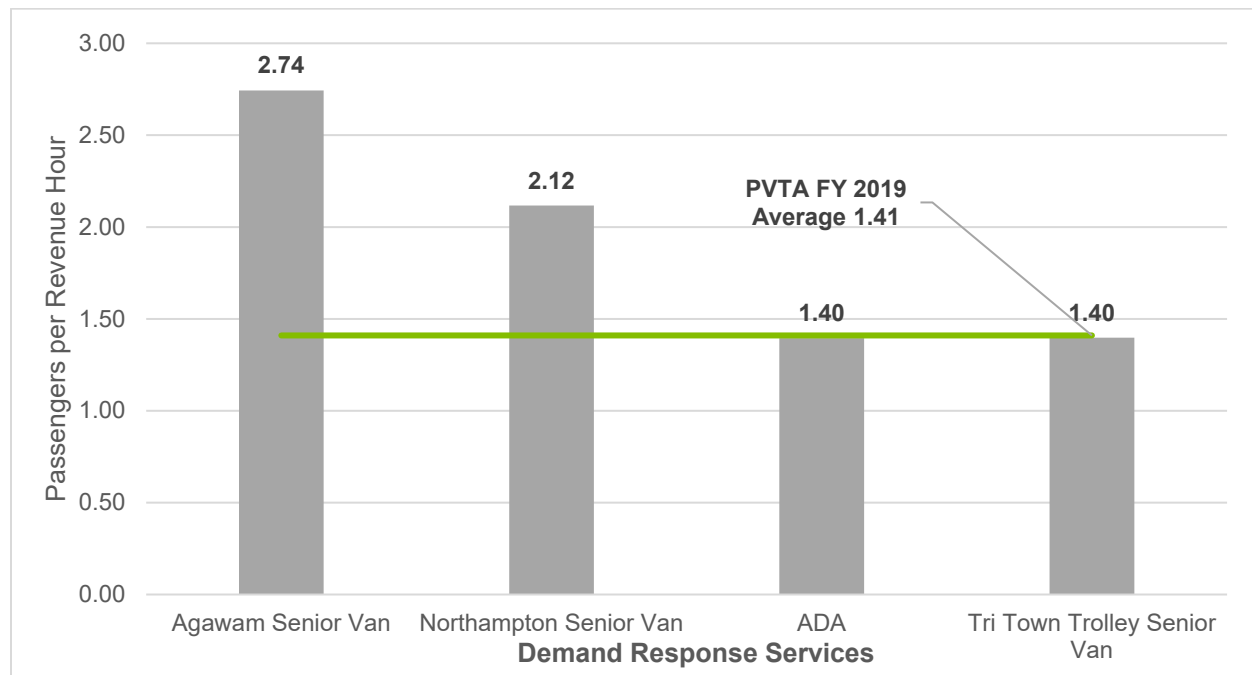
**Figure 105. Demand Response Passengers per Revenue Mile by Route (FY 2019)**



Source: PVTA

*\*Data were unavailable for the Wilbraham Eastfield Mall (Route W) shuttle.*

**Figure 106. Demand Response Passengers per Revenue Hour by Route (FY 2019)**



Source: PVTA

*\*Data were unavailable for the Wilbraham Eastfield Mall (Route W) shuttle.*

## Financial Performance

Cost efficiency measures how much the dollars put into the system are being used to provide service or produce trips. The cost efficiency indicators are cost per revenue mile and cost per revenue hour.

Three measures link cost efficiency and cost effectiveness, measuring how resources (dollars) are ultimately used to produce passenger trips, and how well the fares collected cover the cost per passenger. The three are cost per passenger, farebox recovery, and subsidy per passenger.

- **Cost per mile** measures how much it costs to provide a mile of service. A smaller number indicates more financially efficient routes. This metric is sensitive to fuel costs and operating speeds.
- **Cost per hour** measures how much it costs to provide an hour of service. A smaller cost per hour indicates more financial efficient routes and/or faster operating speeds. This metric is sensitive to labor costs.
- **Cost per passenger** is the overall cost to operate a route divided by the number of passengers and measures how well the resources are being used to produce trips.
- **Farebox recovery** measures the percent of operating cost covered by fares and is an outcome heavily influenced by the ridership productivity of a route against its total operating cost, as well as the fare policy of the system. It is calculated by dividing fare revenue by operating cost.
- **Subsidy per passenger** measures how much it costs to operate a route on a “per passenger” basis. It is calculated by subtracting passenger revenue from operating cost and dividing by the total number of passengers. It is the cost to operate after taking into account fare revenue and must be subsidized by other sources.

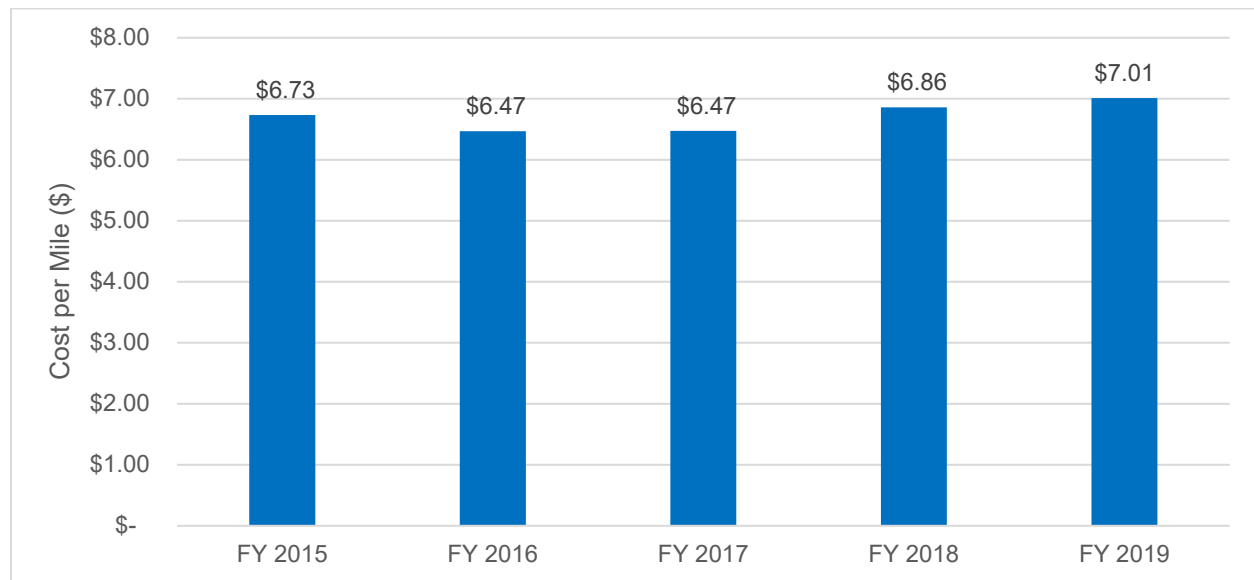


Fixed route metrics are examined first followed by demand response.

**Fixed Route Financial Performance**

Cost per revenue mile measures the financial efficiency of providing service based on how much it costs to provide a mile of service. A smaller number indicates a combination of more financially efficient routes, faster operating speeds, or lower fuel costs. From FY 2015 to FY 2019 cost per mile ranged from approximately \$6.50 to \$7.01 dollars. From FY 2016 to FY 2017 costs per mile remained steady; however, costs began to increase in FY 2018.

**Figure 107. Fixed Route Cost per Mile (FY 2015–FY 2019)**



Source: NTD and PVTA

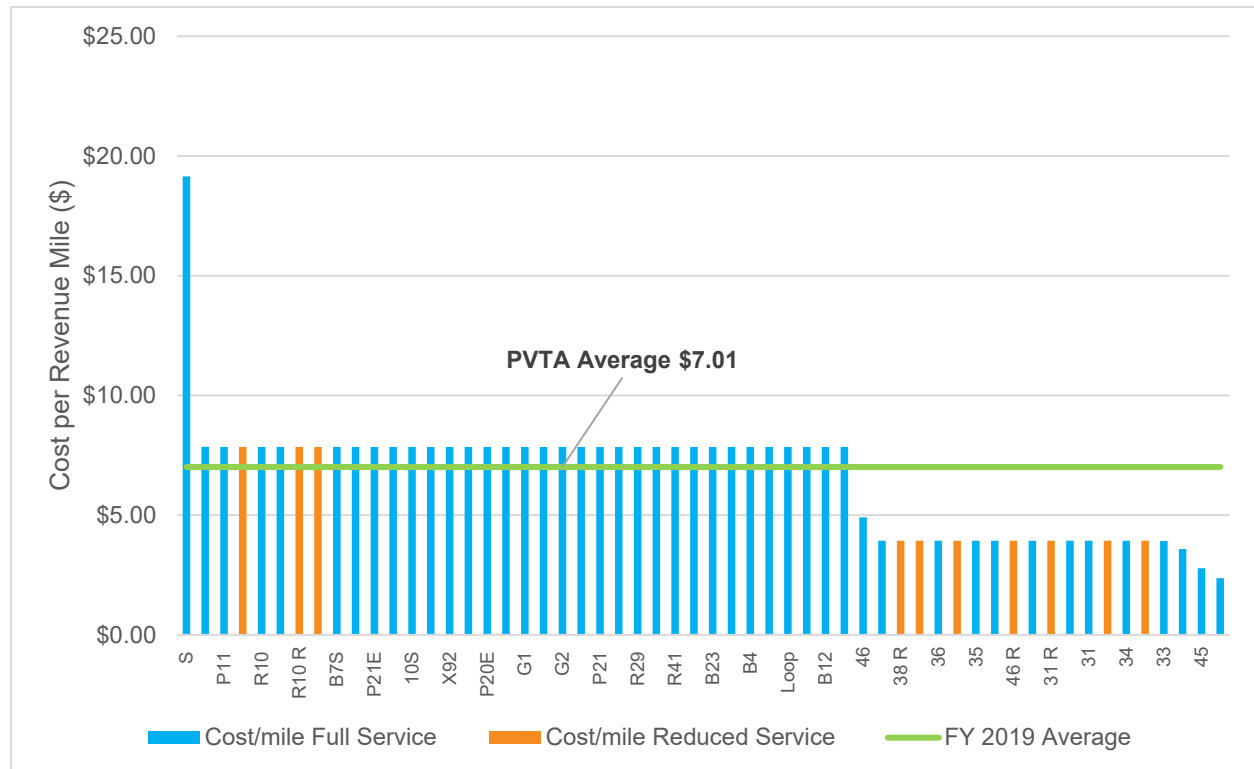
In FY 2019, the average fixed route operating cost per revenue mile in FY 2019 was \$7.01, which is 3 percent lower than the state (\$7.24) and 37 percent lower than the national (\$11.15) average (Table 79). Cost data were calculated by PVTA based on revenue miles, and as such, the cost per revenue mile varies not by route but by the garage operating the route. Routes operated by UMTS had the lowest cost per revenue mile of \$3.93, as they employ student drivers, whereas routes operated by VATCo and SATCo were \$7.85. Routes NE and WP are operated by Hulmes, and costs were based on revenue hours operated, as such the cost per revenue mile for Route WP was \$2.37, and Route NE was \$3.59. Route S is operated by NEXT, and cost per revenue mile was \$19.15 (Figure 108).

**Table 79. Fixed Route Financial Efficiency (FY 2019)**

Route	Cost/Mile
PVTA System Average	\$7.01
Massachusetts Average (excludes MBTA)	\$7.24
National Average	\$11.15

Source: NTD; PVTA

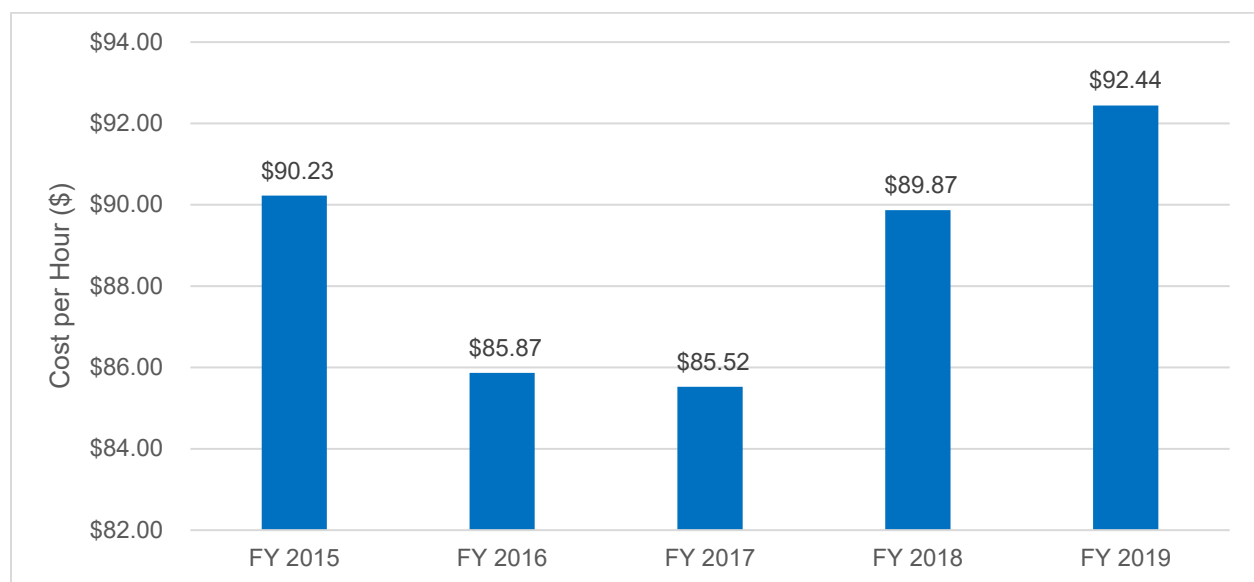
**Figure 108. Fixed Route Cost per Revenue Mile (FY 2019)**



Source: PVTA

Cost per revenue hour measures the financial efficiency of providing service based on how much it costs to provide an hour of service. A smaller cost per revenue hour indicates more financial efficient routes and/or slower operating speeds and/or lower labor costs. From FY 2015 to FY 2019, the cost per hour for PVTA fixed route service ranged from a low of \$85.52 in FY 2017 to a high of \$92.44 in FY 2019 (Figure 109). This equates to an increase of roughly 4 percent annually.

**Figure 109. Fixed Route Cost per Hour (FY 2015–FY 2019)**



Source: NTD and PVTA

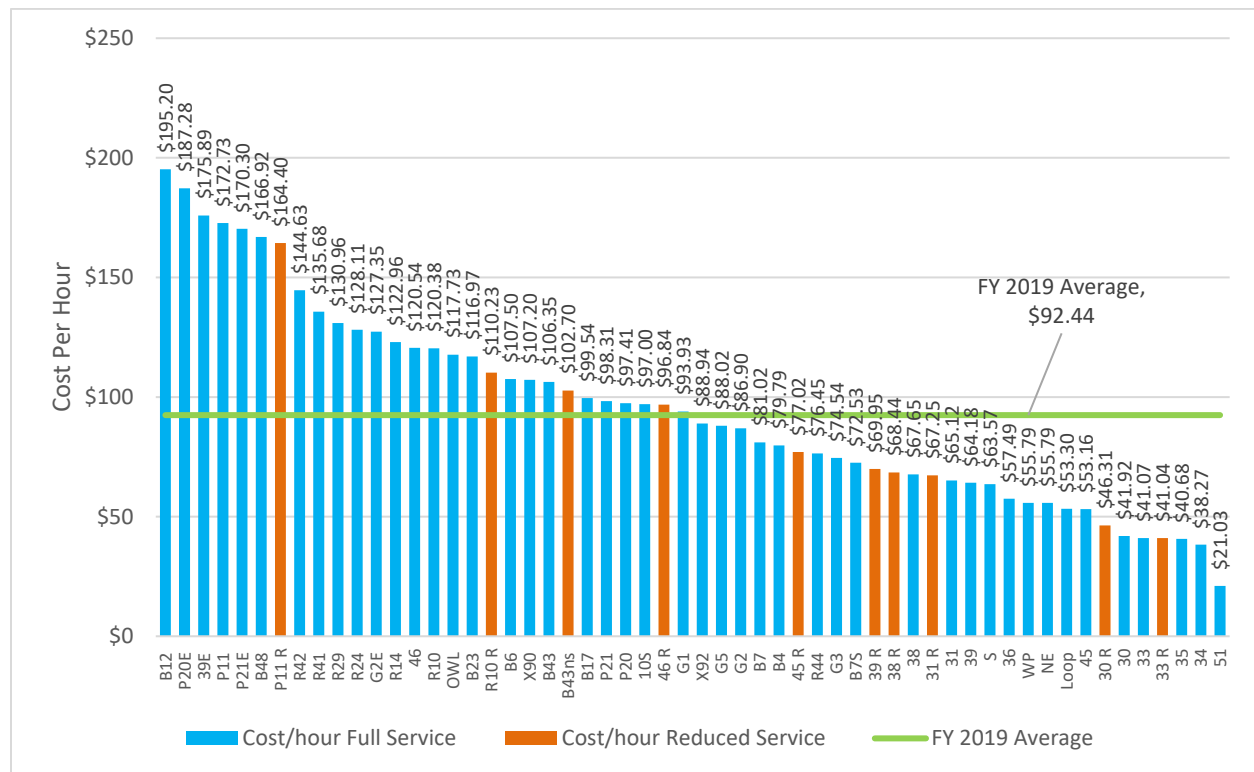
Despite PVTA's increased cost per hour, its average fixed route operating cost per revenue hour in FY 2019 was \$92.44, 5 percent lower than the state (\$97.20) average and 31 percent lower than the national (\$133.99) average (Table 80). Thirty-one fixed routes had operating cost per revenue hour lower than the state average, indicating higher financial efficiency compared to the state (Figure 110). Nine of PVTA fixed routes are above the national average. In general the routes operated by UMTS tend to have lower costs per hour due to the lower labor costs of the student drivers they employ.

**Table 80. Fixed Route Cost per Hour (FY 2019)**

Route	Cost/Hour
PVTA System Average	\$92.44
Massachusetts Average (excludes MBTA)	\$97.20
National Average	\$133.99

Source: NTD; PVTA

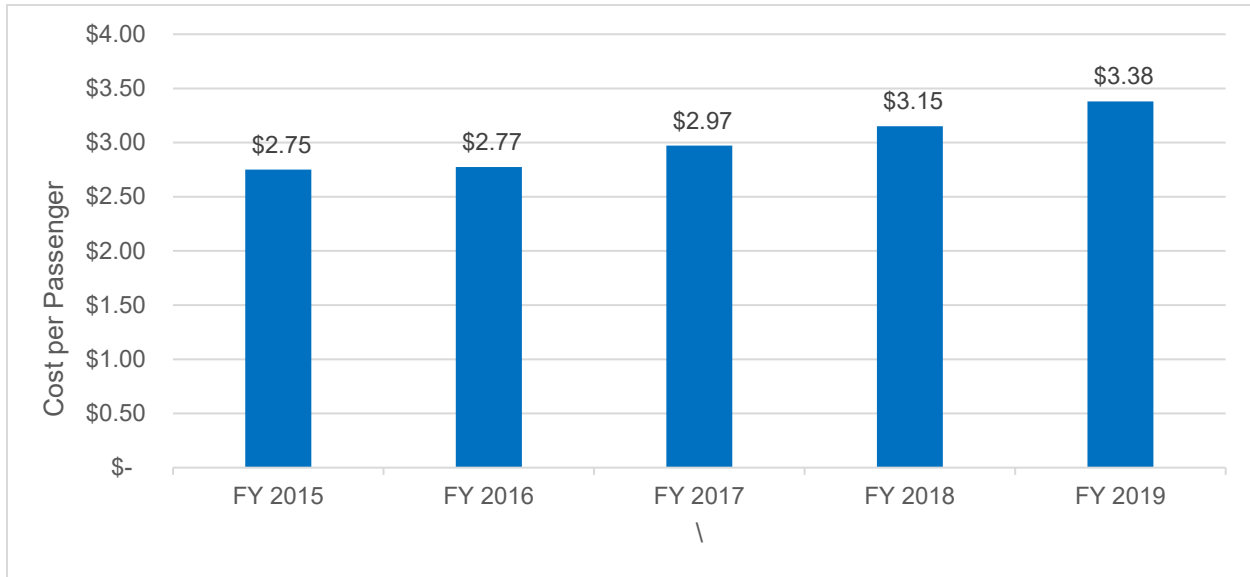
**Figure 110. Fixed Route Cost per Revenue Hour by Route (FY 2019)**



Source: PVTA

Cost per passenger is the overall cost to operate a route divided by the number of boarding passengers; a lower cost is desirable. The cost per passenger incrementally increased from \$2.75 in FY 2015 to \$3.38 in FY 2019 as the system also experienced declining passenger volumes (Figure 111).

**Figure 111. Fixed Route Cost per Passenger (FY 2015–FY 2019)**



Source: NTD; PVTA

Again despite PVTA’s increased costs, its average fixed route system operating cost per passenger in FY 2019 was \$3.38, which is 36 percent lower than the state (\$5.29) average and 31 percent lower than the national (\$4.92) average (Table 81). This puts PVTA among the top 10 percent of transit systems operating fixed route nationwide in terms of cost per passenger. Among all 15 RTAs and MBTA, PVTA has the lowest cost per passenger in the state, and fourth lowest in New England, for bus operations.

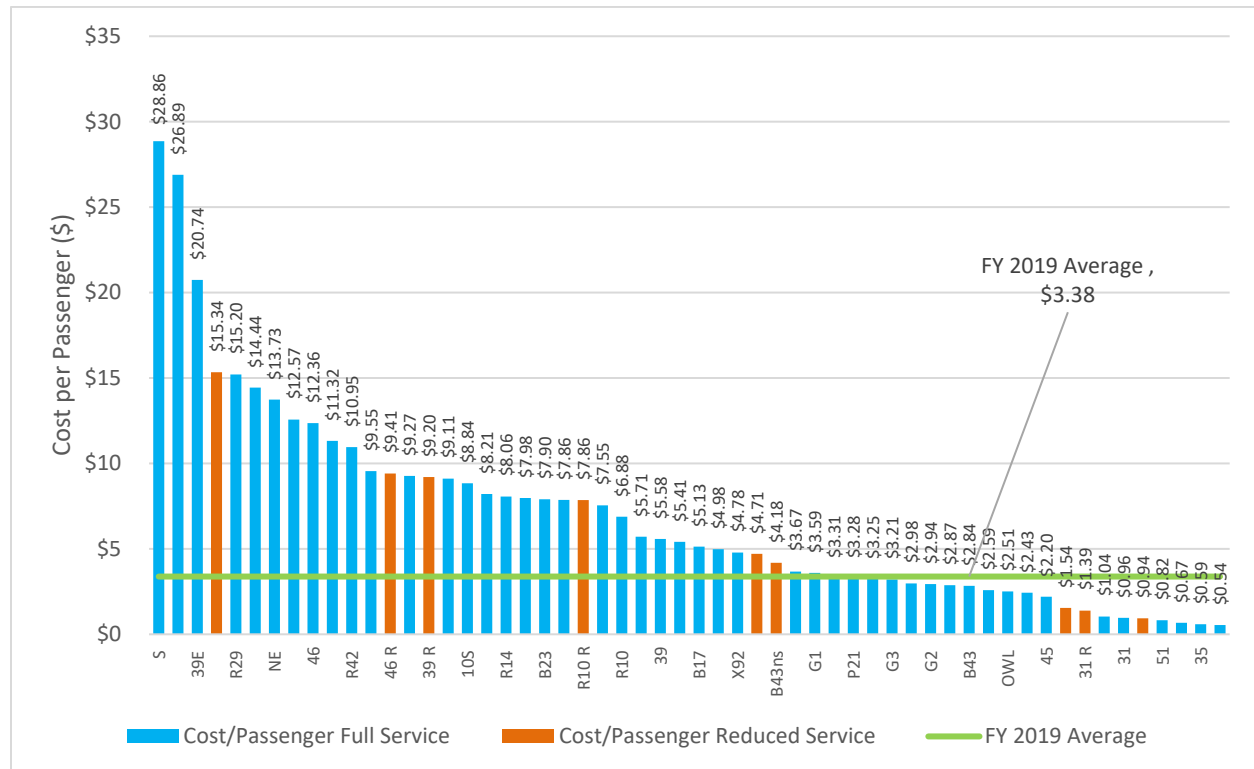
**Table 81. Fixed Route Cost per Passenger (FY 2019)**

Route	Cost/Passenger
PVTA System Average	\$3.38
Massachusetts Average (excludes MBTA)	\$5.29
National Average	\$4.92

Source: NTD; PVTA

In FY 2019, 21 fixed routes performed better and had lower cost per passenger than the system average and 20 routes performed better than the state and national averages (Figure 112). Eight fixed routes (Routes 31R, 33, 31, 30R, 34, 35, 51, and 30) performed extremely well with cost per passenger lower than \$1.50. Compared to national averages, only 2 percent of systems operating fixed routes have a system average less than \$1.50; this is a good reflection of PVTA’s financial performance for its fixed routes in terms of cost per passenger. However, 10 fixed routes, including Routes S, B12, 39E, P11 R, R29, G2E, NE, WP, 46, P20E, and R42, did not perform well, with operating costs per passenger greater than twice that of the national average.

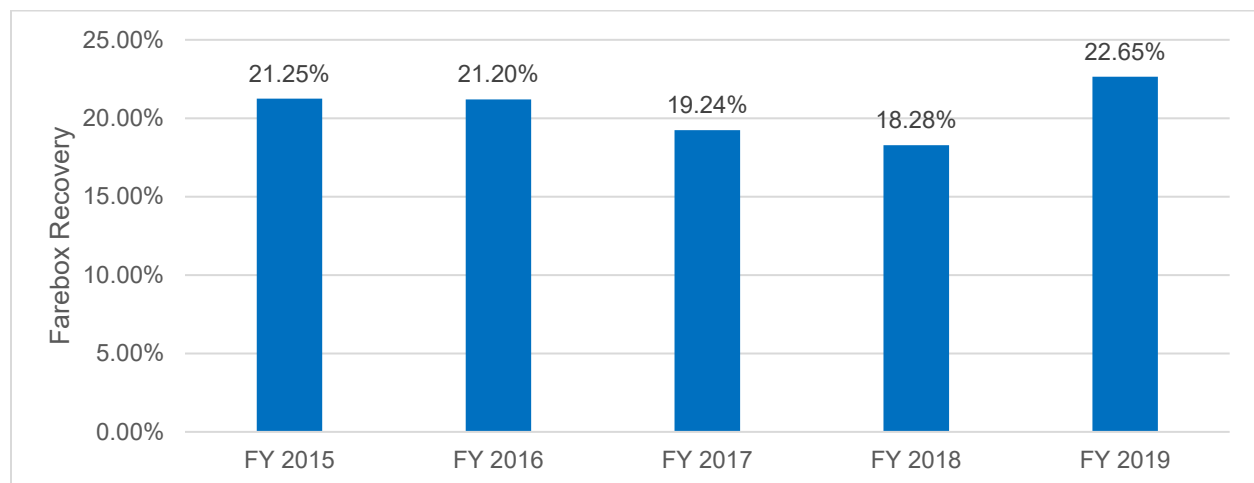
**Figure 112. Fixed Route Cost per Passenger by Route (FY 2019)**



Source: PVTA

Farebox recovery measures the percentage of operating cost covered by fare revenue and is an outcome heavily influenced by the ridership productivity of a route against its total operating cost, as well as the fare policy of the system. It is calculated by dividing fare revenue by operating cost. Fare revenue comes from the fareboxes, ticket and pass sales, and funding partnerships, which partially or completely covers the cost of service as depicted in Table 15. From FY 2015 to FY 2019 farebox recovery ranged from 18.28 to 22.65 percent with the highest farebox recovery, 22.65 percent, in the most recent fiscal year FY 2019 (Figure 113).<sup>59</sup>

**Figure 113. Fixed Route Farebox Recovery (FY 2015–FY 2019)**



Source: NTD; PVTA

<sup>59</sup> Farebox recovery for fixed routes is higher than the systemwide total of 15 percent due to the contract revenue for fixed routes.

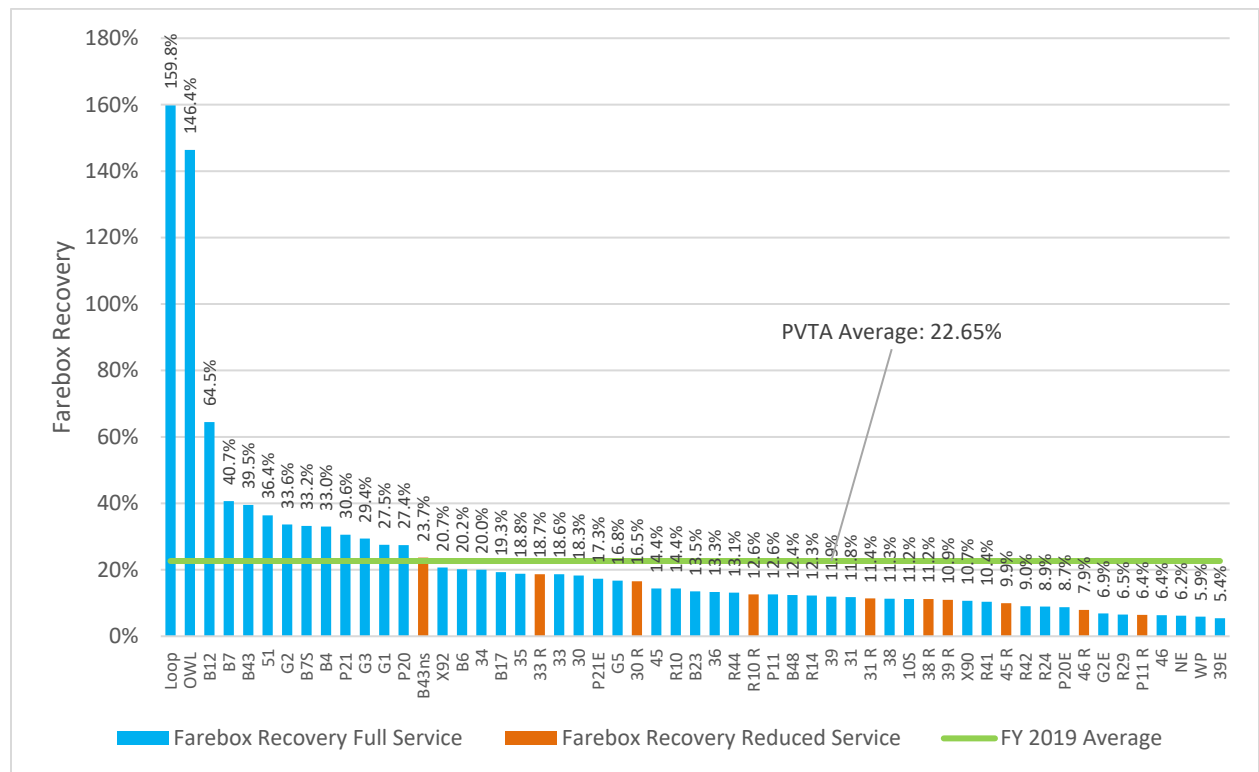
In FY 2019, the average fixed route system farebox recovery ratio was 22.65 percent, which exceeded both the state farebox recovery average of 15.4 percent and the national average (22.1 percent) (Table 82). At the route level, 13 fixed routes performed above the system average (Figure 114). Two routes, Loop and OWL, have farebox recovery higher than 100 percent because of contract partnerships with MGM and Westfield State. Twelve fixed routes (Routes R42, P20E, R24, 46 R, G2E, R29, P11 R, 46, NE, WP, and 39E) have a farebox recovery of less than 10 percent.

**Table 82. Fixed Route Farebox Recovery (FY 2019)**

Route	Farebox Recovery
PVTA System Average	22.65%
Massachusetts Average (excludes MBTA)	15.4%
National Average	22.1%

Source: NTD; PVTA

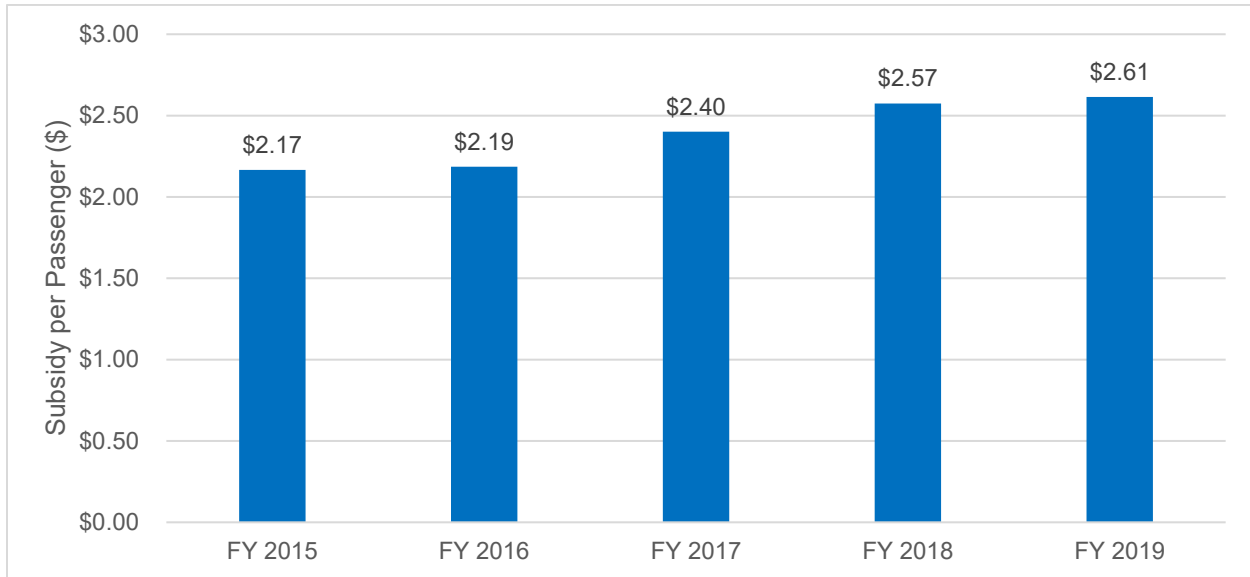
**Figure 114. Fixed Route Farebox Recovery by Route (FY 2019)**



Source: PVTA

Subsidy per passenger is calculated by subtracting passenger revenue (including contract revenue) from operating cost and dividing by the total number of passengers. It is the cost to operate after taking into account fare revenue and is subsidized by other sources such as state, local, and federal dollars. From FY 2015 to FY 2019 the subsidy per passenger incrementally increased from year to year starting at \$2.17 in FY 2015 to \$2.61 in the most recent fiscal year, FY 2019 (Figure 115).

**Figure 115. Fixed Route Subsidy per Passenger (FY 2015–FY 2019)**



Source: Calculations based upon NTD and PVTA data

In FY 2019, the average fixed route system subsidy per passenger was \$2.61, which is about 60 percent of the state (\$4.47) and national averages (\$3.83) (Table 83). Within New England, PVTA has the fourth lowest subsidy per passenger among systems that collect a fare.

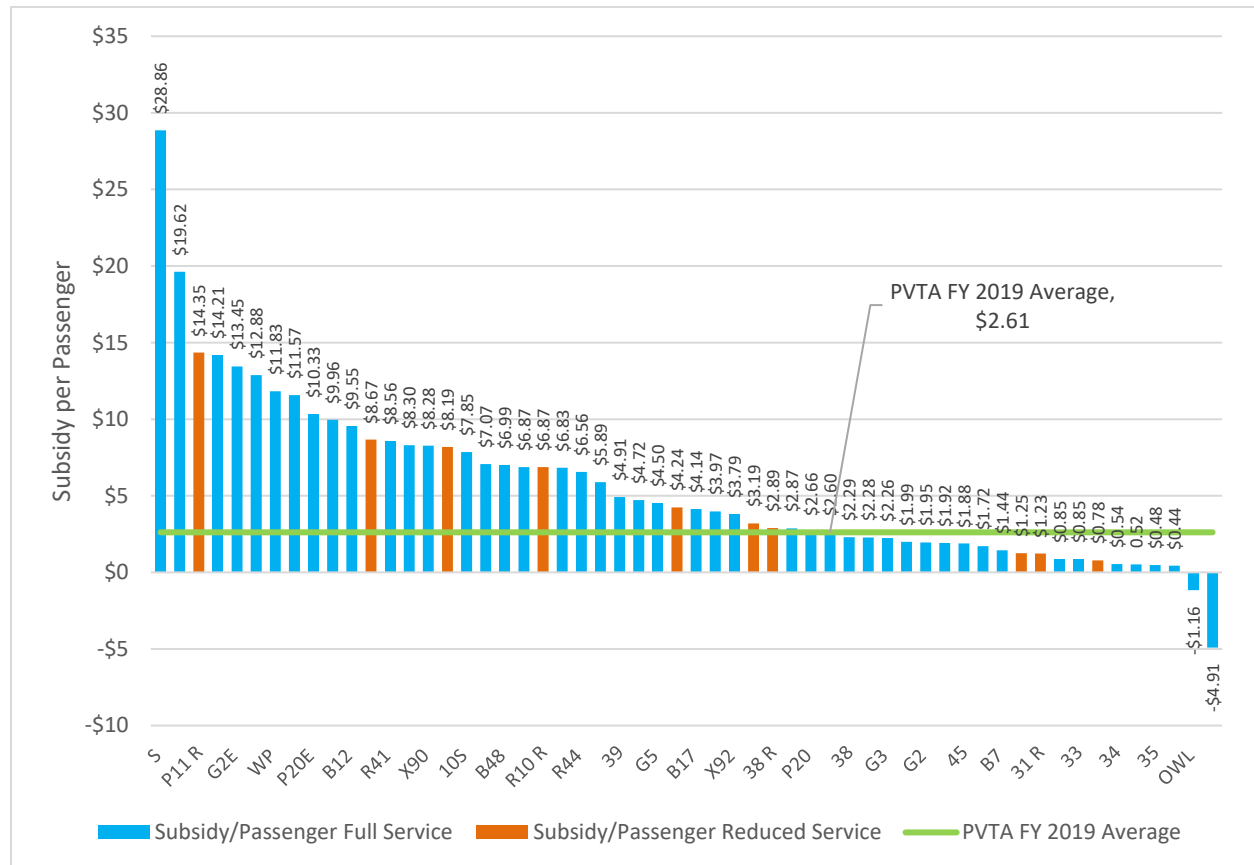
**Table 83. Fixed Route Subsidy per Passenger (FY 2019)**

Route	Subsidy/Passenger
PVTA System Average	\$2.61
Massachusetts Average (excludes MBTA)	\$4.47
National Average	\$3.83

Source: NTD; PVTA

At the route level, the top performing routes with the lowest subsidies per passenger were Routes Loop, OWL, 30, and 35 (Figure 116). Routes OWL and Loop generated more revenue than the cost to operate the service, resulting in negative subsidies because of partnerships formed with agencies that cover the operating cost of the route. Thirty-six fixed routes were higher than the system average. Ten of these 35 routes, Routes S, 39E, P11 R, R29, G2E, NE, WP, 46, R24, and P20E, had very high subsidies per passenger at over \$10.

**Figure 116. Fixed Route Subsidy per Passenger by Route (FY 2019)**



Source: PVTA

**Demand Response Financial Performance**

Table 84 outlines the financial performance for demand response services. Compared to state and national averages, PVTA performs more efficiently in terms of cost per mile, cost per hour, and farebox recovery, while it is performing slightly less effectively in cost per passenger and subsidy per passenger. Overall, the ADA and region-wide senior van service has the highest costs compared to other demand response services.

**Table 84. Demand Response Financial Efficiency (FY 2019)\***

Route	Cost/Mile	Cost/Hour	Cost/ Passenger	Subsidy/ Passenger	Farebox Recovery
Wilbraham Shuttle	N/A	N/A	\$21.54	N/A	N/A
ADA & Senior Van (region-wide)	\$3.31	\$49.81	\$35.70	\$32.54**	9.0%**
Northampton Senior Van	\$1.63	\$15.95	\$7.53	N/A	0.0%
Agawam Senior Van	\$1.33	\$16.19	\$5.90	N/A	0.0%
Tri-Town Trolley: East Longmeadow/Longmeadow /Hampden	\$1.96	\$16.48	\$11.80	N/A	0.0%
<b>PVTA System Average</b>	<b>\$3.28</b>	<b>\$48.79</b>	<b>\$34.71</b>	<b>\$31.67</b>	<b>8.8%</b>



Route	Cost/Mile	Cost/Hour	Cost/ Passenger	Subsidy/ Passenger	Farebox Recovery
<b>Massachusetts Average***</b>	<b>\$4.38</b>	<b>\$59.86</b>	<b>\$28.28</b>	<b>\$25.95</b>	<b>8.3%</b>
<b>National Average</b>	<b>\$4.33</b>	<b>\$64.93</b>	<b>\$32.92</b>	<b>\$30.46</b>	<b>7.5%</b>

Source: NTD; PVTA

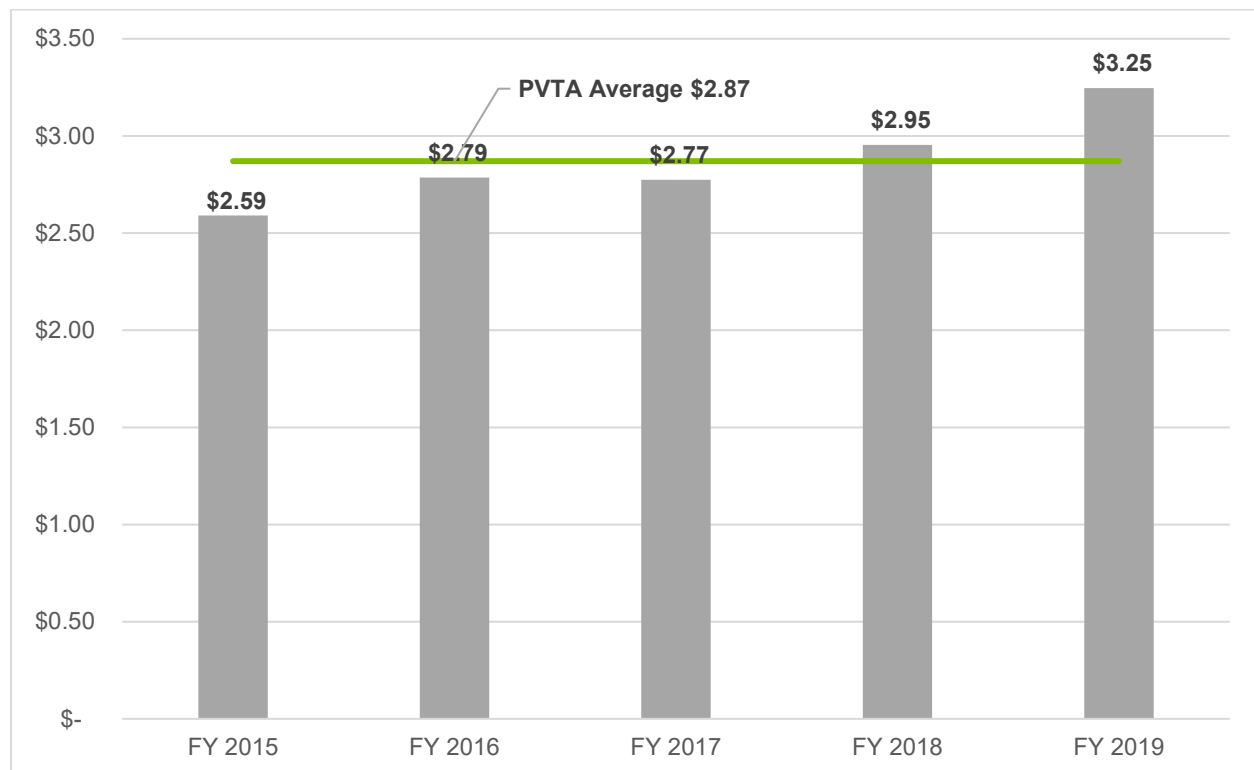
\*Historical averages for FY 2015–FY 2019 are calculated using PVTA data as reported in the NTD. FY 2019 averages may differ slightly due to demand response service level calculations.

