Case Studies, Experiences, and Early Lessons

Microtransit in Pennsylvania

Technical Memorandum

July 23, 2024
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PA Microtransit Case Study Analysis
Technical Memorandum

Executive Summary

Microtransit is a technology-enabled, on-demand, public transportation service that allows users to request trips to locations within a designated area without advance reservations. In Pennsylvania, several transit agencies have implemented pilot programs or are continuing microtransit service, particularly in areas where traditional fixed-route transit is not effectively serving the community. This technical memorandum provides an analysis of microtransit services offered by six Pennsylvania transit agencies, to characterize these services and the communities they serve and identify common themes associated with successful microtransit services.

Operating and service-area characteristics of each microtransit service are compiled on summary sheets in the **Appendix**. Microtransit typically operates within a designated zone—a specific geographical area within which rides may begin and end at any location. The characteristics of zones were analyzed, including demographics, population density, and size. The analysis found a moderate correlation (without implying causation) between smaller zone size, higher resident and job density, and more productive service.

A statewide performance evaluation categorized services into two groups: supplement cases, where microtransit supports the surrounding fixed-route system, and replacement cases, where microtransit replaces an underperforming fixed-route service. Microtransit services were also compared based on productivity, wait time, operating cost per revenue vehicle hour, and operating cost per passenger trip.

Based on agency interviews, analysis of zone characteristics, and performance evaluation, this study identified the following key takeaways. It is important to note that these represent early patterns and trends from Pennsylvania and are based on a limited snapshot in time.

> **Key Takeaways**
> 1. Microtransit is a flexible tool but not a universal solution. It can be a supplement or alternative to traditional transit but should address specific goals and needs.
> 2. Clear goals, key performance metrics, and service-level expectations should be set early in the planning process.
> 3. Microtransit service has a productivity ceiling and can become costly and difficult to scale effectively during periods of high demand.
> 4. Microtransit is often less expensive per revenue vehicle hour but more expensive per passenger trip than fixed-route service.
> 5. Measuring the success of providing first- and last-mile connections is challenging.
> 6. Most microtransit zones in Pennsylvania are 5 to 15 square miles, contain a mix of trip generators and land uses, and are in lower-density small-town or suburban settings.
> 7. Communication with peer agencies is important when designing or altering services.
> 8. Marketing and advertising are key for building ridership, while continuous monitoring and operational flexibility drive success.
> 9. The choice of software impacts the agency and user experience in microtransit service.
> 10. Agencies have considered the efficiency benefits of co-mingling shared-ride and microtransit trips, but software integration and clear reporting guidance are needed.

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Introduction

As U.S. transit agencies reassess their service to adapt to changing travel patterns and integrate new technology to improve efficiency, microtransit has emerged as a method to improve rider experience and create flexibility in routing, scheduling, and use of transit vehicle types. In Pennsylvania, several agencies have implemented pilot programs or are continuing microtransit service, particularly in areas not effectively served by traditional fixed-route transit.

Microtransit service is a type of on-demand public transportation that allows users to request a trip to locations within a designated area without advance reservations. It has several key characteristics:

- **Technology-enabled**: Passengers book rides through an app or call center, and the software automatically groups trips and directs drivers to requested locations.
- **On-demand**: Riders request trips when they are ready to travel (vs. booking the day before, as with most shared-ride systems), improving flexibility and the customer experience.
- **Shared ride:** To increase the number of people who can be served, a trip may be shared with other passengers.
- **Effectively serves lower-density areas**: Smaller vehicles and on-demand response mean microtransit service can be more effective in serving areas with lower population density than traditional fixed-route service (regular city buses).
- **Lower cost per hour of service**: The hourly cost to provide microtransit service is more akin to demand response than fixed-route service because microtransit is often provided by demand response drivers using demand response vehicles under the demand response terms of collective bargaining agreements, which are often less costly than those of fixed-route service.

Microtransit is often operated as a curb-to-curb service model within a designated microtransit zone—a specific geographical area within which rides may begin and end at any location. These zones are smaller than traditional countywide shared-ride services. Microtransit can also operate as a designated-stop service model, where users must start and end their trips at predefined locations such as bus stops. Agencies may use microtransit to fulfill various service objectives, ranging from accommodating riders whose transportation needs are not met by the available fixed-route schedule to serving residents in more rural areas that cannot sustain regular fixed-route service.

Given the varied landscape of microtransit services offered in Pennsylvania today, the Pennsylvania Department of Transportation (PennDOT) undertook a review of the current state of service. The aim was to capture lessons learned and best practices to assist other agencies that may be considering implementing microtransit services in their communities.

This technical memorandum is the Task 2 deliverable for the PA Microtransit Case Study Analysis project (E05448 WO10). It builds on Task 1, which included the development of summary sheets on Pennsylvania microtransit services currently operating or that have operated in the past (**Appendix**).

The purpose of the microtransit analysis undertaken as Task 2, and summarized in this document, was to characterize Pennsylvania microtransit services—and the communities they serve—and identify common themes associated with successful microtransit service. Activities included analyzing available before-and-after service data, comparing fixed-route and microtransit service data, and interviewing microtransit service providers.

Six Pennsylvania agencies with current or previous microtransit services were analyzed (see **Figure 1**):

- Monroe County Transit Authority (MCTA) Pony Plus
- Centre Area Transportation Authority (CATA) CATAGO!
- Crawford Area Transportation Authority (CATA) CATA GO
- rabbittransit Stop Hopper
- Lehigh and Northampton Transportation Authority (LANTA) LANtaFlex
- Southeastern Pennsylvania Transportation Authority (SEPTA) Owl Link

Figure 1: Pennsylvania Microtransit Case Studies
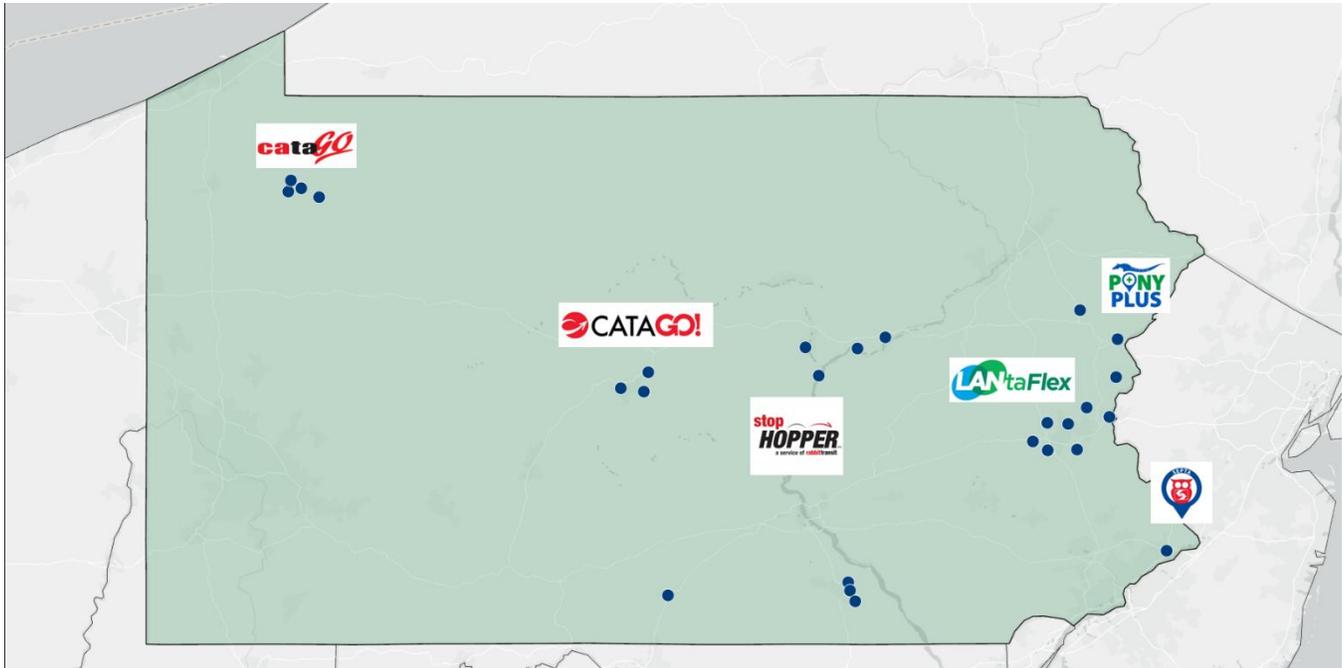
Microtransit Summary Sheets