\*\*The revenue generated for all PVTA demand response is included in the ADA and Senior Van Service; therefore, data were not available for service level analysis for subsidy per passenger or farebox recovery.

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

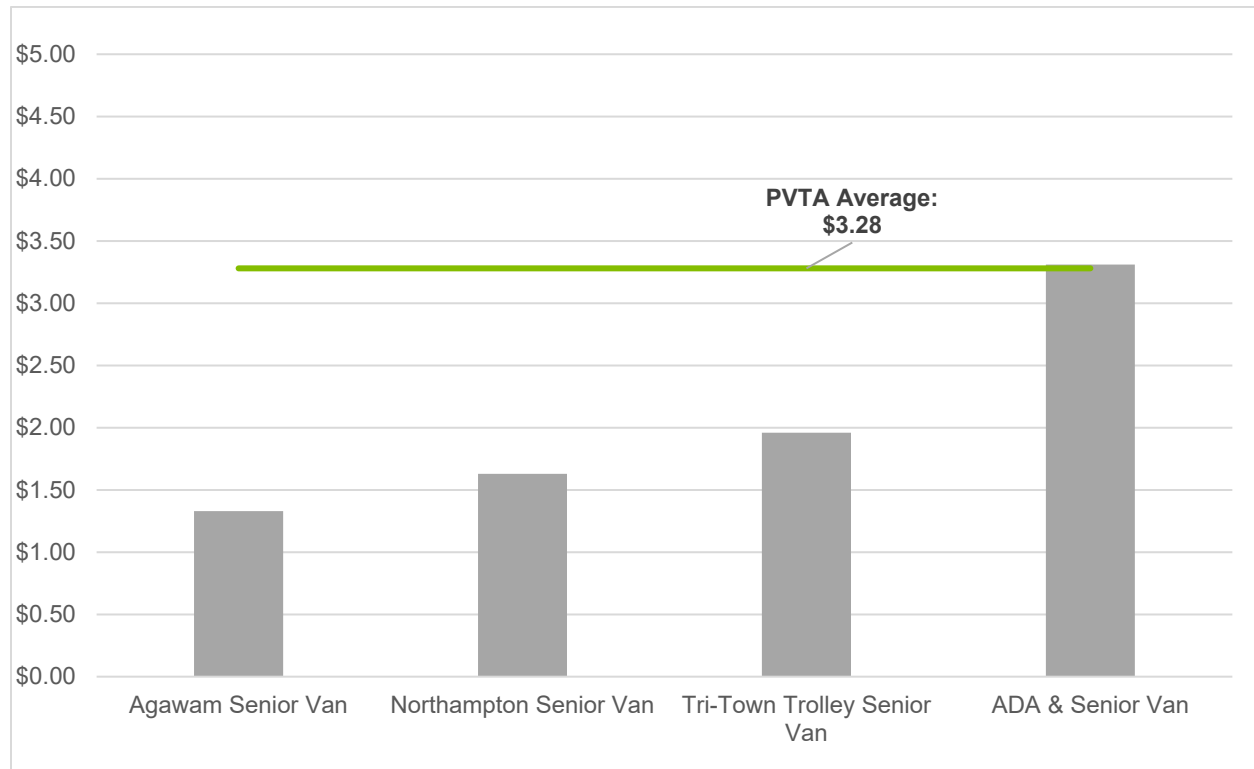
PVTA’s demand response cost per revenue mile from FY 2015 to FY 2019 averaged \$2.87 with its lowest cost per mile of \$2.59 and its highest cost per mile of \$3.25 occurring in the most recent fiscal year (Figure 117). While the revenue miles operated for demand response declined from year to year, the cost of operating the service increased. In FY 2019, the average cost per mile was \$3.28 with the greatest cost per mile being generated by the ADA and Senior Van Service. Agawam Senior Van had the lowest cost per mile; however, this service was only operating for one month of FY 2019 (Figure 118).

**Figure 117. Demand Response Cost per Revenue Mile (FY 2015–FY 2019)**



Source: MassDOT NTD Data (FY 2015-FY 2019)

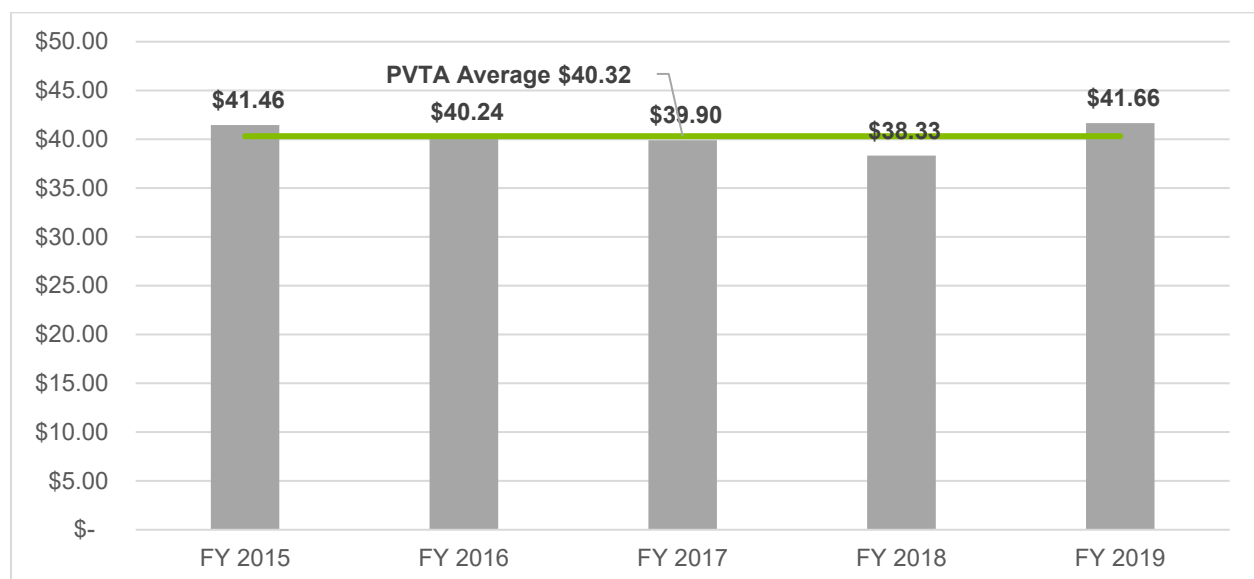
**Figure 118. Demand Response Cost per Revenue Mile by Route (FY 2019)**



Source: PVTA

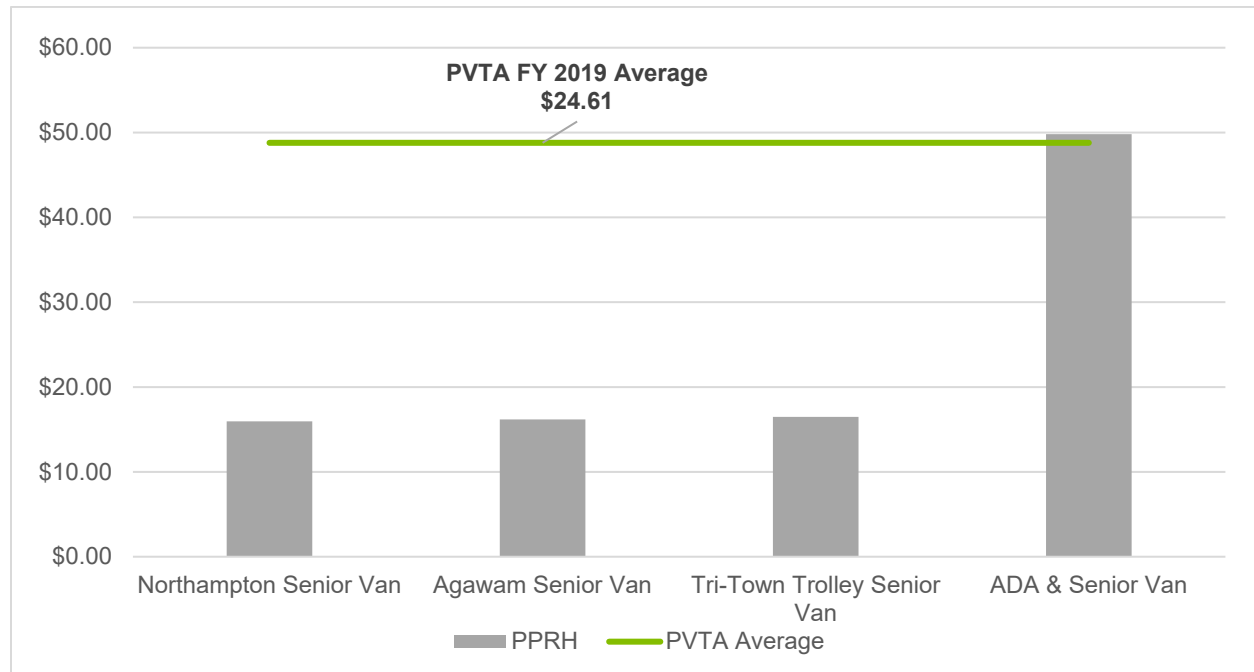
PVTA's demand response average cost per revenue hour ranged from \$38 and \$41 between FY 2015 and FY 2019, with an average value of was \$40.32 per revenue hour (Figure 119). The highest cost per revenue hour was reported in FY 2019, a 0.5 percent increase from FY 2015. On a service level, in FY 2019, the average cost per revenue hour was \$48.79, which is primarily driven by the cost of ADA and region-wide senior van service, at three times the costs of Northampton, Agawam, and Tri-Town Trolley senior van service (Figure 120).

**Figure 119. Demand Response Cost per Revenue Hour (FY 2015–FY 2019)**



Source: MassDOT BlackCat Data

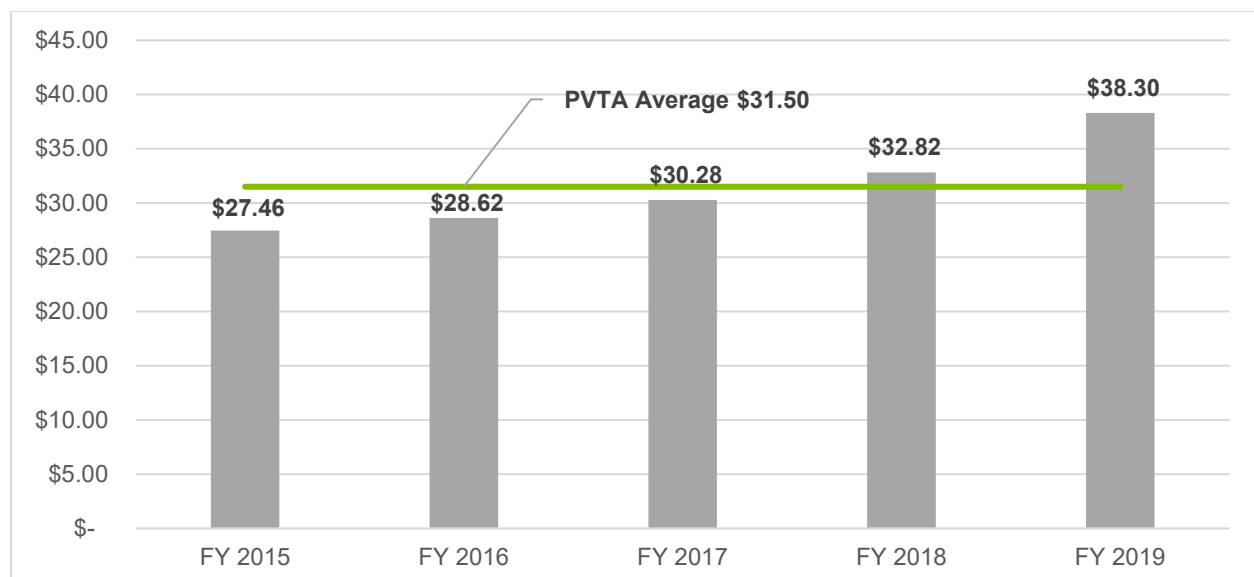
**Figure 120. Demand Response Cost per Revenue Hour by Route (FY 2019)**



Source: PVTA

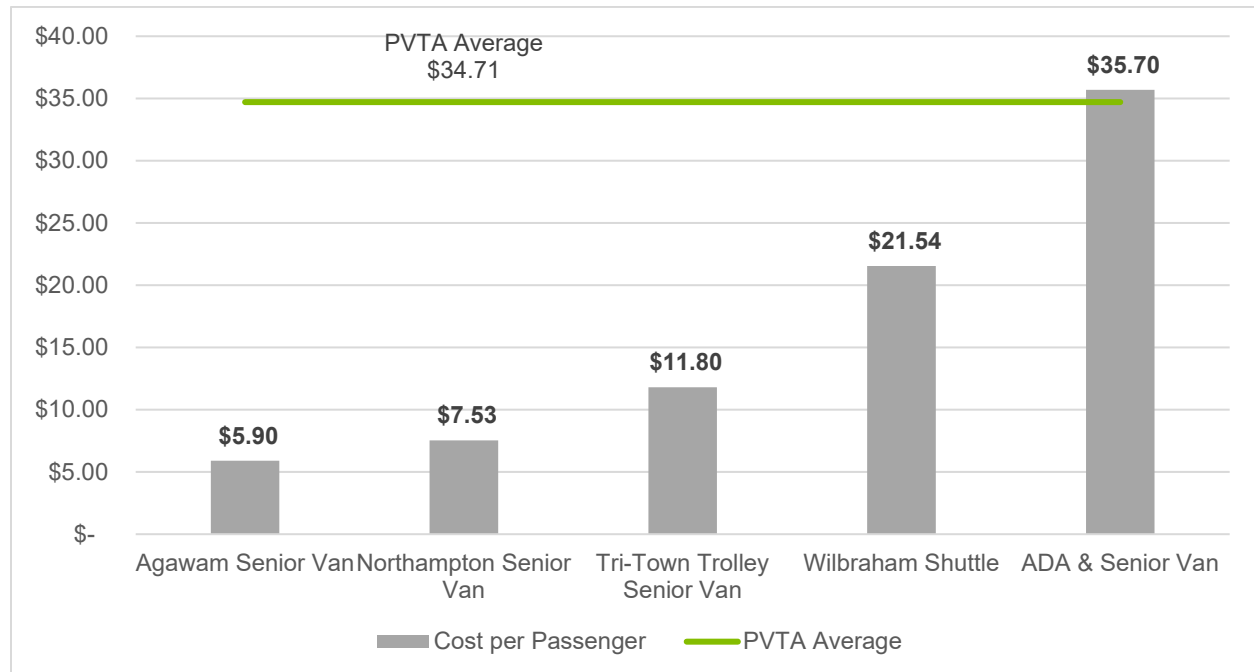
PVTA’s demand response cost per passenger increased by 39.4 percent from \$27.46 in FY 2015 to \$38.30 in FY 2019 (Figure 121). This is a cost per passenger increase of 39.4 percent across five fiscal years. Over time the cost of service has increased while the number of demand response passengers has decreased, thus driving the cost per passenger upward. In FY 2019, the average cost per passenger was \$38.30. The lowest cost per passenger was on Agawam Senior Van service; however, it also had the lowest overall cost and number of passenger as the service was recently introduced. The Wilbraham Shuttle had the second highest cost per passenger (\$21.54) following behind the ADA and region-wide senior van service (\$35.70) (Figure 122).

**Figure 121. Demand Response Cost per Passenger (FY 2015–FY 2019)**



Source: MassDOT BlackCat Data

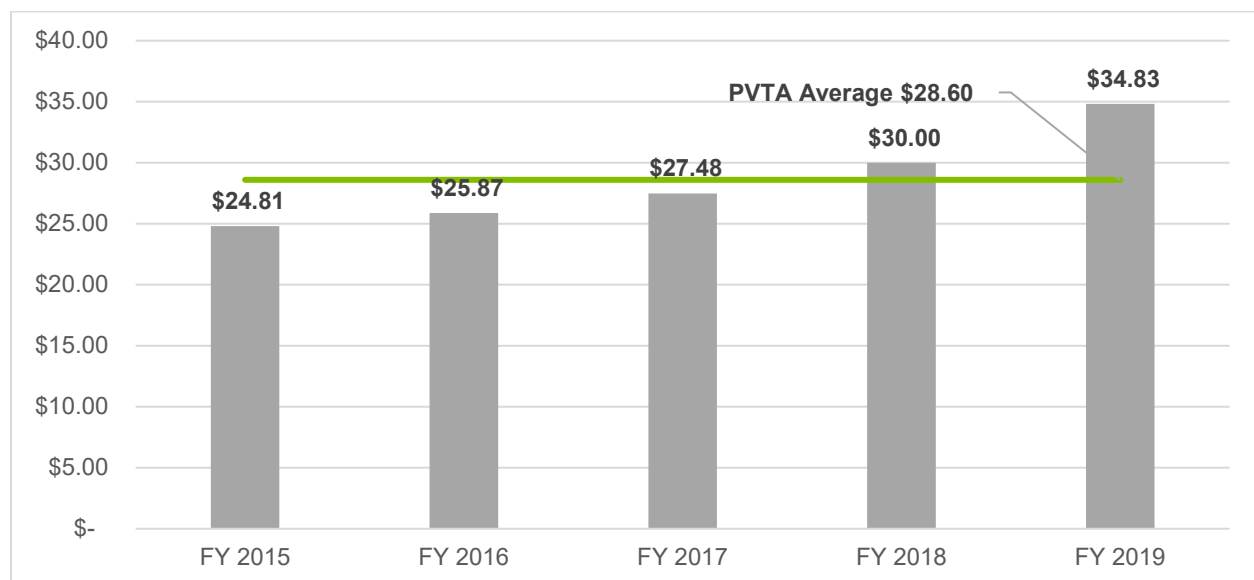
**Figure 122. Demand Response Cost per Passenger by Route (FY 2019)**



Source: PVTA

Between FY 2015 and FY 2019 the subsidy per passenger for PVTA demand response increased by \$10.00 from \$24.81 to \$34.83 (Figure 123). Additionally, the farebox recovery decreased from FY 2015 to FY 2018, but began to increase slightly again in FY 2019 (Figure 124). On average, PVTA demand response services recover about 9.2 percent of farebox revenue. The average subsidy per passenger for FY 2019 was \$31.67 and farebox recovery of 8.8 percent.<sup>60</sup>

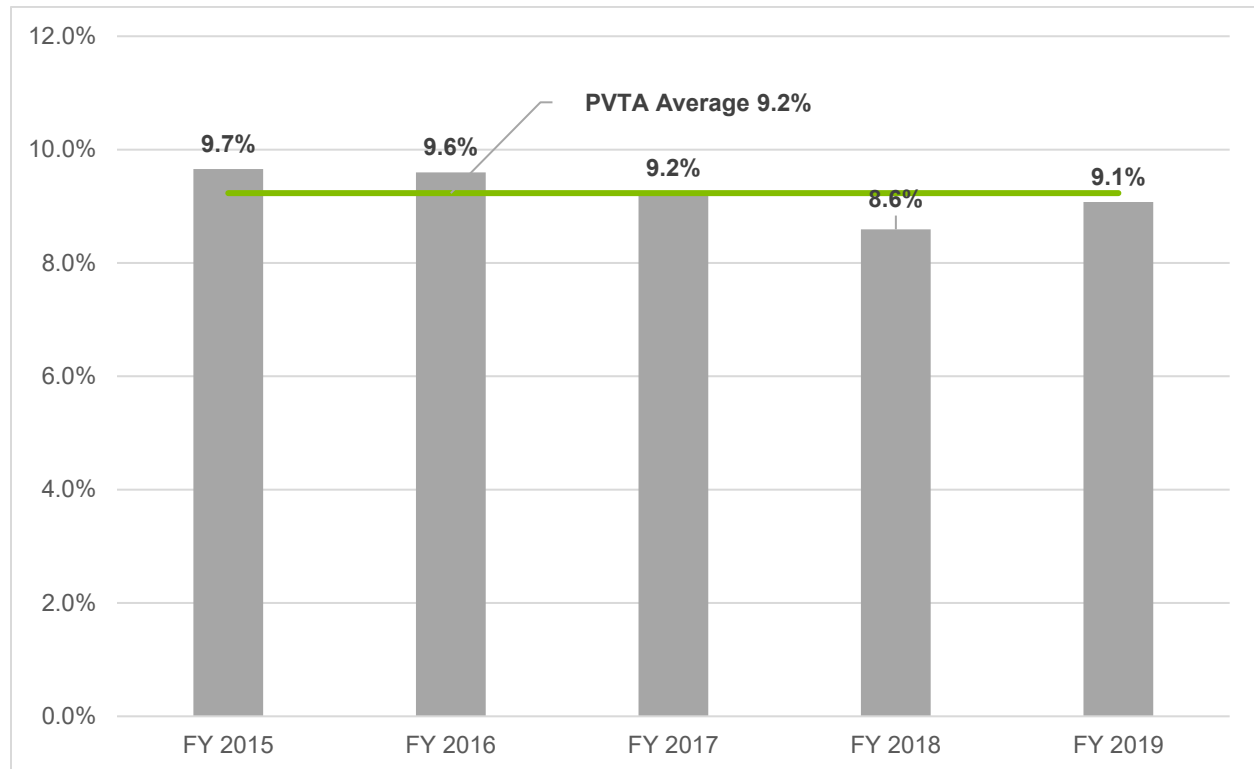
**Figure 123. Demand Response-Subsidy per Passenger (FY 2015–FY 2019)**



Source: MassDOT BlackCat Data

<sup>60</sup> Data were not available for a demand response route/service level analysis for subsidy per passenger or farebox recovery as the data for all services are incorporated into the ADA and region-wide senior van service for FY 2019.

**Figure 124. Demand Response Farebox Recovery (FY 2015–FY 2019)**



Source: MassDOT BlackCat Data

### Capacity

Capacity examines the ability of a system to handle the passenger demand. When demand exceeds capacity customers can be denied trips or experience an unpleasant trip.

### ADA Paratransit and Demand Response

Capacity constraints can be indicated through denied and missed trips, long telephone hold times, and OTP. High levels of cancellations and no-shows can create a strain on the system and lead to capacity issues as well. Table 85 and Table 86 summarize the ADA paratransit and non-demand response capacity analysis, respectively, from FY 2015 to FY 2019. As shown in Table 85, ADA paratransit trips per passenger increased from FY 2015 to FY 2018 then decreased in FY 2019 with 94.73 trips per passenger. Capacity analysis shows a declining trend in the trips per passenger for demand response non-ADA service. The demand response non-ADA trips per passenger increased from 22.77 trips per passenger in FY 2018 to 24.11 in FY 2019 (Table 86).

**Table 85. ADA Paratransit Capacity Analysis (FY 2015–FY 2019)**

ADA Paratransit	2015	2016	2017	2018	2019
Trips/Passenger	85.96	99.58	98.97	103.09	94.73
Unique Passengers	2,442	2,179	2,199	2,158	2,063
% Denied Trips	0.06%	0.08%	0.06%	0.07%	0.34%
% Missed Trips	N/A	N/A	0.06%	0.10%	0.21%

<b>ADA Paratransit</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
% No-show	2.33%	2.57%	2.57%	2.66%	2.89%
% Late Cancellation	2.39%	2.80%	3.05%	2.65%	2.45%
% Same Day Cancellation	12.66%	12.21%	12.32%	12.14%	12.89%

Source: PVTA

**Table 86. Demand Response Non-ADA Capacity Analysis (FY 2015–FY 2019)**

<b>Demand Response Non-ADA</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Trips/Passenger	29.85	35.83	26.26	22.77	24.11
Unique Passengers	2,477	2,398	2,065	1,799	1,600
% Denied Trips	0.10%	0.10%	0.27%	0.21%	0.34%
% Missed Trips	N/A	N/A	0.11%	0.21%	0.30%
% No-show	3.90%	4.08%	3.89%	3.87%	3.99%
% Late Cancellation	2.43%	2.99%	3.21%	2.89%	2.27%
% Same Day Cancellation	34.03%	27.96%	29.74%	27.37%	24.75%

Source: PVTA

FTA defines a denial as a trip requested at least a day prior that the agency cannot provide or is outside of the 1-hour negotiation window. It also includes round-trip requests where the agency can only provide one leg of the trip; if one portion is taken then it equates to one denial and if the entire trip is not taken then two denials. This applies specifically to ADA complementary paratransit service, but PVTA applies the definition to all demand response trips. The percentage of denied trips increased over the past 5 years, averaging 0.34 percent in FY 2019 for both ADA paratransit and demand response non-ADA services.

Missed trips are defined as trips that do not take place at the fault of the agency but were requested, confirmed, and scheduled. This includes leaving before the beginning of the pick-up window, not waiting the required wait time, arriving after the pick-up window is over, and departing without the rider or not arriving at all. PVTA further clarifies that any trip that arrives outside the 20 minute pickup window is also a missed trip. In FY 2019, the percentage of missed trips was 0.21 percent and 0.30 percent for ADA paratransit and demand response non-ADA services, respectively.

No-shows are defined as incidents when passengers are not at the scheduled pick-up locations during the 20-minute window in order to board within 5 minutes of the vehicle arriving, and when passengers cancel at the door or wave away the driver who has arrived at the scheduled pick-up time and location. No-shows also include late cancels when a passenger cancels trips less than 1 hour prior to their scheduled 20-minute pick-up window. In FY 2019, PVTA averaged 21.7 no-shows per day, which represents 2.8 percent of overall ridership and 3.99 percent of demand response non-ADA ridership.

While it is anticipated that some level of cancellations will exist, high percentages of same-day cancellations can put strain on a system and lead to increased costs. Trip cancellations are required no later than 1 hour before the start of the pick-up window. Trip changes are also considered cancellations. Failure to cancel trips at least 1 hour before the scheduled 20-minute

pick-up window results in a late cancel. Same day cancels are defined as incidents when passengers cancel trips more than 60 minutes or more before the 20-minute pickup window on the day of service. The percentage of late cancellations for ADA paratransit increased in FY 2017 and decreased in FY 2018 and FY 2019, while the percentage of same day cancellation increased over 5 years (Table 85). The percentages of late cancellation and same day cancellations for demand response non-ADA service have been declining over the past 5 years.

### Fixed Route

Capacity is measured based on overloads and the number of trips where crowding exists. UMTS reports overloads in their monthly reports to PVTA, but they are only instances of overloads, not the total number of passengers left behind. Even when a driver reports an overload, those passengers are typically captured by their helper buses each morning. PVTA also schedules the inbound Route 45 (Belchertown Center/UMass) and the inbound Route 33 buses so that they pick up overload passengers and act as “helpers” as well.

Table 87 summarizes the number of overload reports (but not the number of passengers impacted) for each year by route from FY 2015 to FY 2019. Over the past five fiscal years, the fixed route overload reports decreased by 50 percent from 839 overload reports in FY 2015 to only 417 overload reports in FY 2019. In general, routes that experienced a decline in ridership also had a decline in overloads and vice versa. The overload reports were lowest in FY 2017 with only 294 reports. As shown in the table, Route 30 accounts for almost half of the overloads each year.

**Table 87. Fixed Route Overload Reports (FY 2015–FY 2019)**

Route	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Route 30 - North Amherst/Old Belchertown Road	485	157	159	254	207
Route 31 - Sunderland/South Amherst	241	144	84	161	98
Route 33 - Shopper Shuttle/Puffers Pond	2	0	3	15	6
Route 34 - Orchard Hill	53	26	26	69	68
Route 35 - Mullins Center	16	7	8	32	30
Route 36 - Atkins Corner/Olympia Drive	0	0	0	1	0
Route 38 - Mount Holyoke College/UMass	5	1	2	5	1
Route 39 - Smith/Hampshire	4	0	1	0	0
Route 45 - Belchertown Center/UMass	1	10	4	7	2
Route 46 - South Deerfield Center/UMass	0	0	0	0	0
Route 51- Helpers	32	9	7	8	5
TOTAL	839	354	294	552	417

Source: PVTA

PVTA has established a vehicle load standard of 100 percent of seating capacity for the off-peak period and 120 percent for the peak period for the maximum number of individuals on average over 1 hour, although individuals trips can exceed the average. This helps minimize standees,

providing a higher comfort level and increased safety for passengers. PVRTA monitors the percentage of trips above the peak load on a monthly basis and flags any trip with more than 35 people onboard at any time as being overloaded. This method overestimates the percentage of trips exceeding the standard when 40 foot and articulated buses are on the route but does give a proxy for demand. The school helpers have the highest percentage of trips that reach a peak load. In the northern tier Routes 30 and 31 have the highest percentage of trips above the standard at 14.4 percent and 9.6 percent, respectively, when school is in session. In the southern tier, Routes B7 and P21 are the highest at 6.6 percent and 6.7 percent, respectively.

## Customer Service

Table 88 shows the annual percentage of calls abandoned and percentage of calls answered within 2 minutes for ADA paratransit and demand response non-ADA services from FY 2015 to FY 2019. The percentage of calls abandoned represents the percentage of total calls to a telephone line at the reservation service or customer service center in which the customer hangs up prior to speaking with an agent. A high number of abandoned calls may indicate insufficient staffing. As shown in the table the percentage of calls abandoned was in the 0.02 to 0.03 percent range from FY 2015 to FY 2018 and increased significantly to 7.6 percent in FY 2019. The percentage of calls answered within 2 minutes has been declining in the past five fiscal years with the lowest at 92.4 percent in FY 2019.

**Table 88. FY 2015–FY 2019 Annual Percent of Calls Abandoned and Calls Answered (ADA Paratransit and Demand Response non-ADA)**

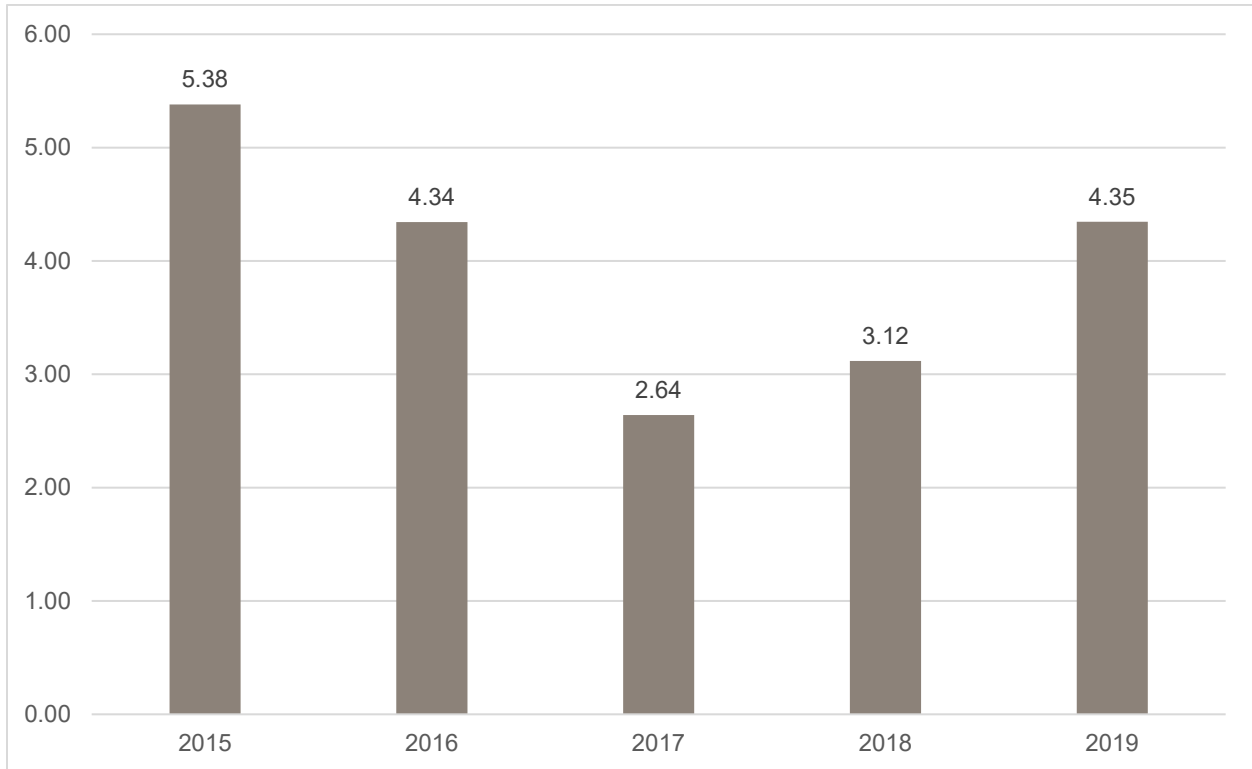
<b>Fiscal Year</b>	<b>% of Calls Abandoned</b>	<b>% of Calls Answered Within 2 Minutes</b>
FY 2015	0.03%	99.7%
FY 2016	0.02%	98.5%
FY 2017	0.03%	99.4%
FY 2018	0.02%	97.9%
FY 2019	7.60%	92.4%

*Source: PVRTA*

Valid complaints are used to assess the level of customer service provided. The number of complaints received is determined to be valid after a thorough investigation. Figure 125 shows the number of valid complaints per 100,000 passenger trips for PVRTA fixed routes, ADA paratransit, and demand response non-ADA services from FY 2015 to FY 2019. As shown in the figure, FY 2015 had the highest valid complaints per 100,000 passenger trips with 5.38 valid complaints per 100,000 passenger trips. FY 2017 had the lowest with 2.64 complaints per 100,000 passenger trips. From FY 2015 to FY 2017, the valid complaints per 100,000 passenger trips decreased by 51 percent but has since increased by 39 percent. The valid complaints per 100,000 passenger trips increased by 32 percent between FY 2017 and FY 2019. In FY 2019, PVRTA set an internal valid complaints per 100,000 passenger goal of 2.38, which they exceeded in FY 2019 by 1.97.



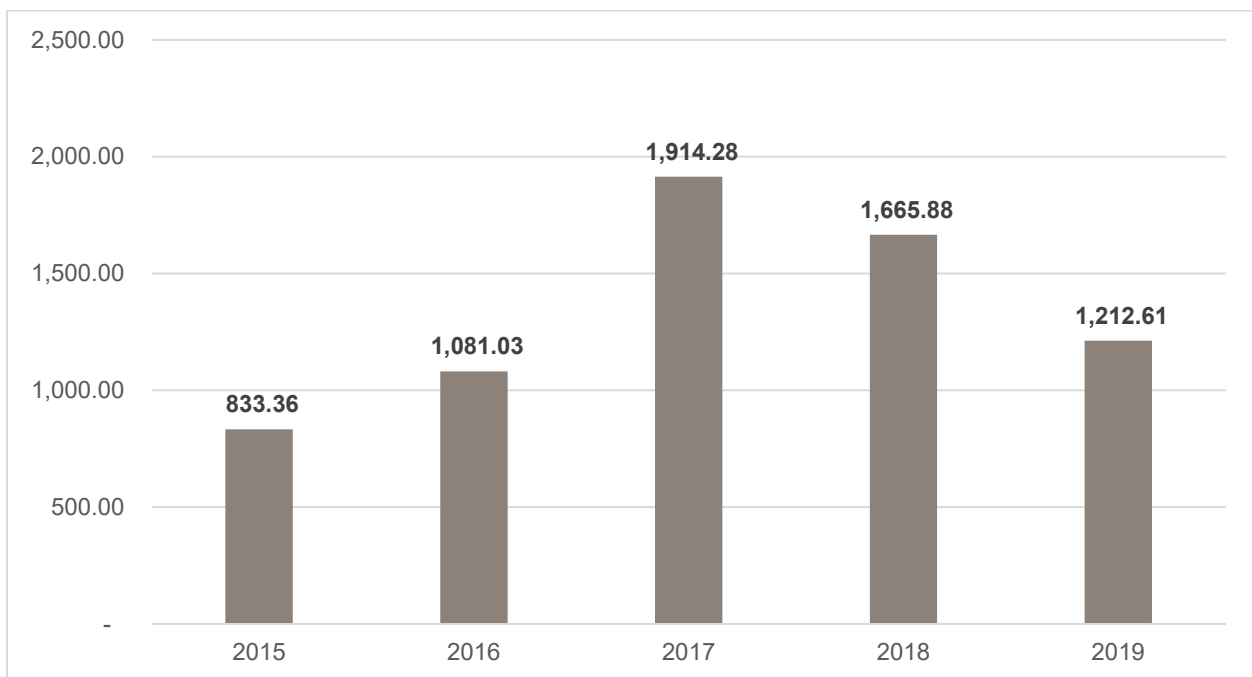
**Figure 125. Valid Complaints per 100,000 Passenger Trips (2015–2019)**



Source: PVTA

Figure 126 shows the number of valid complaints per vehicle service hour received for PVTA fixed routes, ADA paratransit, and demand response non-ADA services from FY 2015 to FY 2019.

**Figure 126. Vehicle Service Hours per Valid Complaint (2015–2019)**

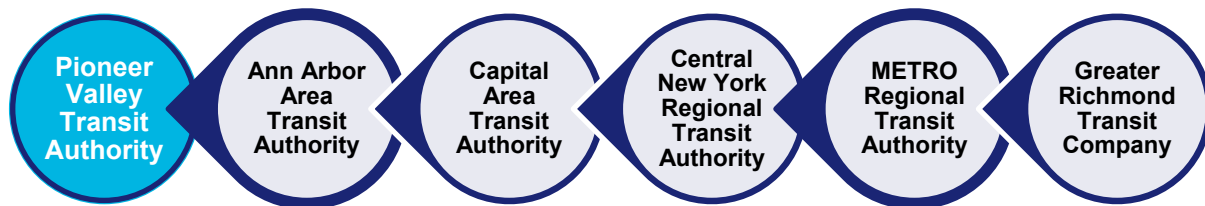


Source: PVTA

## Peer Evaluation

As part of the comprehensive regional transit plan update a peer review was prepared to gain an understanding of how similar systems are operating transit service. This peer review explores five transit services that operate in similar conditions. Although each transit system and its routes are unique, the similarities and differences in these five peers provide useful insight into how transit service is provided and operated throughout the country. The list of peers was developed based on areas with similar demographics and service levels (Figure 127).

**Figure 127. PVTA Peers**



Data were gathered from the NTD and the U.S. Census, comparing 2018 agency profiles. Table 89 summarizes for each agency the census data, including town name, state, counties served, population, population density, population growth rate, and percent of individuals living at or below the poverty line. Population density helps in understanding whether the communities in the service area are densely or sparsely populated since denser communities can be served more efficiently by transit. Population growth rate indicates whether communities are growing rapidly, moderately, or slowly. Transit agencies serving communities with high population growth rate have different challenges than the agencies serving communities with moderate growth rates or communities that are decreasing in size. Percent of poverty level helps in understanding income level in the service area as people with lower income level are more likely to depend on public transportation.

### Peer Systems Census Analysis

In 2018, as shown in the table, the PVTA service area had a population of 626,594 people, the second largest in the peer group, albeit spread across a larger area as indicated by the population density of 1,798 persons per square mile, the second lowest in the peer group. PVTA had a population growth rate of 8.47 percent and poverty rate of 16.5 percent, ranking in the 60<sup>th</sup> and 40<sup>th</sup> percentile in the peer group. While the table shows aggregate service area values, it is important to note that there is great variation in densities, growth rates, and poverty rates between each community in PVTA's service area, and likewise for the peers.