The summary sheets developed in Task 1 offer valuable context regarding the subject of microtransit services and are included in the **Appendix** for reference.

The information within the summary sheets is compiled from data requests and interviews with the agencies, along with data sourced from the U.S. Census Bureau's 2022 American Community Survey. Each agency's microtransit service is described, including its technology, vehicle fleet, outreach programs, and funding sources. Where applicable, a breakdown of information by zone is provided.

The service-area characteristics, including population/employment density and land use, are detailed for each zone. Additionally, the demographic makeup of the areas served by microtransit is outlined. A summary table comparing the service characteristics of each zone in Pennsylvania is included following the summary sheets.

Additionally, summary sheets are included for microtransit activity occurring in three other states— Virginia, North Carolina, and Texas—with key takeaways applicable to Pennsylvania service. The information on programs in other states provides highlights, not an exhaustive review of all activities. Several sources were consulted, including:

- Websites of local microtransit service providers in each state
- Virginia Department of Rail and Public Transportation, Rural Microtransit Case Study and Report, 2023
- NC State University, Public Microtransit Pilots in the State of North Carolina, 2023
- TxDOT, Texas Rural Microtransit Guidebook, 2023

Microtransit Zone Characteristics in Pennsylvania

Microtransit is often deployed in areas with a population that desires or needs public transit but where a traditional fixed-route service is unproductive or viewed as too costly. Because the reasons for implementing microtransit differ among agencies, each Pennsylvania agency's microtransit zone varies in terms of demographic makeup, land use and development type, size, and density.

Pennsylvania transit agencies tend to create microtransit zones in areas that have a population that needs or desires transit and also have large trip generators that attract trips throughout the day, such as shopping centers. Microtransit service areas were summarized using demographic characteristics and employment data from the U.S. Census Bureau's 2022 American Community Survey and the 2021 Longitudinal Employer-Household Dynamics datasets. The population characteristics of the microtransit service areas are shown in **Table 1**. These population characteristics were analyzed because these groups tend to rely on transit services more than the general population.

The first set of columns shows the total populations and households that have been served by microtransit. The concentrations of various populations that received service are compared to the demographics of the overall Pennsylvania population. The age distribution of people receiving microtransit is fairly representative of the general population. However, vulnerable populations are slightly underrepresented compared to Pennsylvania's general population. This is because microtransit service is not prevalent in all of Pennsylvania.

The majority of the zones in this study contain a mix of residential, commercial, and industrial land uses. The area types are typically suburban, which also tend to have lower density and road networks that are inefficient for fixed-route transit routing compared to grid patterns in urban areas. Six zones were classified as suburban, and nine additional zones were classified as a mix of small city/suburban or suburban/rural. This indicates that microtransit zones are often located at the lower-density peripheries of higher-density cities or areas.

The size and activity density of microtransit zones are key differentiating features between zones. Because microtransit trips are usually limited to pick-up and drop-off points within the zone, the interviewed transit agencies recommended that zones include enough potential riders and activity generators to justify the service without overwhelming the available vehicles, which would result in significant wait times for passengers. They also noted that microtransit could be effective in areas with dispersed origins and destinations rather than linear travel that would be more conducive to a fixed route.

Table 1: Comparison of Demographic Characteristics of Microtransit Service Areas

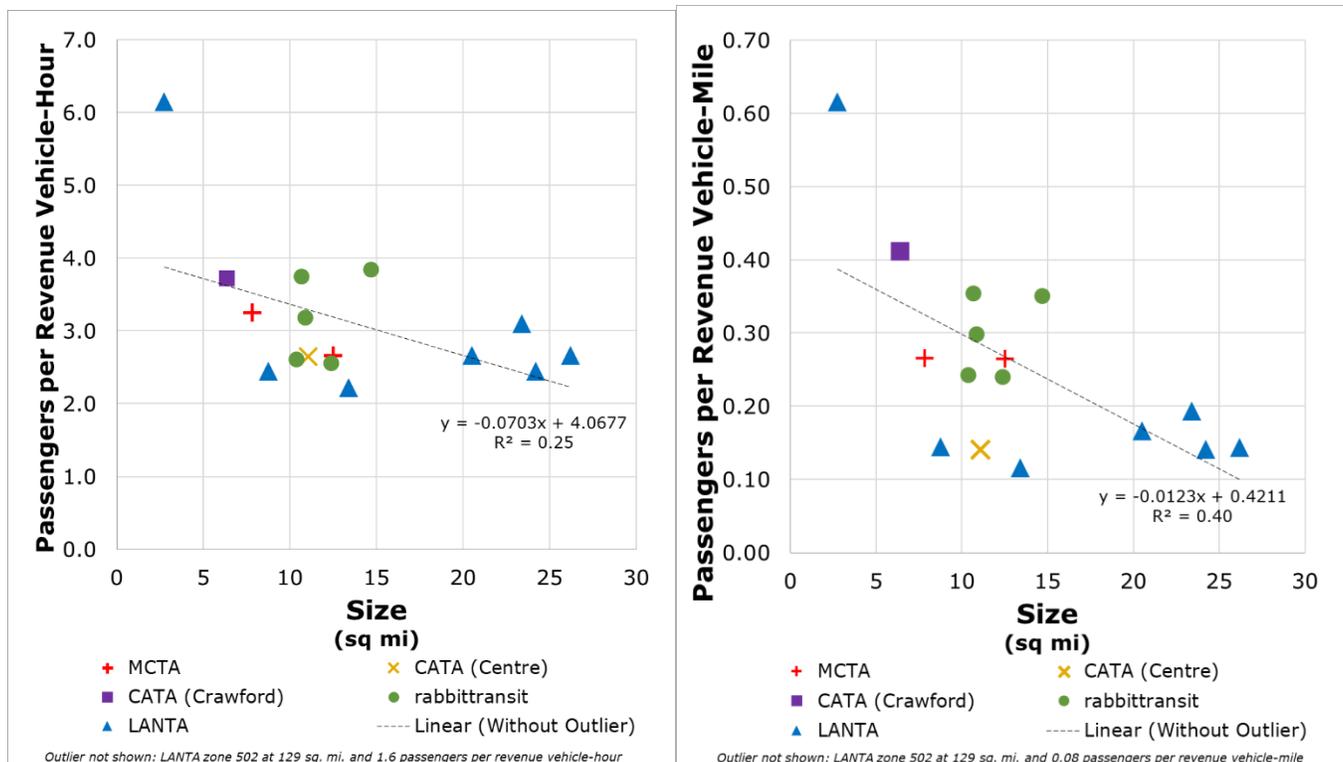|	Total Served with Microtransit (Present or Past)		Overall PA	Population Served with Microtransit					
				MCTA	CATA (Centre)	CATA (Crawford)	rabbittransit	LANTA	SEPTA (Past)
Population Served	446,500			24,000	35,400	5,400	106,500	180,100	95,100
Households Served	174,300			8,800	13,700	2,300	41,700	70,200	37,600
Population Age <18	88,900	20%	20%	17%	17%	21%	19%	22%	20%
Population Age between 18-64	274,700	62%	60%	62%	67%	56%	63%	59%	64%
Population Age 65+	83,000	19%	20%	21%	16%	23%	18%	20%	16%
Non-White Population	78,500	18%	24%	37%	20%	5%	16%	17%	31%
Population with a Disability	59,700	13%	15%	16%	9%	26%	16%	12%	15%
Limited-English-Proficiency Households	4,700	3%	7%	2%	2%	0%	2%	2%	5%
Zero-Car Households	12,200	7%	11%	11%	7%	19%	9%	5%	7%
Population Below Poverty Line	43,700	10%	13%	12%	7%	21%	13%	8%	10%

Source: U.S. Census Bureau's 2022 American Community Survey. Microtransit service zones as of January 2024, but SEPTA zone reflects Owl Link pilot that was discontinued in 2022.

The performance in terms of productivity compared to the size of each zone in Pennsylvania is shown in **Figure 2**. For agencies where data was available, each point represents a microtransit zone. For agencies where zone-level data is limited, a system-wide average of zone size and performance is shown instead.

The majority of agencies have operated zones within a size range of 10 to 15 square miles. The two outliers are both zones within the LANTA system. The smaller zone, Zone 507 West/South Easton, is much more productive than other zones, including those closer in size. Although its small size and high density certainly play a role, the productivity is also improved by the limited number of destinations within the zone, short trip length, and LANTA's co-mingling of microtransit trips with its shared-ride service. Note that because LANTA reports its shared-ride and microtransit trips together, this productivity value may be inflated. The larger zone, Zone 502 Slate Belt (not shown on the charts), covers 129 square miles. Still, its productivity is in line with other LANTA zones at 1.6 passengers per revenue vehicle-hour and 0.08 passengers per revenue vehicle-mile.

In general, zones less than 15 square miles tend to be more productive in terms of passengers per revenue vehicle-hour and passengers per revenue vehicle-mile, with productivity increasing as the zone size decreases. Both measures of productivity show a low to moderate negative correlation with zone size—as the zone size increases, productivity decreases. It becomes more challenging to serve the zone with the same fleet due to longer travel distances between rides, more complex routing, and potentially uneven demand. Smaller zones enable vehicles to move quickly between drop-offs and pick-ups, maximizing the time spent directly serving passengers and often concentrating demand on key trip generators, such as major employers or shopping centers within the zone.

Figure 2: Microtransit Productivity by Zone Size

Outlier not shown: LANTA zone 502 at 129 sq. mi. and 1.6 passengers per revenue vehicle-hour

Outlier not shown: LANTA zone 502 at 129 sq. mi. and 0.08 passengers per revenue vehicle-mile

Source: Data provided by agencies. Service data is from July 2022 to June 2023 except CATA (Crawford) microtransit, which is from July 2023 to December 2023.

In addition to its overall size, the development within the zone plays a crucial part in determining its ridership. An area's population and employment density can be used to estimate its potential for generating ridership and resulting in more productive transit service. **Figure 3** shows the performance in terms of productivity (passengers per revenue vehicle-hour and per revenue vehicle-mile) of each zone and its combined population and employment density.

Figure 3: Microtransit Productivity by Zone Density
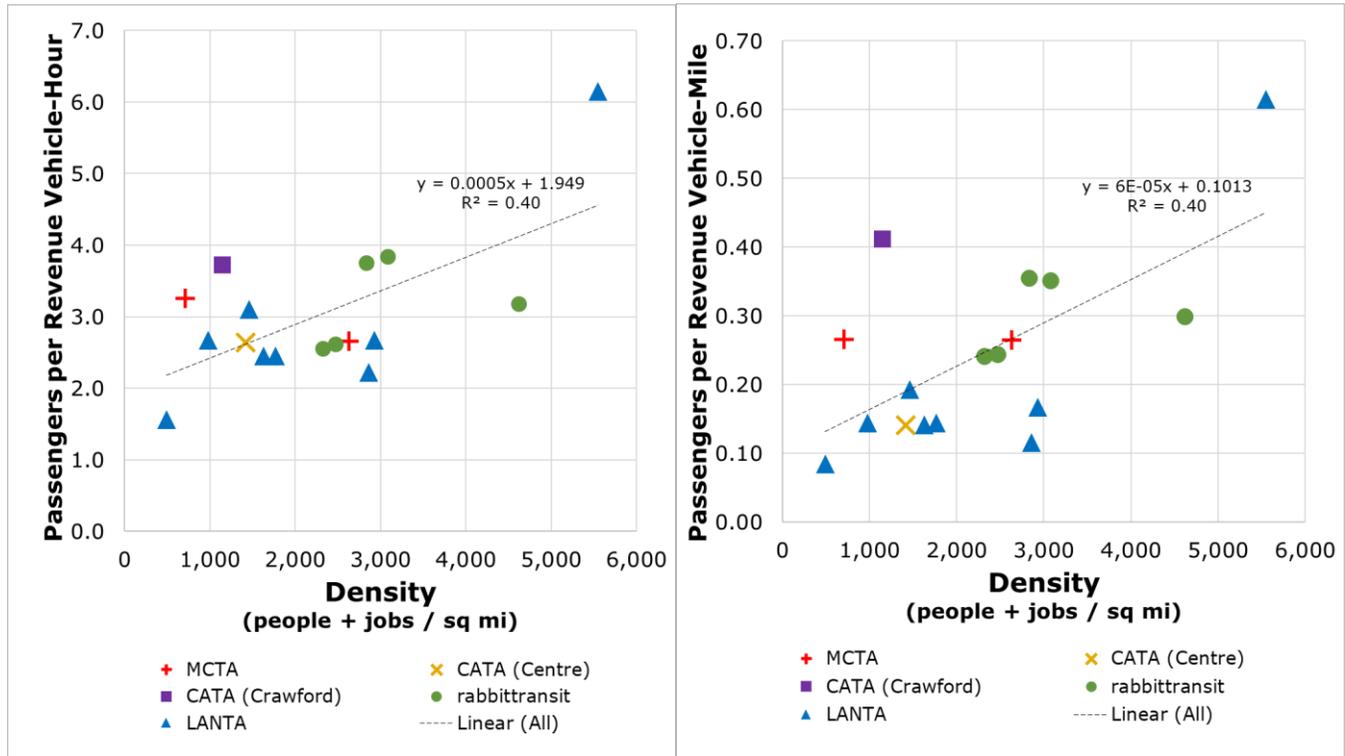
Source: U.S. Census Bureau's 2022 American Community Survey and the 2021 Longitudinal Employer-Household Dynamics datasets.