**Table 89. Peer Systems Census Data (2018)**

System	Town	State	Counties Served	Population	Population Density	Population Growth Rate	Percent Below Poverty
<b>Pioneer Valley Transit Authority (PVRTA)</b>	<b>Springfield</b>	<b>MA</b>	<b>Hampshire and Hampden</b>	<b>626,594</b>	<b>1,798</b>	<b>8.47</b>	<b>16.5%</b>
Ann Arbor Area Transportation Authority (TheRide)	Ann Arbor	MI	Ann Arbor, Ypsilanti, & Washtenaw County Townships	320,990	2,012	10.25	16.5%
Capital Area Transportation Authority (CATA-MI)	Lansing	MI	Ingham, Eaton, and Clinton	322,236	2,037	7.76	20%
Central New York Regional Transportation Authority (Centro)	Syracuse	NY	Onondaga, Oswego, Cayuga, and Oneida	409,002	2,098	1.58	15.9%
METRO Regional Transit Authority	Akron	OH	Summit	568,131	1,746	1.57	14.9
Greater Richmond Transit Company (GRTC)	Richmond	VA	City of Richmond; Henrico, Hanover, and Chesterfield	1,010,680	2,053	12.54	13%

Source: 2018 NTD

## Peer Systems Operating Analysis

An overview of the operating data of PVRTA and the five peer transit agencies is provided in Table 90; statistics include all modes operated. PVRTA has the highest ridership among the peer group and given it has the second largest service area also operated the second highest amount of service in terms of revenue miles and hours. In terms of operating budget, PVRTA has a budget less than all but one in its peer group. Put together, PVRTA operates the second largest service with an operating budget considerably lower than its peers. In FY 2018, PVRTA generated \$7,011,521, the second lowest revenue from passenger fares. However, PVRTA's farebox revenue was 73 percent higher than METRO Regional Transit, which was the lowest in the peer group, and 6 percent and 8 percent lower than Ann Arbor Area Transportation Authority and Capital Area Transportation Authority, the next two highest among the peers, respectively.<sup>61</sup>

<sup>61</sup> Note that this revenue is based on what each agency reports to NTD as farebox revenue.

**Table 90. Peer Systems Operating Data (2018)**

<b>System</b>	<b>Ridership</b>	<b>% miles Demand Response</b>	<b>Operating Budget</b>	<b>Revenue Miles Operated</b>	<b>Revenue Hours Operated</b>	<b>Farebox Revenue</b>
<b>Pioneer Valley Transit Authority</b>	<b>11,223,169</b>	<b>44%</b>	<b>\$46,531,050</b>	<b>7,947,598</b>	<b>586,575</b>	<b>\$7,011,521</b>
Ann Arbor Area Transportation Authority	7,166,843	22%	\$39,907,398	6,512,248	442,158	\$7,649,229
Capital Area Transportation Authority	10,384,586	51%	\$46,634,224	6,430,485	459,095	\$7,458,477
Central New York Regional Transportation Authority	10,396,768	27%	\$69,295,258	6,129,219	498,399	\$14,967,833
METRO Regional Transit Authority	5,142,955	43%	\$51,722,064	6,016,822	443,459	\$4,052,602
Greater Richmond Transit Company	8,126,404	18%	\$50,453,119	11,337,313	600,397	\$10,003,819
<b>Peer Average</b>	<b>8,243,511</b>	<b>32%</b>	<b>\$51,602,412</b>	<b>7,285,217</b>	<b>488,702</b>	<b>\$8,826,392</b>

*Source: 2018 Urban Integrated NTD; 2018 NTD Agency Profiles for PVTA, Ann Arbor Area Transportation Authority, Capital Area Transportation Authority, Central New York Regional Transportation Authority, Centre Area Transportation Authority, and Greater Richmond Transit Company.*

## Peer Systems Performance

### Service Effectiveness

The peer system service effectiveness for passengers per mile and passengers per mile compared to PVTA is outlined in Table 91. PVTA exceeds the peer group average in terms of productivity for passengers per mile (Figure 128) and passengers per hour (Figure 129). Additionally, PVTA exceeds the peer group average for each measure. Only two peers are performing slightly more effectively than PVTA, the Capital Area Transportation Authority and Central New York Regional Transportation Authority. Overall, these measures are a function of the amount of service provided by each transit agency and vary based on the geographic spread of the area and average operating speed.

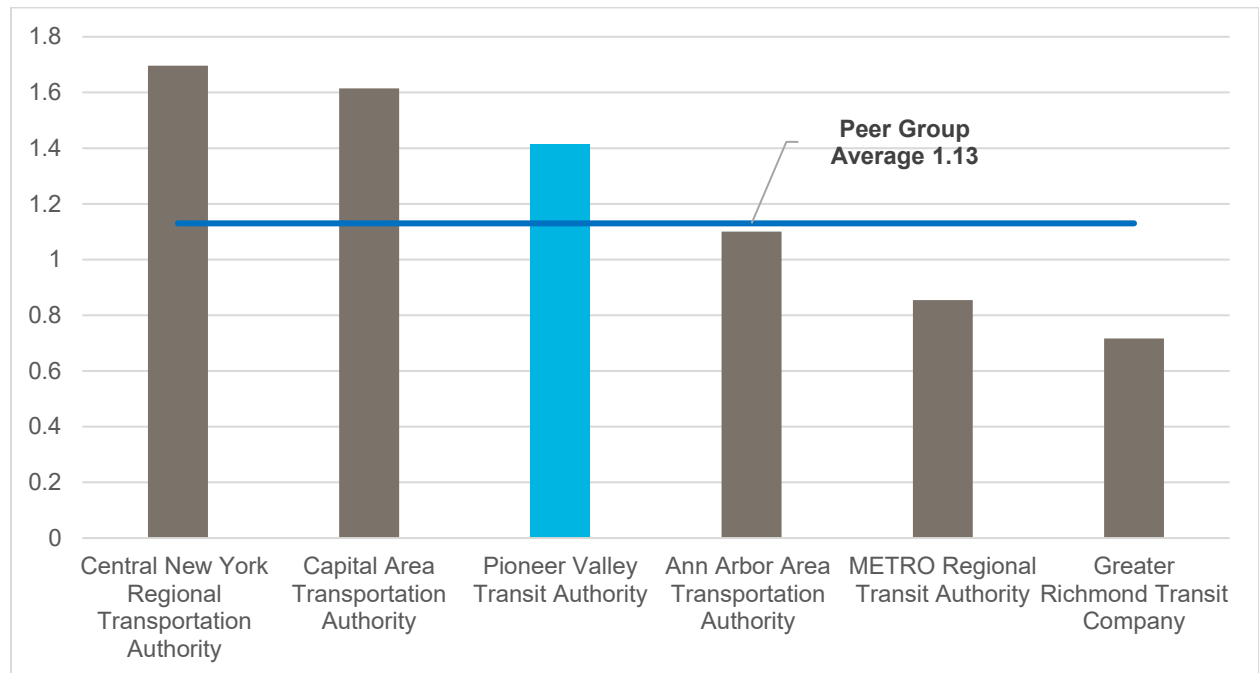
**Table 91. Peer Systems Service Effectiveness**

<b>Peer</b>	<b>Passengers/ Mile</b>	<b>Passengers/ Hour</b>
<b>Pioneer Valley Transit Authority</b>	<b>1.41</b>	<b>19.13</b>
Ann Arbor Area Transportation Authority	1.10	16.21

Peer	Passengers/ Mile	Passengers/ Hour
Capital Area Transportation Authority	1.61	22.62
Central New York Regional Transportation Authority	1.70	20.86
METRO Regional Transit Authority	0.85	11.60
Greater Richmond Transit Company	0.72	13.54
Peer Group Average	1.13	16.87

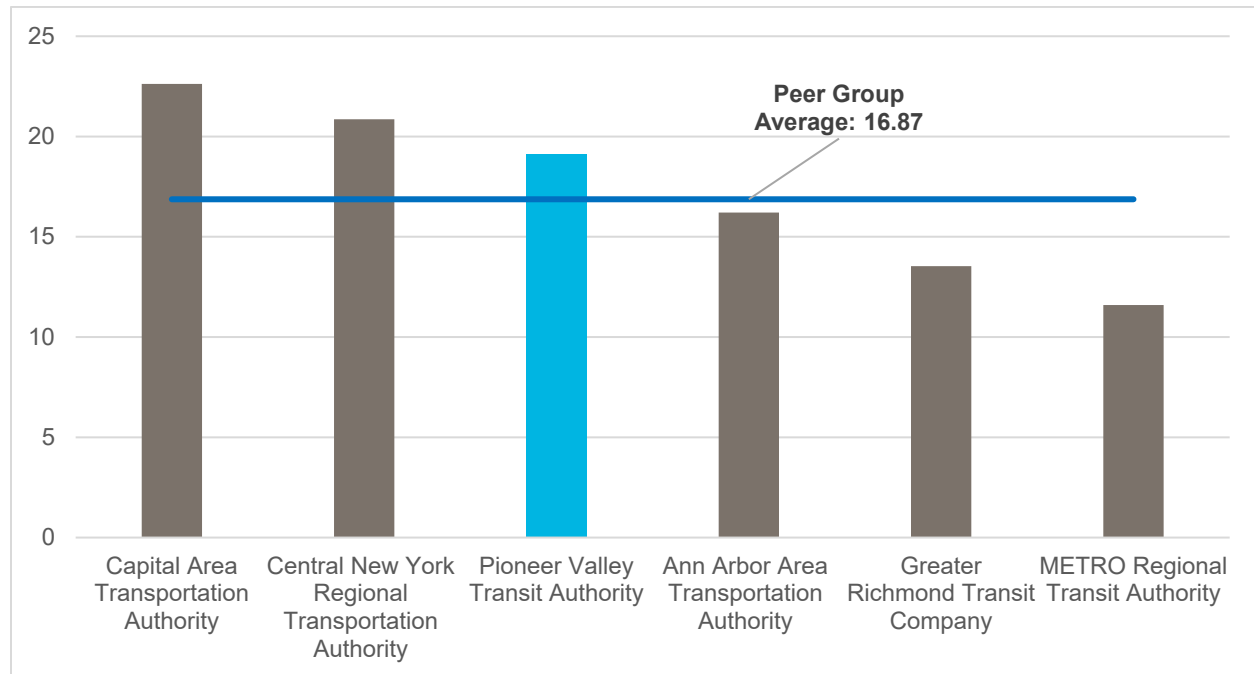
Source: 2018 NTD Agency Profiles

Figure 128. Peer Comparison: Passengers per Mile (2018)



Source: NTD

**Figure 129. Peer Comparison: Passengers per Hour (2018)**



Source: NTD

**Peer Comparison per Capita Measures**

A peer comparison of per capita measures is outlined in Table 92. Ridership per capita gives a representation for how many public transit trips the population in the area takes yearly. Among its peers, PVTA had a ridership per capita of 17.91, which was below the peer average of 19.16, but exceeded two of its peers, METRO Regional Transit Authority and Greater Richmond Transit Company. This is to be expected given the low density of the PVTA service area. Revenue miles per capita and revenue hours per capita are the total annual miles and hours of transit service, respectively, traveled per person in the population in a given area. PVTA had a revenue miles per capita value of 12.68, and a revenue hours per capita of 0.94, which were both slightly below the group average of 14.95 and 1.06, respectively. This suggests that PVTA operates less service per person living its area compared to its peers. Lastly, speed can be an indicator of the type of area served where higher speeds indicate the service operates in a less congested area and lower speeds indicate operations under congested conditions. PVTA had a speed of 13.55 miles per hour, which is second lowest speed amongst its peers; indicating that PVTA service operates in many congested urban areas.

**Table 92. Peer Comparison per Capita Measures (2018)**

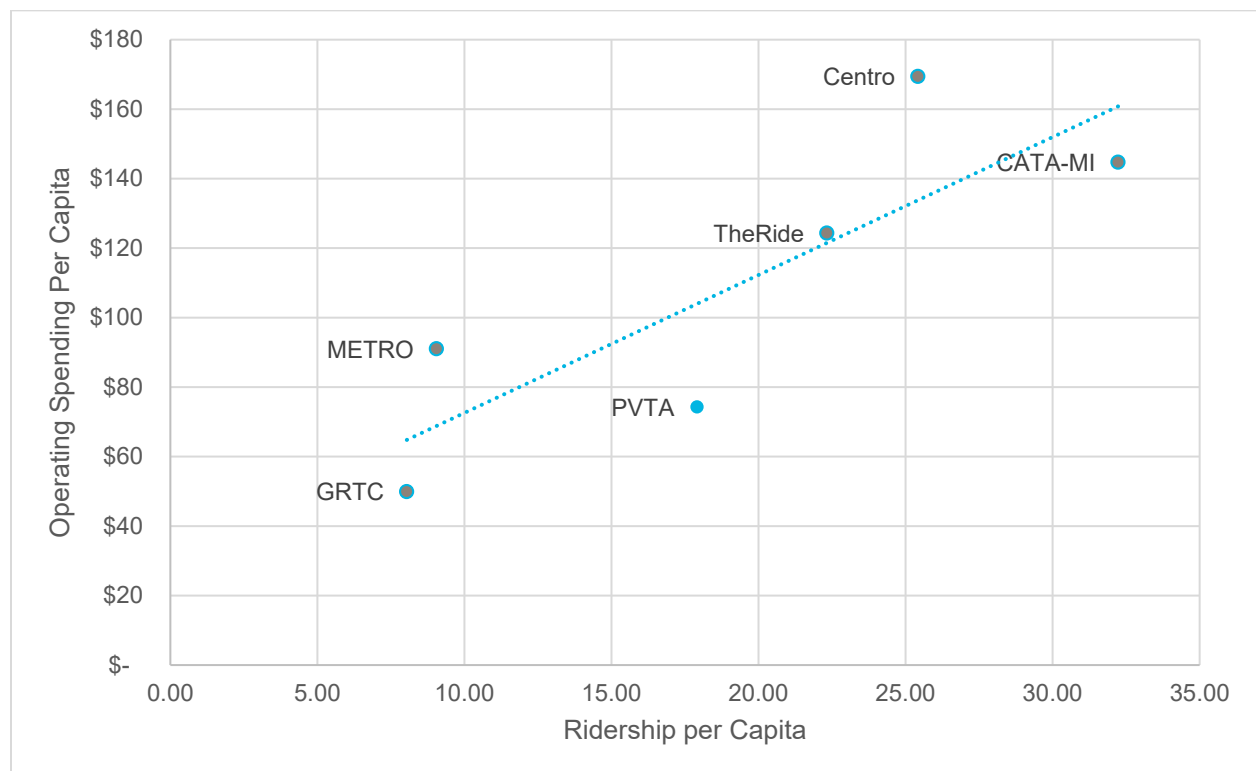
Peer	Ridership per Capita	Revenue Miles/ Capita	Revenue Hours/ Capita	Speed (miles/ hour)
<b>Pioneer Valley Transit Authority</b>	<b>17.91</b>	<b>12.68</b>	<b>0.94</b>	<b>13.55</b>
Ann Arbor Area Transportation Authority	22.33	20.29	1.38	14.73
Capital Area Transportation Authority	32.23	19.96	1.42	14.01
Central New York Regional Transportation Authority	25.42	14.99	1.22	12.30

Peer	Ridership per Capita	Revenue Miles/ Capita	Revenue Hours/ Capita	Speed (miles/ hour)
METRO Regional Transit Authority	9.05	10.59	0.78	13.57
Greater Richmond Transit Company	8.04	11.22	0.59	18.88
Peer Group Average	19.16	14.95	1.06	14.51

Source: 2018 NTD Agency Profiles

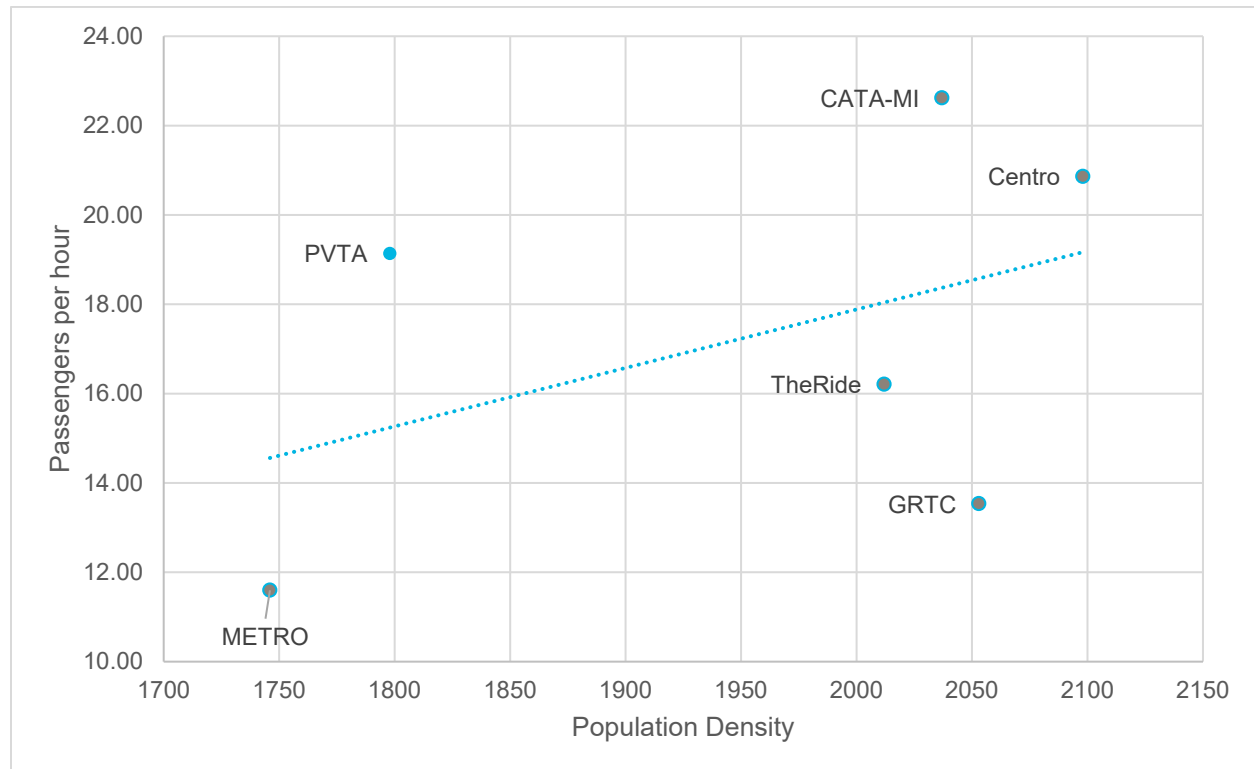
Among peer regions, there is a connection between transit spending, level of service, and ridership. CATA-MI, Centro, and TheRide spend the most in transit and in turn have the highest level of service (Figure 130). PVTA has the second lowest transit spending per capita, after GRTC. Additionally, passengers per hour and population density were compared. Different levels of service can affect total revenue hours per capita. In comparison to its peers, in 2018, PVTA had a higher number of passengers per hour despite operating in a region with a lower population density (Figure 131).

**Figure 130. Peer Analysis Operating Spending per Capita versus Ridership per Capita (2018)**



Source: 2018 Urban Integrated NTD

**Figure 131. Peer Analysis: Passengers per Hour versus Density (2018)**



Source: 2018 Urban Integrated NTD

**Financial Performance**

Financial performance measures include cost per hour, cost per passenger, subsidy per passenger, farebox recovery, and spending per capita (Table 93). Financial measures show that PVTA is outperforming most of its peers and has the lowest cost per hour, cost per passenger, and subsidy per passenger. PVTA’s farebox recovery seems low among the peers because, while PVTA operates one of the most cost effective services, they collect fewer fares per passenger from the farebox because of contracts with various organizations that cover the cost of fares for either the organization’s members or the general public depending on the route. Additionally, in FY 2019 PVTA had a farebox recovery that exceeded the state (15.4 percent) and national averages (22.1 percent). However, farebox recovery is reduced systemwide because of ADA demand response service. Lastly, PVTA spends less money per capita than most of its peers and is below the peer group average of \$109. This combined with the higher passenger per hour is an indication of PVTA’s strong financial performance.

**Table 93. Peer Systems Financial Performance**

Peer	Cost/ Hour	Cost/ Passenger	Subsidy/ Passenger	Farebox Recovery	Spending per Capita
<b>Pioneer Valley Transit Authority</b>	<b>\$79.33</b>	<b>\$4.15</b>	<b>\$3.52</b>	<b>15.1%</b>	<b>\$74</b>
Ann Arbor Area Transportation Authority	\$90.26	\$5.57	\$4.50	19.2%	\$124
Capital Area Transportation Authority	\$101.58	\$4.49	\$3.77	16.0%	\$145



Peer	Cost/ Hour	Cost/ Passenger	Subsidy/ Passenger	Farebox Recovery	Spending per Capita
Central New York Regional Transportation Authority	\$139.04	\$6.67	\$5.23	21.6%	\$169
METRO Regional Transit Authority	\$116.63	\$10.06	\$9.27	7.8%	\$91
Greater Richmond Transit Company	\$84.03	\$6.21	\$4.98	19.8%	\$50
<b>Peer Group Average</b>	<b>\$105.59</b>	<b>6.26</b>	<b>5.19</b>	<b>17%</b>	<b>\$109</b>

Source: 2018 NTD Agency Profiles for PVTA, Ann Arbor Area Transportation Authority, Capital Area Transportation Authority, Central New York Regional Transportation Authority, Centre Area Transportation Authority, and Greater Richmond Transit Company.

## Peer Systems Technology Deployment

Technology today serves a variety of functions in many aspects of everyday life, including transit. A review of the peer systems' technology provides an understanding of trends within the industry for similar size agencies. This section explores three primary sectors of technology: schedule information, fare payment, and ability to stay connected. Table 94 provides a description of technology deployment in each of the peer services.

**Table 94. Technology Deployment in the Peer Systems**

Peer	AVL/ Real Time Info	Google Transit	Smart Card	Mobile Payment	Wi-fi On Board	Microtransit
Pioneer Valley Transit Authority	Yes	Yes	Yes	Yes	No	Yes
Ann Arbor Area Transportation Authority	Yes	Yes	No	No	No	No
Capital Area Transportation Authority	Yes	Yes	No	No	No	No
Central New York Regional Transportation Authority	Yes	Yes	No	No	Yes	No
METRO Regional Transit Authority	Yes	Yes	No	Yes	No	No
Greater Richmond Transit Company	Yes	Yes	No	Yes	No	No

PVTA is one of three transit agencies, in addition to the Greater Richmond Transit Company and METRO Regional Transit Authority, to have deployed mobile payments. PVTA recently deployed MassDOT BusPlus, allowing passengers to buy tickets on their smart phone. Only one peer, the Central New York Regional Transportation Authority offers wi-fi onboard their buses. Microtransit is a variant of demand response where users are able to request, and often pay for their trips, using a mobile app. While there are varying models the service typically provides curb-to-curb service that is on-demand. None of the peers have piloted a microtransit project.

## Appendix C Outreach Backup Materials

A public survey, driver survey, and interviews were conducted to engage the community and operators in a discussion of transportation needs and how PVTA can best serve the community into the future. The results of each are presented in the following sections.

### Public Survey

As a result of the COVID-19 pandemic and the associated social distancing requirements, in-person public outreach was cancelled and an online, mobile-friendly survey was created to reach as many people as possible who travel in and around the 24 communities they serve within the Pioneer Valley area. The goal of this survey was to engage the community in a discussion of transportation needs and how it can best serve the community into the future. The survey went live to the public on June 15, 2020, and remained open until August 3, 2020. The following section contains an analysis of the survey results for the duration of the survey.

### Methodology

Through a series of conference calls and meetings with the AECOM team and PVTA staff, a series of survey questions were prepared to target both riders of the PVTA system, both fixed bus and demand response, and those who do not use the service. The development of the questions began in February 2020 and include questions about residency, frequency of travel with PVTA, primary mode of transportation, preference of service extensions, possible improvements, and included a set of optional demographic questions.

PVTA helped the AECOM team spread the word about the survey through stakeholder email blasts that included a QR code, short link, and advertising graphic for use on websites and social media accounts. All the survey promotional content included a brief description of the purpose of the survey, a link to the survey, and a QR code, which when scanned by a smart phone, provided a direct link to the survey. In addition, PVTA posted links to the survey on their social media accounts, Twitter, and Facebook to reach a larger audience. Flyers and signs were posted at PVTA transportation hubs and on vehicles for passengers to read while riding. The AECOM team prepared and PVTA distributed a press release to local media outlets and local towns, colleges, and universities for additional coverage. Using the automated phone system, PVTA set up pre-recorded calls to registered demand response riders to fill out the public survey online, provide feedback through the email address, or call the phone number and leave a voicemail.

To gather additional feedback from respondents who do not have access to a computer, smart phone, or other technology to complete the online survey, a Google Voicemail phone number was created. Those who called the phone number were greeted with a recording thanking them for their participation and asking for feedback about PVTA as a transportation resource to the region and their experiences as a rider, if applicable. A total of 41 voicemails were collected and are summarized in the report below. A Google email address was also created for those who preferred to submit their feedback in a typed format. No feedback was submitted via email. The Google Voicemail number and Gmail email address were included on each promotional material shared with the public and stakeholders, in both English and Spanish.

The AECOM team made a brief presentation to the PVTA Paratransit Council to introduce the purpose for the plan, the public survey, and the creation of the Google Voicemail phone number and Gmail email address. Phone interviews were set up for one-on-one interviews with council members by the AECOM team if desired and two interviews were held. The PVTA Paratransit Council members helped spread the word about the survey and encourage the public to submit feedback to the AECOM team for inclusion in the plan.

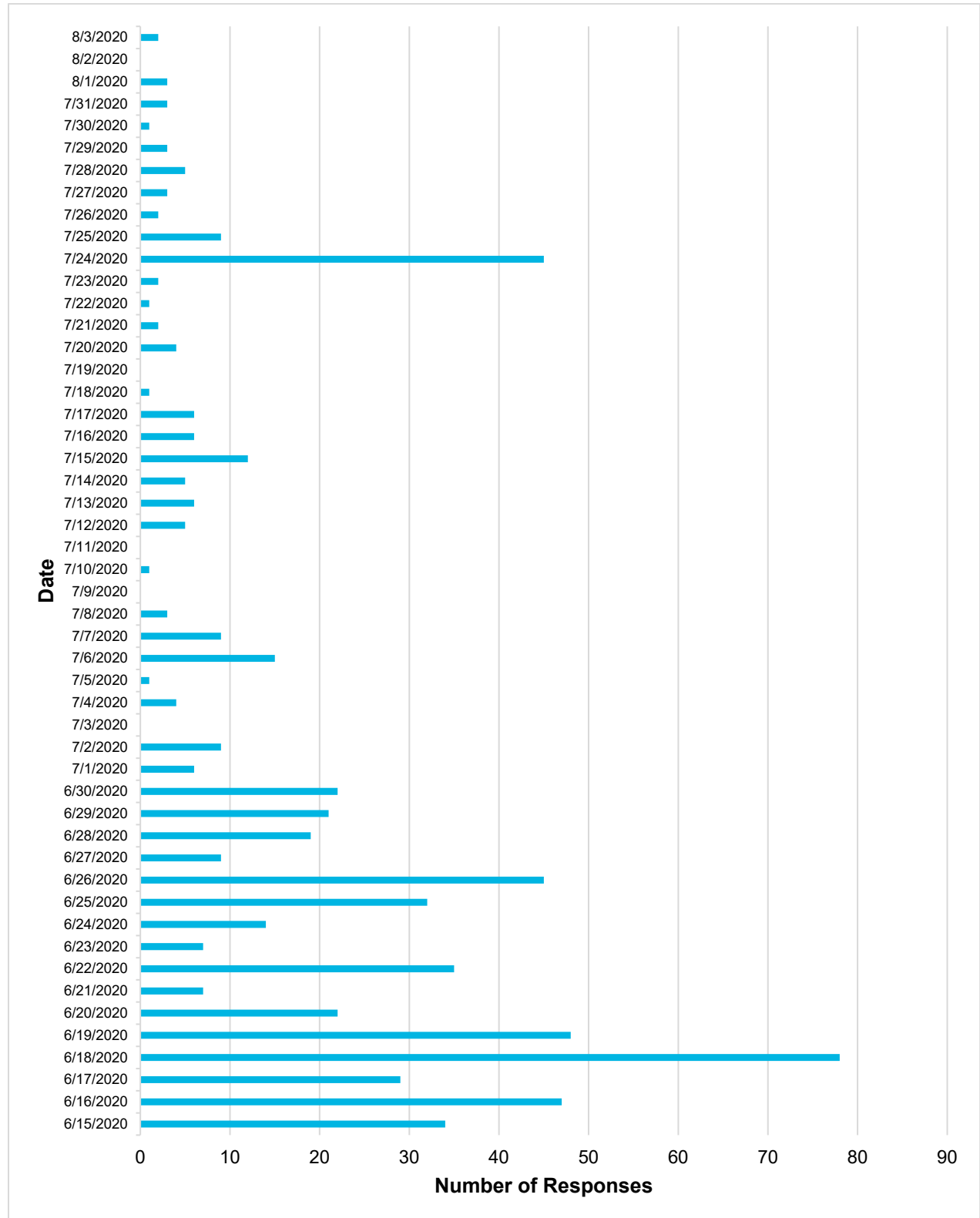
## Online Survey

As previously stated, the online survey opened on June 15, 2020, and was available through August 3, 2020. The survey was open to all individuals who live, work, or visit the area and was open to both riders and non-riders of the PVTA system. The survey was made available in both English and Spanish and included an initial question to determine whether the respondent is a current rider of PVTA or not.

## Responses

The survey received 643 responses, 452 completed surveys and 191 partially completed surveys. The peaks in responses shown in the following graph correlate with email blasts to stakeholder groups. A total of 544 respondents use PVTA services and 99 respondents do not ride with PVTA. Not all respondents answered all the survey questions. As such, the percentages in all figures are based on the number of responses received for that question rather than on the total number of responses.

**Figure 132. Survey Responses by Date**



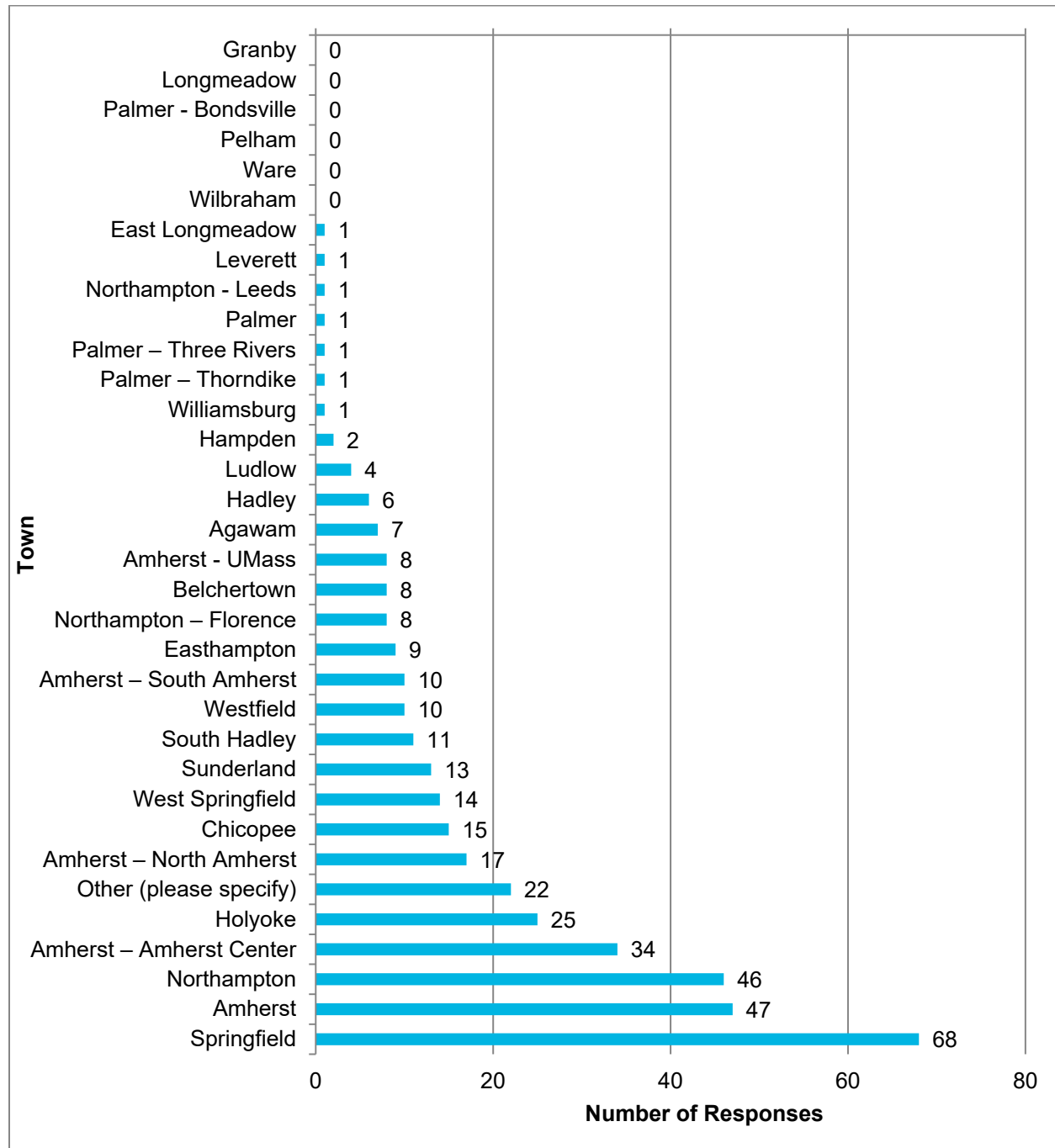
**Fixed Route Riders**

A total of 417 respondents use the PVTA fixed route bus service. Their survey responses are summarized below:

**1. Where do you live? (n = 369)**

The majority of respondents who use the PVRTA fixed route bus services live in Amherst (116 total). Of the neighborhoods within Amherst, 34 respondents live in Amherst Center, 17 live in North Amherst, 10 live in South Amherst, and 8 live at UMass. The remaining 47 respondents live in Amherst, not a specific neighborhood. Similarly, Northampton consists of various neighborhoods and a total of 55 respondents live in the town. Of the 55 total respondents, eight live in the Florence neighborhood, one lives in Leeds, and the remaining 46 live in Northampton, not a specific neighborhood. A total of 68 respondents live in Springfield. No respondents live in Granby, Longmeadow, Palmer (Bondsville), Pelham, Ware, or Wilbraham.

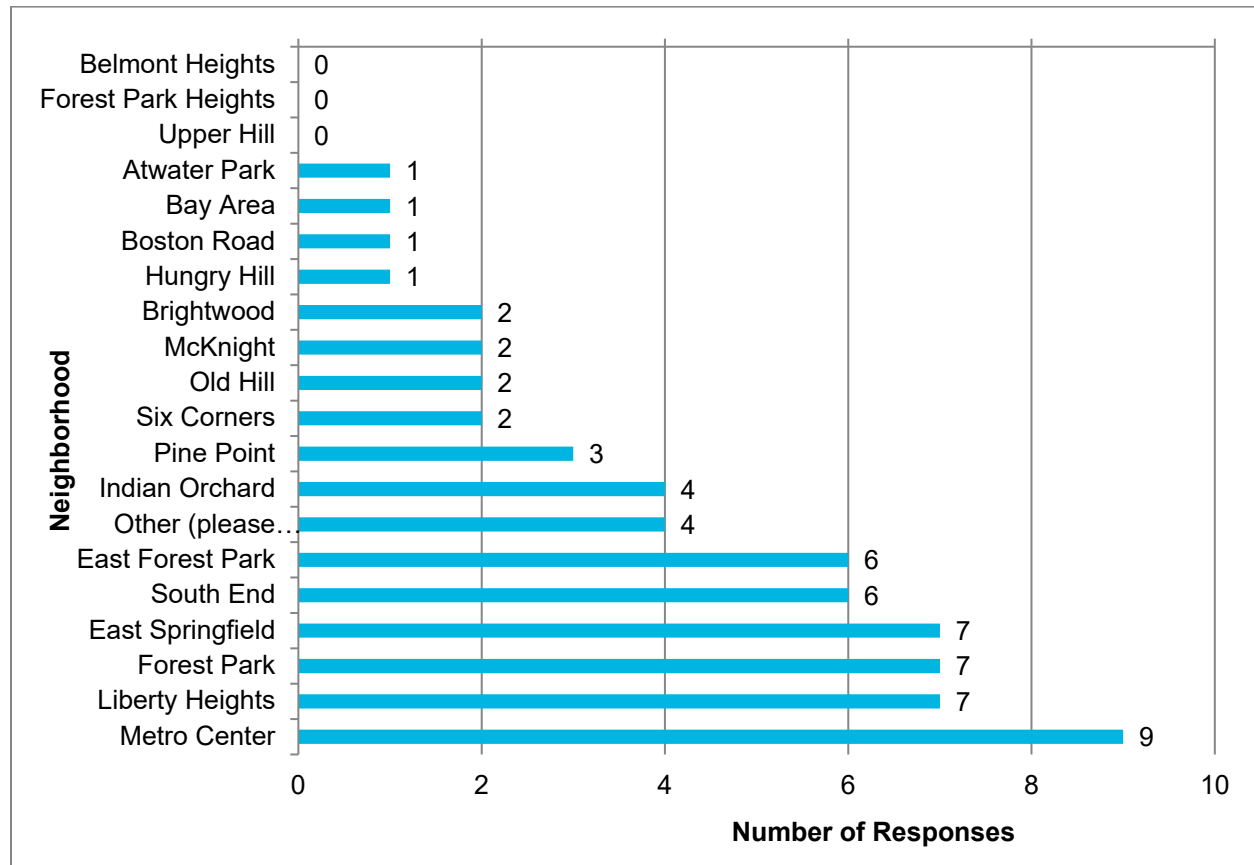
**Figure 133. Towns Where Respondents Live**



**2. What Springfield Neighborhood do you live in? (n = 61)**

Sixty-one of the respondents who live in Springfield provided additional information about the neighborhood in Springfield they live. Nine respondents live in the Metro Center neighborhood, seven respondents live in Liberty Heights, seven live in Forest Park, and seven live in East Springfield.

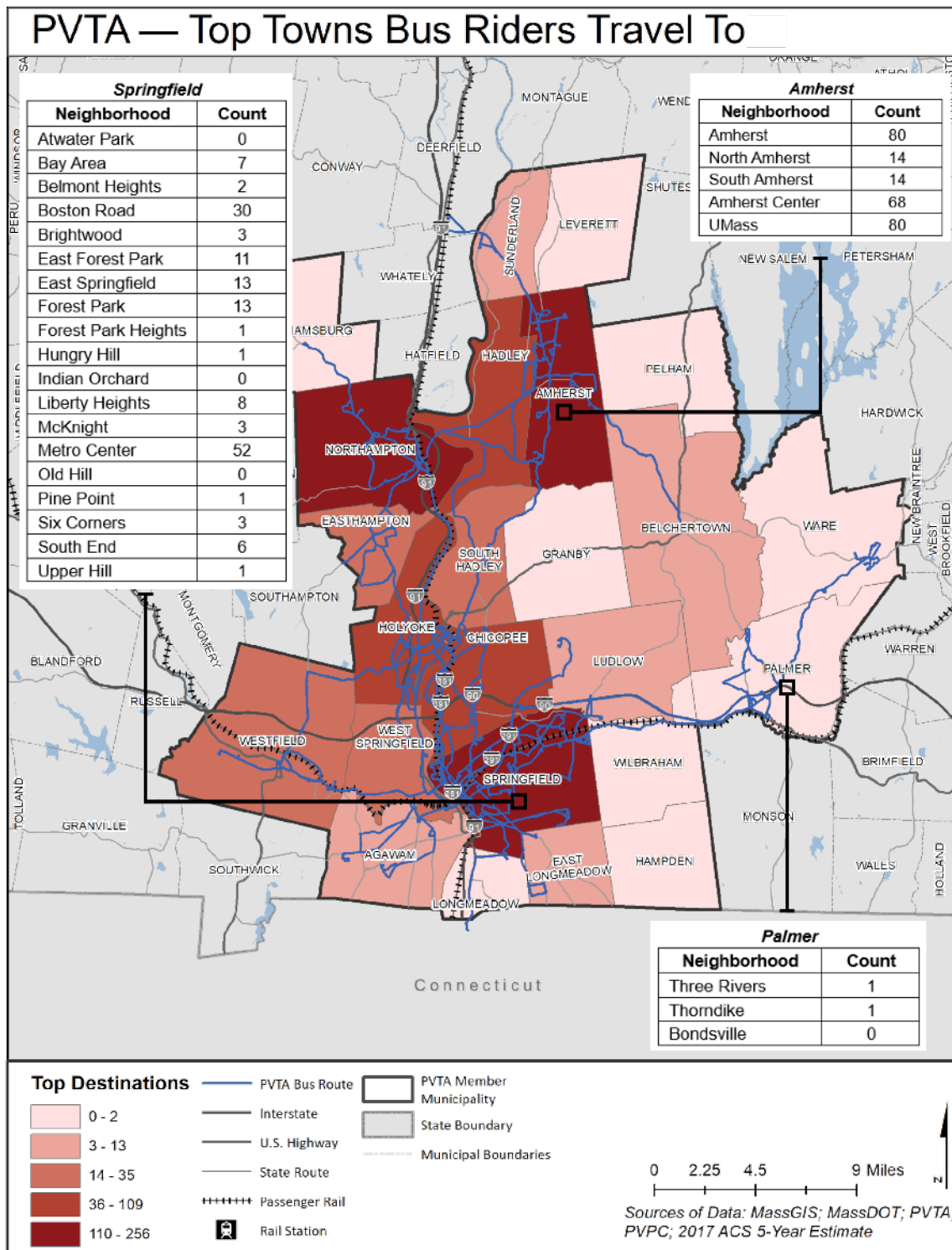
**Figure 134. Neighborhoods in Springfield in which Respondents Live**



**3. What are the top three places you travel to most often? (n = 339)**

The top three places respondents (339 total) travel to most often are Northampton (154), Holyoke (109), and Hadley (75).