Like the relationship between productivity and zone size, there is a moderate correlation between higher-density zones and higher productivity. Within a transit system, most zones show similar performance levels even as density increases. This suggests that there isn't always a direct correlation between zone density and the overall productivity or performance of the microtransit service in those zones. Factors beyond the shape and composition of a zone also influence productivity. A broad range of factors could influence productivity such as the specific demographics and behavioral patterns of users in each zone, availability and attractiveness of other travel options, service quality, and efficiency of service operations and batching of trips.

Figure 2 and **Figure 3** suggest there is an upper limit to the productivity of microtransit service, as no zone (aside from the previously noted LANTA outlier) serves more than four passengers per revenue vehicle hour.

The top performers in passengers per revenue vehicle-hour and passengers per revenue vehicle-mile share some overlap, as seen in **Table 2**. Both CATA (Crawford) and rabbittransit have the majority of top-performing microtransit zones. LANTA and MCTA also have top-performing zones in either performance measure. While these zones have a range of population and employment densities, they

are all less than 15 square miles and have a mix of land use types. Several of the rabbittransit zones operate in areas that have fixed-route service.

The lowest-performing zones in terms of productivity are also shown in **Table 2.** These are low-density areas with less than 2,400 people and jobs per square mile (less than 3.75 per acre) or LANtaFlex 507, which has limited service hours and only operates on Saturdays. Several of them are also larger zones, such as LANtaFlex 502, 503, and 506, which are larger than 25 square miles.

Table 2: Pennsylvania Microtransit Zones with Highest and Lowest Productivity

High-Performing Microtransit Zones		Low-Performing Microtransit Zones	
Zones	**Passengers per Revenue Vehicle-Hour**	**Zones**	**Passengers per Revenue Vehicle-Hour**
LANTA, 507 West/South Easton	6.1	LANTA, 502 Slate Belt	1.6
rabbittransit, Chambersburg	3.8	LANTA, 504 Coplay/Egypt Airport	2.2
rabbittransit, Selinsgrove/Sunbury	3.7	LANTA, 505 Coopersburg	2.4
CATA (Crawford) Titusville	3.7	LANTA, 506 Bethlehem-Gracedale	2.5
MCTA Pocono Summit Connector	3.3	rabbittransit, Danville/Bloomsburg	2.5
Zones	**Passengers per Revenue Vehicle-Mile**	**Zones**	**Passengers per Revenue Vehicle-Mile**
LANTA, 507 West/South Easton	0.62	LANTA, 502 Slate Belt	0.08
CATA (Crawford) Titusville	0.41	LANTA, 504 Coplay/Egypt Airport	0.12
rabbittransit, Selinsgrove/Sunbury	0.35	CATA (Centre), Average of All	0.14
rabbittransit, Chambersburg	0.35	LANTA, 506 Bethlehem-Gracedale	0.14
rabbittransit, Red Lion/East York	0.30	LANTA, 503 Slatington/Walnutport	0.14

Source: Data provided by agencies. Service data is from July 2022 to June 2023, except CATA (Crawford) microtransit, which is from July 2023 to December 2023

Microtransit Performance in Pennsylvania

Microtransit is often implemented in areas where fixed-route service underperforms or where potential ridership is uncertain. For this reason, it is expected that microtransit would have a lower productivity than fixed-route service. Since this service type has grown in popularity in recent years and many agencies continue to explore the potential for microtransit service in their system, there is a desire for general guidelines for service performance to be developed. Although agencies have different service objectives and reasons for implementing microtransit, they should have realistic expectations for performance based on what other agencies have experienced, and a plan for achieving similar performance.

A statewide analysis of performance by service was conducted to understand the expected range in performance of Pennsylvania microtransit services. Since the microtransit service objectives and historical transit service in the microtransit service areas impacted how agencies designed and implemented their services, the analysis was grouped into two categories: supplement cases and replacement cases.

Supplement cases are services to support the surrounding fixed-route system by expanding into an area with transit ridership potential that would be difficult to serve with fixed-route. These zones typically have connections to fixed-route service, but there are also several examples of microtransit services in communities that do not have fixed-route service.

Replacement cases aim to replace an underperforming, inefficient, or expensive fixed-route service. These zones often cover the area previously served by the replaced route and may expand into nearby areas. An inherent assumption is that the hourly cost to provide microtransit service is more akin to demand response than fixed-route service. That is because microtransit is most often provided by demand response drivers using demand response vehicles under the demand response terms of collective bargaining agreements, which are often less costly than fixed route driver terms.

The following sections provide a system-by-system review of the recent microtransit performance for each case in Pennsylvania.

Supplement Cases

MCTA (Pony Plus)

The Monroe County Transit Authority (MCTA) began microtransit service in August 2022 and operates two zones. Combined, the two zones cover approximately 20 square miles and serve a population of more than 24,000. Microtransit service in Monroe County was developed to expand transit connections with a more responsive, faster, and flexible service than traditional fixed-route bus. One zone also covers an area that had fixed-route service several years ago, but today, microtransit is primarily a supplement to fixed-route service.

Figure 4 shows two measures of productivity for each microtransit zone and system-wide fixed-route service: passengers per revenue vehicle hour and passengers per revenue vehicle mile. MCTA's microtransit service was less productive than the fixed-route service, which is expected given that it is a lower-capacity service type.

Figure 4: MCTA Productivity, Microtransit vs. Fixed-Route
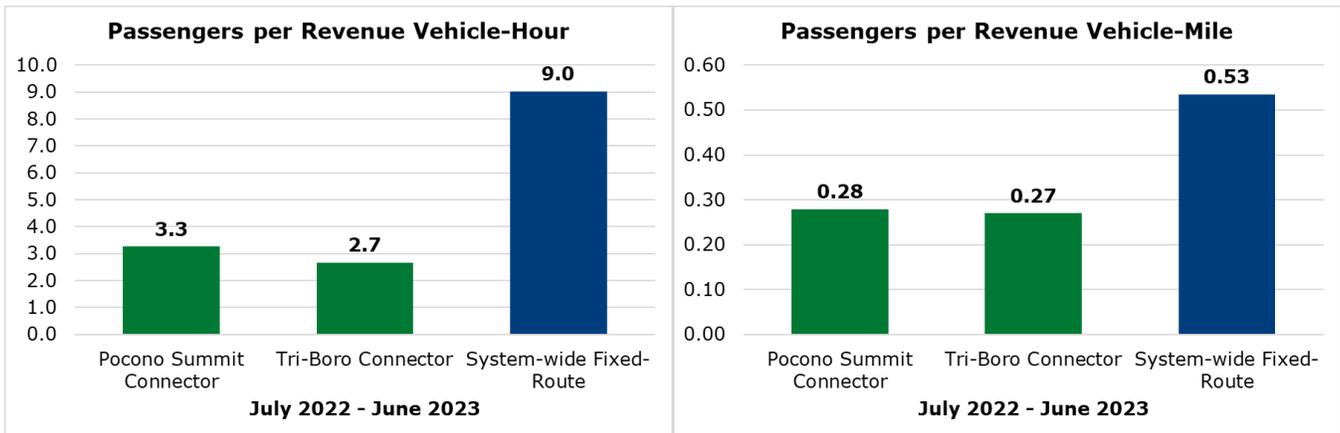
Source: MCTA and dotGrants. Microtransit data is from August 2022 to June 2023. Fixed-route data is from July 2022 through June 2023.