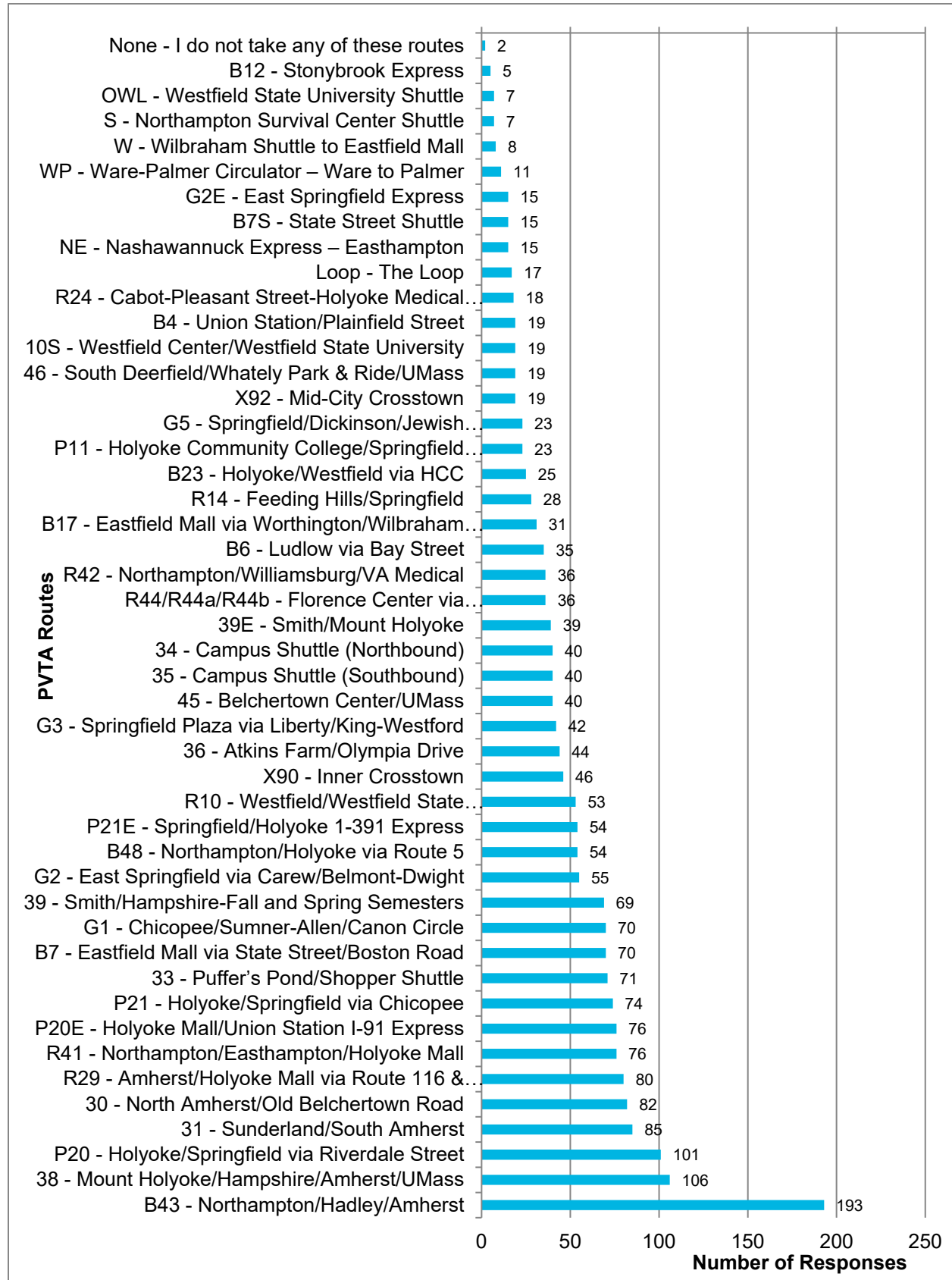
Figure 135. Top 3 Destinations by Fixed Route Riders



**4. Which PVTA routes do you use? (n = 366)**

The three routes used most often by respondents are Route B43 Northampton/Hadley/Amherst (193), Route 38 Mount Holyoke/Hampshire/Amherst/UMass (106), and P20 Holyoke/Springfield via Riverdale Street (101). The routes used least often by respondents are B12 Stonybrook Express, OWL Westfield State University Shuttle (5), and Route S Northampton Survival Center Shuttle (7).

**Figure 136. Routes Respondents Use**





**5. Which improvements would you like to see on the PVRTA routes you use? (n = 302)**

Summarized in Table 95 are the improvements most wanted by respondents for the top five routes used most often:

**Table 95. Desired Improvements on Routes Used**

Improvement	Top 5 Routes per Improvement	Percent Respondents (#) Per Route
Bus came more often	G2E WP OWL B12 R44/R44a/R44b	100.00% (9) 100.00% (8) 100.00% (4) 100.00% (2) 96.00% (24)
Earlier weekday service	S OWL B6 X92 W	75.00% (3) 75.00% (3) 55.00% (11) 54.55% (6) 50.00% (2)
Bus ran later on weekdays	B6 S W OWL G3	80.00% (16) 75.00% (3) 75.00% (3) 75.00% (3) 68.42% (13)
Earlier Saturday service	S OWL X90 B6 W	75.00% (3) 75.00% (3) 50.00% (15) 50.00% (10) 50.00% (2)
Bus ran later on Saturday	S W B6 G3 Loop	75.00% (3) 75.00% (3) 70.00% (14) 63.16% (12) 57.14% (4)
Saturday service	S B23 R24 39E 46	75.00% (3) 64.29% (9) 53.85% (7) 52.17% (12) 50.00% (6)
Earlier Sunday service	S B6 X90 W OWL	75.00% (3) 55.00% (11) 50.00% (15) 50.00% (2) 50.00% (2)
Bus ran later on Sunday	S W B6 X90 Loop	75.00% (3) 75.00% (3) 65.00% (13) 60.00% (18) 57.14% (4)
Sunday service	S W X92 WP 10S	75.00% (3) 75.00% (3) 63.64% (7) 62.50% (5) 55.56% (5)

**6. Are there any locations you would like the bus to go that it currently does not go? (n = 111)**

A total of 111 respondents responded to this question and the responses have been separated into the following categories: Route Change(s), Business, Town/City/Neighborhood, Additional Stop(s), State, Schedule Change(s), Other, and N/A. A total of 15 respondents replied “no” or expressed satisfaction with current locations served by PVTA and are filed under N/A.

**Figure 137. Other locations respondents would like to go on the bus**

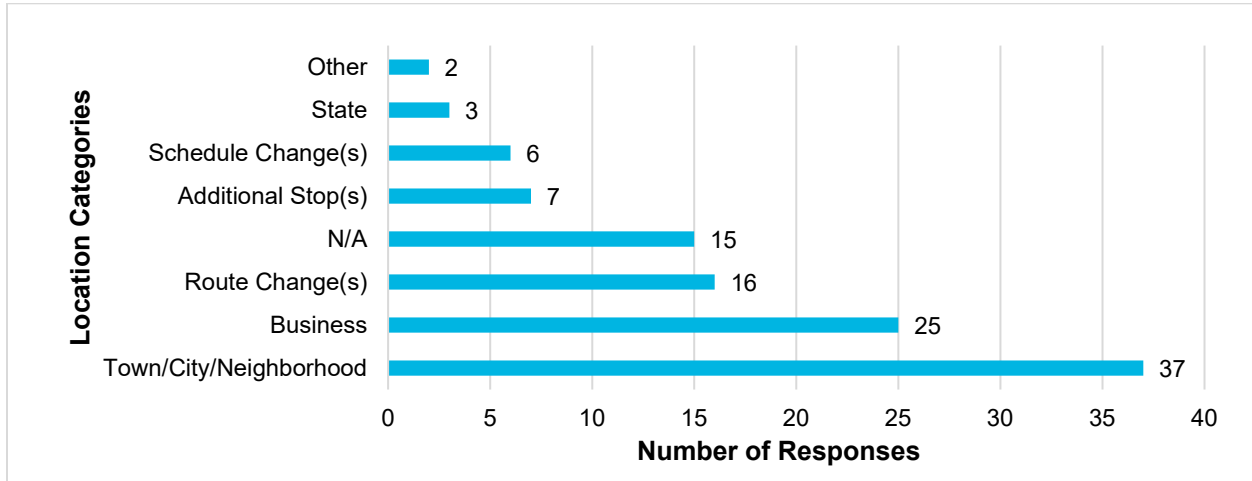
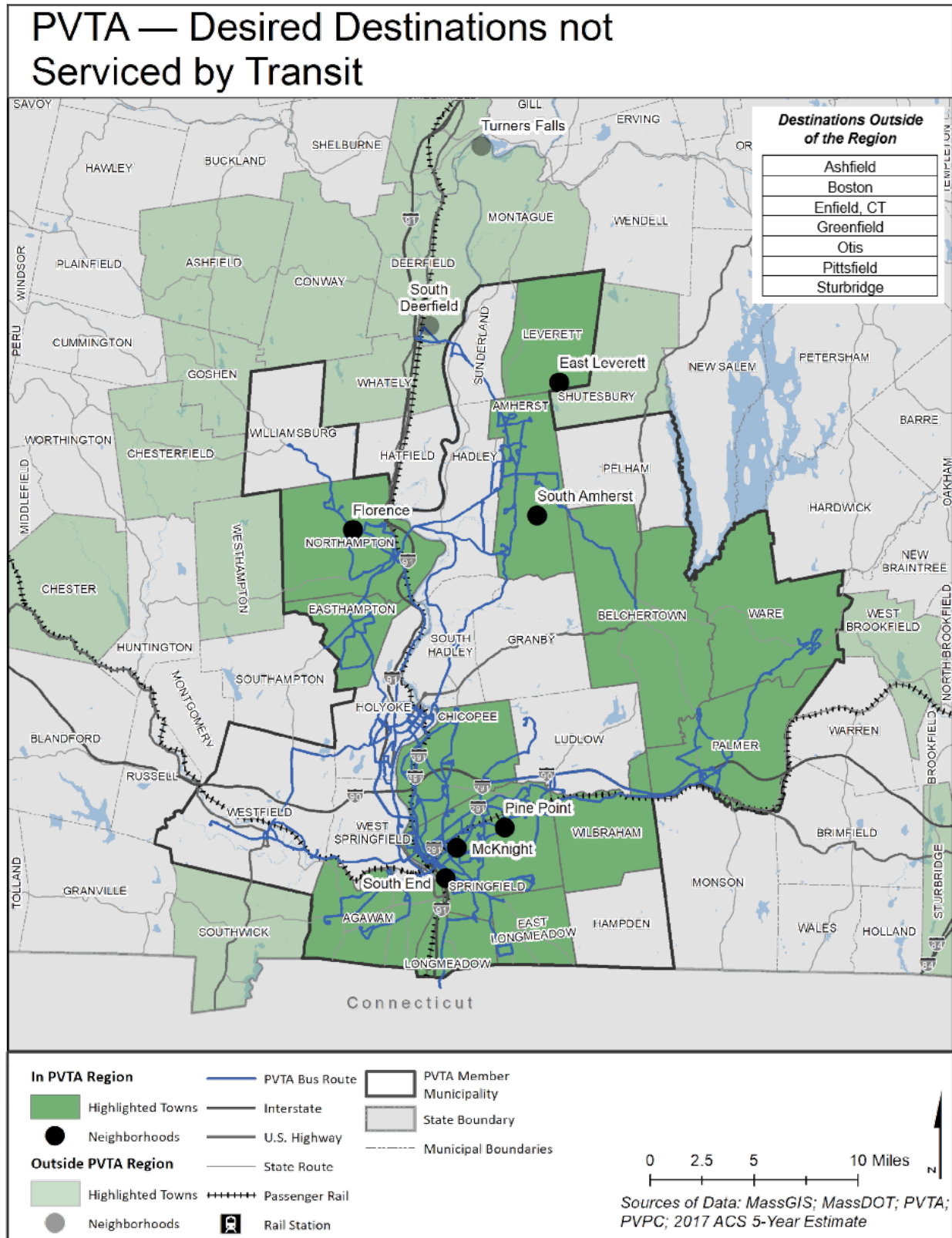


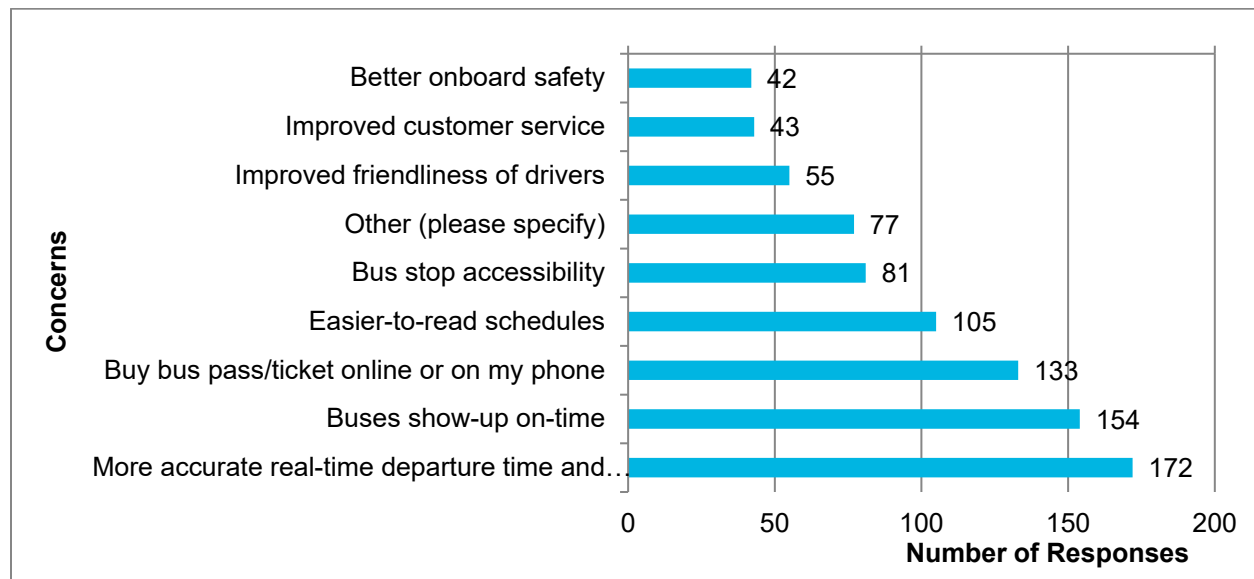
Figure 138. Locations you would like to go using PVRTA that you currently cannot



**7. What other concerns do you have regarding PVRTA service that you would like to see improved? (n = 287)**

More than half of respondents (179 total) would like to see more accurate real-time departure and delay information for the routes they are using and about 53 percent of respondents (154) would like to see the buses show on time more often. A total of 133 respondents would like the ability to buy bus passes or tickets online or through their mobile device/smartphone. Only 42 respondents would like to see onboard safety improvement and 43 would like to see customer service improved. A total of 77 respondents selected “other” and provided concerns that include weekend service, shorter wait on return trips, COVID-19 precautions, bus stop accessibility (crosswalks, enclosures, benches), discounted fares for essential workers, additional locations to purchase weekly passes, express buses between Northampton and Amherst, service in summer months, and efficient transfers.

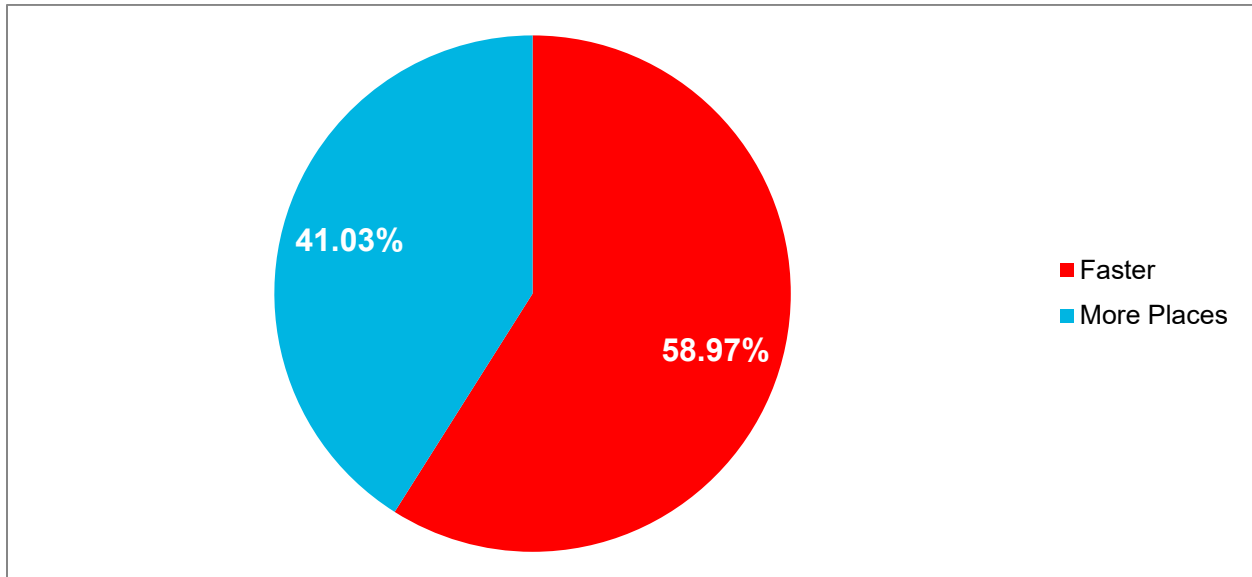
**Figure 139. Concerns Regarding PVRTA Service that Respondents would like Improved**



**8. Would you prefer the bus goes to more places (slower/more stops) or the bus makes less stops (faster)? (n = 290)**

Given the option between the bus going to more places or the bus making fewer stops and running faster, 171 respondents (58.97%) would prefer the bus ran faster and 119 (41.03%) would prefer more stops.

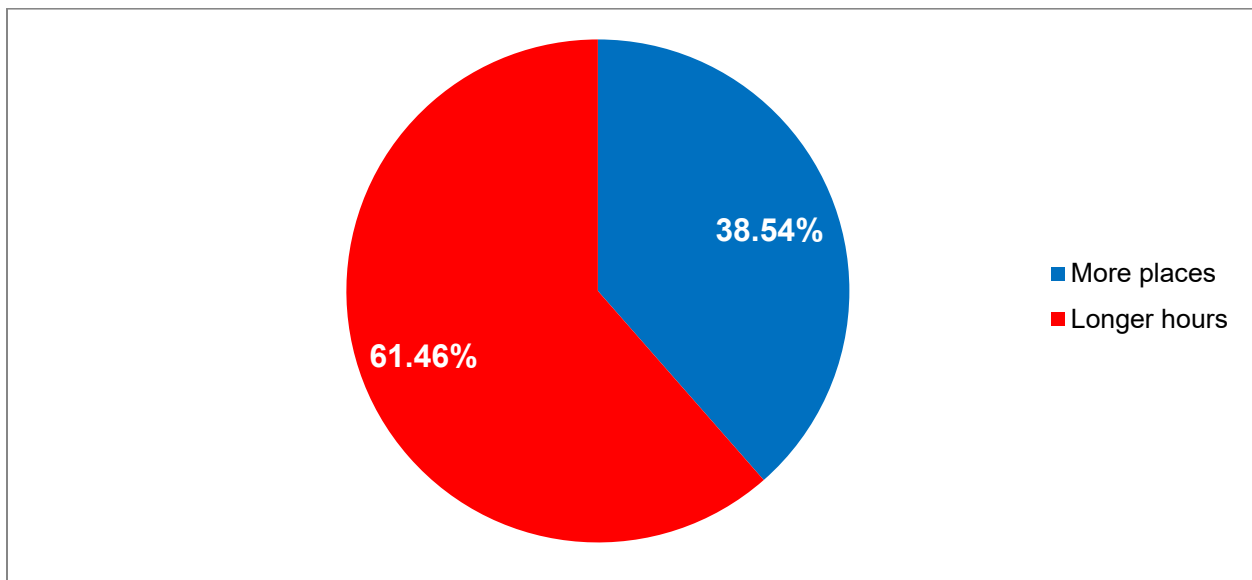
**Figure 140 . Respondent Preference for Bus to go More Places or have Fewer Stops**



**9. Would you prefer the more bus destinations, or the bus runs earlier/later per day? (n = 288)**

More than half of respondents (177 total; 61.46%) would prefer the buses run earlier/later per day (longer hours) and 111 (38.54%) would prefer the bus traveled to more places.

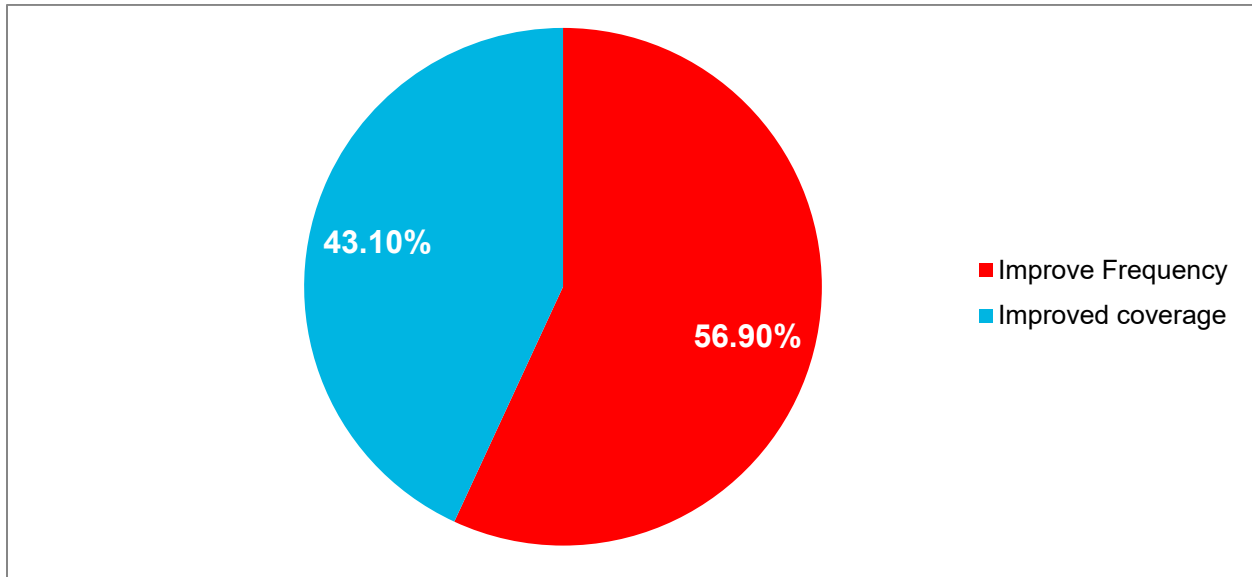
**Figure 141. Respondent preference for more bus destinations or longer hours**



**10. Would you prefer the bus comes more often (increased frequency) or the bus goes to more places (increased coverage)? (n = 290)**

Approximately 56 percent of respondents (165) would prefer the bus frequency was improved and 44 percent of respondents (125) would prefer the bus went to more places that currently offered.

**Figure 142. Respondent preferences for improved frequency or improved coverage**



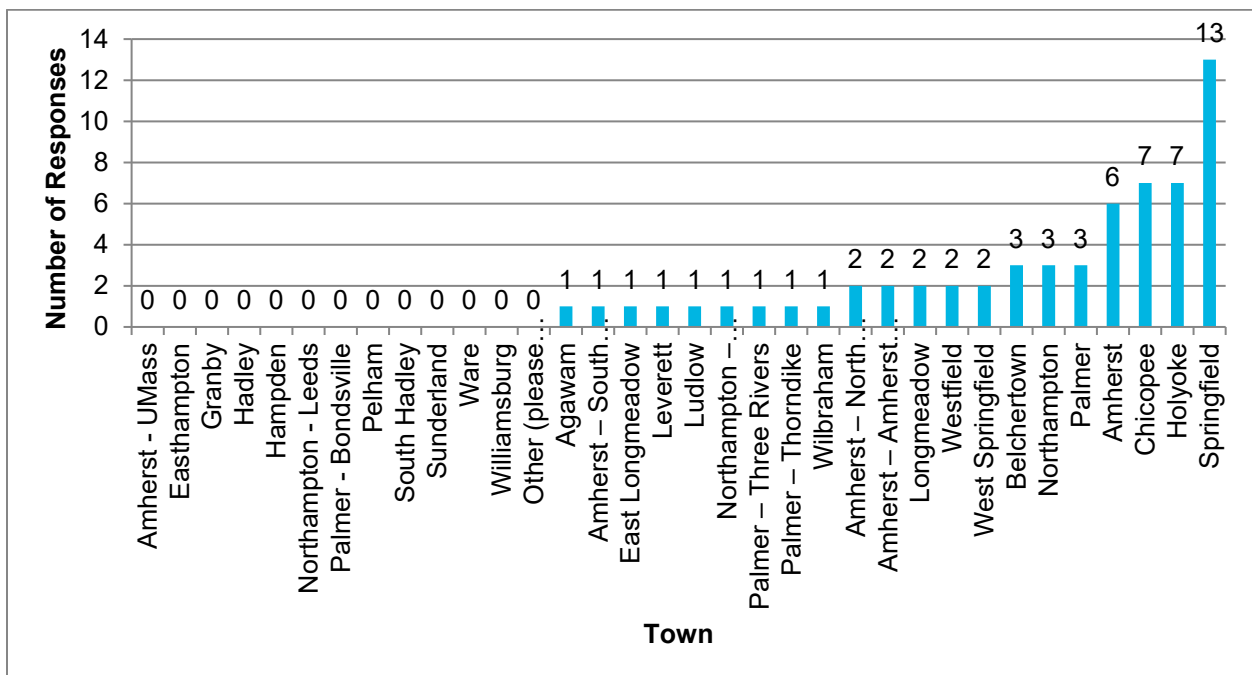
**Demand Responses Riders**

A total of 87 respondents use the PVRTA paratransit van service (demand response). Their survey responses are summarized below:

**1. Where do you live? (n = 61)**

The top three towns respondents who use PVRTA demand response services live in are Springfield (13), Holyoke (7), and Chicopee (7). Other respondents currently live in Amherst (6), Palmer (3), Northampton (3), and Belchertown (3).

**Figure 143. Where Demand Response Riders live**

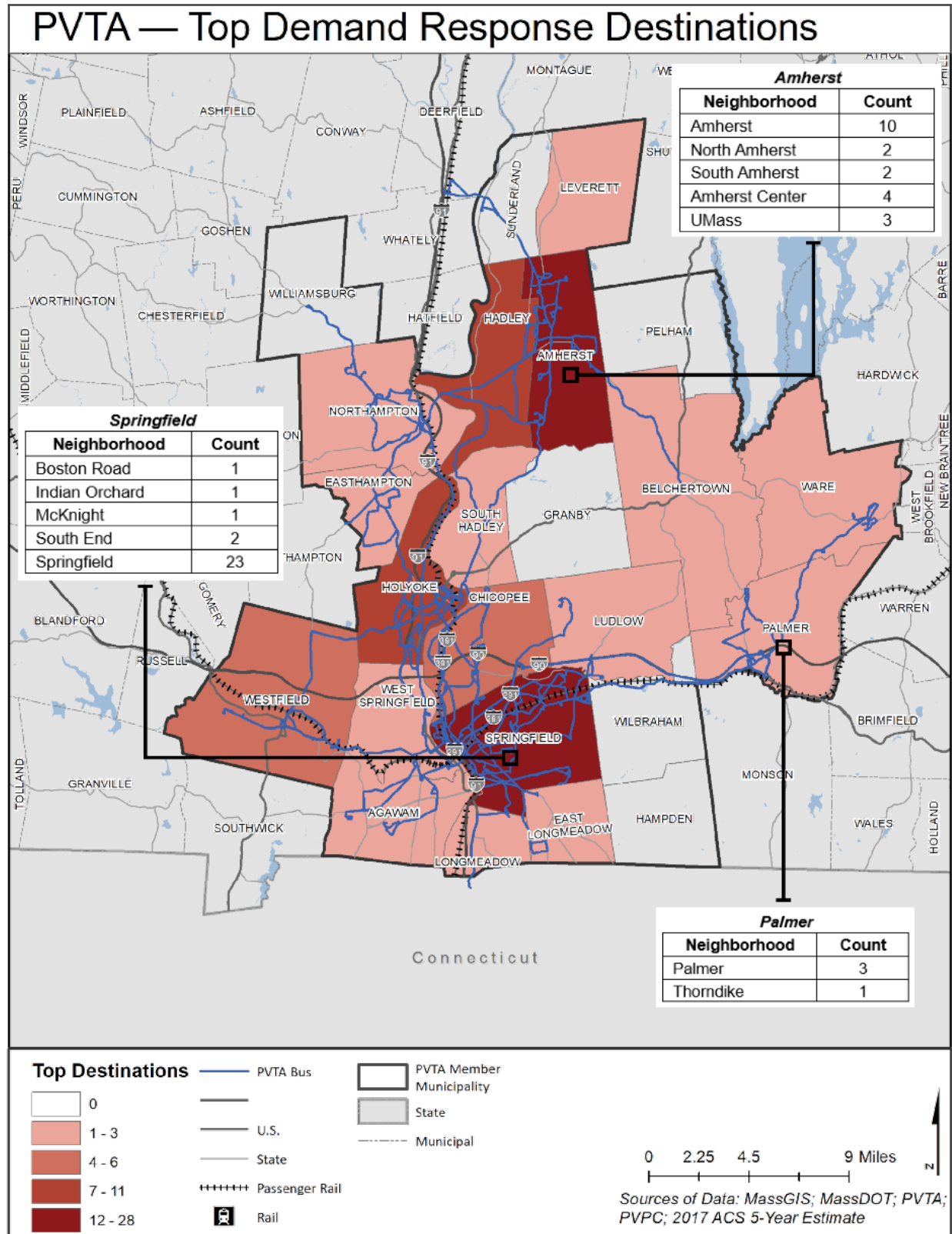


**2. What are the top three places you travel to most often? (n = 62)**

The top three places respondents travel to most often are Springfield (23), Amherst (21), and Holyoke (11). The town of Amherst was broken down into neighborhoods and respondents were

given the option to select the section(s) of town they travel to most often. Of the 21 respondents who travel to Amherst, four travel to Amherst Center three travel to UMass, two travel to North Amherst, and two travel to South Amherst. The remaining 10 respondents travel to Amherst, not a specific neighborhood or section of town.

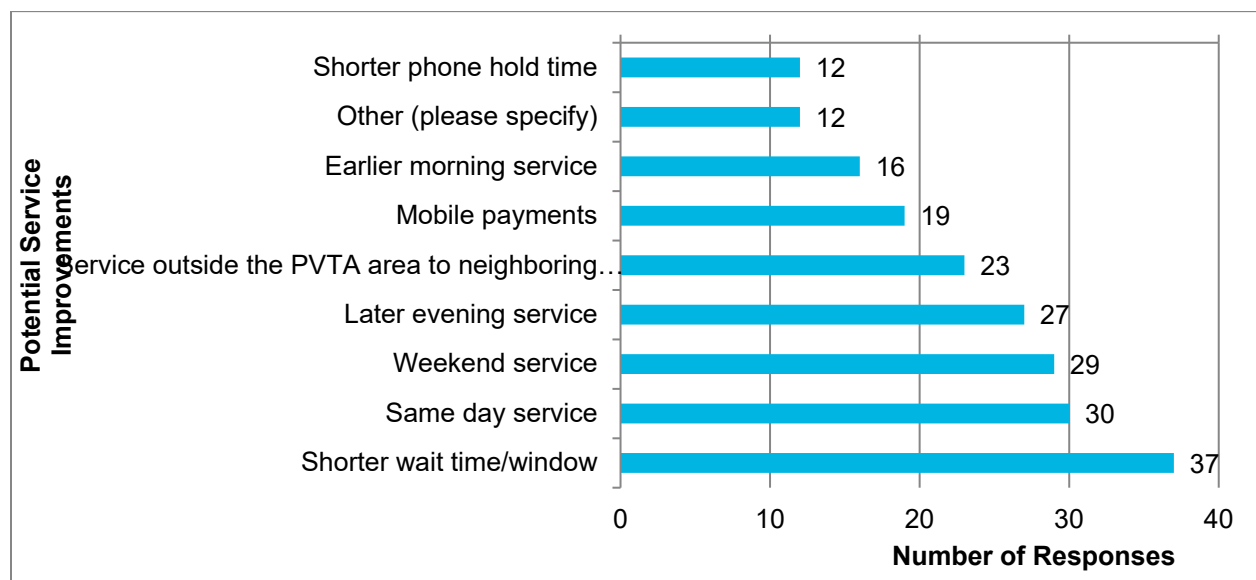
**Figure 144. Top 3 Places Demand Response Riders Travel to Most Often**



**3. Which of the following service improvements would most improve service for you to use? (n = 62)**

More than 50 percent of respondents (37 total) would like shorter wait times or windows and 30 would like to be able to schedule rides for same day service. An additional 29 respondents would like PVTA to offer weekend service and 27 would like PVTA to offer demand response service later into the evening. A total of 23 respondents would like PVTA to provide service to communities outside of the PVTA service area, 19 would like to PVTA offer mobile payment options, 16 want earlier morning service, 12 would prefer a shorter hold time when calling PVTA on the phone, and a total of 12 respondents selected “other”. The “other” service improvements provided by respondents include shorter wait times before and after appointments, the option to book a trip online, text message alerts, reduced fare for service within county, collaborations with employers to provide fare discounts, on-time arrivals, and driver training for working with riders in bad weather and riders with disabilities.

**Figure 145. Service improvements which would improve service for Demand Response users.**

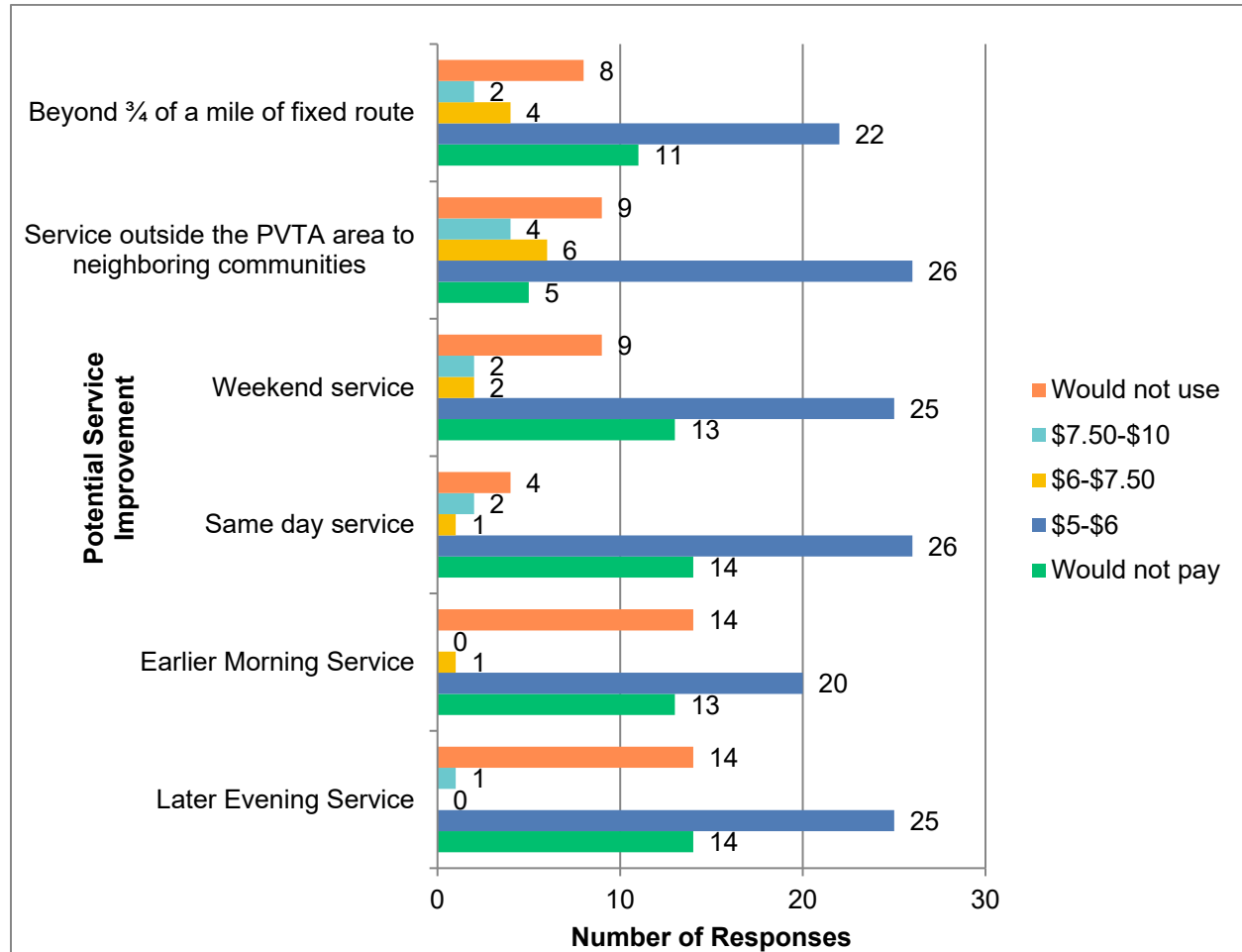


**4. What is the maximum you would be willing to pay for each service? (n = 56)**

The maximum most respondents would be willing to pay for each service improvement is between \$5 and \$6. Only four respondents would not take advantage of same day service if offered and 14 would not pay for this service.



**Figure 146. Maximum Amount Respondents are willing to pay for Service Improvements**



**5. How would you rate your current experience riding the PVTA paratransit service on a scale of 1 to 10? (n = 50)**

The average rating from 50 respondents based on current experiences riding with PVTA using a scale from 1 to 10 (10 = best) is 7.4 out of 10.

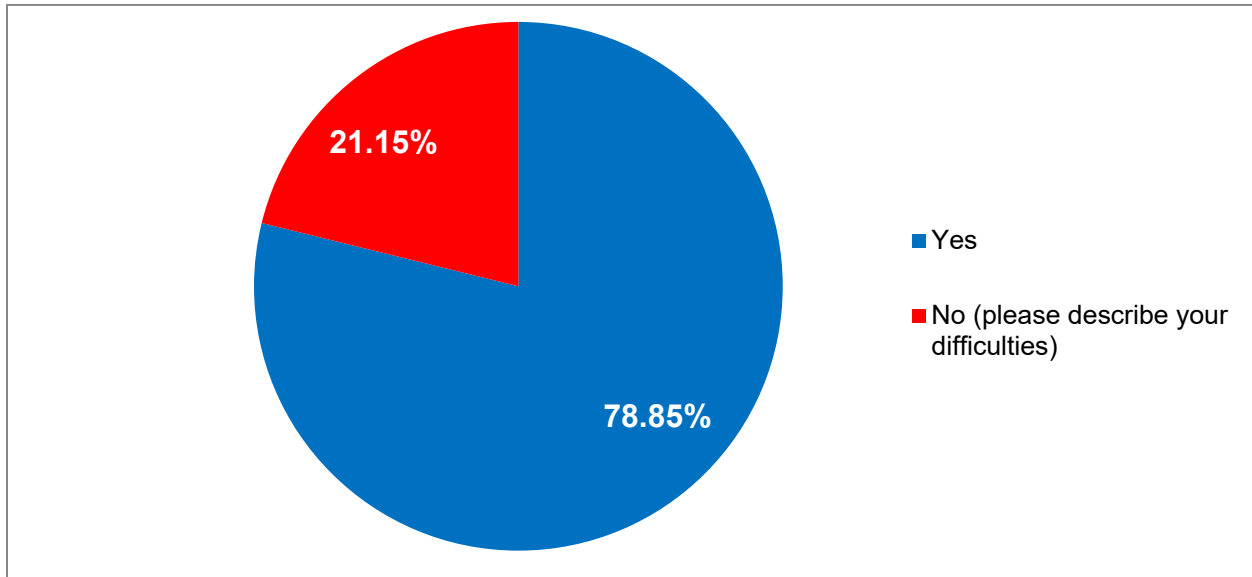
**6. How would you rate your current experience when booking a ride on the PVTA paratransit service on a scale of 1 to 10? (n = 51)**

The average rating from 51 respondents based on current experiences booking a ride with PVTA paratransit service using a scale from 1 to 10 (10 = best) is 7.5 out of 10.

**7. Are you able to schedule rides at the times and days needed? (n = 52)**

Approximately 80 percent of respondents (41) are able to schedule rides with PVTA paratransit service on the days and times they need. Only 11 respondents have difficulty with scheduling.