A key component of a successful microtransit implementation is cost efficiency. **Figure 5** shows the system-wide costs of microtransit, fixed-route, ADA paratransit, and shared-ride service on a passenger trip basis for Fiscal Year (FY) 2023. MCTA's microtransit service required a comparable level of subsidy per passenger trip to other modes.

Figure 5: MCTA Operating Cost, Subsidy, and Revenue per Passenger Trip by Service Type

Source: MCTA and dotGrants. Microtransit ridership data is from August 2022 to June 2023. Operating cost and fixed-route, ADA, and shared-ride ridership data are from July 2022 to June 2023.

Figure 6 shows the operating cost per passenger trip for MCTA's fixed-route service and each microtransit zone. All values are from FY 2023. MCTA's microtransit service had a slightly higher operating cost per passenger trip compared to its fixed-route service.

Figure 6: MCTA Operating Cost per Passenger Trip, by Zone and System-wide
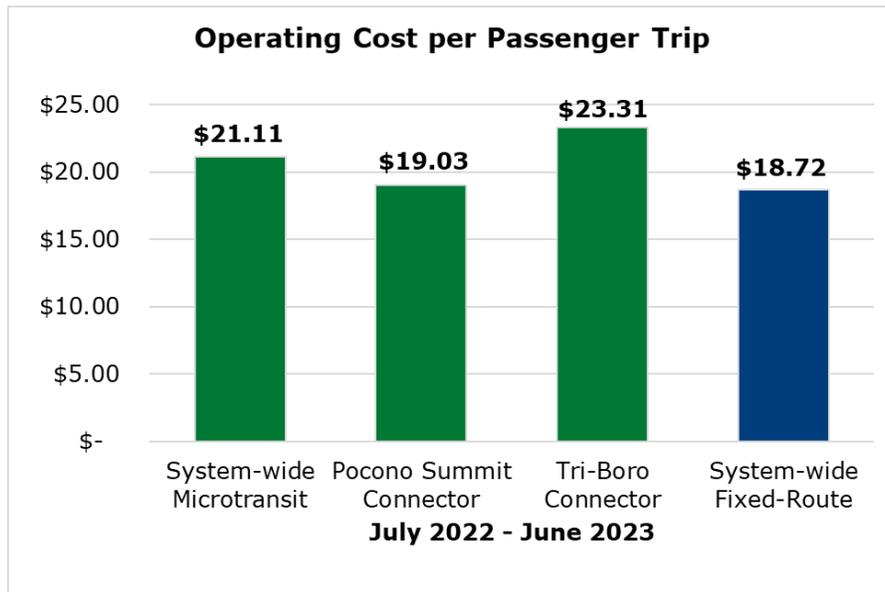
Operating Cost per Passenger Trip

	System-wide Microtransit	Pocono Summit Connector	Tri-Boro Connector	System-wide Fixed-Route
	$21.11	$19.03	$23.31	$18.72

July 2022 – June 2023

Source: MCTA and dotGrants. Microtransit data is from August 2022 to June 2023. Fixed-route data is from July 2022 to June 2023. Costs for each zone were allocated from the total annual operating cost of microtransit service using each zone's share of system-wide microtransit revenue vehicle-hours.

In addition to traditional productivity measures, microtransit scheduling software enables agencies to access near real-time information on many other performance metrics. **Table 3** shows additional measures of MCTA microtransit performance related to the customer experience of using the service.

Table 3: Pony Plus User Experience Performance Metrics

Performance Metrics	
Average Pick-up ETA (Wait Time)	16.7 minutes
Average Ride Duration	10.6 minutes
Average Ride Distance	2.9 miles
Pick-up On-Time Performance	96%
Drop-off On-Time Performance	85%
Trip Cancellation Rate	14%
Rider No-Show Rate	4%
Rider Acceptance Rate	79%
Booking Method (App / Call-In / Other)	91% / 9% / <1%

Source: MCTA. Data range includes September 2023 to December 2023. Due to a change in microtransit technology providers, MCTA did not have access to previous data.

LANTA (LANtaFlex)

The Lehigh and Northampton Transportation Authority (LANTA) began its Flex service in 2011 and currently operates eight zones with a wide variety of zone characteristics and service objectives. Collectively, the zones cover approximately 248 square miles and serve a population of more than 178,000.

LANtaFlex service is unique because it uses the same Ecolane software as LANTA's shared-ride service. For this reason, the agency reports some data that combines microtransit and shared-ride metrics. Also, unlike other microtransit services operating in Pennsylvania where trips can be booked for immediate pick-up, all Flex trips must be scheduled at least two hours before the desired pick-up time, and two zones require scheduling one day in advance.

LANTA's service objectives vary from zone to zone. In some areas, LANtaFlex operates as a lifeline service for rural populations needing transit or because some roads or bridges cannot be traversed by a fixed-route bus. In other areas, it is used to evaluate ridership potential in future service areas or to supplement and provide connection to fixed-route service. **Figure 7** shows the productivity of each zone in the LANTA system.

Figure 7: LANtaFlex Productivity—All Zones
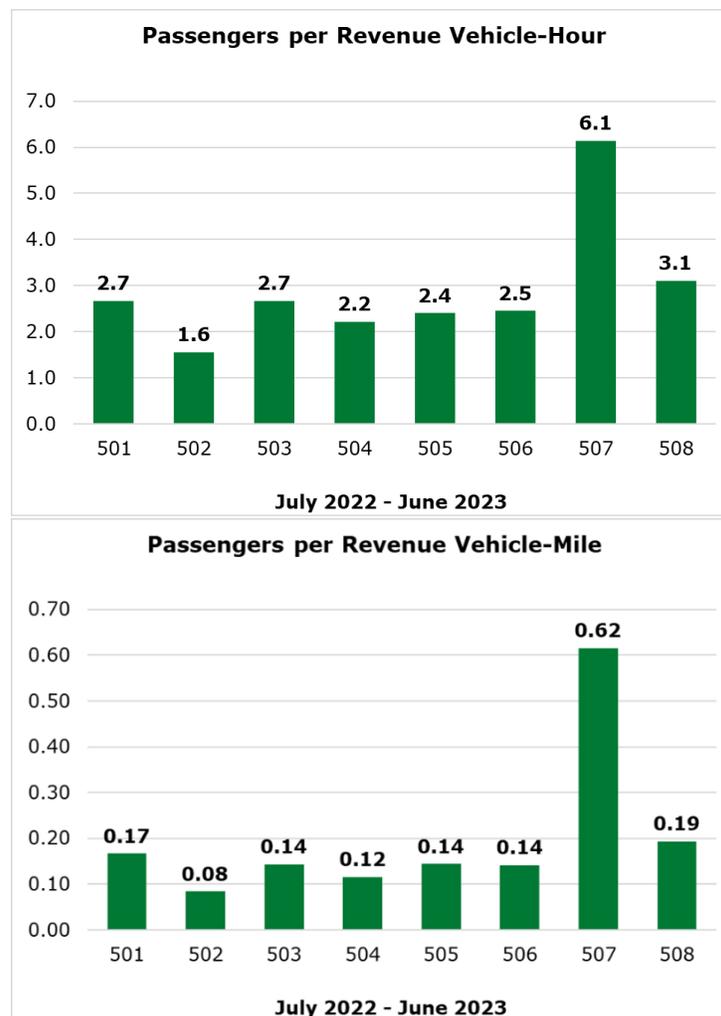
Source: LANTA Ecolane reporting. Flex data is from July 2022 to June 2023.