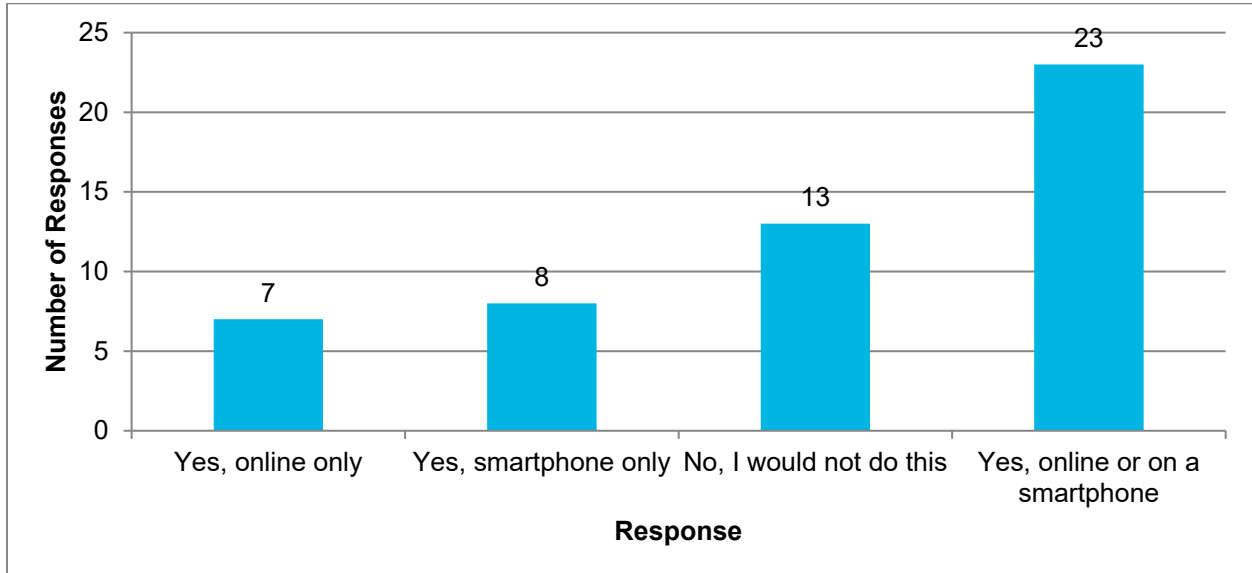
**Figure 147. Ability to schedule rides at the times and days needed**



**8. If you could book your trip online through a smartphone, would you? (n = 51)**

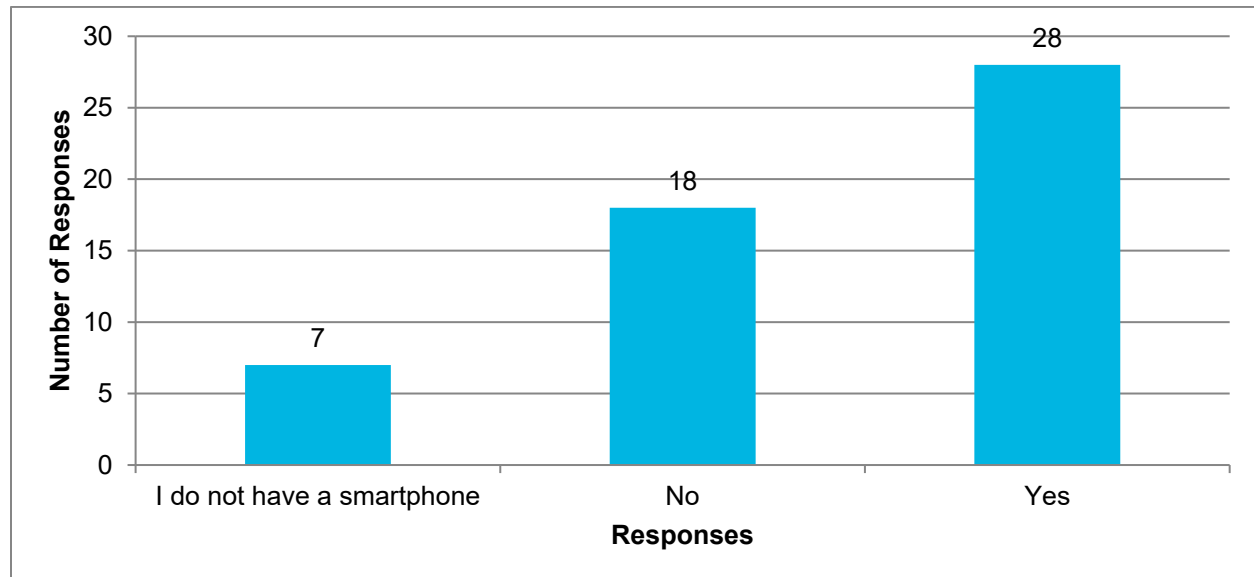
If the option to book trips with PVRTA using a smartphone were available, a total of 43 respondents would do so; 23 either online or on a smartphone, eight would use just a smartphone, and seven would just book trips online using another device. Only 13 respondents would not take advantage of online or mobile booking.

**Figure 148. Respondents preferences for booking trips online through a smartphone.**



**9. If you could pay your fare on your smartphone, would you? (n = 53)**

The majority of respondents (28 total) would pay for their transportation fare on their smartphone if the option were available and only 18 would not. A total of seven respondents do not have access to a smartphone to pay for their fare.

**Figure 149. Respondents preferences for paying fare on smartphones.**

**10. What percent of the time do you share your PVTA trip with another person (not including a companion, friend, family member or personal care attendant)? (n = 48)**

Using a scale from 0 to 100 percent, respondents were asked to estimate the amount of time they share their paratransit trip with another passenger. The average amount of time respondents report sharing a paratransit ride with other passengers is 42.4%, based on 48 respondents.

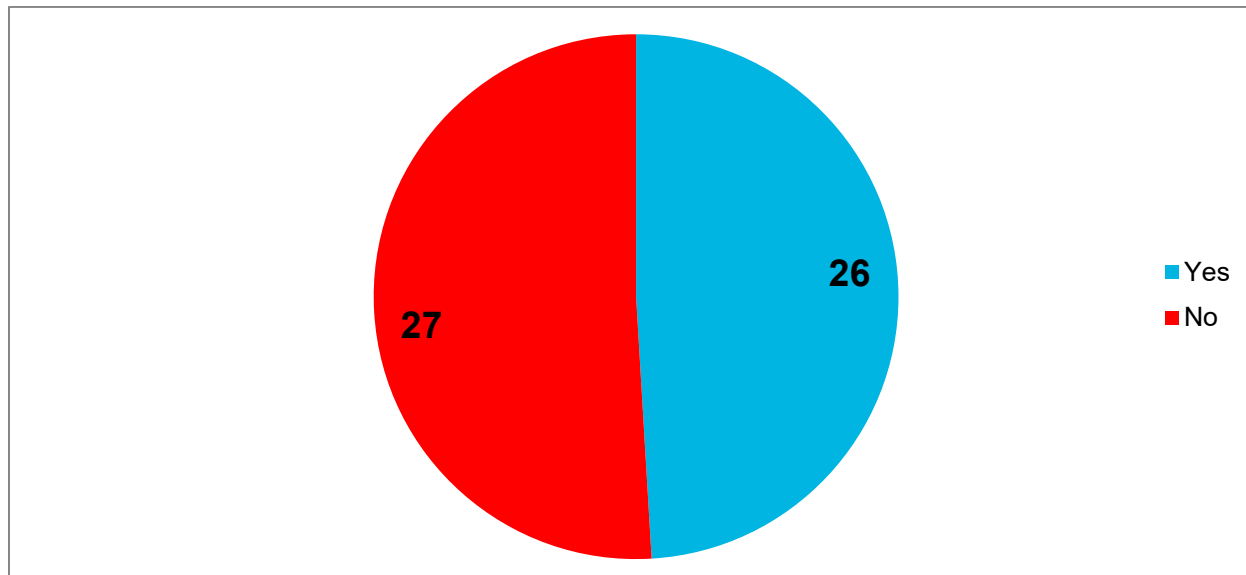
**11. Do you have other concerns regarding the PVTA paratransit service? (n = 31)**

Respondents were asked to explain any additional concerns they may have about using the PVTA paratransit service and 31 respondents provided feedback. A total of eight respondents do not have additional concerns. The remaining respondents submitted concerns that include enough time to board/sit down, running late, van arrival times, no same-day service, no access to Hatfield, connections with FRTA, staff training, flexible pick-up/drop-off times, payment options, long wait time for return trips, high fares, use of texts instead of calling, efficient booking and scheduling, limited service area/destinations, and mobile tickets and payment options.

**12. Do you use the PVTA fixed route bus service? (n = 53)**

PVTA paratransit riders who responded to the survey were asked if they also ride the PVTA fixed bus route service. Out of a total of 53 respondents, almost 50 percent (27 respondents) do not use the fixed bus service and 26 do.

**Figure 150. Demand Response respondents usage of PVRTA fixed route bus service**



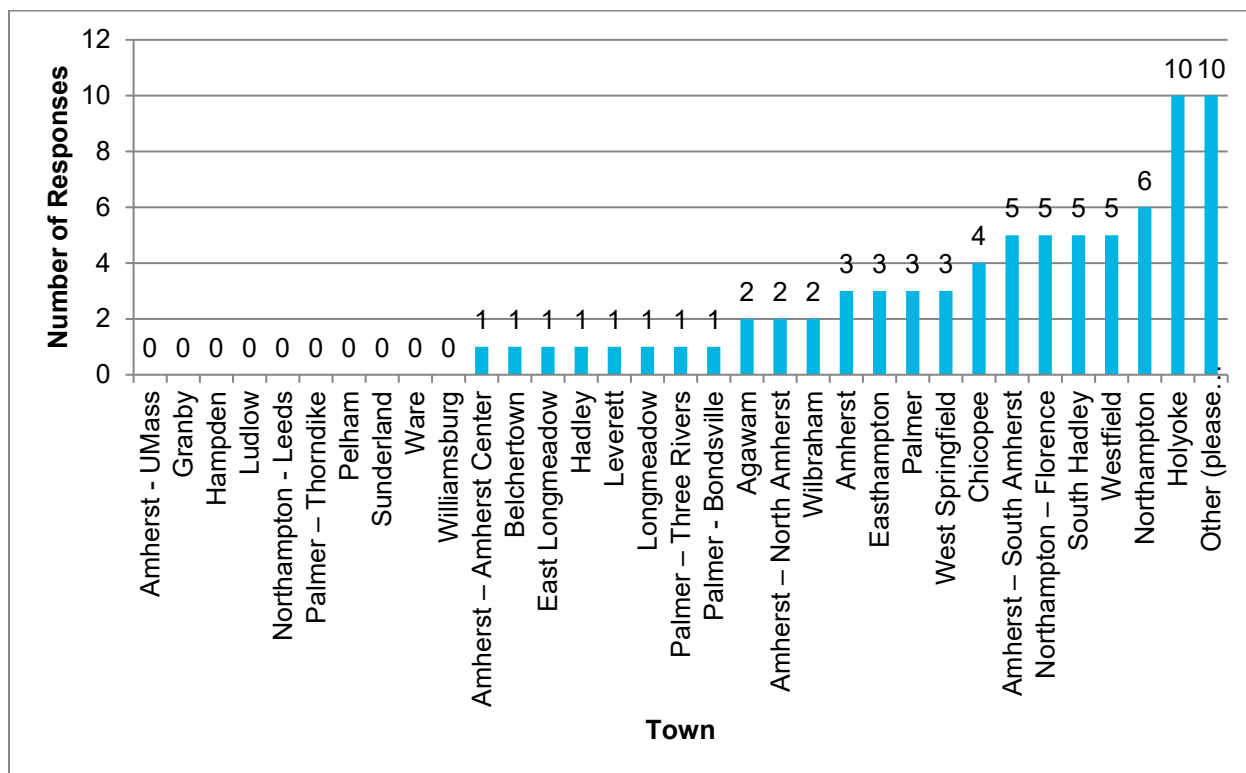
**Non-Riders**

A total of 99 respondents do not currently use PVRTA transportation services. Their survey responses are summarized below:

**1. Where do you live? (n = 77)**

Respondents who do not currently use PVRTA services live in Holyoke (10), Northampton (6), Westfield (5), South Hadley (5), Florence neighborhood of Northampton (5), and South Amherst (5). A total of ten respondents selected “other” and live in Westhampton, Shutesbury, Southwick, Feeding Hills, American Samoa, and New Britain, CT.

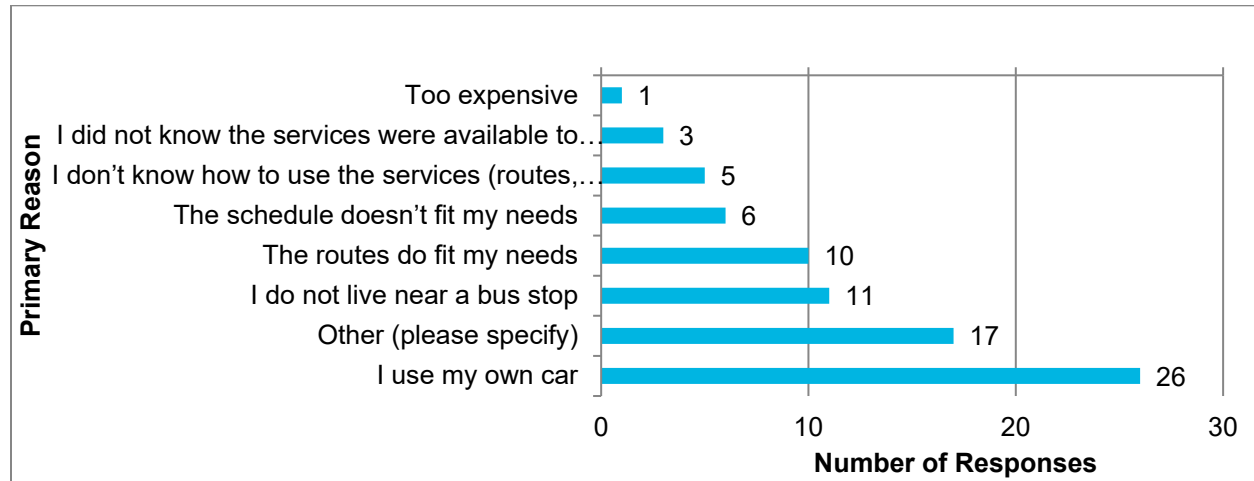
**Figure 151. Where Non-Riders Live**



**2. What is the primary reason you do not use PVTA transit services? (n = 79)**

The majority of respondents do not use PVTA transit services because they use their own car (26). Seventeen respondents selected “other” and do not use PVTA transit services because they do not live in the area, rides take too long, no longer a student in the area, have not needed public transit, safety concerns, COVID-19 pandemic related, rides have been late, and the schedule changes do not fit their needs.

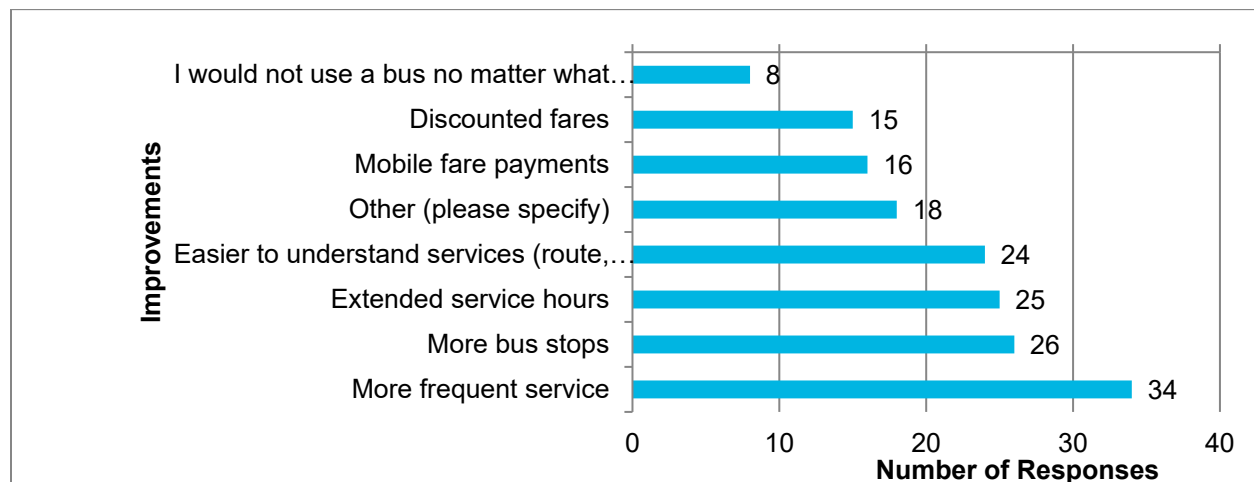
**Figure 152. Primary reason non-riders do not use PVTA transit services**



**3. What improvements would get you to use PVTA transit services? (n = 81)**

Respondents were asked to think of potential improvements the PVTA could make that would encourage them to ride and a total 81 respondents provided feedback. Thirty-four respondents would ride with PVTA if there were more frequent service and 26 would ride if there were more bus stops. A total of 25 respondents would ride with PVTA if service hours were extended and 24 would ride if they knew more about the services offered, including routes and schedules. Only eight respondents would not use PVTA services no matter the improvement.

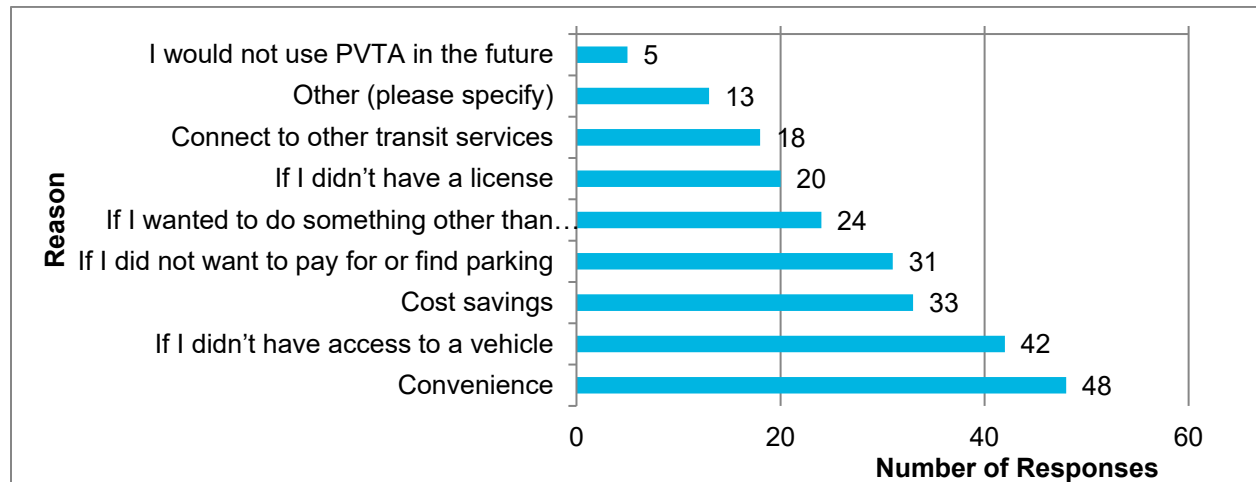
**Figure 153. Improvements to Encourage Non-Rides to Use PVTA transit services**



**4. What are the primary reasons you would use PVTA in the future? (n = 82)**

A total of 48 respondents would use PVTA services in the future if it were convenient to them and 42 would ride if they did not have access to a vehicle. Only five respondents would not use PVTA in the future and 13 respondents selected “other”. The responses provided by those who selected “other” include public transit is better for the environment or if they were no longer able to drive themselves.

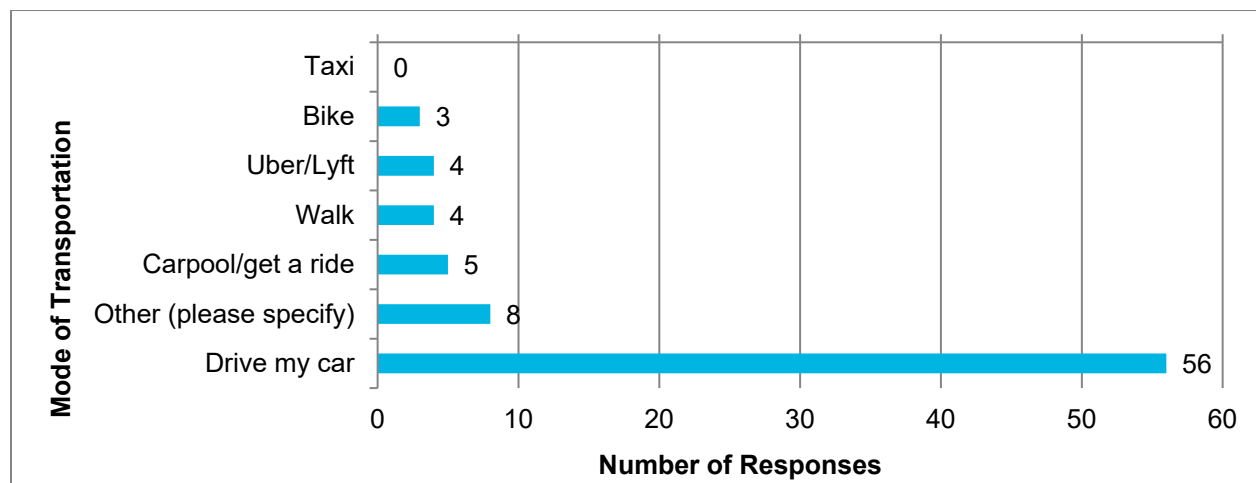
**Figure 154. Primary reasons non-riders would use the PVTA in the future**



**5. What is your primary mode of transportation? (n = 80)**

Seventy percent of respondents (56) drive their own vehicle as their primary mode of transportation. The remaining respondents carpool or get a ride with others (5), walk (4), use a rideshare service like Uber or Lyft (4), or use a bicycle (3). No respondents use a taxi service as their primary mode of transportation. A total of eight respondents selected “other” and use the PVTA bus or medical transportation to get around.

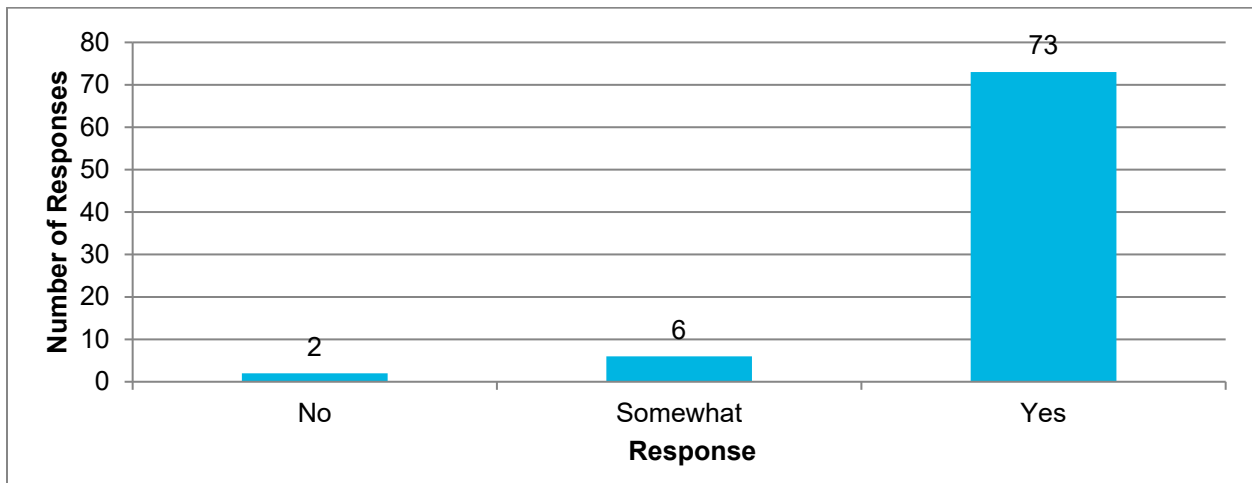
**Figure 155. Primary mode of transportation for non-riders**



**6. Do you feel that PVTA is a valuable public transportation resource in the region? (n = 81)**

The overwhelming majority of respondents feel PVTA is a valuable public transportation resource in the region (73 total). Only six respondents feel it is somewhat valuable and two respondents do not feel it is valuable.

**Figure 156. Respondents thoughts on if or if not PVTA is a valuable public transportation resource in the region**

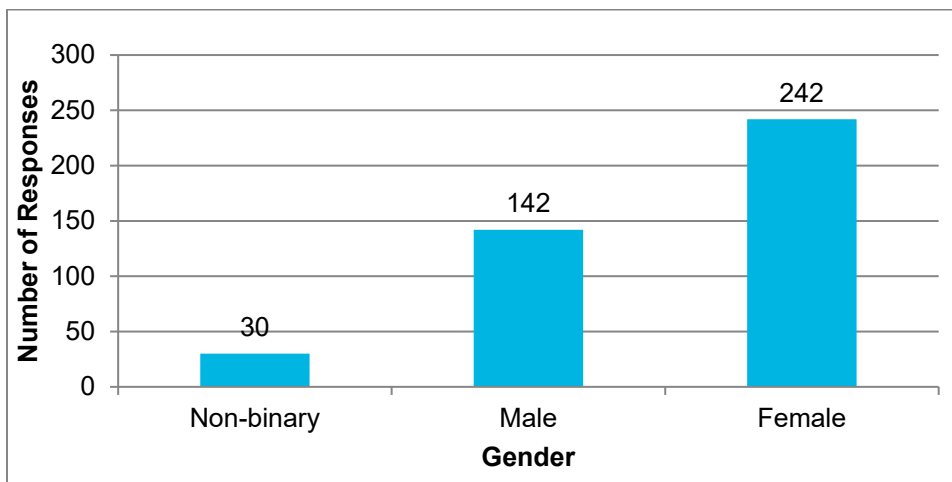


**Demographics**

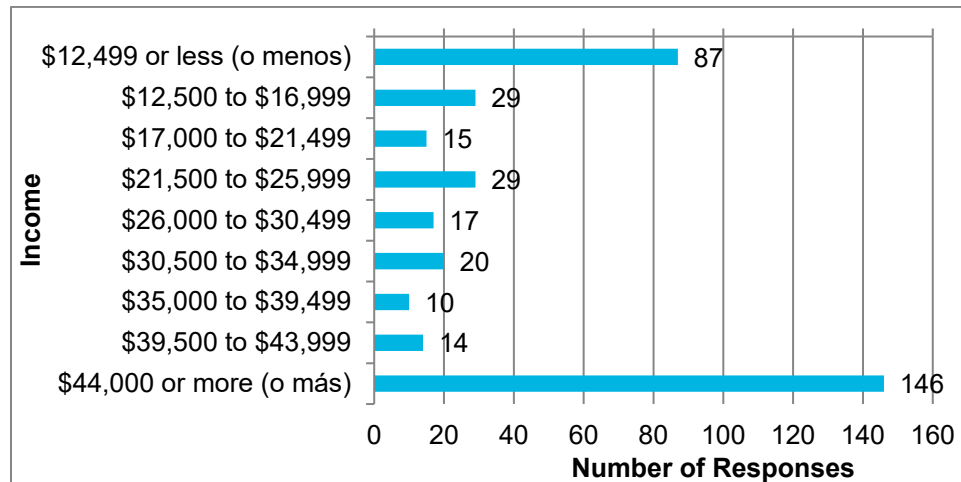
**Table 96. Respondent Demographics**

<b>Respondents by Tier (Northern versus. Southern)</b>	Northern Region Respondents: 57.5% riders; 55.6% non-riders Southern Region Respondents: 42.5% riders; 44.4% non-riders
<b>Age: (N = 364)</b>	Average = 40 years Median = 36 years

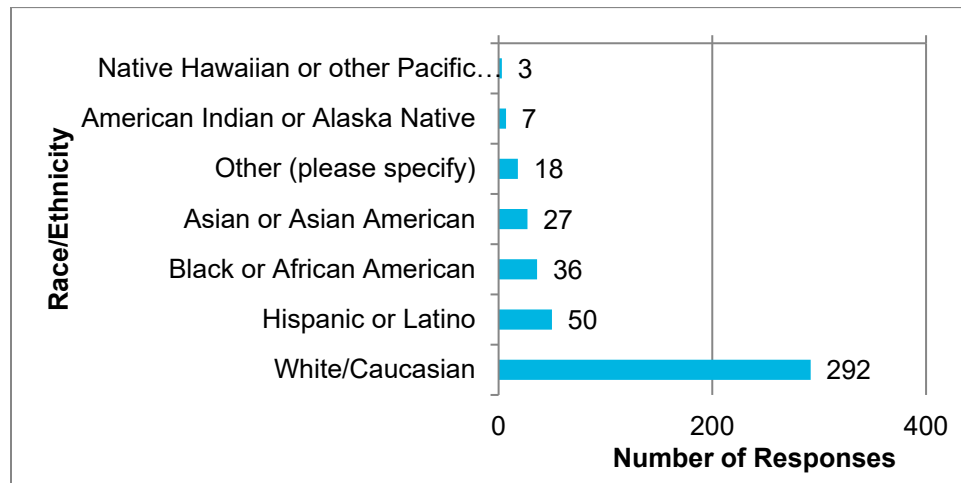
**Figure 157. Respondents Gender**



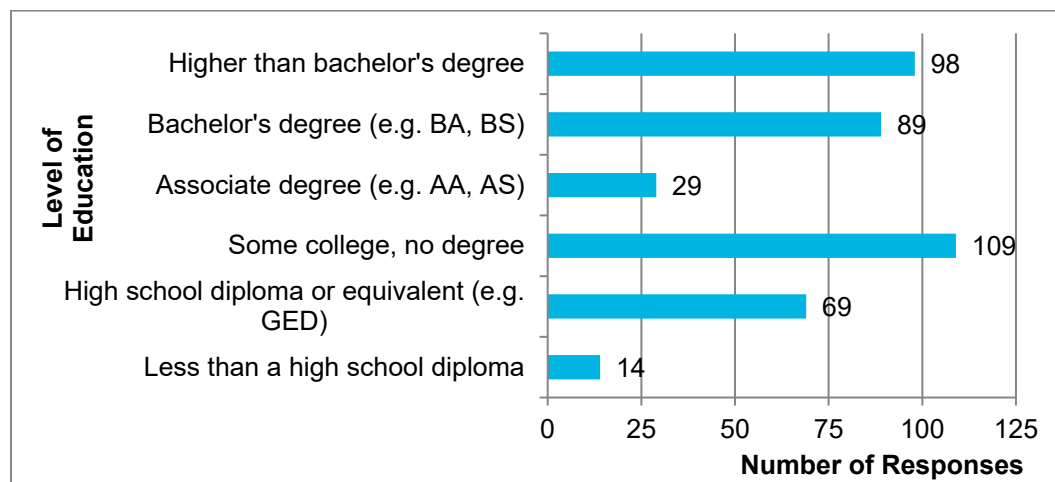
**Figure 158. Respondents Total Annual Household Income**



**Figure 159. Respondents Race/Ethnicity**

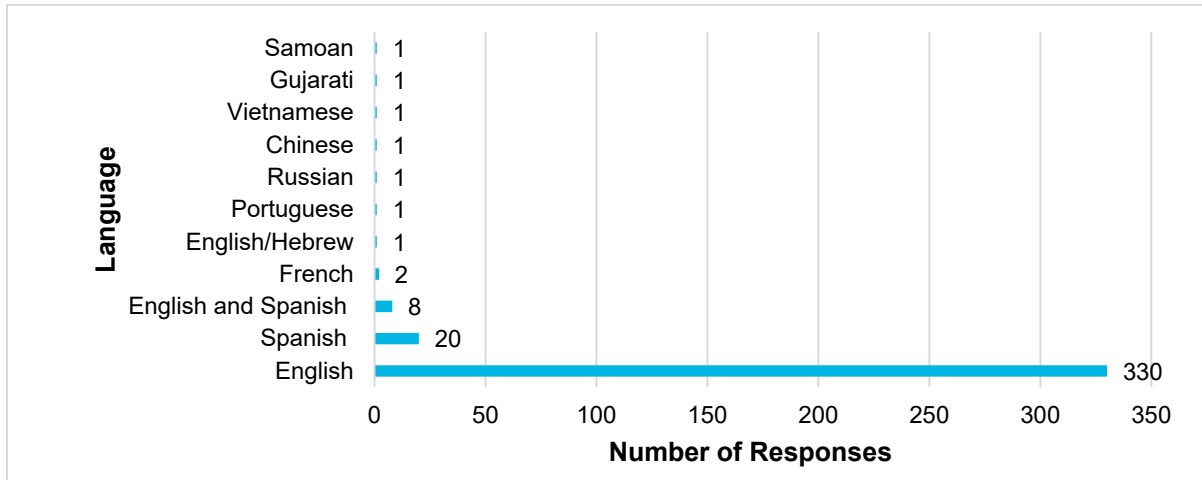


**Figure 160. Respondents highest level of educational attainment**

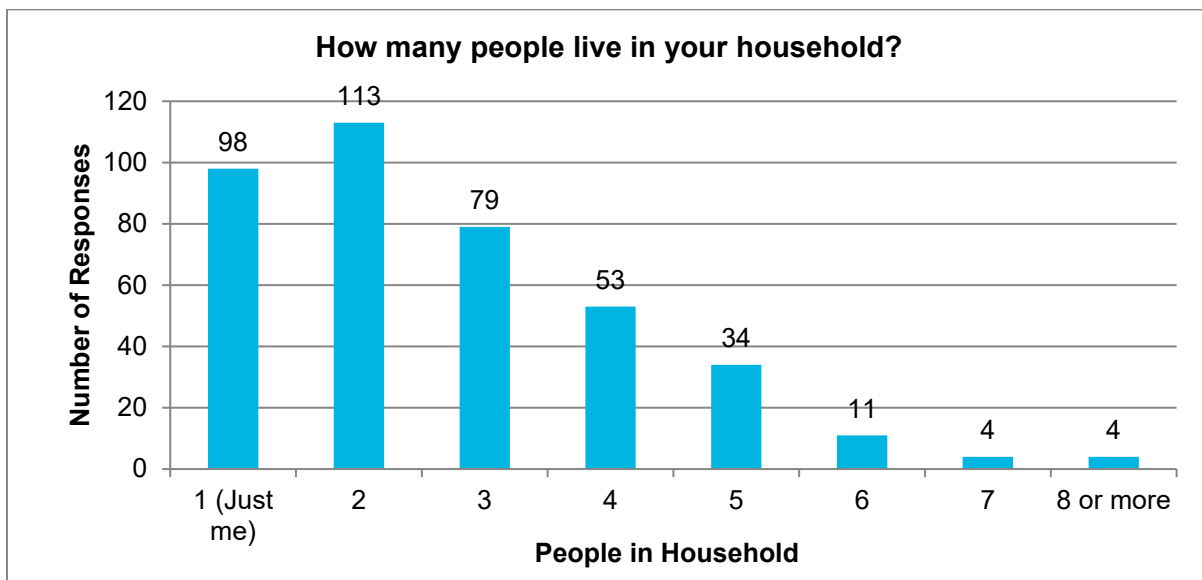




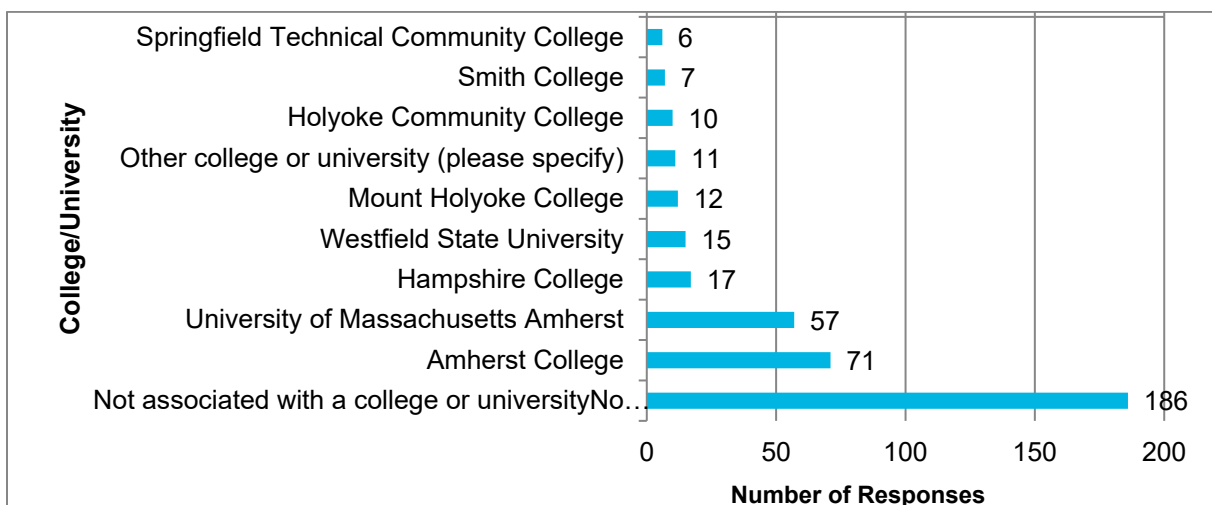
**Figure 161. Respondents primary language spoken at home**



**Figure 162. Number of People in Household**



**Figure 163. Respondents College/University Affiliation**



**Additional Comments and Feedback: Voicemails and Emails**

No additional feedback was submitted to the project team via email.

Summarized below is the feedback collected through a total of 41 voicemails left for the project team at the Google Voicemail number in the following categories: Bus stops (1); Overall Satisfaction (21); Booking and Scheduling (16); COVID-19 (2); Comfort (2); Fares (1); Bags (2); and Wait Times (5).

**Table 97. Additional Feedback from the Public at Google Voicemail**

<b>Bus Stops</b>	Wave down the bus as clearly marked, designated bus stops like on Cape Cod with a safe pull-off area for the bus
<b>Overall Satisfaction</b>	Happy with the service; No improvements; Excellent Service
<b>Booking and Scheduling</b>	Cannot book return times when needed; confusion/miscommunication when scheduling rides for appointments; later evening bookings
<b>COVID-19</b>	Overcrowding; cannot ride during pandemic
<b>Comfort</b>	Turn on air conditioning; loud vehicles
<b>Fares</b>	Too expensive for short/local trips; many on fixed income
<b>Bags</b>	Allow more bags for passengers on shopping trips
<b>Wait Times</b>	Long wait times for return trips; shorter wait times for shopping trips;

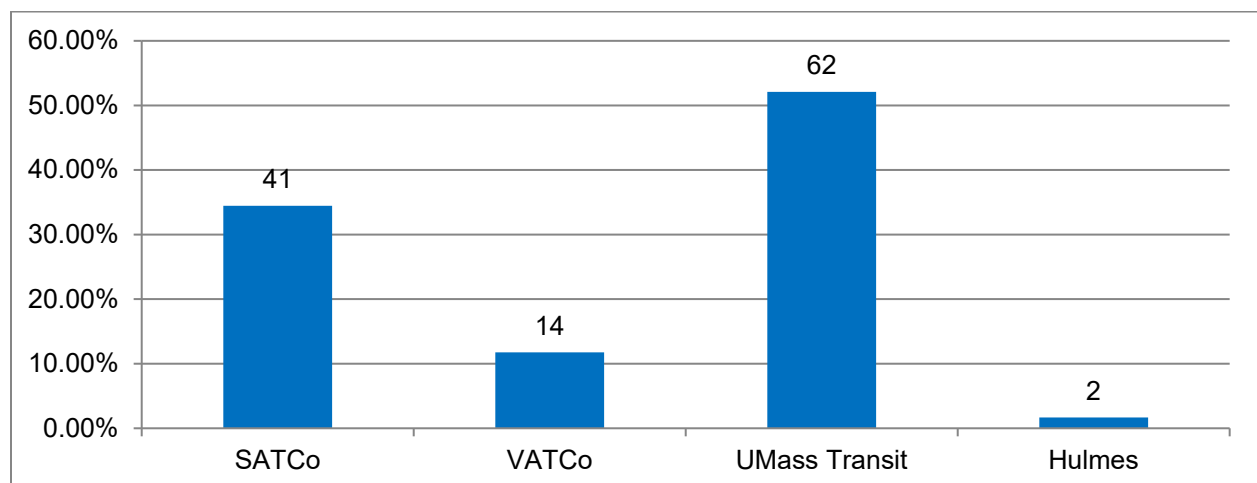
## Operator Survey

A survey was sent out to all PVRTA fixed route and demand response operators. Responses were received from 119 fixed route and 14 demand response operators. The survey had separate questions for fixed route and demand response operators that asked about needed improvements/ changes, operational challenges and recommendations to improve service. A review of responses by question and mode operated is presented below.

### Fixed Route

Responses were heard from 119 bus operators, with the greatest number coming from UMTS (Figure 164).

**Figure 164. Response by Bus Operator**



**Q1. What is the best part about the PVTA service?**

Respondents were able to select more than one response. The top cumulative response, at slightly over 75 percent, was that it served a vital need for the community (Figure 165). This was also the top response for each operator.

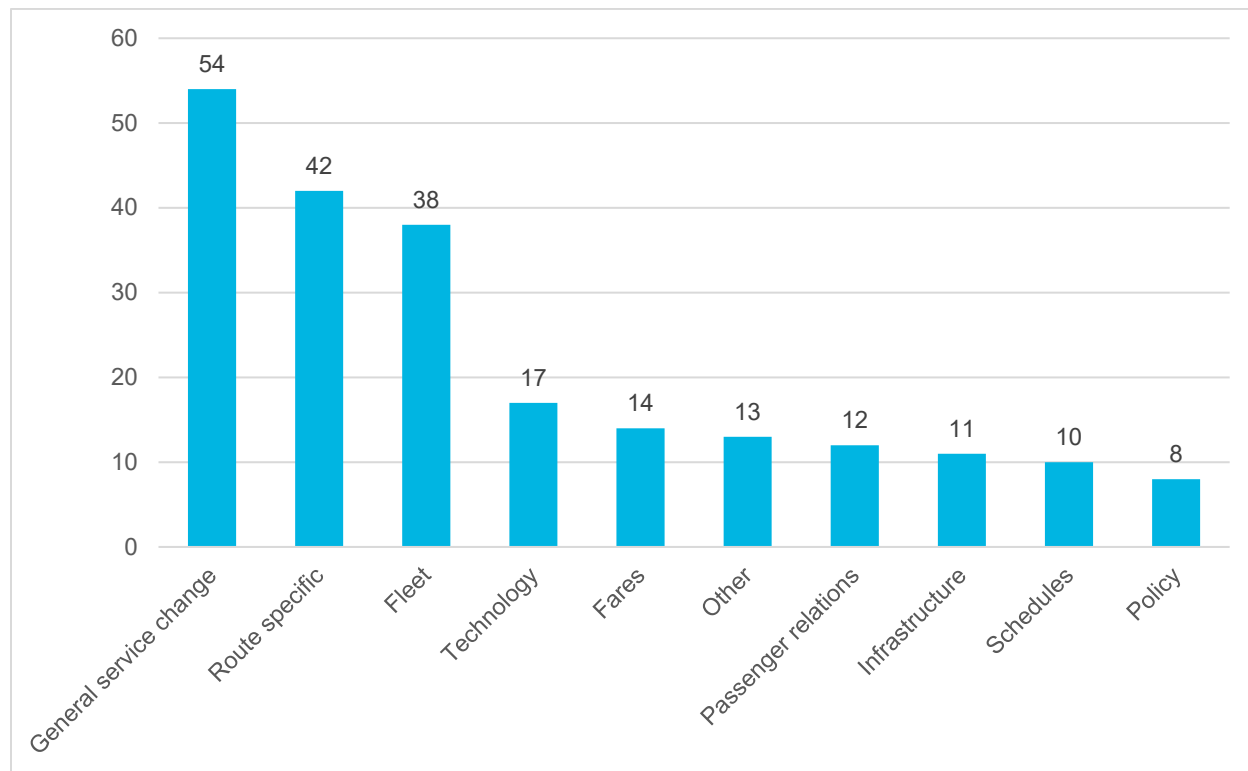
**Figure 165. Best Part About the PVTA Service by Fixed Route Operator**



**Q2. What are the top three service changes that you would like to see that would improve service for the customers?**

This question was open-ended, responses were then categorized into 10 themes. The most mentioned theme was general service changes such as more weekend service, increased frequency, later hours, and improved transfers (Figure 80). A breakdown of the comments within each theme is shown in Table 98 with the number of responses in parenthesis. Table 99 shows the breakdown of specific comments by route. Additionally, there were a number of operational comments beyond the extent of the RTP such as the need for more drivers, increased pay, better benefits, more training, management issues, or how shifts are designed. The top five comments heard in order were for cleaner buses, changes to the Route 31, increasing the fleet size, changes to the Route 30, and better enforcement of the code of conduct policy. The comments for cleaner busses, fleet expansions, and better enforcement of the PVTA code of conduct was stated by all operators except Hulmes.