The operating cost for LANtaFlex per passenger trip in **Figure 8**. The Flex service operated at a higher cost and subsidy per passenger trip than the fixed-route service. However, it operated at a lower operating cost per passenger trip than the ADA paratransit and shared-ride service. LANTA saw much lower fares collected than other agencies due to COVID-19 discount programs continued into October 2023, resulting in a much higher subsidy.

Figure 8: LANTA Operating Cost, Subsidy, and Revenue per Passenger Trip by Service Type

Operating Cost per Passenger Trip

	Microtransit	Fixed-Route	ADA	Shared-Ride
Total	$27.98	$10.45	$54.65	$44.55
Revenue per Trip	$0.11	$0.60	$4.10	$25.62
Subsidy per Trip	$27.87	$9.86	$50.55	$18.92

July 2022 - June 2023

Source: LANTA Ecolane reporting and dotGrants. Data is from July 2022 to June 2023.

Table 4 shows additional measures of Flex service performance related to the customer experience, using data available from Ecolane.

Table 4: LANtaFlex User Experience Performance Metrics

Performance Metrics	
Average Ride Duration	26 minutes
Average Ride Distance	10 miles*
On-Time Performance	57%
Rider No-Show Rate	11%

Source: Ecolane reporting and all zones. Data range includes July 2022 to June 2023. * Unusually high value.

Zones 502 and 508 were selected for detailed analysis as specific supplement cases in the LANTA system given the availability of both fixed-route and Flex service in these areas.

Flex Zone 502, launched in 2011, is in Slate Belt. It primarily connects residents to Northampton Community College's Green Pond Campus, the Walmart at Northampton Crossings, or destinations entirely within the zone. LANTA's Route 217 fixed-route service operates entirely within Flex Zone 502's geographical area.

Flex Zone 508, launched in 2022, is 23 square miles and serves residents in New Smithville, Fogelsville, and Trexlertown. Fixed-route service is also available, with Route 613 operating entirely within Flex Zone 508, and Route 218 operating a portion of its route within Flex Zone 508. Before a

June 2023 service change, Route 101 (replaced with EBS Blue Line) and Route 213 (consolidated with Route 218) also had portions of their route within Flex Zone 508.

Figure 9 compares performance measures in terms of productivity of the Flex zones and the adjacent fixed routes they intended to supplement. **Figure 10** shows the operating cost per passenger trip for each zone and route.

In the Zone 502 Slate Belt area, the LANtaFlex zone was less productive than the fixed-route it supplemented but it was more cost-efficient in terms of cost per passenger trip. For Zone 508, the Flex service performed better than the fixed-route 613 that was contained entirely within the zone, but worse than the other fixed routes that extended beyond the zone.

Figure 9: LANTA Productivity. Flex vs. Fixed-Route
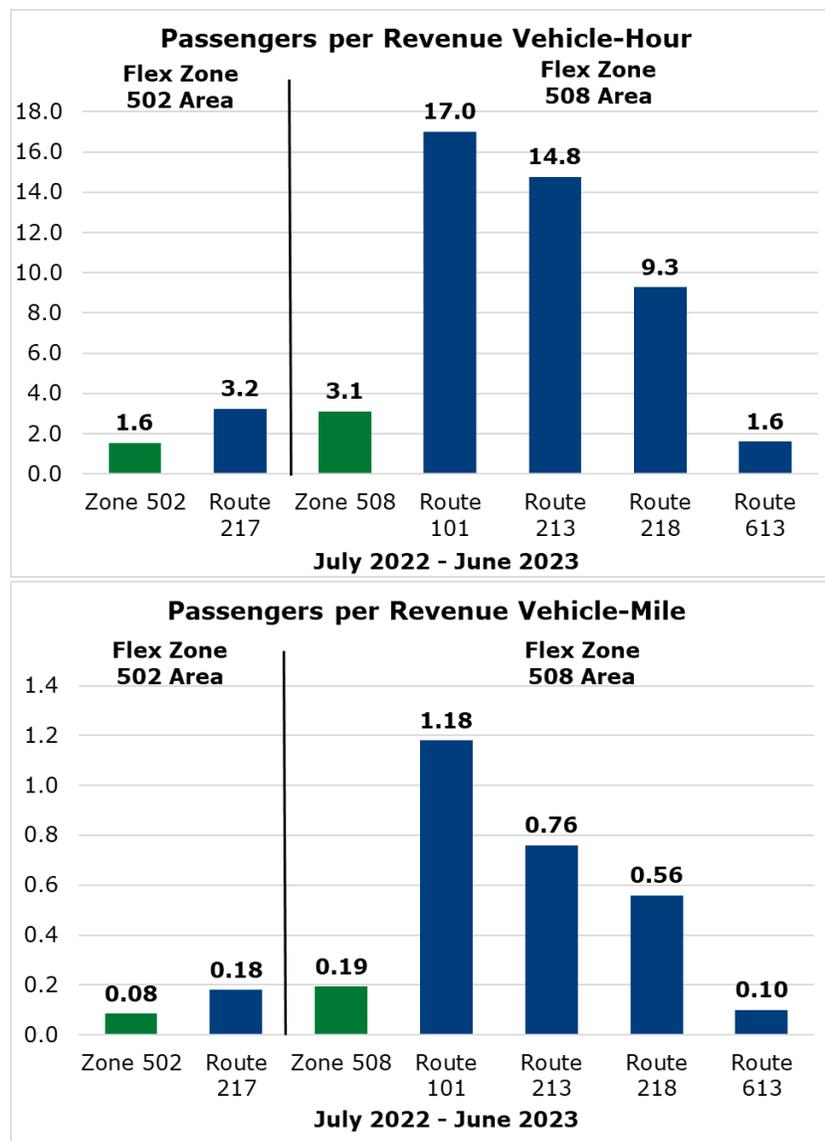
Source: LANTA Ecolane reporting and dotGrants. Flex and fixed-route data is from July 2022 to June 2023.