**Figure 166. Top Service Changes Identified by Operators**



**Table 98. Breakdown of Comments by Theme**

Fleet	Schedules	Technology	Policy	Infrastructure
<ul style="list-style-type: none"> <li>Cleaner Fleet (10)</li> <li>Larger fleet (8)</li> <li>More Artics' (6)</li> <li>Newer buses (6)</li> <li>Better Maintenance (4)</li> <li>Electric buses (3)</li> <li>Plastic bus seats (1)</li> </ul>	<ul style="list-style-type: none"> <li>Create easier to read schedules (4)</li> <li>Re-establish paper schedules (3)</li> <li>Include all service variants in the public schedule (3)</li> </ul>	<ul style="list-style-type: none"> <li>Improve real time app (7)</li> <li>Improve bus automatic announcements (4)</li> <li>Transit signal priority (3)</li> <li>Better radio system (1)</li> <li>Improved web interface (1)</li> <li>Improved real time at stations (1)</li> </ul>	<ul style="list-style-type: none"> <li>Enforcement of Code of Conduct (8)</li> <li>Enforcement (1)</li> </ul>	<ul style="list-style-type: none"> <li>Improved lighting at stops (4)</li> <li>Install bus lanes (4)</li> <li>Improve bus Capacity at Cowles Lane and Academy of Music by removing parking (1)</li> <li>Repave University Drive (1)</li> <li>Improve bus safety (1)</li> </ul>

Other	Fares	General Service Change	Route Specific	Passenger Relations
<ul style="list-style-type: none"> <li>• COVID related (3)</li> <li>• Consolidate bus stops (2)</li> <li>• Security (1)</li> <li>• Replace flag stop with signed stops (2)</li> <li>• Improve snow removal at stops (1)</li> <li>• Police on bus routes (3)</li> <li>• Better way to handle routes that run late (1)</li> </ul>	<ul style="list-style-type: none"> <li>• Fix the Smartcard system (3)</li> <li>• Eliminate fares (3)</li> <li>• Make B43 Free for 5 College year round (2)</li> <li>• Decrease fares (2)</li> <li>• Allow transfers to be used on same route (1)</li> <li>• Improve E&amp;D pictures on cards (1)</li> <li>• Upgrade fareboxes (1)</li> <li>• Sell passes at more locations (1)</li> </ul>	<ul style="list-style-type: none"> <li>• Improve frequency (7)</li> <li>• Adjust route timing (6)</li> <li>• Add later evening service (6)</li> <li>• Better coordinate transfers (6)</li> <li>• More weekend service (6)</li> <li>• Extend Sunday service hours (4)</li> <li>• Service more areas (3)</li> <li>• Six Flags (2)</li> <li>• Bradley airport (1)</li> <li>• Hadley (1)</li> <li>• Montague (1)</li> <li>• More express trips (2)</li> <li>• Eliminate poor performing routes (2)</li> <li>• Eliminate holiday service and run regular service (1)</li> <li>• Operate all routes 7 days a week (1)</li> <li>• Increase Sunday service (1)</li> <li>• Expand reduce service routes (1)</li> <li>• Simplify routes and variants (1)</li> <li>• Eliminate mid-day service on unpopular routes (1)</li> <li>• Increase Friday and Saturday night service in the</li> </ul>	<ul style="list-style-type: none"> <li>• 31 (9)</li> <li>• 30 (8)</li> <li>• 33 (7)</li> <li>• 34 (5)</li> <li>• 35 (3)</li> <li>• 46 (3)</li> <li>• R41 (3)</li> <li>• B7 (2)</li> <li>• P20 (1)</li> <li>• 14 (1)</li> <li>• G1 (1)</li> <li>• 21E (1)</li> <li>• B4 (1)</li> <li>• R10 (1)</li> <li>• 90B (1)</li> <li>• G2 (1)</li> <li>• B17 (1)</li> <li>• B48 (1)</li> <li>• 38 (1)</li> <li>• 39 (1)</li> <li>• 45 (1)</li> <li>• M40 (1)</li> </ul>	<ul style="list-style-type: none"> <li>• Provide public with more information(4)</li> <li>• Educate passengers on rules and how to use service (4)</li> <li>• Expand Customer service booth hours (1)</li> <li>• Create educational videos about passenger rules (1)</li> <li>• Engage the public more in service and stop changes (1)</li> <li>• Display schedules on interior bus screens (1)</li> </ul>

**Table 99. Route-Specific Changes for Recommended Service Changes**

**Route-Specific Changes**

---

Increase B7 (1)

---

Provide more time on the P20 on weekends (1)

---

Increase R14 (1)

---

Eliminate Price Rite on the B7 (1)

---

Increase G1 (1)

---

Increase P21E (1)

---

Use 40 minute cycle times all the time on the B4 (1)

---

Create North End to South End Shuttle (1)

---

Create more stops on the R10 (1)

### Route-Specific Changes

---

Provide more time on the 90B between Db and East Longmeadow (1)

---

Increase G2 (1)

---

Adjust B17 timepoints (1)

---

Add additional evening trip on the B48 weekdays and Sunday (1)

---

Add additional evening service on the R41 in Easthampton (1)

---

Operate the R41 on Sundays (1)

---

Add more time to the 412 run (1)

---

Increase service during the peak on the 31 (8)

---

Increase service during the peak on the 30 (6)

---

Bring back the M40 (1)

---

Eliminate the Amherst College timecheck on the 38 for the last eve trip (1)

---

Convert Valley Med to on request only (2)

---

Increase the 35 during the peak (1)

---

Improve both campus shuttle routes (1)

---

Bring back the 34 Eve (2)

---

Increase service on the 45 (1)

---

Increase service on the 34 (2)

---

Increase service on the 33 (7)

---

Reduce the 38 on Friday and Saturday nights (2)

---

Increase AM trippers (1)

---

Less 34 (1)

---

Less 35 (1)

---

Eliminate the 39 (1)

---

Add more 46 trips (3)

---

Increase time allotted to get to Sunderland from Campus on the 31 (1)

### Q3. Where else or when do you think transit service should be provided that is currently not?

This question was open-ended, 75 individuals responded with comments. All comments were categorized into five themes (Table 100). The top comment was from SATCo operators for service to Six Flag. Overall UMass Transit provided primarily related to route specific changes, SATCo's were geared to creating new connections between areas and citing towns/areas that

would benefit from new or additional service, and VATCo had a mix of general as well as route specific.<sup>62</sup>

**Table 100. Comments by Theme for Additional Service**

Other (2)	Service More Areas (34)	General Service Change (9)	Route Specific (21)	Create Connections (9)
<ul style="list-style-type: none"> <li>COVID-19 related (1)</li> <li>Park and Rides for UMass (1)</li> </ul>	<ul style="list-style-type: none"> <li>Six Flags (4)</li> <li>Southwick (3)</li> <li>Bradley airport (1)</li> <li>Hadley (1)</li> <li>Pittsfield (1)</li> <li>Montague (1)</li> <li>Palmer (1)</li> <li>Ware (1)</li> <li>Belchertown (1)</li> <li>Franklin county (1)</li> <li>Berkshires (1)</li> <li>Longmeadow (1)</li> <li>East Longmeadow (1)</li> <li>Carew Street Springfield (1)</li> <li>Westfield Industrial Park (1)</li> <li>James Street Springfield (1)</li> <li>Greenfield (1)</li> <li>Southeast Amherst (1)</li> <li>General more areas (1)</li> </ul>	<ul style="list-style-type: none"> <li>More weekend service (3)</li> <li>Better coordinate transfers (2)</li> <li>Sunday service on all routes (1)</li> <li>Extend Sunday service hours (1)</li> <li>Earlier morning service in the Amherst Area (1)</li> <li>Add later evening service (1)</li> <li>Improve frequency (1)</li> </ul>	<ul style="list-style-type: none"> <li>31 (4)</li> <li>34 (2)</li> <li>35 (2)</li> <li>46 (2)</li> <li>30 (2)</li> <li>B43 (1)</li> <li>33 (1)</li> <li>45 (1)</li> <li>B7 (1)</li> <li>P20 (1)</li> <li>B6 (1)</li> <li>G1 (1)</li> <li>X90 (1)</li> <li>G2 (1)</li> </ul>	<ul style="list-style-type: none"> <li>UMass to Venture way via Hadley Farm (2)</li> <li>Connect 5 town Plaza and Eastfield Mall (1)</li> <li>Holyoke to Northampton express service (1)</li> <li>Union Station to Northampton Express bus (1)</li> <li>Route 5 Express bus to Enfield (1)</li> <li>Springfield to Easthampton bus (1)</li> <li>Chicopee Falls to East Springfield connection (1)</li> <li>Indian Orchard to Five Town (1)</li> </ul>

**Q4. What times/trips on specific routes do you think should be evaluated and/or possibly eliminated due to extremely low ridership?**

This question was open-ended, 66 individuals responded with 76 comments. While the overwhelming majority (90 percent) were route specific, additionally there were five that were for a town (Westfield, Ludlow, Palmer, Belchertown, and West Springfield) and two general comments pertaining to adjusting the timing on routes. The route with the most comments was the 39, it had 26 comments, of which the largest were to eliminate the 39.

**Table 101. Route-Specific Recommendations to Evaluate for Low Ridership**

**Recommended Service to Evaluate for Low Ridership**

Eliminate the R10 trips to the hospital and apartments (1)

Eliminate X90B to South Hadley (2)

Eliminate R29 (3)

Reduce service on the X90 after 7 PM (1)

P11 Helper (2)

<sup>62</sup> Hulmes did not provide any comments.

**Recommended Service to Evaluate for Low Ridership**

---

B7 Express (2)

---

G5 service to Mass Mutual (1)

---

The Loop (1)

---

Combine the B23 and R24 (1)

---

B7s (1)

---

B12 (1)

---

G5 (1)

---

B7 (1)

---

P20 (1)

---

Reduce the 38 at night (1)

---

Reduce service on the 38 (1)

---

Eliminate service past Rolling Green on the 30 (1)

---

Eliminate the 39 (15)

---

Reduce service on the 39 (4)

---

Eliminate late night service on the 39 (6)

---

Convert Valley Med to on request only on the 31 (1)

---

Evaluate the 39 mid-day (1)

---

Eliminate the mdi day trip on the 45 (1)

---

Reduce service on the 46 (2)

---

Reduce service on the 45 (3)

---

Increase service on the 34 (2)

---

Reduce the 33 in the morning (1)

---

Reduce the 38 on Saturday nights (3)

---

Reduce the 38 on Friday nights (4)

---

Eliminate the trips to the mall on the 39 (1)

---

Reduce AM service on the 35 (1)

---

Reduce service on the B48, low ridership (1)

---

Reduce early morning service on the R44 (1)

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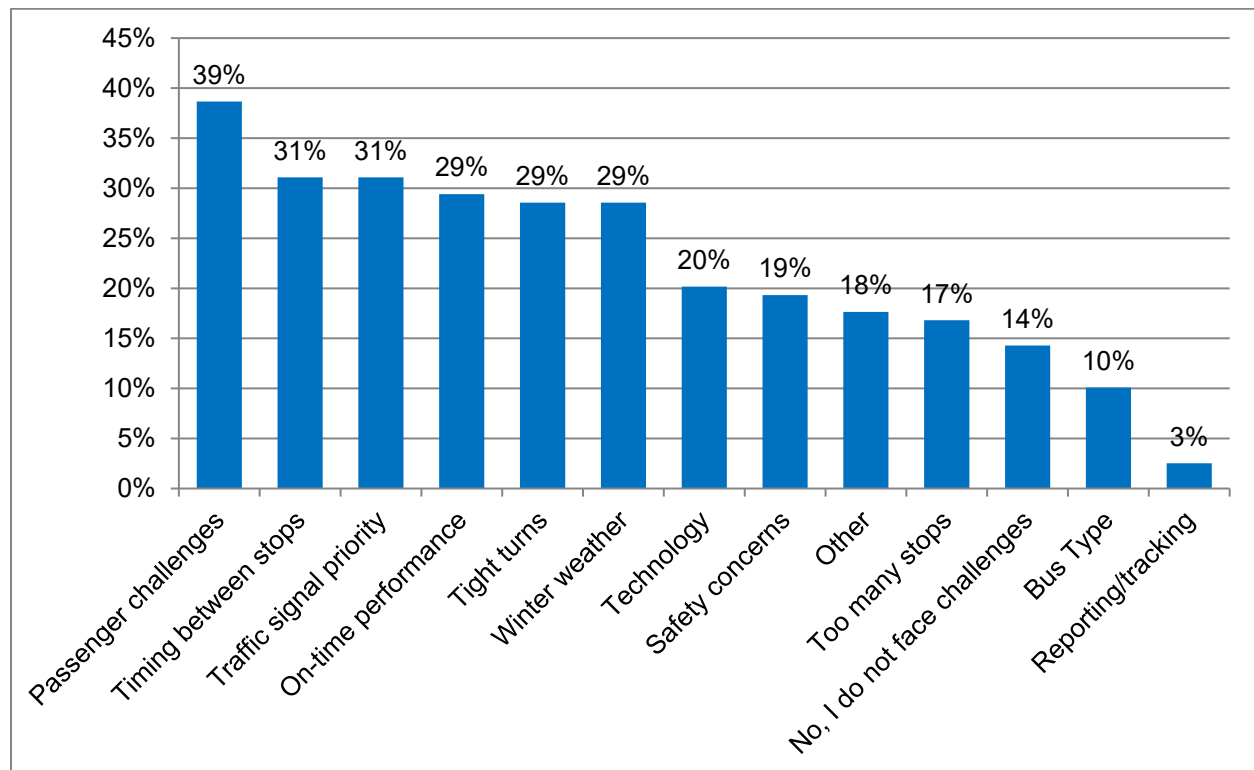
Eliminate the last B43 trip on Saturdays and Sundays (1)



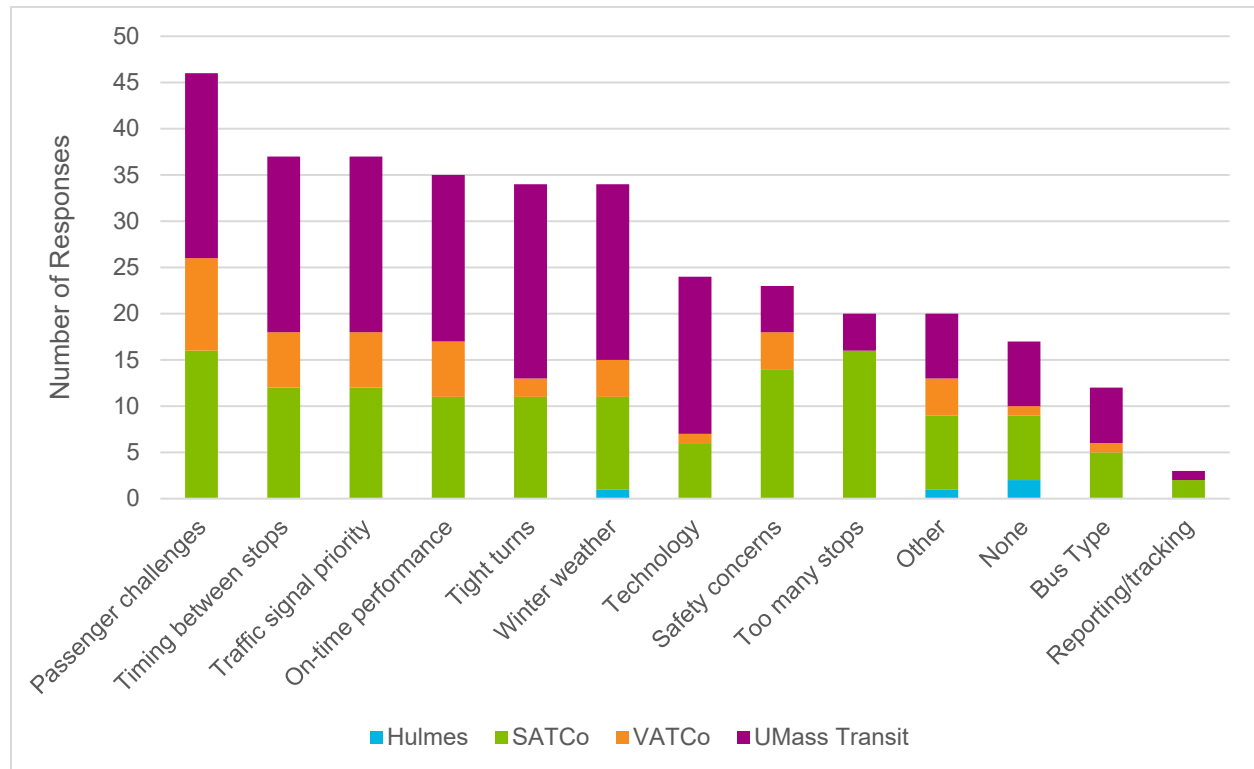
**Q5. Do you face any operational challenges?**

Respondents were able to select more than one response, over all 118 individuals provided 343 responses. The overwhelming majority identified at least one challenge, with only 14.4 percent stating they do not have any operational challenges (Figure 167). The top challenge reported was passenger challenges followed by the timing between bus stops. A breakdown of challenges by operator shows that the top challenge for VATCo are passenger related, for SATCo it is tied at both too many stops and passenger challenges, and for UMass Transit it is tight turns (Figure 168). Both Hulmes operators stated they do not have any challenges.

**Figure 167. Operational Challenges Faced**



**Figure 168. Operational Challenges by Operator**



For each challenge selected follow up questions were provided for the operator to describe the challenge (Table 102). The majority of the passenger challenges are related to disrespectful or disruptive passengers. The UMass Transit Comments related to traffic signal priority were primarily with issues at existing signals and difficulties taking left turns when the signal was not protected or short signal cycles which cause delay in the route. Comments regarding winter weather were split between identifying specific areas (generally hills and sloped areas) that are difficult and fleet issues. Overall New Flyers were identified as having poorer handling in the snow.

**Table 102. Description of Challenges by Theme**

Challenge	Responses
Passenger challenges	<ul style="list-style-type: none"> <li>• Disrespectful passengers (11)</li> <li>• Disruptive passengers (11)</li> <li>• “Joy” riding (3)</li> <li>• Crowding (2)</li> <li>• More training is needed for drivers on passenger relations (2)</li> <li>• COVID related (2)</li> <li>• Substance abuse onboard (2)</li> <li>• Crossing in front of bus (1)</li> <li>• Harassing other passengers (1)</li> <li>• Route specific (1)</li> <li>• Talk too much to drivers (1)</li> <li>• Do not let supervisors transport (1)</li> <li>• Passenger hygiene (1)</li> <li>• Communicating events that might impact routing or schedules to passengers (1)</li> </ul>
Timing between stops	<ul style="list-style-type: none"> <li>• General difficulties in making timepoints (9)</li> <li>• UMass to Cliffside on the 31 (2)</li> <li>• Fine Arts Center to Cowles Lane (2)</li> <li>• B43 (2)</li> <li>• G1 outbound from Union Station (1)</li> <li>• HTC to Union Station 1)</li> <li>• The X (1)</li> <li>• Mason Square (1)</li> <li>• X92 has too many mid time points (1)</li> <li>• Saturdays P20 Kmart to Riverdale Shops has too much time (1)</li> <li>• Eliminate mid timepoints (1)</li> <li>• Fine Arts Center to the Stadium on the 35 (1)</li> <li>• Library to Big Y on the 33 (1)</li> <li>• Olympia Drive to Studio Arts Building (1)</li> <li>• Colonial Village to Old Belchertown Road on the 30 (1)</li> <li>• Route 45 in the afternoon – all time points (1)</li> <li>• Studio Arts Puffton on the 30 (1)</li> <li>• The entire 30 during reduced service (1)</li> <li>• The 45 in the evening too much time for Rolling Green timecheck (1)</li> <li>• Too much time at Amherst College outbound on the 38 (1)</li> <li>• Transfer issues (1)</li> <li>• B43 Saturday mornings 6 AM – 8 AM (1)</li> <li>• R42 (1)</li> </ul>

**Challenge****Responses**


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Traffic signal priority	<ul style="list-style-type: none"> <li>• Transit signal priority is desired (5)</li> <li>• Route 9 TSP does not appear to work correctly (4)</li> <li>• Issues taking left turns due to lack of protected signal: <ul style="list-style-type: none"> <li>• Mass Ave to Commonwealth (2)</li> <li>• Route 9 onto University Drive (2)</li> <li>• N. Pleasant onto Main (2)</li> <li>• Southeast St onto Main (1)</li> </ul> </li> <li>• TSP in Springfield is not working (3)</li> <li>• All of Northampton signals are difficult (2)</li> <li>• Remove no right on red policy (2)</li> <li>• Signal at Liberty and Main (2)</li> <li>• Signals and traffic cause lateness (2)</li> <li>• B7 midtown (1)</li> <li>• P21 (1)</li> <li>• State St. in Wilbraham (1)</li> <li>• Signal timing to short (1)</li> <li>• Exiting the Cowles Lane Bus stop (1)</li> <li>• Right from Main Street to Southeast Street (1)</li> </ul>
On-time performance	<hr/> <ul style="list-style-type: none"> <li>• Traffic results in running late (8)</li> <li>• UMass North Pleasant Street during class change (5)</li> <li>• R42 timing is to tight (3)</li> <li>• R10 (3)</li> <li>• UMass Campus to town (2)</li> <li>• 35 (2)</li> <li>• 30 (2)</li> <li>• G1 (1)</li> <li>• 34 (1)</li> <li>• B43 mid-day trips 1:40 is insufficient for a loop and 1:20 early morning is overly ambitious (1)</li> <li>• Construction results in running late (1)</li> <li>• B6 (1)</li> <li>• G3 (1)</li> <li>• X90B (1)</li> <li>• P20 (1)</li> <li>• B7 (1)</li> <li>• P20 weekends (1)</li> <li>• Bus terminals (1)</li> </ul>

**Challenge****Responses****Tight turns**

- Route 30 Main Street to Southeast Street (11)
- Route 31 Meadow Street on to North Pleasant St (7)
- Route 31 Route 116 to Meadow (2)
- Right from Main to Carew St (2)
- Montcalm Heights (2)
- Route 33 Right into the Big Y Plaza (1)
- Navigating through Orchard Hill (1)
- The Smith College turn around (1)
- Route 33 Right onto Amity Street (1)
- During detours (1)
- Hancock St dues to parked cars (1)
- Parking lots (1)
- Walmart in Springfield (1)
- Dwight St. (1)
- Magazine to Lincoln (1)
- General (1)
- Central and Pine Streets (1)

**Winter weather**

- Lack of timely plowing of roads (5)
- Snowed in bus stops (4)
- New Flyers don't handle well in the snow (3)
- Going up and over the Notch (3)
- Belmont Street (2)
- Artics don't handle well in the snow (1)
- Causes poor on-time performance (1)
- Springfield St in Chicopee (1)
- Hills – general (1)
- Vehicles – general (1)
- Harrison (1)
- Heating of buses (1)
- Walmart parking lot Springfield (1)
- State Street (1)
- Orchard Hill (1)
- Amity Street (1)

**Technology**

- Avail (15)
- Vectors (3)
- Announcement system (3)
- Radio (3)
- Cameras (1)

<b>Challenge</b>	<b>Responses</b>
Safety concerns	<ul style="list-style-type: none"> <li>• Passengers situations (7)</li> <li>• Vehicle concerns (4)</li> <li>• Pedestrians crossing in front of bus (3)</li> <li>• Staff supervision/assistance (2)</li> <li>• COVID (1)</li> <li>• Crowding on buses (1)</li> <li>• Passenger information (1)</li> <li>• The X (1)</li> <li>• Bicyclists (1)</li> <li>• Lack of security (1)</li> <li>• Navigating the Big Y Century Plaza (1)</li> </ul>
Other	<ul style="list-style-type: none"> <li>• B43 timing issues (2)</li> <li>• Crowding at bus stops (1)</li> <li>• Reduce flag stops and convert to signed stop (1)</li> </ul>
Too many stops	<ul style="list-style-type: none"> <li>• Bus stop consolidation is needed (5)</li> <li>• G1 (3)</li> <li>• B7 (2)</li> <li>• High &amp; Maple Streets Holyoke (2)</li> <li>• Olympia Drive the stops are very close (2)</li> <li>• Sanders Stop on the Hampshire College campus (1)</li> <li>• G1 North end to Union Station (1)</li> <li>• B6 on Berkshire Ave (1)</li> <li>• G2 (1)</li> <li>• P20 (1)</li> <li>• White St Springfield (1)</li> <li>• Orange St X 92 (1)</li> </ul>
Bus Type	<ul style="list-style-type: none"> <li>• Mechanical failures (3)</li> <li>• Inability to open passenger windows (2)</li> <li>• Desire electric (2)</li> <li>• New Flyers don't handle as well (1)</li> <li>• Glare from passenger lights (1)</li> <li>• Need new buses (1)</li> <li>• Gillig (1)</li> </ul>
Reporting/tracking	<ul style="list-style-type: none"> <li>• Phone App for passenger accuracy (1)</li> <li>• Vector (1)</li> <li>• Need more time (1)</li> </ul>

**Q6. What other recommendations/thoughts do you have which would improve the service?**

This question was open-ended, 46 individuals responded with 57 comments. Comments made by UMTS operators were largely route specific, SATCo comments were management concerns, and VATCo general suggestions to improve the service (Table 103).<sup>63</sup>

**Table 103. Other Recommendations**

<b>Customer</b>	<b>Training (3)</b>	<b>Management (7)</b>	<b>Infrastructure</b>
<ul style="list-style-type: none"> <li>• Bring back paper schedules (2)</li> <li>• Better method for public feedback (1)</li> </ul>	<ul style="list-style-type: none"> <li>• More driver passenger relations training (2)</li> <li>• Longer CDL training program (1)</li> </ul>	<ul style="list-style-type: none"> <li>• Needs to be more approachable (2)</li> <li>• Driver support (2)</li> <li>• Better relations (2)</li> <li>• Drivers have say in routing (1)</li> </ul>	<ul style="list-style-type: none"> <li>• Install bus lanes (3)</li> <li>• More park and rides (1)</li> <li>• Bigger bus stops (1)</li> </ul>
<b>Capital/Maintenance (8)</b>	<b>Technology (7)</b>	<b>Route Specific (11)</b>	<b>Other (11)</b>
<ul style="list-style-type: none"> <li>• More Artics (2)</li> <li>• COVID-19 disinfectant leaves film (2)</li> <li>• More mechanics (1)</li> <li>• New driver seats (1)</li> <li>• TVM in northern tier (1)</li> <li>• Signs on rear of vehicle "This bus does not turn on red" and "Bus makes frequent stops" (1)</li> </ul>	<ul style="list-style-type: none"> <li>• Improve real time app (2)</li> <li>• Improve bus automatic announcements (1)</li> <li>• Avail (1)</li> <li>• Transit signal priority (1)</li> <li>• More monitors on board (1)</li> <li>• Real time detour updates (1)</li> </ul>	<ul style="list-style-type: none"> <li>• More Route 30 service (3)</li> <li>• More Route 31 service (3)</li> <li>• Less route 39 (1)</li> <li>• Less Route 38 at night (1)</li> <li>• Improve B43 schedule (1)</li> <li>• End B43 on UMass Campus (1)</li> <li>• Service the Trade Joes Cut out on Route 9 B43 Express trips (1)</li> </ul>	<ul style="list-style-type: none"> <li>• More time added to routes (4)</li> <li>• Towns remove pedestrian crosswalk sandwich boards (1)</li> <li>• More cops on evening service (1)</li> <li>• Enforce rear door exit, front door enter policy (1)</li> <li>• Stop consolidation (1)</li> <li>• Better parking lot circulation (1)</li> <li>• Better benefits (1)</li> <li>• Mirror at Union Station to help with visibility turning (1)</li> </ul>

<sup>63</sup> Hulmes operators provided no additional recommendations/thoughts.

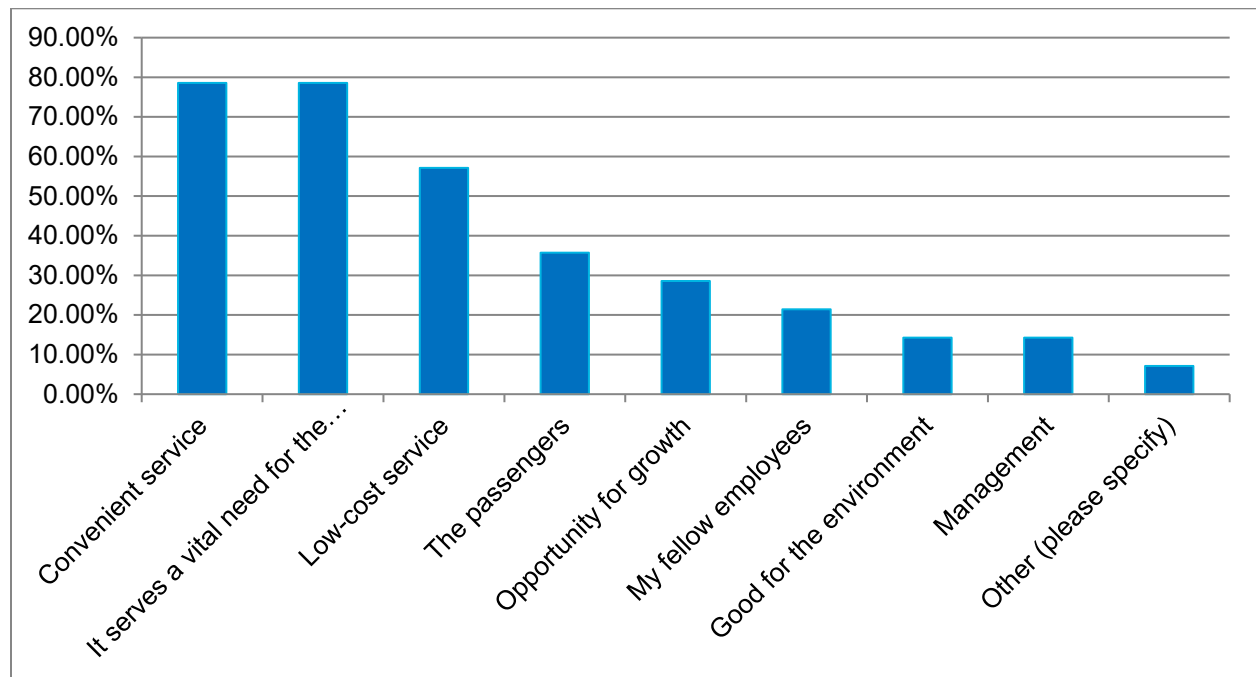
**Demand Response**

Responses were heard from 14 demand operators

**Q1. What is the best part about the PVTA service?**

Respondents were able to select more than one response. The top cumulative responses, at 78.6 percent each were convenient service and is serves a vital need for the community Figure 169.

**Figure 169. What is the Best Part About the PVTA Service – Demand Response**

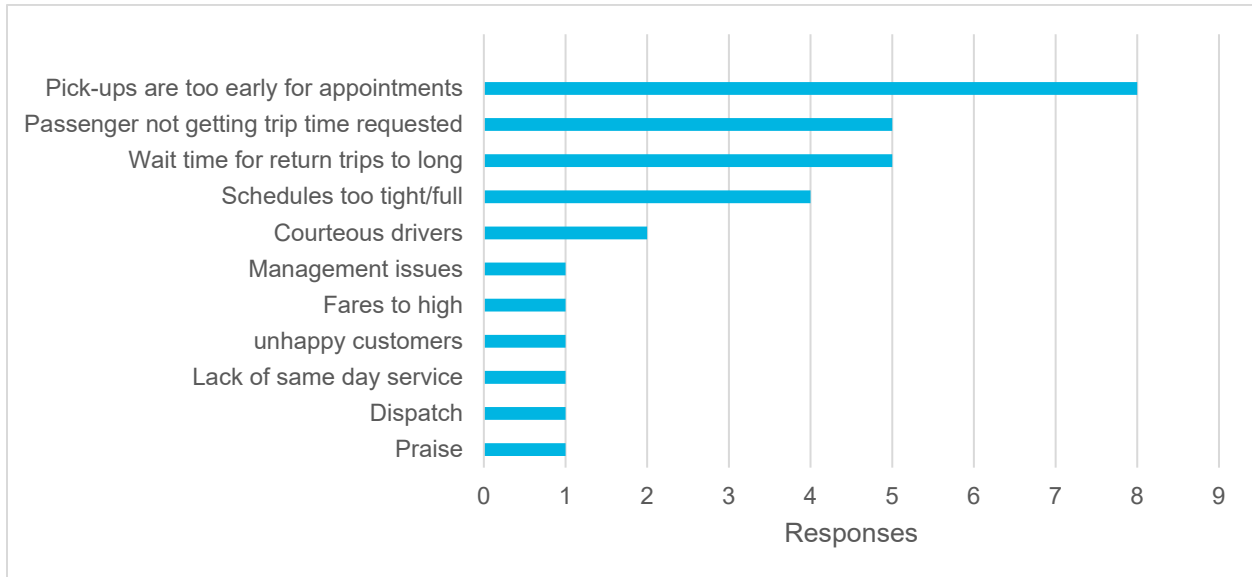


**Q2 What are the top three service changes that you would like to see that would improve service for the customers?**

This question was open-ended. Thirteen individuals responded providing 30 responses that were categorized into 11 themes. The most mentioned theme had to do passengers having pick-up times that were too early for their appointment (Figure 170).



**Figure 170. Top Service Changes – Demand Response**



**Q3. What do you hear from customers about with regard to unmet needs – places they’d like to go or times/days they’d like to travel?**

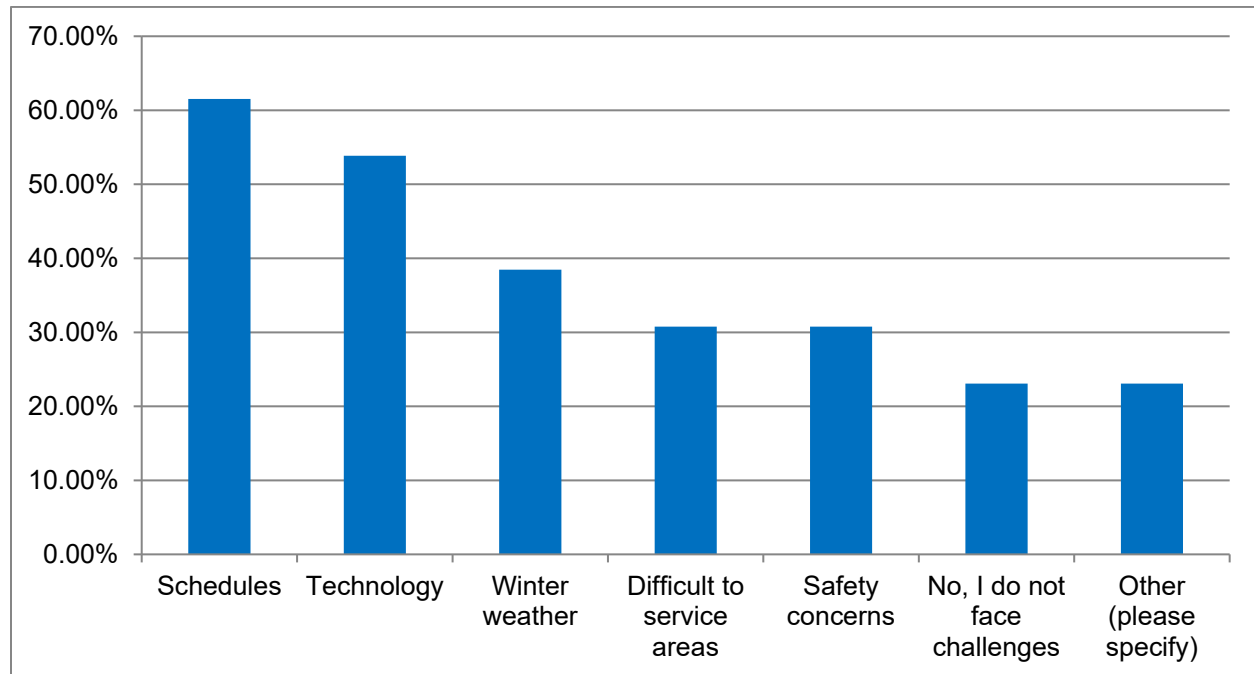
This question was open-ended, four responses were received. A summary of responses is below:

- Weekend senior service
- Weekends (general)
- Long Wait times
- Weekends in Belchertown

**Q5. Do you face any operational challenges?**

Respondents were able to select more than one response, over all 13 individuals provided 34 responses. The majority identified at least one challenge, only 23.1 percent stated they do not have any operational challenges (Figure 171). The top challenge reported was schedules followed by technology. For each challenge selected follow up questions were provided for the operator to describe the challenge (Table 104). The majority of the challenges are related to the schedules or to issues with the radio/GPS system.

**Figure 171. Demand Response Operational Challenges**



**Table 104. Demand Response Challenges by Theme**

Challenge	Responses
Schedules	<ul style="list-style-type: none"> <li>• Schedules are too tight (4)</li> <li>• Passenger wait times (2)</li> <li>• Schedules change too much throughout the day</li> <li>• Last trip goes beyond end of shift</li> <li>• Passengers on-board for too long</li> <li>• Pick-ups are too early for appointments</li> </ul>
Technology	<ul style="list-style-type: none"> <li>• GPS issues (2)</li> <li>• Timecard punch in/out</li> <li>• Hard to hear dispatch</li> <li>• Zonar/Victon not working</li> <li>• Computers break</li> <li>• Adept</li> </ul>
Winter weather	<ul style="list-style-type: none"> <li>• Safety should be prioritized over schedules</li> <li>• Essential trips only during storms</li> <li>• Vehicles handle poorly</li> <li>• Streets are not plowed</li> </ul>
Difficult to reach service areas	<ul style="list-style-type: none"> <li>• Radio dead zone areas (2)</li> <li>• Small side streets and one-ways</li> <li>• Steep driveways</li> </ul>
Safety concerns	<ul style="list-style-type: none"> <li>• Breaks need to be built in</li> <li>• COVID</li> <li>• Pick up locations that require a U-turn or are on a dead end</li> </ul>

**Challenge****Responses**

Other

- Radio dead zone areas
- Management issues
- Schedules are too packed

**Q6. What other recommendations/thoughts do you have which would improve the service?**

This question was open-ended, eight individuals responded. A summary of responses is as follows:

- Higher pay is needed (2)
- Keep dual wheel vans
- Home pick-ups need to be inspected before approved to ensure accessible for the vehicle
- People/drivers who smoke make vans smell bad, even if they smoke out of the van
- Better communications
- Driver committee
- Allow early pick-ups if passenger is ready

**Interviews**

Interviews were held with members of the PVTA paratransit council who elected to do so after presenting to the council. As representatives of the paratransit community each was asked the following four questions. Two individuals were interviewed, both live in the northern service tier.

- What do you hear from other passengers about the PVTA paratransit service?
- Are there places you wish you could go on the PVTA paratransit service that you cannot now or times?
- What barriers or concerns do you have about the PVTA paratransit service?
- What are some of the improvements that you and fellow passengers would like to see and would benefit greatly from?

**What do you hear from other passengers about the PVTA paratransit service?**

- The changes in schedules because of the colleges impacts the ADA users as the hours are shortened and in some cases service does not operate when school is not in session. This makes the service unreliable to use year-round
- There appears to be a disconnect between dispatch and scheduling
- There is no verification process that ensures people are dropped at the correct location, this is dangerous for those with cognitive disabilities as they might not be aware they are at the wrong location
- Vehicles do not always show up on time and those with cognitive disabilities may not have the wherewithal to know and call about the status of the ride.
- On-vehicle times sometimes seem longer than necessary
- There is a need to connect to the rural areas in the hilltowns

**Are there places you wish you could go on the PVTA paratransit service that you cannot now or times?**

- Later service hours in all towns
- Access to the hilltowns (Westhampton)

**What barriers or concerns do you have about the PVTA paratransit service?**

- There appears to be high turnover in drivers. Newer drivers tend to require more training in human services and safety
- Reduction in hours during the summer because of the colleges
- Long trip times
- Bad weather has caused some riders to not be picked up at all

**What are some of the improvements that you and fellow passengers would like to see and would benefit greatly from?**

- Ability to schedule trip online
- Ability to pay fare with a smartcard that had an online component to add funds to
- Being able to track to location of the vehicle in real-time so did not have to call and ask the status
- Two different phone lines; one for scheduling and the other for everything else
- Service to Westhampton along Route 66
- Improved educational material on how public transit benefits the environment

## Appendix D PVTA Needs

### Existing Fixed Routes Needs

Need	Rationale	Source(s)
<b>Route 30</b>		
Route 30: Reduce service to Valley Medical	Very little ridership (5 daily); does not meet requirement for deviation; difficult to maneuver bus through; would help improve OTP	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Route 30: Earlier morning weekday service	The first trips in the morning to campus from either direction have high loads and average standing space only. 27% of survey respondents wanted earlier morning service on this route.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> <li>• Previous RTP</li> <li>• Public Outreach</li> </ul>
Route 30: Increased frequency mid-day weekdays during the semester	Ridership from 8:00 AM to 5:00 PM averages over 70 PPRH with over 650 instances where more than 30 individuals board the same stop at the same time	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Route 30: Increase frequency during the early evening	Ridership from 6:00 PM to 8:00 PM average 60 passengers per revenue hour.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Route 30: Add service on Thursday and Friday night between 8 :00 PM and 11:00 PM	Ridership spikes from 8:00 PM to 11:00 PM with over 80 PPRH	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Route 30: Earlier morning Sunday service	Service on the first full trip has the highest ridership of all trips. 50% of survey respondents wanted earlier morning Sunday service on this route.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> <li>• Public Outreach</li> </ul>
Route 30: Adjust service level to meet demand	Ridership levels are low in the late evening with less than 10 people per trip	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Route 30: Additional Sunday service 11:00 AM to 10:00 PM	Ridership from 11:00 AM-10:00 PM averages 77 PPRH	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Route 30: Additional Saturday service	Ridership from 10:00 AM to the end of service averages 117 Passengers per hour from a low of 71 to a high of 188	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>

Need	Rationale	Source(s)
<b>Route 31</b>		
Route 31: Additional Sunday service	Ridership from 11:00 AM to 10:00 PM averages 66 Passengers per hour with trips heading to Sunderland having greater loads	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 31: Additional Saturday service	Ridership from 10:00 AM to 11:00 PM averages 108 Passengers per hour with some having over 125 Passengers	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 31: Earlier morning weekday service	The first trips in the morning to campus from either direction have high loads and average standing space only. 33% of survey respondents wanted earlier morning service on this route.	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> <li>Public Outreach</li> </ul>
Route 31: Earlier morning Sunday service	Service on the first full trip has the highest ridership of all trips. 37% of survey respondents wanted earlier morning Sunday service on this route.	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> <li>Public Outreach</li> <li>Previous RTP</li> </ul>
Route 31: Increased frequency mid-day weekdays during the semester	Ridership from 9:00 AM to 3:00 PM averages over 60 passengers per revenue hour with several instances where more than 30 individuals board the same stop at the same time	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 31: Additional evening service on Thursday and Friday nights	Ridership spikes from 8:00 PM to 10:00 PM, resulting in some of the highest productivities	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 31: Connect Route 31 with shopping centers on Route 9	These locations are less than 2 miles apart, but passengers must travel to the center of town and then transfer	<ul style="list-style-type: none"> <li>Public Outreach</li> <li>HST Plan</li> </ul>
Route 31: Additional travel time to go from Sunderland to UMass	During full service the schedule allocates 15 minutes to go between Sunderland and the UMass Campus a distance of 6.2 miles. This is tight in particular because of the high ridership activity in North Amherst and development occurring along Route 116.	<ul style="list-style-type: none"> <li>Driver Survey</li> </ul>

Need	Rationale	Source(s)
<b>Route 33</b>		
Route 33: Remove unused deviations, shorten layover at Stop & Shop and create 30 minute headways	More weekday service is needed, by eliminating the Cushman center deviation (low ridership), and reducing the Stop & Shop time check could create 30 minute service on weekdays. The deviation takes four minutes to complete. Layover at Stop & Shop averages 23 minutes	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> <li>• Public Outreach</li> <li>• Regional Transportation Plan</li> </ul>
Route 33: Additional mid-day service on Saturdays	There is only one bus on Saturdays but mid-day between 11:00 AM and 5:00 PM it averages 45 passengers per hour, many with shopping bags	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
<b>Route 34</b>		
Route 34: Weekday evening service	This route ends at 8:00 PM service is provided in the opposite direction on route 35. In the last hour of service on the 34 the route carries 20 PPH. 38% of survey respondents wanted later weekday hours	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
Route 34: Increase frequency weekdays	The 34 had 242 overloads reported. Activity peaks between 9:00 AM and 10:00 AM on trips coming from the stadium going to North Pleasant Street carries upwards of 40 people per trip on average. 62% of route survey respondents wanted increased frequency	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
Route 34: Saturday service	This route does not operate on Saturdays, 43% of route users desired Saturday service. The 35 operates it averages 40 PPRH between noon and 10:00 PM	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
<b>Route 35</b>		
Route 35: Increase frequency weekdays	Between 9:00 AM and 6:00 PM the PPRH is greater than 40. 61% of route survey respondents wanted increased frequency	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>

Need	Rationale	Source(s)
<b>Route 38</b>		
Route 38: Adjust service level to meet demand	Ridership drops to 4.7 passengers per revenue hour after 11:00 PM. At 8:00 PM productivity drops to 10.6. The one anomaly is Halloween	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 38: Adjust service level to meet demand	Ridership drops after 10:00 PM	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 38: Adjust service level to meet demand	Ridership on the last trip averages much lower productivities (7.3)	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 38: Reduce service on Saturday nights	Drivers report low ridership	<ul style="list-style-type: none"> <li>Driver Survey</li> </ul>
<b>Route 39</b>		
Route 39: Adjust service level to meet demand	Route has very little ridership, is not meeting the target and enrollment has been dropping at HC	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 39: Adjust service hours to meet demand - weekdays	Ridership drops to single digits each hour starting at 6:00 PM. All classes end by 8:50 PM	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 39 Adjust routing to meet demand	The trips to Smith College have twice the ridership than those going to the mall during the same time periods	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
Route 39: Adjust service hours to meet demand - Saturday	Ridership after 8:00 PM begins to drop. Particularly after the first month of return to school, ridership is single digits per trip	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Driver Survey</li> </ul>
<b>Route 45</b>		
Route 45: Increased peak hour service	Ridership is highest on this route between 7:00 AM and 9:00 AM and 4:00 PM to 6:00 PM. While the productivity is over 20 PPRH half of the activity along this route are passengers who are traveling between campus and downtown Amherst/Main Street. Increased frequency was desired by 87% of route users	<ul style="list-style-type: none"> <li>Driver Survey</li> <li>Public Outreach</li> <li>Previous RTP</li> </ul>



Need	Rationale	Source(s)
<b>Route 46</b>		
Route 46: Additional trips	Service is very limited with only 2 trips a day. 92% of route users in the survey wanted more service on this route	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• Public Outreach</li> </ul>
<b>R41</b>		
R41: Additional Saturday evening service	The last northbound trip has the highest ridership of all northbound trips. 55% of passengers desired later evening service	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• Public Outreach</li> </ul>
R41: Sunday service	Easthampton has no Sunday bus service. 55% of survey respondents desired Sunday service on the route. This route was noted the most by VATCo drivers for needing improvements including Sunday service	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• Public Outreach</li> </ul>
R41: Additional weekday evening service	Ridership in the southbound direction has a consistent passengers per trip from the second trip in the morning to the last with 17 -11 passengers, ridership does not peak and taper off. 59% of passengers desired later evening service. This was one of the few routes to have an increase in weekday ridership between 2012 (CSA data) and 2019	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• Public Outreach</li> <li>• Existing Conditions Analysis</li> </ul>
<b>R42</b>		
R42: Discontinue service to Nash Hill	Service to Nash Hill is on request three times a day. No ridership was recorded at this location, turning the bus around at this location is difficult	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> </ul>
R42: Sunday service	Williamsburg has no Sunday bus service beyond the VA. 45% of survey respondents desired Sunday service on the route.	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• Public Outreach</li> <li>• Existing Conditions Analysis</li> </ul>

Need	Rationale	Source(s)
<b>R44</b>		
R44: Increased frequency	96% of survey respondents desired this. The current frequency is 70 minutes but with buses circulating in the opposite direction departs the Salvo house every 35 minutes	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Existing Conditions Analysis</li> </ul>
R44: Increased Sunday service	Sunday hours are limited and there are only three trips daily with service patterns inconsistent because of service to the VA.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
R44: Streamline the routing	The R44 deviates to High Street outbound on weekends and 44A on weekdays. This deviation does not meet the productivity standard and averages 1 boarding per week	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> </ul>
<b>B43</b>		
B43: Increased Weekend frequency	Ridership on this route is above 50 PPRH between 2:00 PM and 9:00 PM with trips averaging over 57 passengers per directional trip. The majority of ridership activity is between town and the Mall	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
B43: Adjust service hours to meet demand -Friday	The last trip on Friday nights carries 7 PPRH compared to the trip before which is 29 PPRH. This trip only operates Friday nights	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
<b>B48</b>		
B48: Express service from Northampton to HTC	The B48 operates service via Route 5 between these two locations, the majority of ridership is in downtown Northampton and HTC. 64% of survey respondents who use this route desired faster service compared to 59% overall. While the scheduled travel time is 30 minutes this route often runs behind schedule, travel via I-91 is faster.	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Previous RTP</li> <li>• Driver Survey</li> </ul>

Need	Rationale	Source(s)
B48: Increased Weekday frequency	In the morning peak service is only hourly, during this time the PPRH averages 26 compared to 21 the rest of the day. 61% of survey respondents wanted higher frequency on this route	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> </ul>
B48: Later evening service	This route operates to 9:00 PM on Saturdays by 8:00 PM on weekdays. 58% of survey respondents for this route desired longer hours	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
B48: Earlier weekday service	In the first hour of service this route carries 25 PPRH. All other Northampton based routes begin weekday service at 6:00 AM this route begins at 7:00 AM.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
B48: Earlier Saturday morning service	The first NB trip in the morning has the greatest ridership amongst all Saturday trips and has a PPRH of 33. All other Northampton based routes begin weekday service at 8:00 AM this route begins at 9:00 AM.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Previous RTP</li> </ul>
B48: Increased Saturday frequency	Saturday service averages 12.7 passengers per trip which is greater than on weekdays. Between 9:00 AM and 5:00 PM the PPRH is greater than 24	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
<b>WP</b>		
WP: Increased service	100% of users wanted increased frequency in the public survey. Ridership is low at 4.44 PPRH	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Palmer Ware Outreach</li> <li>• Intercity Bus Study</li> </ul>
WP: Service to Springfield	Springfield is one of the top destinations desired for WP residents.	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Palmer Ware Outreach</li> <li>• Intercity Bus Study</li> </ul>
WP: Dedicated Routes	Previously this service had two routes but was combined into one and service reduced	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Palmer Ware Outreach</li> </ul>
WP: Saturday service	In the Palmer-Ware on-board survey 25% desired Saturday service and 50% said this for route riders in the public survey	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Palmer Ware Outreach</li> <li>• Intercity Bus Study</li> </ul>

Need	Rationale	Source(s)
WP: Sunday service	In the Palmer-Ware on-board survey 16% desired Sunday service and 63% said this for route riders in the public survey	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Palmer Ware Outreach</li> <li>• Intercity Bus Study</li> </ul>
<b>Miscellaneous Routes</b>		
M40: Express service between Northampton and Amherst	The M40 was discontinued but provided 9 trips daily. The B43 schedule absorbed some of these trips with an express variant	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Existing Conditions Analysis</li> </ul>
NE: Improved service	90% of route users desired an increase in frequency. The current frequency is 90 minutes with multiple trip variants. Ridership activity by stop is unknown as are travel patterns.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Public Outreach</li> </ul>
<b>G1</b>		
G1: Later weekday evening service	Service ends at 10:00 PM but the last trips leaving Union Station is at 9:10 in both directions. From 9:00 to 10:00 PM the route carries ~25 people per day. 42% wanted later weekday evening service.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
G1: Adjust weekday frequency to meet demand	The frequency throughout the day maintains steady at 20-25 minutes though ridership is lower in the mornings and evening than mid-day which carries over 200 people per hour. In the evening the route carries ~50 people per hour. Increased frequency was the top desired improvement on this route (57%).	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
G1: Consistent service to the Chicopee Big Y	Approximately 1/3 of the trips do not extend to the Chicopee Big Y plaza but terminate in Chicopee center. This creates confusion for passengers as there are over 25 stops between the center and Big Y including the Chicopee Marketplace Plaza. On an average weekday there are over 225 boardings at these stops	<ul style="list-style-type: none"> <li>• Existing Conditions</li> </ul>

Need	Rationale	Source(s)
G1: Additional Saturday Service	On Saturdays the PPRH is ~29, greater than on weekdays. The route has a 30 minute headway but is performing closer to a Tier 1 route, though it is a Tier 3 on Saturdays.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
G1: Additional Sunday Service	On Sundays the PPRH is ~27, greater than on weekdays. Ridership has increased by 556% since the last CSA due to increased frequency. The route has a 45 minute headway but is performing closer to a Tier 1 route, though it is a Tier 3 on Sundays. Of the Southern Tier routes, it has the second highest Sunday ridership.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
G1: Later evening Sunday Service	The last trip departing Union Station SB averages 12 people. Later Sunday service was desired by 47%.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> <li>Previous RTP</li> </ul>
<b>G2</b>		
G2: Increased service to Big Y	The Big Y variation has four times the ridership than Dwight Road.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
G2: Eliminate unused deviation	The Industrial Park deviation has a productivity of 0.08 PPRH.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Previous RTP</li> </ul>
G2: Adjust weekday frequency to meet demand	Of the Tier 3 routes this route has the highest ridership and a productivity closer to a Tier 1 Route. Improved headway was the top desired improvement in the public survey for this route (70%). In the evening though ridership begins to drop starting at 6:00 PM from 100 passengers per hour to 60, then to 40 at 8:00 PM and 24 at 9:00 PM despite headway remaining every 30 minutes.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> <li>Driver Survey</li> </ul>
G2: Additional Saturday Service	Between 10:00 AM and 5 PM this route carries 100 people per hour. The PPRH on Saturdays is ~27	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
G2: Additional Sunday Service	Between 9:00 AM and 6:00 PM this route carries 51 people per hour. The Sunday average PPRH is 26.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>

Need	Rationale	Source(s)
G2: Later weekday evening service	Service ends at 10:00 PM but the last trips leaving Union Station is ~9:30 PM. 48% wanted later weekday evening service.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
G2: Longer Sunday Hours	Service begins at 9:00 AM and ends at 7:00 PM. It does not follow a traditional bell curve but begins and ends with high ridership. 33% of the public wanted earlier morning service and 55% later on Sundays.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
<b>G3</b>		
G3: Saturday evening service	Later evening on Saturdays was identified as a need by 63%, service ends at 6:30 PM though most other Tier 3 routes on Saturday end later.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
G3: Adjust weekday frequency to meet demand	Service currently ends at 7:45 PM with irregular frequencies after 2:45 PM (20-40 minutes) through the end even though ridership begins to drop at 6:00 PM. Even though ridership drops later evening service was the top desired improvement in the public survey for this route (68%) .	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
G3: Adjust weekday morning service to meet demand	Ridership is lower before 9:00 AM but Frequency is 30 minutes.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
G3: Increased service to State Street	Service east of Hancock Street only accounts for 7% of the ridership and all stops are within 1/4 mile of State Street. This route would be better served as a loop with service on Wilbraham Road	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
G3: Consistent Routing	The Sunday Chicopee Falls deviation has very little ridership and creates confusion for Passengers.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
<b>B4</b>		
B4: Cleaner Schedule	The schedules imply that on Saturdays the bus does not service this area, but it does.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>

**G5**

Need	Rationale	Source(s)
G5: Eliminate unused service	The Campus has closed, there is very little ridership on this section. Demand was identified instead to connect to CT Transit.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• Previous RTP</li> <li>• Driver Survey</li> </ul>
G5: Sunday Service	This route does not have Sunday service. A need was identified by 46% of survey respondents using the route.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
G5: Additional Saturday evening service	Service ends at 6:00 PM put the PPRH is increasing from 4 to 5 from 5 to 15. 46% of the survey respondents using the route wanted later Saturday Service.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
<b>B6</b>		
B6: Longer Saturday Hours	Service on Saturdays ends at 8:40 PM, the earliest of the Tier 2 routes. The last EB trip carries an average of 16 passengers. 70% wanted later Saturday service.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
B6: Consistent routing and improved Sunday frequency	On Sundays the route serves the Eastfield Mall. This variation has very little ridership by eliminating it.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> </ul>
B6: Expanded Sunday service	On Sunday service ends at 7:15 PM. The westbound trip with the greatest ridership is the first (26 passengers) and the eastbound with the greatest is the last trip (20 passengers). 65% want later Sunday service and 55% earlier.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
B6: Remove unused deviations	The B6 Health South Deviation is sporadic and has little activity compared to the Main routing and averages about 7 passenger per day.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> </ul>
B6: Adjust Frequency to Match Demand	The B6 has the lowest productivity and highest subsidy per passenger of the Tier 2 routes. Annual ridership is half of that of the P20 or G1. From 8:00 AM to 5:00 PM per hour it carries 100 passengers similar to that of many Tier 3 routes. Additionally, the B6 has one of the poorest OTP on weekdays .	<ul style="list-style-type: none"> <li>• Existing Conditions</li> </ul>

Need	Rationale	Source(s)
<b>B7</b>		
B7: Express and local variant	The route has multiple deviations, many which do not meet the requirements. With the loss of many businesses at the Mall, ridership east of Walmart has dropped.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Previous RTP</li> </ul>
B7: Match frequency to demand on weekdays	The B7 operates a 15 minute frequency until 6:00 PM and then reduces to 30 minutes. At 5:00 PM ridership drops from 250 passenger per hour to 200 and then to less than 100 at 7:00 PM and less than 50 after 9:00 PM.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> </ul>
B7: Match frequency to demand on Saturday	On Saturdays the headway is 20 minutes all day, despite ridership having a bell curve and peaking 1 PM. Before 8:00 AM the route carries less than 10 PPRH. In the evening ridership begins declining steadily at 4:00 PM.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Previous RTP</li> </ul>
B7: Consistent Saturday Routing	On Saturdays the B7 has express trips via I-91 to the Eastfield Mall. These trips carry less than 10 passengers each and create a confusing schedule.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Previous RTP</li> </ul>
B7: Improve Sunday Service Span	Sunday Service is limited to 9:00 AM to 7:00 PM. Ridership on the first trip outbound carries on average 26 passengers. The last outbound trip is at 6:00 PM and averages 29 passengers. Additional morning service was desired by 45% of users and evening by 43% on Sundays.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• Previous RTP</li> </ul>
<b>R10</b>		
R10: Remove unused deviations	The Hospital and East Mt. View Apartments deviations have very little ridership and do not meet the deviation requirement.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Previous RTP</li> <li>• Driver Survey</li> </ul>
R10: Remove unused deviations	This Union Street branch has little ridership and creates a sporadic schedule. Eliminating it could streamline the schedule.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Previous RTP</li> </ul>



Need	Rationale	Source(s)
R10: Additional morning service to Walmart	The first trip into Walmart on weekdays is 8:30 AM but the store opens at 7:00 AM.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
R10: Consistent routing	When WSU is in session during weekdays the R10 ends at the Olver Transit Pavilion but when it is not continues onto WSU. The different schedule times and destinations can be confusing to individuals not associated with the university.	<ul style="list-style-type: none"> <li>Existing Condition</li> <li>Driver Survey</li> </ul>
R10: Improved weekday frequency	The frequency on this route is inconsistent, mainly because of the multiple deviations that could occur. 86% of the route users desired improved frequencies.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> <li>Previous RTP</li> <li>Driver Survey</li> </ul>
R10: Improved Sunday morning service	The first inbound trip from Westfield in the morning on Sundays averages over 20 people.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> <li>Previous RTP</li> <li>Driver Survey</li> </ul>
<b>P11</b>		
P11: Additional morning service	The first trip in the morning carries the greatest number of people (~ 25 passengers). 43% desired more morning service.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
<b>B12</b>		
B12: Reduce unproductive routes	The B12 has one of the highest cost per passenger but because the Department of Corrections subsidizes it the farebox recovery is one of the highest. This route carries 3.5 passenger per round trip on weekdays and 2 on Saturday.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Driver Survey</li> </ul>
<b>R14</b>		
R14: Streamline the routing	Route has multiple deviations and branches and at different times of the day circulate in different directions. Simplifying the route could improve constancy and create consistent headways.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Regional Transportation Plan</li> <li>Previous RTP</li> <li>Driver Survey</li> </ul>

Need	Rationale	Source(s)
<b>B17</b>		
B17: Sunday Service	This route does not have Sunday service. A need was identified by 40% of survey respondents using the route. On Saturdays this route carries ~ 19 PPRH.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
B17: Adjust weekday frequency to meet demand	This route carries an average of 19.4 PPRH, almost twice the tier 1 goal of 10 PPRH. Increased frequency was the top desired improvement on this route (64%).	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
<b>P20</b>		
P20: Improve Weekday frequency	This route carries over 800,000 annually and has an average PPRH of 26.55 and ranks fifth in average daily weekday ridership. Ridership forms a bell curve, peaking in the afternoon. 48% of route users desired improved frequency.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
P20: Later evening Saturday service	The last trip leaving the Mall SB is at 10:05 and NB 9:15 PM. Each trip averages 10 people. Later evening service was desired by 44% of the route users.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
P20: Increase Sunday span of service	Service begins at 9:00 AM and the first NB and SB trip carry 25 passengers each. 33% of riders wanted earlier morning service and 47% later evening.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
<b>P20E</b>		
P20E: Additional Saturday service	On Saturdays the service averages a PPRH of 30. The first trip to the Mall in the morning carries 10 passengers and the last trip back 12. 44% wanted earlier morning service and 51% later.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
P20E: Sunday service	This route has no service on Sundays but was desired by 46% of route users.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
<b>P21</b>		

Need	Rationale	Source(s)
P21: Increase Saturday span of service	Service begins at 8:00 AM and the first trip has 13-16 passengers, in the evening service ends at 9 PM but there is a desire for it to end later (44%).	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
P21: Increase Sunday span of service	Service begins at 8:00 AM and the first SB trip carries 20 passengers. Service ends at 7:00 PM 36% of riders wanted earlier morning service and 42% later evening.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
P21: Improve weekday frequency	This route has a PPRH of 28.58, almost twice that of the target of 15 PPRH. It is one of the few routes which experienced an increase in weekday ridership between 2012 and 2019. 45% of route users want improved frequency and later evening service.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
<b>B23</b>		
B23: Weekend Service	This route does not operate on weekends. 64% of route users in the survey desired Saturday service and 50% Sunday Service.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> <li>Driver Survey</li> </ul>
B23: Remove unused deviations	The deviation to the Solider Home is also served by the R24 and it does not meet the deviation requirement	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
B23: Service to the Silver Street Big Y	The Big Y on Silver Street is not serviced by the PVTA but is considered a major generator as it would benefit both patrons and employees.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
<b>R24</b>		
R24: Weekend Service	This route does not operate on weekends. 54% of route users in the survey desired Saturday service and 39% Sunday Service.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> <li>Driver Survey</li> </ul>
<b>R29</b>		
R29: Mid-Day weekend service	Weekend service is limited to one-trip in each direction.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>
<b>X90</b>		

Need	Rationale	Source(s)
X90: Increased Sunday Service	Sunday service ends in Chicopee and does not connect to a transit center. Ridership in the last hour is the greatest amongst all hours. Later Sunday service was identified as a need by 60% of route users.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
X90: Reduce Unproductive Deviations	The X90B deviates to Montcalm Heights but this deviation does not meet the requirement. Both the A and B serve South Hadley Center, but this area has very little ridership.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Driver Survey</li> </ul>
<b>X92</b>		
X92: Sunday service	This route does not have Sunday service. A need was identified by 64% of survey respondents using the route.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
X92: Adjust weekday frequency to meet demand	The X92 has a morning and afternoon peak in ridership, as opposed to many other routes which peak mid-day. During these peaks' trips can be carrying upwards of 25 passengers. Increased service was the top desired improvement (73%).	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
<b>LOOP</b>		
LOOP: Funding Partnership	This route has low ridership and is not meeting the PPRH target of 10. It is subsidized by MGM.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Driver Survey</li> </ul>
LOOP: Adjust weekday span to meet demand	Ridership after 8:00 PM drops to less than 3 PPRH on weekdays with most activity at stops which are serviced by other routes.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Driver Survey</li> </ul>
LOOP: Adjust Sunday span to meet demand	Sunday ridership is low averaging just 4.4 PPRH and is highest from 11:00 AM to 3:00 PM. After 3:00 PM the PPRH ranges from 0.8 to 4.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Driver Survey</li> </ul>
<b>R10s/OWL</b>		

Need	Rationale	Source(s)
R10s/OWL: Consistent schedules and increased connections	The OWL operates different schedules on MWF and Tu/Th because of class schedules. This route is very short. The 10S connects WSU to downtown Westfield. These two routes provide duplicative service in places.	<ul style="list-style-type: none"> <li>Existing Conditions</li> </ul>

**W**

W: Weekend service	This service only operates on weekdays, but weekend service is desired. The demand response service overall carries less people on weekends.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>
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### Demand Response Needs

Need	Rationale	Source(s)
Demand response connections to FRTA	Currently the FRTA and PVTA area for non-ADA demand response do not overlap. Many of the rural FRTA communities' main destinations are PVTA communities.	<ul style="list-style-type: none"> <li>Public Outreach</li> </ul>
Connect Sunderland to the South County Senior Center	Sunderland residents have a tri-town senior center located in South Deerfield, but seniors cannot access it via dial-a-ride because South Deerfield is a FRTA town.	<ul style="list-style-type: none"> <li>Public Outreach</li> </ul>
Online trip scheduling for Demand Response	Improve the passenger experience and lower the number of calls and call wait time.	<ul style="list-style-type: none"> <li>Public Outreach</li> <li>PVTA Paratransit Study</li> <li>COVID Exercise</li> </ul>
Demand Response: Coordination with Quaboag Connector	The Quaboag connector provides demand response service to several towns in the Quaboag region including desired connections to WRTA and PVTA routes in Belchertown	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> <li>Public Outreach</li> </ul>

## New Service Needs

Need	Rationale	Source(s)
First-mile/last-mile service	While most of the high population areas have access to transit there is still a proportion of the population that does not.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Regional Transportation Plan</li> </ul>
Late night service	There are varying needs for service throughout the service area to accommodate 2nd and 3rd shift workers	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Regional Transportation Plan</li> </ul>
Same day demand response service	Demand response users must book their trip in advance. This limits mobility. Same day service was desired by almost 50% of users.	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• HST Plan</li> </ul>
Service to Six Flags	During the summer months there is demand for access to Six Flags for both recreation and for jobs.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
Connection to CTtransit	The G5 provides limited connections to CT Transit at Mass Mutual.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> </ul>
Out of service area medical trips	There is a need to access medical service in Worcester and Boston	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Public Outreach</li> <li>• HST Plan</li> </ul>
Service to Venture Way	More and more UMass departments are moving here	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Express service between Northampton and Springfield	Innovative methods to increase transit ridership which could serve park and rides, provide fast direct service and entice commuters. Convenient service was identified as the top reason no riders would begin riding	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• HST Plan</li> <li>• Regional Transportation Plan</li> <li>• Previous RTP</li> <li>• Intercity Bus Study</li> </ul>
Express service between Amherst and Springfield	The Route 29 provides service between Amherst and Holyoke providing connections to Springfield, but it can take 2 hours to complete this trip. Convenient service was identified as the top reason no riders would begin riding	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• HST Plan</li> <li>• Previous RTP</li> <li>• Driver Survey</li> <li>• Intercity Bus Study</li> </ul>

Need	Rationale	Source(s)
Service deeper into East Longmeadow	There is no service to the center of East Longmeadow which was identified as a need.	<ul style="list-style-type: none"> <li>Public Outreach</li> </ul>
Transit service in South Hadley Falls	Service to most of South Hadley outside the 116 corridor was discontinued with the elimination of the Tiger Trolley but there has been a need identified.	<ul style="list-style-type: none"> <li>Public Outreach</li> </ul>
Connection between Westfield Neighborhoods and Industrial area	There are several neighborhoods in Westfield which have no service but exhibit a high demand. Additionally the streamlining of the R10 will eliminate service from certain areas.	<ul style="list-style-type: none"> <li>Previous RTP</li> </ul>
Additional Agawam Service	The deviation to the industrial park is recommended for elimination. Service is limited and the industrial park businesses has varying needs for hours and shift times.	<ul style="list-style-type: none"> <li>Public Outreach</li> </ul>
Additional service in Palmer and Ware	These communities use to be serviced by 2 routes. There are several destinations and neighborhoods which need to be connected.	<ul style="list-style-type: none"> <li>Palmer Ware Outreach</li> </ul>

## Systemwide Needs

Need	Rationale	Source(s)
Faster service	Faster service was preferred over serving more places in the public outreach.	<ul style="list-style-type: none"> <li>Public Outreach</li> <li>HST Plan</li> <li>Intercity Bus Study</li> </ul>
Improved weekend service	Weekend service drops on many routes and some do not operate at all.	<ul style="list-style-type: none"> <li>HST Plan</li> <li>Intercity Bus Study</li> </ul>
Expand evening service	Later evening service is needed to accommodate 2nd and 3rd shift workers.	<ul style="list-style-type: none"> <li>HST Plan</li> </ul>
Increased frequency	Increased frequency would improve mobility for the region. Frequency was desired over coverage in the public survey for riders. 42% of non-riders stated they would use the PVTA if service was more frequent and 56% said they would use it if it was convenient	<ul style="list-style-type: none"> <li>Public Outreach</li> <li>HST Plan</li> <li>PVTA Northern Tier</li> <li>PVTA Southern Tier</li> <li>COVID Exercise</li> </ul>

Need	Rationale	Source(s)
Additional weekend service for fixed route and demand response	Increased frequency would improve mobility for the region. Frequency was desired over coverage in the public survey	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• HST Plan</li> </ul>
Improved weekend service	Weekend service drops on many routes and some do not operate at all.	<ul style="list-style-type: none"> <li>• Intercity Bus Study</li> </ul>
Systemwide: First-mile/last-mile and after hours service	There is a need to provide service to all in the region, and during later evening and early morning hours in order to increase mobility, economic activity and livability. In many cases Fixed Route is not financially feasible nor is there enough demand to warrant a micro transit program	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> </ul>

## Bus Stop Needs

Needs	Rationale	Source(s)
Improved lighting at bus stops	Difficult to see waiting customers and would improve safety. It was found that 374 stops do not have adequate lighting	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Accommodate additional vehicles at Cowles Lane and Academy of Music	These stops are serviced by multiple routes. Cowles Lane can only hold 1 bus at a time. Academy of Music can only hold three buses, but up to 5 buses can be there at once.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Safer crossings at heavily used crosswalks by bus stops	This is a main crosswalk on campus, and it is difficult to pull out of the bus stop and then get through the crosswalk, especially during class change. This causes vehicles to run behind	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Bus stop consolidation	In some areas stops are placed closer than the recommended standard, slowing down the routes	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> <li>• PVTA Northern Tier</li> <li>• PVTA Southern Tier</li> </ul>
Improved bus stop amenities	This includes benches, shelters and improved accessibility	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• HST Plan</li> <li>• PVTA Northern Tier</li> <li>• PVTA Southern Tier</li> </ul>



<b>Needs</b>	<b>Rationale</b>	<b>Source(s)</b>
Bus stop shelters at high ridership stops	PVTA has at least 19 stops that meet the requirement for installing a shelter but do not have one	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• PVTA Northern Tier</li> <li>• PVTA Southern Tier</li> <li>• COVID Exercise</li> </ul>
Policy for bench placement at bus stops	This will help PVTA prioritize where to put benches	<ul style="list-style-type: none"> <li>• Existing Conditions</li> </ul>
Improved safety at crosswalks at bus stops	In areas with high pedestrian activity and numerous crosswalks passengers often cross in front of the bus making it difficult to pull out of stops and creating a safety hazard.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Longer bus stops	Many stops with pullouts are not designed to accommodate more than one vehicle or longer articulated vehicles.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Bus stop snow and trash removal	When snow is not removed from bus stops, they become difficult to service, in some cases snow is removed in a manner limiting accessibility and ramp deployment or shelter access. Trash can build up if not removed. While each garage has a crew to maintain and clean shelters this is time consuming and costly.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>

## Fleet Needs

<b>Needs</b>	<b>Rationale</b>	<b>Source(s)</b>
Increased vehicle capacity	Increase capacity on the 30 and 31, these two routes have the greatest number of overloads.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Buses with windows that open	This would help with air circulation, which is recommended in enclosed spaces during the pandemic, reduce odors, and reduce dependency on AC.	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• COVID Exercise</li> </ul>
Electric bus	To reduce the carbon footprint in the Pioneer Valley	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>

<b>Needs</b>	<b>Rationale</b>	<b>Source(s)</b>
Newer buses	18.5% of revenue vehicles are past their ULB. These older vehicles have high mileage and become more costly to maintain and components begin to break. The automatic announcement system was noted as a concern on older buses	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Inform other drivers that PVTA buses do not turn on red and stop frequently	A way is needed to let drivers behind the bus know that the bus does not turn on red and that it stops frequently.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>

### Infrastructure Needs

<b>Need</b>	<b>Rationale</b>	<b>Source(s)</b>
BRT Infrastructure on Route 9	Route 9 is the primary corridor connecting Northampton and Amherst. The DOT is working on improvements to the roadway which would benefit PVTA including TSP, and new bus pull outs.	<ul style="list-style-type: none"> <li>• Route 9 BRT Study</li> <li>• Driver Survey</li> <li>• Previous RTP</li> </ul>
BRT Infrastructure on State Street	The B7, one of the busiest routes, operates along the State Street corridor. Additionally, several other routes serve sections of this corridor. The existing conditions analysis identified this as a high ridership corridor. Treatments are needed to shorten travel time given the numerous traffic signals and would help with OTP.	<ul style="list-style-type: none"> <li>• State Street BRT Study</li> </ul>
Protected left turns in order to increase OTP	Without the protected lefts, vehicles can wait a substantial time to turn causing the routes to fall behind schedule	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Improved curb radii in order to reduce the need to use the oncoming lane or rubbing the tire on the curb	Turn is difficult in a bus when cars are waiting at the stop bar. Off track's often occur	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>

Need	Rationale	Source(s)
Elimination of regular car traffic on North Pleasant Street on Campus. Allow buses, emergency and university plated vehicles only on weekdays during the day.	Would help improve OTP for the 30, 31, 33, 34, 35 which use this corridor. Getting in and out of the bus stops with car and pedestrian traffic is difficult. xx buses an hour during the peak are traveling this corridor	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Expansion of the UMass and VATCo Maintenance Facilities	The current facilities do not accommodate safe and proper maintenance of articulated buses. This is needed to expand the use of articulated buses	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Regional Transportation Plan</li> <li>• COVID Exercise</li> </ul>
Additional park and rides throughout the region.	Additional Park & Rides are needed in areas surrounding the UMass campus in order to reduce vehicles on campus. They should be serviced by PVRTA with appropriate amenities.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Reduced number of crosswalks on North Pleasant Street, UMass Campus.	Route often run behind schedule along this segment and travel time can vary from 2 mins to 10 min depending on the time of day. From the Roundabout to intersection with Mass Ave there are 14 crosswalks over the .7 mile long roadway segment, with some just 100 feet apart.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>

## Fare Needs

Need	Rationale	Source(s)
Cash less fare options in addition to magnetic stripe cards	This would speed up boarding times and OTP and improve passenger satisfaction. This could be a mobile payment or smart card option	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• PVRTA Northern Tier</li> <li>• COVID Exercise</li> </ul>
Additional locations to obtain a PVRTA E&D card	Currently there are no locations in the northern tier to obtain a card	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
New fare collection system	The current system is becoming outdated and there were several issues with the Fast Break card deployment and TVMs. The current system does not have a functional Smart Card system.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>

Need	Rationale	Source(s)
Cashless fare option for demand response	The mobile payment app recently deployed is for fixed route. Over 50% of demand response users would pay via phone.	<ul style="list-style-type: none"> <li>Existing Conditions</li> <li>Public Outreach</li> </ul>

## Policy Needs

Need	Rationale	Source(s)
Minimum span of service guidelines that reflect new route classification structure	The 2014 CSA outlines the minimum span of service for each route type and day type. These should be adjusted to reflect the new route type structure	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> </ul>
Identification of flag stop corridors	While the majority of stops have signs or are identified in the GTFS and app there are several corridors where the entire corridor is flag stop. By identifying these it is clear to passengers and drivers where the bus will stop if waved down verse where someone must be at a prescribed stop	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> </ul>
Electric scooter policy	As micro mobility increases, and more individuals are utilizing electric scooters PVTA should establish a policy regarding if and when they are allowed on buses.	<ul style="list-style-type: none"> <li>Existing Conditions Analysis</li> </ul>
Data driven framework for determining service levels	Enhanced performance management system to support an enterprise-wide data-driven and performance focused management and decision-making framework	<ul style="list-style-type: none"> <li>RTA Task Force</li> <li>MassDOT</li> </ul>

## Operational Needs

Needs	Rationale	Source(s)
UMTS: Improved timing on route segments	Drivers reported insufficient timing on several routes.	<ul style="list-style-type: none"> <li>Driver Survey</li> </ul>
Additional road supervisors	Drivers had concerns about the response time for incidents that occur on-board buses	<ul style="list-style-type: none"> <li>Driver Survey</li> </ul>

<b>Needs</b>	<b>Rationale</b>	<b>Source(s)</b>
Improved communication between drivers and drivers/Management and PVTA	TBD	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Improved transfer communication	Communication between vehicles is not quick and sometimes transfers are missed.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Continually monitoring OTP	Reliable service is imperative to maintaining ridership, most routes have segments where OTP is not meeting the performance metric	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• PVTA Northern Tier</li> <li>• PVTA Southern Tier</li> </ul>
Improved cleanliness of vehicles	This was a top concern in on-board passenger surveys and was heard from drivers.	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• PVTA Northern Tier</li> <li>• PVTA Southern Tier</li> <li>• COVID Exercise</li> </ul>
Coordinated service along State Street	With the proposed changes there will be an increase in service along State Street, a busy corridor with high ridership. The timing of the routes should be coordinated to reduce buses running back to back.	<ul style="list-style-type: none"> <li>• Existing Conditions</li> <li>• Previous RTP</li> <li>• State Street BRT Study</li> </ul>
Adjusted timing on routes	Drivers identified route segments where timing needs to be improved because routes are running hot or behind	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
30/31/45/ Additional time from UMass Graduate Research Center (GRC) to Cowles Lane	4 minutes are allotted in the schedule, but drivers report often running behind because of the high ridership activity in this corridor, and numerous crosswalks.	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> <li>• Driver Survey</li> </ul>
Improved travel time and OTP through the center of Amherst	To help move the buses through town quicker. The Cowles Lane stop is just before the signal and getting out of the stop and through the signal can be very difficult and time consuming.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>

## Technology Needs

Need	Rationale	Source(s)
New AVL Software	Avail not working properly was a common complaint across garages. In particular, voice fallback, silent alarms trigger automatically and randomly, poor radio quality, intermittent automatic announcements	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Improved real-time information at stations	Screens at Union Station and HTC do not always work properly	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
AVL and APC data for the community shuttles	The WP route and NE do not have AVL and the APC technology is not turned on. This hinders the ability to monitor the routes performance. These routes do not show up on the Transit App	<ul style="list-style-type: none"> <li>• Existing Conditions Analysis</li> </ul>
Transit signal priority	PVTA currently has TSP deployed along at a select few locations. In some instances it was reported that it was not working by drivers	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
New Demand Response scheduling and CAD software	PVTA currently uses Adept	<ul style="list-style-type: none"> <li>• Technology Survey</li> </ul>
New Fixed Route scheduling software	PVTA utilizes Hastus	<ul style="list-style-type: none"> <li>• Technology Survey</li> </ul>
Route planning software	PVTA currently uses Remix to aid in planning but this software is limited and requires the developer to upload new files each time there is a route/schedule change. Additionally, it does not function well for routes that operate different schedules on different days of the week	<ul style="list-style-type: none"> <li>• Technology Survey</li> </ul>
Upgraded parts management and Maintenance work order software	PVTA has just upgrade the software	<ul style="list-style-type: none"> <li>• Technology Survey</li> </ul>
Integrated service alert system with social media	A service alert system would better inform passengers of change	<ul style="list-style-type: none"> <li>• Technology Survey</li> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>

Need	Rationale	Source(s)
Vehicle-mounted collision warning and tracking systems	Zonar technology is currently deployed on the paratransit fleet but there is no such technology on the bus fleet	Technology Survey Existing Conditions Analysis

## Other Needs

Need	Rationale	Source(s)
How to ride guide	Information is needed that walks passengers through how to use the bus system including reading a schedule, boarding the bus, and paying the fare.	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
Improved customer communication	Customers need a way to communicate with PVTA and provide feedback about the service. While PVTA does have a customer complaint form it is geared toward this and not necessarily feedback that would help improve the system. Pre-pandemic PVTA did hold rider meetings but had mixed results on attendance.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Reestablish printed schedules	Not all customers have access to a smart phone with data plan that allows them to see schedules as a result they are having to ask the drivers for schedule information.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Better enforcement of code of conduct	Passenger challenges were the top challenge identified by fixed route operators. In particular those who are disruptive and disrespectful and make the driver and other passengers uncomfortable.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>
Improved schedule format	Schedules with multiple variants can be difficult to read, especially in the Amherst area, they lack info on ending early, reduced etc. 36% of survey respondents stated the need for easier to read schedules	<ul style="list-style-type: none"> <li>• Public Outreach</li> <li>• Driver Survey</li> </ul>
Method for public to provide feedback	Drivers noted that there needs to be a method for passengers to provide feedback to PVTA with suggestions on how to improve the service. While PVTA does have a Contact form under Customer Service making this more prominent and highlighting that you are look for feedback on a main page would help.	<ul style="list-style-type: none"> <li>• Driver Survey</li> </ul>

<b>Need</b>	<b>Rationale</b>	<b>Source(s)</b>
Connections to Franklin County	Bus drivers and passengers identified this need. FRTA operates two routes which connect to PVTA service	<ul style="list-style-type: none"> <li>• Driver Survey</li> <li>• Public Outreach</li> </ul>



## Appendix E PVTA Recommendations

### Existing Fixed Routes Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Route 30</b>									
<b>Route 30: Reduce Service to Valley Medical</b>	Convert to on-request only	Implemented							
<b>Route 30: Earlier morning weekday service</b>	Begin weekday service earlier by adding an additional trip in each direction				×	Low	Low	Low	3
<b>Route 30: Increased frequency mid-day weekdays during the semester</b>	Add service mid-day to create 12 minute headway from 8:00 AM to 5:00 PM				×	High	Low	High	3
<b>Route 30: Increase frequency during the early evening</b>	Additional Service from 6:00 PM to 8:00 PM, improve headway to 15 minutes			×		Medium	Low	Low	4
<b>Route 30: Add service on Thursday and Friday night between 8:00 PM and 11:00 PM</b>	Add service on Thursday and Friday night between 8:00 PM and 11:00 PM to create 20 minute headways				×	Low	Medium	Medium	2
<b>Route 30: Earlier morning Sunday service</b>	Begin Sunday service an hour earlier	×				Low	Low	Medium	2
<b>Route 30: Adjust service level to meet demand</b>	End Sunday service an hour earlier	Implemented							
<b>Route 30: Additional Sunday service 11:00 AM to 10:00 PM</b>	Additional Sunday service 11:00 AM to 10:00 PM by adding another bus and increasing frequency to 30 minutes	Implemented							