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Figure 10: LANTA Operating Cost per Passenger Trip, by Route and Zone Level

Source: LANTA, dotGrants, and Ecolane reporting. Microtransit and fixed-route data is from July 2022 to June 2023. Costs for each zone and route were allocated from the total annual operating cost of each service using each zone's or route's share of system-wide revenue vehicle-hours.

rabbittransit (Stop Hopper)

rabbittransit began offering microtransit in 2018 and operated seven zones as of April 2024, when the latest Franklin County zone was added in Fayetteville. rabbittransit uses its microtransit service to create connections to fixed-route, where available, to expand mobility with an additional service type, and to investigate the ridership potential in new areas. The only zones that connect to fixed-route service are the Red Lion and East York zones.

Figure 11 shows the productivity of each Stop Hopper zone or group of zones.

Figure 11: rabbittransit Productivity, All Microtransit Zones

Passengers per Revenue Vehicle-Hour

Zone	Value
Chambersburg	3.8
Red Lion/East York	3.2
Selinsgrove/Sunbury	3.7
Danville/Bloomsburg	2.5
Lewisburg/Milton	2.6

July 2022 - June 2023

Passengers per Revenue Vehicle-Mile

Zone	Value
Chambersburg	0.35
Red Lion/East York	0.30
Selinsgrove/Sunbury	0.35
Danville/Bloomsburg	0.24
Lewisburg/Milton	0.24
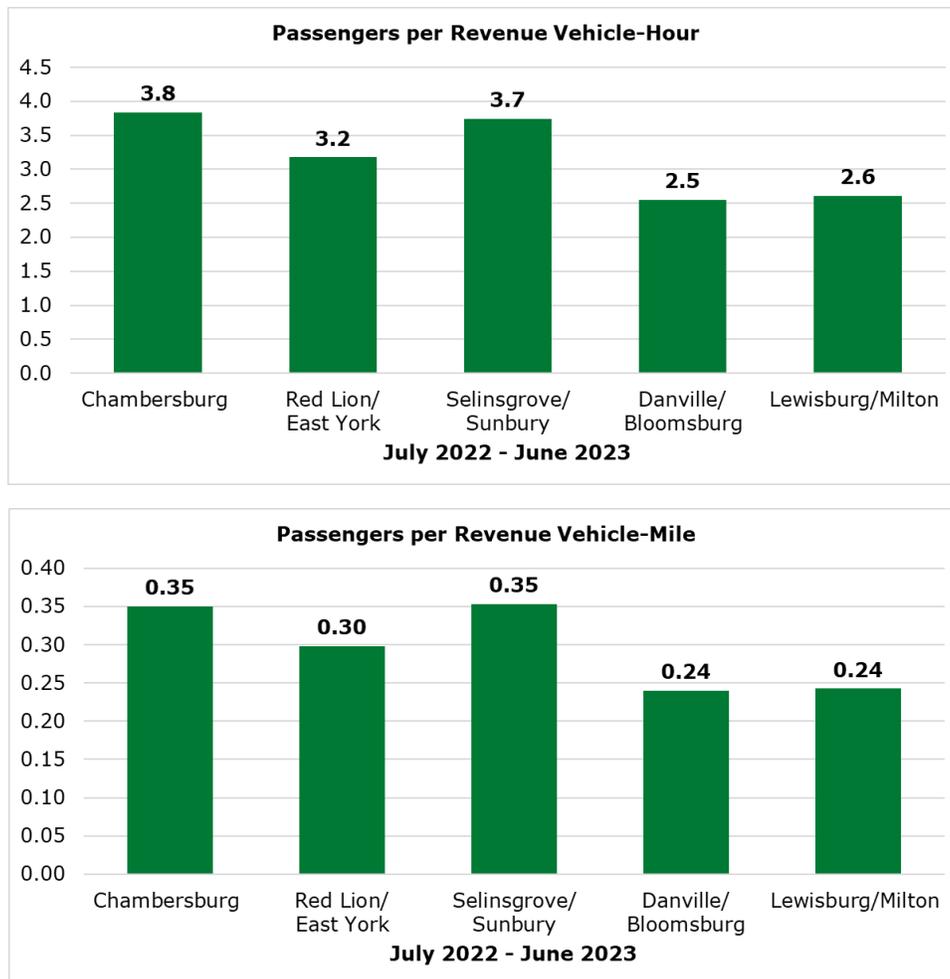
July 2022 - June 2023

Source: rabbittransit. Microtransit data is from July 2022 to June 2023.

Figure 12 shows the operating cost per passenger trip for each service. Microtransit was more expensive than fixed-route service and ADA but less than shared-ride.

Figure 12: rabbittransit Operating Cost, Subsidy, and Revenue per Passenger Trip by Service Type

Source: rabbittransit. Fixed-route data is from July 2022 to June 2023 for the Gettysburg, Hanover, and York service area. Microtransit, ADA, and shared-ride data is from July 2022 to June 2023.

The Red Lion and East York zones supplement fixed-route service in the surrounding area. The zones collectively cover 10.9 square miles and have a population density of 2,600 people per square mile.

Figure 13 shows the performance of the Red Lion / East York microtransit service as a portion of the system-wide microtransit and the four routes that it supplements. The productivity of the microtransit zone was most similar to Route 33, a relatively long-distance route with limited service hours. The East York microtransit zone overlaps most with Route 1E. However, this route operates with frequent 15- to 30-minute headways, resulting in high productivity.

Figure 13: rabbittransit Productivity, Microtransit vs. Fixed-Route
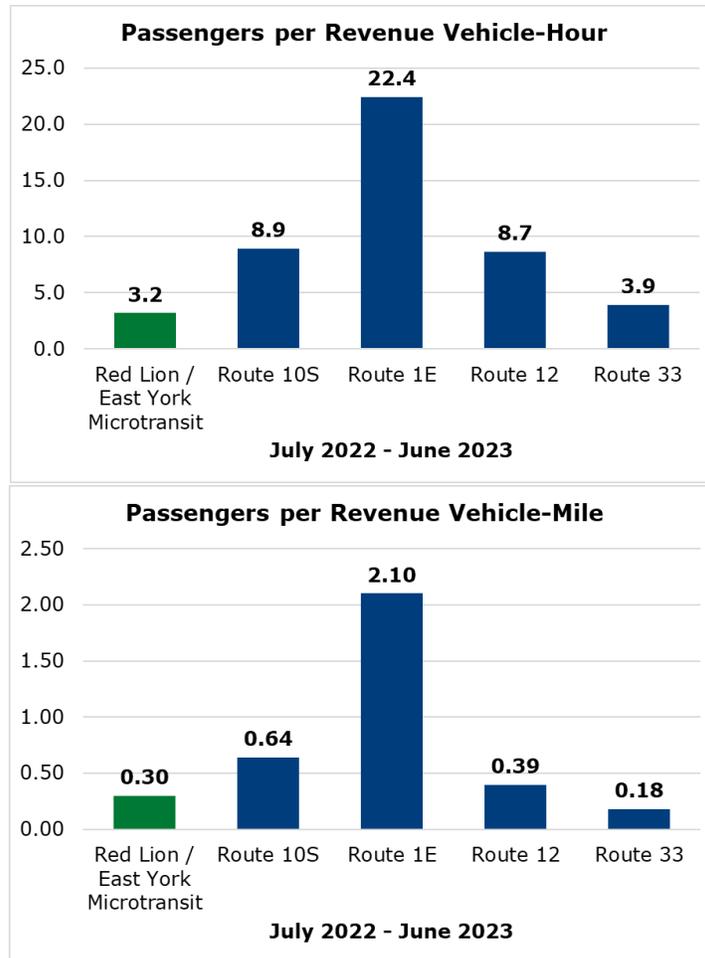
Source: rabbittransit. Fixed-route data is from July 2022 to June 2023. Microtransit data is from July 2022 to June 2023.