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Route 30: Additional Saturday service</b>	Additional Saturday service 10 AM to end of service by adding another bus and increasing frequency to 30 minutes	Implemented							
<b>Route 31</b>									
<b>Route 31: Additional Sunday service</b>	Additional Sunday service 11 AM to 10 PM by adding another bus and increasing frequency to 35 minutes	Implemented							
<b>Route 31: Additional Saturday service</b>	Additional Saturday service 10 AM to 11 PM by adding another bus and increasing frequency to 35 minutes	Implemented							
<b>Route 31: Earlier morning weekday service</b>	Begin weekday service earlier by adding an additional trip in each direction				×	Low	Low	Low	3
<b>Route 31: Earlier morning Sunday service</b>	Begin Sunday service an hour earlier	×				Low	Low	Low	3
<b>Route 31: Increased frequency mid-day weekdays during the semester</b>	Add service mid-day to create shorter 12 minute headways from 9:00 AM to 3:00 PM				×	High	Medium	High	3
<b>Route 31: Additional evening service on Thursday and Friday nights</b>	Add service on Thursday and Friday night between 8:00 PM and 10:00 PM to create 20 minute headways				×	Low	Medium	Medium	3
<b>Route 31: Connect Route 31 with shopping centers on Route 9</b>	Further research would be needed to implement any service to determine potential ridership levels.				×	High	Low	Low	5
<b>Route 31: Additional travel time to go from Sunderland to UMass</b>	Increase traveling time and reduce layover time at the Boulders	Implemented							

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Route 33</b>									
<b>Route 33: Remove unused deviations, shorten layover at Stop &amp; Shop and create 30 minute headways</b>	Remove unused deviations, shorten layover at Stop & Shop and create 30 minute headways using two buses. Without eliminating the deviation it is likely the route will fall behind at times given the varying traffic levels and pedestrian activity on Campus and in town.	X				Low	Low	Medium	2
<b>Route 33: Additional mid-day service on Saturdays</b>	Add a second bus between 11:00 AM and 5:00 PM creating 45 minute frequencies and extending to the Hampshire Mall	Implemented							
<b>Route 34</b>									
<b>Route 34: Weekday evening service</b>	Extend service to 10:00 PM				X	Medium	Low	Low	4
<b>Route 34: Increase frequency weekdays</b>	Capacity issues appear to be at discrete times. Establish a tripper for this time.				X	Medium	Low	Medium	3
<b>Route 34: Saturday service</b>	Provide service from noon to 10:00 PM				X	Low	Low	Medium	2
<b>Route 35</b>									
<b>Route 35: Increase frequency weekdays</b>	Improve headway to 12 minutes on weekdays from 9:00 AM-6:00 PM				X	High	Medium	High	3
<b>Route 38</b>									

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Route 38: Adjust service level to meet demand</b>	Monday - Thursday end service by 11:00 PM and reduce frequency after 8:00 PM to 90 Minutes	✗				Low	Low	Negative	3
<b>Route 38: Adjust service level to meet demand</b>	Friday - reduce frequency after 10:00 PM	✗				Low	Medium	Negative	3
<b>Route 38: Adjust service level to meet demand</b>	Sunday - eliminate the last trip	✗				Low	Low	Negative	3
<b>Route 38: Reduce service on Saturday nights</b>	A review of ridership per revenue hour shows while ridership does drop in the evening the route still carries just under 20 PPRH. Continue providing service but monitor future evening ridership	✗				Low	Low	Low	3
<b>Route 39</b>									
<b>Route 39: Adjust service level to meet demand</b>	Reduce to 60 minute headways on weekdays	✗				Low	Low	Negative	3
<b>Route 39: Adjust service hours to meet demand - weekdays</b>	End service earlier in the evening on weekdays with the last trip departing for Smith College around 9:00 PM	✗				Low	Low	Negative	3
<b>Route 39 Adjust routing to meet demand</b>	Eliminate trips to the Hampshire Mall	✗				Low	Low	Negative	3
<b>Route 39: Adjust service hours to meet demand - Saturday</b>	End Saturday service at 8:00 PM	✗				Low	Medium	Negative	3
<b>Route 45</b>									

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Route 45: Increased peak hour service</b>	Add a trip during the morning peak that arrives on campus in time for the 10:00 and 10:10 AM class schedule block				×	Low	Low	Low	3
<b>Route 46</b>									
<b>Route 46: Additional trips</b>	Add back in the morning and evening trips eliminated as part of the FY2019 service reductions				×	High	Low	Medium	4
<b>R41</b>									
<b>R41: Additional weekday evening service</b>	Add an additional evening trip on weekdays				×	Low	Low	High	1
<b>R41: Additional Saturday evening service</b>	Add an additional evening trip		×			Low	Low	Low	3
<b>R41: Sunday service</b>	Implement service with one hour headways with a minimum span of 10:00 AM-5:00 PM	×				Low	Low	High	1
<b>R42</b>									
<b>R42: Discontinue service to Nash Hill</b>	Eliminate Nash Hill	×				Low	Medium	Low	2
<b>R42: Sunday service</b>	Implement service with one hour headways with a minimum span of 10:00 AM-5:00 PM	×				Low	Medium	High	1
<b>R44</b>									

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>R44: Increased frequency</b>	Eliminate circular routing and on weekdays use Saturday routing, reduce headway to hourly and extend service span to 8 PM. Serve Rocky Hill Co-housing on-request using the NE		×			Low	Medium	High	1
<b>R44: Increased Sunday service</b>	Expand service hours by adding an additional morning and afternoon trip using Saturday routing. VA to be serviced with establishment of Sunday service on the R42	×				Low	Low	Medium	2
<b>R44: Streamline the routing</b>	Convert to on-request only.	×				Low	Medium	Low	2
<b>B43</b>									
<b>B43: Increased Weekend frequency</b>	On Saturdays extend the Route 33 to the Mall, creating 45 minute headways and reducing the Big Y layover				×	Low	Medium	High	1
<b>B43: Adjust service hours to meet demand -Friday</b>	Eliminate last trip on Friday nights				×	Low	Low	Low	3
<b>B48</b>									
<b>B48: Express service from Northampton to HTC</b>	The current routing serves a small number of passengers along Route 5 and Lincoln Street for which there is no other service. Therefore it is recommended to alternate trips between an express variant (I-91) and the current routing and market appropriately.				×	Low	Low	Medium	2
<b>B48: Increased Weekday frequency</b>	Create consistent 30 minute headways on this route from 7:00 AM to 6:00 PM				×	Low	Low	Medium	2

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>B48: Later evening service</b>	Expand service to 9:00 PM on weekdays				×	Low	Low	High	1
<b>B48: Earlier weekday service</b>	Add a 6:00 AM trip		×			Low	Low	Low	3
<b>B48: Earlier Saturday morning service</b>	Add an 8:00 AM trip		×			Low	Low	Low	3
<b>B48: Increased Saturday frequency</b>	Increase Saturday frequency between 9:00 AM and 5:00 PM				×	Low	Low	High	1
<b>WP</b>									
<b>WP: Increased service</b>	Coordinate with the Quaboag Connector to provide Microtransit and connection to neighboring communities			×		Medium	Low	High	2
<b>WP: Service to Springfield</b>	Increase the number of trips to Springfield and serve the Ware Big Y, Walmart, Palmer Big Y and ending at either Union Station or the Eastfield Mall. Trips can alternate between going to Union Station and the Mall			×		Low	Low	Medium	1
<b>WP: Dedicated Routes</b>	Work with Quaboag connector to reestablish two routes that connect at the Ware Walmart. The Quaboag Connector can operate one route and PVTA the other			×		Low	Medium	High	1
<b>WP: Saturday service</b>	Establish a micro transit that operates on Saturdays from 8:00 AM to 5:00 PM. Include access to the Eastfield Mall for transfer opportunities to Springfield	×				High	Medium	High	3

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>WP: Sunday service</b>	Establish a micro transit that operates on Sundays from 8:00 AM to 5:00 PM. Include access to the Eastfield Mall for transfer opportunities to Springfield	×				High	Medium	High	3
<b>Miscellaneous Routes</b>									
<b>M40: Express service between Northampton and Amherst</b>	Convert the B43 express trips back to non-express trips and reestablish the M40 with morning trips heading toward UMass and afternoon toward Northampton. Vehicle schedules can be interwoven with the B43 to reduce deadhead and increase efficiency				×	High	Low	High	3
<b>NE: Improved service</b>	Conduct an on/off study to better understand ridership activity and adjust the route converting deviations with little ridership to by request, adjusting routing where needed and create one hour headways that depart Northampton on an opposite schedule than the 41	×				Low	Low	High	1
<b>G1</b>									
<b>G1: Later weekday evening service</b>	Add 1 additional evening trip departing Union Station in each direction.		×			Low	Low	Medium	2
<b>G1: Adjust weekday frequency to meet demand</b>	Improve frequency to 15 minutes from 8:00 AM to 4:00 PM, from 6:00 PM to 8:30 PM reduce to 30-40 min and after 8:30 PM reduce to 60 minutes.				×	High	Low	High	3



Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>G1: Consistent service to the Chicopee Big Y</b>	Extend Route to the Chicopee Plaza on all trips	✗				High	Low	High	3
<b>G1: Additional Saturday Service</b>	Between 10:00 AM and 4:00 PM improve headway to 20 minutes.			✗		Low	Low	High	1
<b>G1: Additional Sunday Service</b>	Between 8:00 AM and 5:00 PM improve headway to 20 minutes.			✗		Medium	Low	High	2
<b>G1: Later evening Sunday Service</b>	Add an additional evening trip departing Union Station SB.		✗			Low	Low	Medium	2
<b>G2</b>									
<b>G2: Increased service to Big Y</b>	Eliminate the Dwight Road variant and replace with microtransit or Taxi/TNC on-demand feeder service, all trips to service Big Y.	✗				Medium	High	Low	3
<b>G2: Eliminate unused deviation</b>	Replace service to the Industrial Park with microtransit	✗				Medium	High	Low	3
<b>G2: Adjust weekday frequency to meet demand</b>	Improve frequency to 20 minutes from 7:00 AM to 6:00 PM, from 6:00 PM to 8:00 PM reduce to 30 min and after 8:00 PM 60 minutes.				✗	High	Low	High	3
<b>G2: Additional Saturday Service</b>	Improve frequency to 20 minutes from 10:00 AM to 5:00 PM			✗		Low	Low	High	1
<b>G2: Additional Sunday Service</b>	Improve frequency to 45 minutes from 9:00 AM to 6:00 PM.			✗		Low	Low	High	1
<b>G2: Later weekday evening service</b>	Add 1 additional evening trip departing Union Station in each direction.				✗	Low	Low	Medium	2

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>G2: Longer Sunday Hours</b>	Begin Service at 8:00 AM and end at 8:00 PM.				×	Low	Low	Medium	2
<b>G3</b>									
<b>G3: Saturday evening service</b>	Extend service to 9:00 PM.				×	Low	Low	High	1
<b>G3: Adjust weekday frequency to meet demand</b>	Consistent 30 minute frequency to 5:00 PM. Begin tapering service off at 5:00 PM with 60 minute headways but extend service to 9:00 PM.				×	Low	Low	High	1
<b>G3: Adjust weekday morning service to meet demand</b>	Reduce frequency in the morning			×		Low	Low	Negative	3
<b>G3: Increased service to State Street</b>	On the eastern section of the route convert to a loop using Wilbraham road instead of an out and back. This will still provide access to the Old Hill/Upper Hill neighborhoods but serve the busier Wilbraham Rd corridor.	×				Low	Low	Low	3
<b>G3: Consistent Routing</b>	Remove the Sunday Chicopee Falls Deviation.	Implemented							
<b>B4</b>									
<b>B4: Cleaner Schedule</b>	Clean up Saturday Schedule to include Plainfield and Wason Timepoints.	×				Low	Low	Medium	2
<b>G5</b>									
<b>G5: Eliminate unused service</b>	Eliminate Service to MassMutual in Enfield and create a new route from Union Station to the Enfield Mall that is express via I-91.	×				Low	Medium	Low	2

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>G5: Sunday Service</b>	Implement hourly Sunday service from 9:00 AM to 5:00 PM.	×				Low	Low	High	1
<b>G5: Additional Saturday evening service</b>	Add 2 additional evening trips				×	Low	Low	Medium	2
<b>B6</b>									
<b>B6: Longer Saturday Hours</b>	Add a 9:30 PM trip	×				Low	Low	High	1
<b>B6: Consistent routing and improved Sunday frequency</b>	Eliminate the deviation and create 45 minute frequencies.	Implemented							
<b>B6: Expanded Sunday service</b>	Add an 8:30 AM westbound trip from Big Y. Add one additional full evening trip ending service at 9:15 PM at Big Y.		×			Low	Low	High	1
<b>B6: Remove unused deviations</b>	Convert to on request only.	×				Low	Medium	Low	2
<b>B6: Adjust Frequency to Match Demand</b>	Reduce frequency to 30 minutes with 45 minute frequency from 5:00 PM to 7:00 PM and hourly after 7:00 PM. This should allow for increased cycle time which will help with OTP.				×	Low	Medium	Negative	3
<b>B7</b>									

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>B7: Express and local variant</b>	Create a limited stop variation that stops at the proposed locations in the BRT study but ends at Walmart, weekdays from 7:00 AM to 5:00 PM. The local variant will service Independence House and Shop Rite on each trip in each direction as well as Mass Mutual when needed. Each should operate at 30 minute headways creating 15 minute headways on the route. Limited stop = 2 buses 60 minute cycle, Local = 4 buses 120 minute cycle. The express variant would need to be branded differently with stops clearly defined in order to not confuse passengers.				×	High	Medium	High	3
<b>B7: Match frequency to demand on weekdays</b>	Reduce to 30 minutes after 5:00 PM and 45-60 minutes after 7:00 PM.				×	Low	Low	Negative	3
<b>B7: Match frequency to demand on Saturday</b>	Before 8:00 AM reduce headway to 30 minutes. Reduce headway to 30 minutes starting at 6:00 PM.				×	Low	Low	Negative	3
<b>B7: Consistent Saturday Routing</b>	Discontinue the Eastfield Mall express variant on weekends.					Implemented			
<b>B7: Improve Sunday Service Span</b>	Begin service at 8:00 AM on Sundays and end at 9:30 PM (2 additional evening trips).		×			Low	Low	Medium	2
<b>R10</b>									
<b>R10: Remove unused deviations</b>	Eliminate scheduled service to the Hospital and East Mt. View Apts. Serve via microtransit					Medium	Medium	Low	3

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>R10: Remove unused deviations</b>	Eliminate Union Street and replace with microtransit service					Medium	Medium	Low	3
<b>R10: Additional morning service to Walmart</b>	Service Walmart on all trips in all directions when store is open.					Low	Low	Medium	2
<b>R10: Consistent routing</b>	Service WSU on all trips, eliminate different schedules for in school and not in school.	Implemented							
<b>R10: Improved weekday frequency</b>	Create consistent 30 minute headways on this route from 5:30 AM to 6:00 PM, then decrease to 60 minutes. Serve the Westfield shops in both directions on each trip.				X	High	Medium	High	3
<b>R10: Improved Sunday morning service</b>	Add an additional morning trip.					Low	Low	Medium	2
<b>P11</b>									
<b>P11: Additional morning service</b>	Add an additional morning trip that gets to campus for 7:30 AM.				X	Low	Low	Medium	2
<b>B12</b>									
<b>B12: Reduce unproductive routes</b>	Eliminate the route and serve using an on-demand service.	X				Medium	Low	Low	4
<b>R14</b>									
<b>R14: Streamline the routing</b>	Convert the Industrial Park variant and North Street to a microtransit zone. Service Big Y and Pheasant Hill on all trips. Creating a consistent routing should improve frequency.	X				Medium	Medium	Low	3
<b>B17</b>									

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>B17: Sunday Service</b>	Implement Sunday service from 9:00 AM to 5:00 PM using 1 bus.	×				Medium	Low	High	2
<b>B17: Adjust weekday frequency to meet demand</b>	Improve mid-day weekday frequency from 9:00 AM to 5:00 PM to 30 minutes.			×		High	Low	High	3
<b>P20</b>									
<b>P20: Improve Weekday frequency</b>	Improve weekday Frequency from 9:00 AM to 5:00 PM to 15 minutes and then decrease to 30 minutes from 5:00 PM to 8:00 PM and hourly after 8:00 PM.			×		High	Low	High	3
<b>P20: Later evening Saturday service</b>	Add one additional round trip on Saturday evenings.				×	Low	Low	Medium	2
<b>P20: Increase Sunday span of service</b>	Add an 8:00 AM trip from HTC and two additional evening trips to increase the span to ~9:30 PM.	×				Low	Low	Medium	2
<b>P20E</b>									
<b>P20E: Additional Saturday service</b>	Add additional morning and evening trip.		×			Low	Low	Medium	2
<b>P20E: Sunday service</b>	Implement hourly service on Sundays from 10:00 AM to 5:00 PM.		×			Low	Low	Medium	2
<b>P21</b>									
<b>P21: Increase Saturday span of service</b>	Add a 7:00 AM trip and one additional evening trip to end service at 10:00 PM HTC.		×			Low	Low	Medium	2
<b>P21: Increase Sunday span of service</b>	Add one additional AM and 2 evening trips to expand service hours		×			Low	Low	Medium	2

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>P21: Improve weekday frequency</b>	Improve weekday Frequency from 9-4 to 20 minutes and then decrease to 30 minutes from 4:00 PM to 7:00 PM and hourly after 7:00 PM. Add in additional evening trip to end service at 10:30 PM			×		High	Low	High	3
<b>B23</b>									
<b>B23: Weekend Service</b>	Implement Saturday service from 10:00 AM to 5:00 PM using 1 bus.	×				Low	Low	High	1
<b>B23: Remove unused deviations</b>	Remove deviation to Solider Home and serve via the R24 as a schedule stop and not via request.	×				Medium	Low	Low	4
<b>B23: Service to the Silver Street Big Y</b>	Extend the B23 to the Silver Street Big Y.	×				Low	Low	Medium	2
<b>B24</b>									
<b>R24: Weekend Service</b>	Implement hourly Saturday service from 10:00 AM to 5:00 PM.	×				Low	Low	High	1
<b>R29</b>									
<b>R29: Mid-Day weekend service</b>	Add an additional mid-day trip on weekends to connect the college areas to HTC and the mall.		×			Low	Low	High	1
<b>X90</b>									
<b>X90: Increased Sunday Service</b>	Extend route to HTC on weekends with 1 hour frequency from 9:00 AM to 7:00 PM.	×				Low	Low	High	1

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>X90: Reduce Unproductive Deviations</b>	Eliminate Montcalm deviation and South Hadley Falls, both A and B to access Holyoke via the Willimansett Bridge. Area eliminate to be served via microtransit.	×				Medium	Low	Low	4
<b>X92</b>									
<b>X92: Sunday service</b>	Implement hourly Sunday service from 9:00 AM to 5:00 PM.	×				Low	Low	High	1
<b>X92: Adjust weekday frequency to meet demand</b>	Implement 20 minute service during the peaks (7:00 AM to 9:00 AM and 3:00 PM to 5:00 PM).				×	High	Low	High	3
<b>LOOP</b>									
<b>LOOP: Funding Partnership</b>	Discontinue route if funding partnership with MGM is no longer available.	×				Low	Low	Low	3
<b>LOOP: Adjust weekday span to meet demand</b>	End weekday service at 8:30.	×				Low	Low	Negative	3
<b>LOOP: Adjust Sunday span to meet demand</b>	Operate service from 11:18 to 3:53 only on Sundays.	×				Low	Low	Negative	3
<b>R10s/OWL</b>									
<b>R10s/OWL: Consistent schedules and increased connections</b>	Combine the OWL and R10s into one route that connects the school parking lots, main campus, Horace Mann Center and downtown Westfield. Work with WSU to determine the routing and timing that works best		×			Medium	Low	High	2
<b>W</b>									



Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>W: Weekend service</b>	Add weekend service.	✗				Low	Low	High	1

### Demand Response Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Connect Sunderland to the South County Senior Center</b>	Allow for demand response trips to and from the senior center as long as the other end is within a PVRTA member community. This location can also be used to transfer passengers wishing to access other FRTA communities via FRTA demand response.	✗				Low	Low	Low	3
<b>Online trip scheduling for Demand Response</b>	Online trip scheduling for Demand Response.	✗				High	Medium	High	3
<b>Demand response connections to FRTA</b>	Work with FRTA to identify locations to transfer passengers	✗				Medium	Low	Low	4
<b>Demand Response: Coordination with Quaboag Connector</b>	Work with Quaboag Connector to better promote services on the PVRTA website and include information on the WP schedule	✗				Low	Medium	Medium	2

## New Service Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Transit service in South Hadley Falls</b>	Establish a microtransit zone that extends from South Hadley falls to Granby which connect to the South Hadley Big Y.	X				High	High	Medium	3
<b>Connect Westfield Neighborhoods and Industrial area</b>	Establish a microtransit zone	X				High	High	Medium	3
<b>Additional Agawam Service</b>	Establish a microtransit zone.	X				High	High	Medium	3
<b>Service deeper into East Longmeadow</b>	Create an East Longmeadow/Longmeadow microtransit zone.	X				High	High	Medium	3
<b>First-mile/last-mile service</b>	Develop a TNC/Taxi feeder program for first-mil/last-mile service to connect people to bus stops.				X	High	High	High	3
<b>Service to Six Flags</b>	When Six flags is open operate a route that is direct from Union Station to Six Flags. Five trips daily, 7 days a week.				X	High	Low	Medium	4
<b>Connection to CTtransit</b>	Create an express route from Union Station to the Enfield Park and Ride Route which will create connections to CTtransit and the local Enfield Magic Carpet Route. Trips should align to make connection with CT Transit. 4 trips daily.	X				High	Low	Medium	4

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Out of service area medical trips</b>	Establish a volunteer driver program in conjunction with FRTA to serve Hampshire and Hampden county				×	High	Negative	Low	5
<b>Service to Venture Way</b>	Coordinate with UMass to determine what departments are moving and if there would be a demand for people to travel between here and campus				×	Low	Low	Low	3
<b>Express service between Northampton and Springfield</b>	Create an express route from Northampton to Union Station via I-91.				×	Low	Low	High	1
<b>Express service between Amherst and Springfield</b>	Create an express route from Amherst to Union Station via Route 116 and HTC. Two hour headways that departs Amherst at half past on the even hours to create 1 hour headways between Amherst and HTC between the new route and the 29. Depart HTC on the hour staggering service to Union Station with the P21E				×	High	Low	Medium	3
<b>Additional service in Palmer and Ware</b>	Establish a microtransit zone in Palmer and Ware in conjunction with the Quaboag Connector			×		High	High	Medium	3

## Systemwide Recommendations

Need	Recommendation
Faster service	See individual existing fixed route and new service recommendations.
Improved weekend service	See individual existing fixed route recommendations.
Expand evening service	See individual existing fixed route recommendations.
Increased frequency	See individual existing fixed route and new service recommendations.
Additional weekend service for fixed route and demand response	See individual existing fixed route, demand response recommendations.
Improved weekend service	See individual existing fixed route recommendations.
Systemwide: First-mile/last-mile and after hours service	See new service recommendations.

## Bus Stop Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership impact	
<b>Improved lighting at bus stops</b>	Solar powered lights at stops with poor lighting. In particular Aspen Chase inbound, North Amherst Center Inbound	X				Low	Low	Low	3
<b>Accommodate additional vehicles at Cowles Lane and Academy of Music</b>	Remove parking at Cowles Lane and Academy of Music to increase the number of buses	X				Medium	Medium	High	2

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership impact	
<b>Safer crossings at heavily used crosswalks by bus stops</b>	Crossing guard at ILC Crossing like at Southwest				×	High	Medium	High	3
<b>Bus stop consolidation</b>	Work with the municipalities that have not undergone a bus stop consolidation study to conduct one where stop spacing is closer then recommended in PVTA guidelines	×				Medium	Medium	Negative	4
<b>Improved bus stop amenities</b>	Prioritize list of capital improvements based on bus stop guidelines developed.	×				Low	Low	Medium	4
<b>Bus stop shelters at high ridership stops</b>	Create a list of priority stops to add shelters and work with landowners to install shelters	×				Low	Low	Medium	2
<b>Policy for bench placement at bus stops</b>	Establish a policy for bench placement at stops	×				Low	Low	Medium	2
<b>Improved safety at crosswalks at bus stops</b>	Create exterior announcements drivers can play reminding people to cross behind the bus	×				Low	Medium	High	1
<b>Longer bus stops</b>	Identify stops where length should be increased and work with municipalities to expand	×				High	Medium	Low	4

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership impact	
<b>Bus stop snow and trash removal</b>	Create an adopt a stop program where individuals and organizations can adopt a stop to empty trash bins on a weekly basis and remove snow in the winter. Offer a set amount of free one trip tickets in exchange.	X				Medium	Medium	High	2

### Fleet Recommendations

Need	Recommendation	Scenarios				Scoring			
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	Priority
<b>Increased Vehicle Capacity</b>	Procure articulated buses.				X	High	Medium	High	4
<b>Buses with windows that open</b>	Future bus procurements to allow windows to open	X				Low	Medium	High	1

Need	Recommendation	Scenarios				Scoring			
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	Priority
<b>Electric Bus</b>	Conduct a facility audit at the VATCo and UMTS garages to better understand the upgrades needed to accommodate electrical vehicles. Perform an analysis on the schedules in Hastus to determine which vehicle schedules are candidates to deploy electric vehicles on	X				High	Medium	Low	4
<b>Newer Buses</b>	Replace vehicles at their ULB	X				Low	High	Low	2
<b>Inform other drivers that PVTA buses do not turn on red and stop frequently</b>	Stickers/signs on the back of the bus that state this	X				Low	Medium	Low	2

### Infrastructure Recommendations

Need	Recommendation	Scenarios				Scoring			
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	Priority
<b>BRT Infrastructure on Route 9</b>	Serve new bus pullouts with the re-established M40 express route. Install TSP technology on the B43 and M40 vehicles				X	High	Low	High	3

Need	Recommendation	Scenarios				Scoring			
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	Priority
<b>BRT Infrastructure on State St</b>	Work with the city to implement BRT measures along State street as proposed in the BRT state St study. This should include Queue jumps, TSP and Branding	X				High	Medium	High	3
<b>Protected left turns in order to increase OTP</b>	Work with Amherst to determine signal warrants for protected left turns: N Pleasant St to Main St, Southeast St to Main St, Russell St to University Drive, Elm St/ West St	X				Low	Medium	Low	2
<b>Improve curb radii in order to reduce the need to use the oncoming lane or rubbing the tire on the curb</b>	Work with municipalities to improve curb radii: Meadow Street. - N. Pleasant St; Main Street to S. East Street; Route 116 to Meadow St, Right into Big Y plaza Route 33; Smith College turn around; right onto Amity Street	X				Low	Medium	Low	2
<b>Eliminate regular car traffic on North Pleasant Street on Campus. Allow buses, emergency and university plated vehicles only on weekdays during the day.</b>	Eliminate regular car traffic on North Pleasant Street on Campus and create a bus only roadway. Allow buses, emergency and university plated vehicles only on weekdays during the day.	X				High	Medium	High	3



Need	Recommendation	Scenarios				Scoring			
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	Priority
<b>Expansion of the UMass and VATCo Maintenance Facilities</b>	Conduct a feasibility study to determine the cost for upgrading maintenance at each.	X				Medium	High	Medium	3
<b>Additional Park &amp; Rides</b>	Work with municipalities and MassDOT to identify future locations and incorporate bus service. Increase bus service to the Whately Park & Ride				X	High	Low	Low	5
<b>North Pleasant Street UMass Campus reduced number of crosswalks</b>	Work with UMass to reduce the number of crosswalks and funnel pedestrians	X				Medium	Medium	High	2

## Fare Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Deploy cash less fare options in addition to magnetic stripe cards</b>	PVTA has already deployed a mobile payment option	Implemented							
<b>Additional locations to obtain a PVTA E&amp;D card</b>	Establish a regular schedule where a customer service representative is available at a central location such as senior center or town hall to process applications and take pictures. The IDs can then be mailed to the individual once printed.	X				High	Negative	Low	3
<b>New fare collection system</b>	The RTAs should do a joint procurement for a new fare system that includes a mobile payment option, items such as fare capping and multiple outlets to procure smartcards.	X				High	Low	High	3
<b>Cashless fare option for demand response</b>	Expand the mobile fare payment to include demand response.		X			Low	Medium	High	1

## Policy Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Minimum span of service guidelines that reflect new route classification structure</b>	Adjustment of minimum span of service guidelines to match new route classification structure	✗				Low	Medium	Low	2
<b>Identification of flag stop corridors</b>	Indicate flag stop corridors on route maps	✗				Low	Medium	Medium	2
<b>Electric scooter policy</b>	Establish an electric scooter policy	✗				Low	Medium	Medium	2
<b>Data-driven framework for determining service levels</b>	Identify technology-driven data tools and key performance metrics, particularly in the service and financial performance areas. Utilize these tools to establish an improved enterprise-wide data-driven performance focused management and decision-making framework; implement a public-facing and transparent performance reporting mechanism.	✗				Medium	Medium	High	2

## Operational Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>UMTS: Improved timing on route segments</b>	Examine timing and OTP on the 35 from FAC to the stadium, 33 Library to Big Y, 30 Colonial Village to Old Belchertown Road, 30 Studio Arts Building to Puffton, 45 evening Rolling Green	X				Low	Medium	High	1
<b>Additional road supervisors</b>	Hire additional road supervisors	X				Medium	High	Low	3
<b>Improved communication between drivers and drivers/Management and PVTA</b>	Establish a locked drivers comment box in the driver breakroom. Create an online form that individuals can anonymously (or by name) report issues to.	X				Low	Medium	Low	2
<b>Improve transfer communication</b>	This would require upgrading the radio/communication equipment.	X				High	Medium	Medium	4
<b>Continually monitor OTP</b>	Continually monitor OTP	X				Low	High	High	1
<b>Improve cleanliness of vehicles</b>	Increased cleaning (interior and exterior) of the buses daily and automatic announcements reminding passengers to remove their belongings	X				Low	Medium	High	1

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Coordinate service along State Street</b>	Adjust route departure/arrival times to Union Station that serve State Street in order to spread out service and reduce bus bunching.	X				Low	Medium	High	1
<b>Adjust timing on routes</b>	Adjust timing on: G1 outbound from Union Station; Union Station to Mason Square; HTC to union Station on the P21E; Union Station to the X; Saturday P20 Kmart to Riverdale Shops	X				Low	Medium	Medium	2
<b>Improve travel time and OTP through the center of Amherst</b>	Transit Signal Priority in Amherst and Northampton Center, in particular Cowles Lane.				X	High	Medium	Low	4

## Technology Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>New AVL Software</b>	Consider a joint procurement with other RTAs looking to upgrade their AVL system	Implemented							
<b>Improved real-time information at stations</b>	Continue working with Union Station to diagnose and fix problems as they arise. Each hour a customer service rep can walk around the bus bays to identify any screens that are out. At HTC develop a way quickly identify screens with errors using internal controls.	X				Low	Medium	High	1
<b>AVL and APC data for the community shuttles</b>	Procure AVL technology for the community shuttle. Turn on and test the APC technology.	X				Medium	Low	High	2
<b>Transit signal priority</b>	Work with municipalities to correct any issues with existing TSP systems. As new roadway projects are developed with the state DOT and local municipality to determine if TSP can be deployed.				X	High	Medium	Low	4
<b>New Demand Response scheduling and CAD software</b>	Upgrade software and add the Passenger app that allows them to request, manage and track trips	X				Low	Medium	High	1

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>New Fixed Route scheduling software</b>	Upgrade software as releases are made	Implemented							
<b>Route planning software</b>	Explore upgrading Hastus to add in the planning platform that will provide the same function but be linked to existing route files	Implemented							
<b>Upgrade parts management and Maintenance work order software</b>	Roll out and test the software	X				Low	Medium	Low	2
<b>Integrated service alert system</b>	The alert feature should be a centralized location that supervisors can post ongoing and in the moment, service updates that posts to the PVTA Twitter account, Facebook account, Banner of PVTA webpage and Transit App	X				Medium	Medium	High	2
<b>Vehicle mounted collision warning and tracking systems</b>	Procure technology. Consider a joint procurement with MART, FRTA, VTA, CCRTA and MVRTA who are also looking to add this technology to their fixed route and demand response fleets.	X				High	Low	Low	5

## Other Recommendations

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>How to Ride Guide</b>	Create a how to ride guide or promotional video that shows passengers that teaches peoples how to use the service. These videos could play at transit stations and on board the buses. MVRTA has a series of well-produced how to ride videos on how to pay your fare, etiquette, reading schedules and using their apps. Videos are in four languages.	X				Low	Medium	High	1



Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Improved customer communication</b>	Update the contact form intro with language that lets people know you are looking for any and all feedback. Update where they select why they are contacting to encourage them to select. Monitor Social media for PVTA related hashtags and provide responses where warranted.	X				Low	Negative	High	1
<b>Reestablish printed schedules</b>	Print a limited number of schedules and redesign to use minimal space.	X				Low	Medium	High	1
<b>Better enforce code of conduct</b>	Have drivers go through annual passenger relations refresher trainings. Create education videos on PVTA etiquette and code of conduct that can play on board the buses. Work with operators so that they report these incidents and PVTA can investigate and properly handle problem passengers	X				Low	Medium	Medium	2

Need	Recommendation	Scenarios				Scoring			Priority
		Core Need	Low Ridership	Medium Ridership	High Ridership	Complexity	Operational Impact	Ridership Impact	
<b>Improved schedule format</b>	On schedules indicate the days that service will end early and the approximate time.	X				Low	Medium	Medium	2
<b>Connections to Franklin County</b>	Increase service on the 46 with timed connections. Work with FRTA when updating connecting schedules to facilitate transfers. Include FRTA schedule information on the Academy of Music schedule screen.		X			Medium	Low	Low	4

## Appendix F Fixed Route Productivity and Financial Efficiency (FY 2019)

### Fixed Route Productivity (FY 2019)

Route	Passengers/Mile	Passengers/Hour
G1	2.17	26.03
G2	2.62	28.96
G2E	0.54	8.82
G3	2.36	22.28
B4	2.33	22.75
G5	1.34	15.11
B6	1.57	21.52
B7	3.23	33.30
B7S	2.63	24.33
10S	0.89	10.97
R10	1.14	17.50
P11	1.00	21.97
B12	0.29	7.26
R14	0.97	15.26
B17	1.53	19.41
P20	2.14	26.55
P20E	0.69	16.55
P21	2.29	28.58
P21E	1.37	29.81
B23	0.98	14.78
R24	0.69	12.14
R29	0.52	8.61
30	7.26	77.44
31	4.09	67.83
33	3.77	39.53
34	5.85	56.92
35	6.68	69.16
36	1.19	17.37

<b>Route</b>	<b>Passengers/Mile</b>	<b>Passengers/Hour</b>
38	1.52	26.14
39	0.70	11.50
39E	0.38	8.48
R41	0.82	14.21
R42	0.72	13.20
B43	2.77	37.48
B43ns	1.88	24.54
R44	1.04	10.13
45	1.26	24.14
46	0.40	9.76
B48	0.98	20.92
X90	0.85	11.57
X92	1.55	17.56
Loop	0.96	6.49
NE	0.26	4.06
OWL	3.13	46.93
S	0.66	2.20
WP	0.19	4.44
R10 R	1.00	14.03
P11 R	0.51	10.72
31 R	2.83	48.45
30 R	4.19	49.41
45 R	0.83	16.35
46 R	0.42	10.29
38 R	1.21	21.04
39 R	0.43	7.60
33R	2.55	26.62
PVTA System Average	2.05	27.15
Massachusetts Average (excludes MBTA)	1.37	18.39
National Average	2.26	27.21

Source: NTD and PVTA

**Fixed Route Financial Efficiency (FY 2019)**

<b>Route</b>	<b>Cost/Mile</b>	<b>Cost/Hour</b>	<b>Cost/ Passenger</b>	<b>Subsidy/ Passenger</b>	<b>Farebox Recovery</b>
G1	\$7.85	\$94.07	\$3.61	\$2.62	27.4%
G2	\$7.85	\$86.80	\$3.00	\$2.01	33.0%
G2E	\$7.85	\$127.35	\$14.44	\$13.45	6.9%
G3	\$7.85	\$74.13	\$3.33	\$2.34	29.8%
B4	\$7.85	\$76.48	\$3.36	\$2.37	29.5%
G5	\$7.85	\$88.24	\$5.84	\$4.85	17.0%
B6	\$7.85	\$107.44	\$4.99	\$4.00	19.8%
B7	\$7.85	\$81.02	\$2.43	\$1.44	40.7%
B7S	\$7.85	\$72.53	\$2.98	\$1.99	33.2%
10S	\$7.85	\$97.00	\$8.84	\$7.85	11.2%
R10	\$7.85	\$120.38	\$6.88	\$5.89	14.4%
P11	\$7.85	\$172.73	\$7.86	\$6.87	12.6%
B12	\$7.85	\$195.20	\$26.89	\$9.55	64.5%
R14	\$7.85	\$122.96	\$8.06	\$7.07	12.3%
B17	\$7.85	\$99.54	\$5.13	\$4.14	19.3%
P20	\$7.85	\$97.59	\$3.68	\$2.69	26.9%
P20E	\$7.85	\$187.28	\$11.32	\$10.33	8.7%
P21	\$7.85	\$98.04	\$3.43	\$2.44	28.9%
P21E	\$7.85	\$170.30	\$5.71	\$4.72	17.3%
B23	\$7.85	\$118.20	\$8.00	\$7.01	12.4%
R24	\$7.85	\$138.29	\$11.39	\$10.40	8.7%
R29	\$7.85	\$130.96	\$15.20	\$14.21	6.5%
30	\$3.93	\$41.92	\$0.54	\$0.44	18.4%
31	\$3.93	\$65.12	\$0.96	\$0.85	11.8%
33	\$3.92	\$41.07	\$1.04	\$0.84	18.7%
34	\$3.93	\$38.27	\$0.67	\$0.54	20.1%
35	\$3.93	\$40.68	\$0.59	\$0.48	18.9%
36	\$3.93	\$57.49	\$3.31	\$2.87	13.4%
38	\$3.93	\$67.65	\$2.59	\$2.16	16.5%
39	\$3.93	\$64.18	\$5.58	\$4.78	14.4%

<b>Route</b>	<b>Cost/Mile</b>	<b>Cost/Hour</b>	<b>Cost/ Passenger</b>	<b>Subsidy/ Passenger</b>	<b>Farebox Recovery</b>
39E	\$7.86	\$175.89	\$20.74	\$19.62	5.4%
R41	\$7.85	\$135.68	\$9.55	\$8.56	10.4%
R42	\$7.85	\$144.63	\$10.95	\$9.96	9.0%
B43	\$7.85	\$106.35	\$2.84	\$1.72	39.5%
B43ns	\$7.85	\$102.70	\$4.18	\$3.19	23.7%
R44	\$7.85	\$76.45	\$7.55	\$6.56	13.1%
45	\$2.79	\$53.16	\$2.20	\$1.88	14.5%
46	\$4.91	\$120.54	\$12.36	\$11.57	6.4%
B48	\$7.85	\$166.92	\$7.98	\$6.99	12.4%
X90	\$7.85	\$107.20	\$9.27	\$8.28	10.7%
X92	\$7.85	\$88.67	\$5.05	\$4.06	19.6%
Loop	\$7.85	\$53.30	\$8.21	-\$4.91	159.8%
NE	\$3.59	\$55.79	\$13.73	\$12.88	6.2%
OWL	\$7.85	\$117.73	\$2.51	-\$1.16	146.4%
S	\$0.00	\$0.00	\$0.00	\$0.00	0.0%
WP	\$2.37	\$55.79	\$12.57	\$11.83	5.9%
R10 R	\$7.85	\$110.23	\$7.86	\$6.87	12.6%
P11 R	\$7.85	\$164.40	\$15.34	\$14.35	6.4%
31 R	\$3.93	\$67.25	\$1.39	\$1.23	11.4%
30 R	\$3.93	\$46.31	\$0.94	\$0.78	16.6%
45 R	\$3.93	\$77.02	\$4.71	\$4.24	10.0%
46 R	\$3.93	\$96.84	\$9.41	\$8.67	8.0%
38 R	\$3.93	\$68.44	\$3.25	\$2.78	14.6%
39 R	\$3.93	\$69.95	\$9.20	\$7.56	17.8%
33 R	\$3.93	\$41.04	\$1.54	\$1.25	18.8%
PVTA System Average	\$7.00	\$92.56	\$3.41	\$2.64	22.5%
Massachusetts Average (excludes MBTA)	\$7.24	\$97.20	\$5.29	\$4.47	15.4%
National Average	\$11.15	\$133.99	\$4.92	\$3.83	22.1%

Source: PVTA; NTD

## Appendix G 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,<sup>64</sup> 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.<sup>65</sup> 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,<sup>66</sup> 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.”<sup>67</sup> 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.<sup>68</sup> In 2019, the Commission on the Future of Transportation released their report, *Choices for Stewardship: Recommendations to Meet the Transportation Future*.<sup>69</sup>

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

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<sup>64</sup> <https://www.mass.gov/doc/a-vision-for-the-future-of-massachusetts-regional-transit-authorities/download>.

<sup>65</sup> <https://www.mass.gov/executive-orders/no-569-establishing-an-integrated-climate-change-strategy-for-the-commonwealth>.

<sup>66</sup> <https://www.mass.gov/doc/final-regulation-4/download>.

<sup>67</sup> <https://www.mass.gov/executive-orders/no-579-establishing-the-commission-on-the-future-of-transportation-in-the>.

<sup>68</sup> <https://www.mass.gov/executive-orders/no-579-establishing-the-commission-on-the-future-of-transportation-in-the>.

<sup>69</sup> <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.

Current RTA-specific sustainable practices are described in Section 4.7 and recommendations for future sustainable practices are described in Chapter 8.