In addition to traditional measures of productivity and cost-efficiency, rabbittransit tracks measures of the user experience. Several available metrics are shown in **Table 5**.

Table 5: Stop Hopper User Experience Performance Metrics

Performance Metrics		
Average Pick-up ETA (Wait Time)	14 minutes	
Trip Cancellation Rate	5%	
Rider No-Show Rate	1%	
Other Uncompleted Ride Type (Not Accepted, Out of Service Hours, Seat Unavailable)	23%	
Trip Completion Rate	71%	
Percentage of Rides Shared	43%*	
Booking Method (App / Call-In / Other)	86% / 12% / 2%	

Source: rabbittransit. Microtransit data is from July 2022 to December 2023.

*The percent of shared ride includes the amount of time with more than one person aboard the microtransit vehicle.

SEPTA (Owl Link)

The microtransit pilot implemented by the Southeastern Pennsylvania Transportation Authority (SEPTA) began in May 2021 and operated for nine months before being discontinued in February 2022. The goal of this service was to provide connections to fixed-route and last-mile service for late-night workers in Lower Bucks County. The 34-square-mile zone contained about 95,100 residents. Connections were available between the zone and Routes 14, 56, and 66 during overnight hours between 10:30 p.m. and 6:00 a.m.

The pilot encountered several challenges including launching during the COVID-19 pandemic, a grievance from Transport Workers Union Local 234, and limited ridership. There were approximately 1,000 rides completed during the pilot, and ridership peaked at 10 trips per night. The cost to operate one SEPTA-owned vehicle, which served the zone for most of the pilot, was reportedly $645 a day. So, on the most productive night, this equated to $64.50 per trip, but the operating cost per trip on average was much higher.

SEPTA ended service at the end of the pilot due to a combination of low ridership and pending arbitration with its union over a grievance. Limited performance and cost data are available because the pilot was discontinued several years ago. Therefore, Owl Link's performance cannot be analyzed at the same level as the other Pennsylvania microtransit cases.

As part of its Bus Revolution, SEPTA identified six On-Demand Zones as recommendations for its new bus network. Service is planned to begin in 2025 but may initially start in one or two zones.

Replacement Cases

Centre Area Transportation Authority (CATAGO!)

Microtransit service was first offered by Centre Area Transportation Authority (CATA) in 2020, and at the time of analysis in early 2024, CATA operated three zones with a combined service area of 33 square miles. In July 2024, CATA introduced a new pilot service zone in Lemont and Houserville and reduced service in the Bellefonte zone to cover only the weekday a.m. and p.m. peak commuting hours. The following analysis includes information from before this service change.

CATAGO! was developed to partially replace underperforming and low-frequency fixed-route service with higher quality, more productive microtransit service. Each zone was developed to partially replace a route that experienced performance issues.

Currently, data is not available at a zone level. System-wide microtransit data from the start of service in 2020 was used to calculate performance and cost values. The performance data of the microtransit service and FY 2023 fixed-route service are shown in **Figure 14.**

Figure 14: CATA (Centre) Productivity, Microtransit vs Fixed-Route

Passengers per Revenue Vehicle-Mile

System-wide Microtransit: 0.14
System-wide Fixed-Route: 2.26

Fixed-Route, July 2022 - June 2023
Microtransit, January 2020 - December 2023

Passengers per Revenue Vehicle-Hour

System-wide Microtransit: 2.6
System-wide Fixed-Route: 35.3

Fixed-Route, July 2022 - June 2023
Microtransit, January 2020 - December 2023
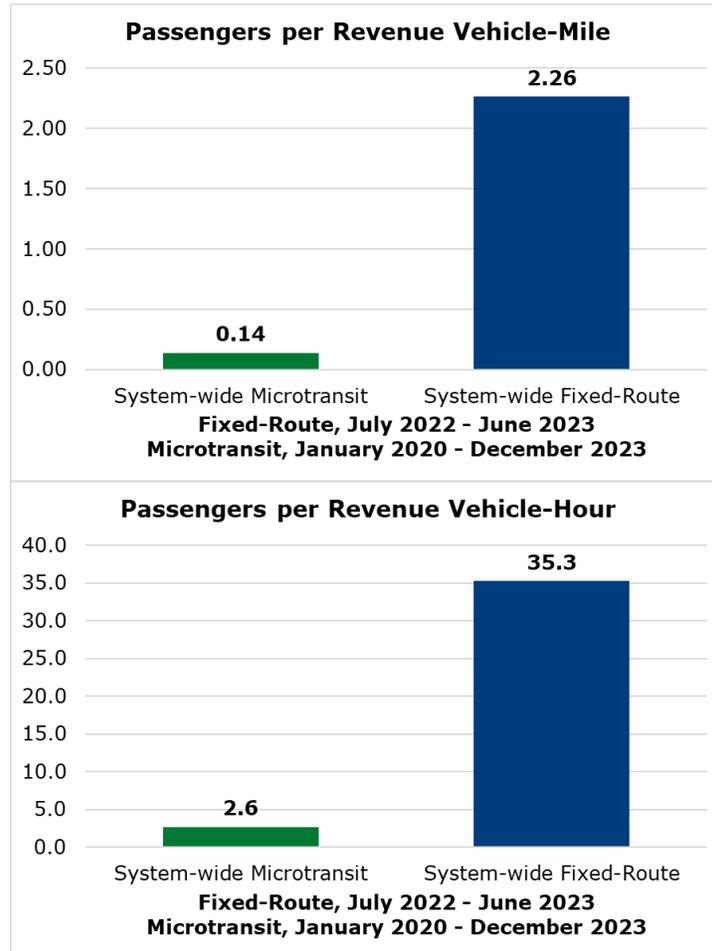
Source: CATA and dotGrants. Microtransit data is from the inception of service in January 2020 to December 2023. Fixed-route data is from July 2022 to June 2023.

Microtransit performance was much lower than system-wide fixed-route performance. This is to be expected and largely due to the difference in ridership and capacity of the two service types.

Figure 15 shows the operating cost per passenger trip comparison of system-wide microtransit, fixed-route, ADA paratransit, and shared-ride services.

Figure 15: CATA (Centre) Operating Cost, Subsidy, and Revenue per Passenger Trip by Service Type

Operating Cost per Passenger Trip

Service Type	Subsidy per Trip	Revenue per Trip	Total
Microtransit	$23.22	$1.55	$24.78
Fixed-Route	$1.55	$1.91	$3.47
ADA	$62.03	$3.32	$65.36
Shared-Ride	$60.92	$25.13	$86.04

July 2022 – June 2023

Source: dotGrants. Data is from July 2022 to June 2023.

CATA also tracks additional measures of the user experience. Available data is shown in **Table 6**.

Table 6: CATAGO! User Experience Performance Metrics

Performance Metrics	
Average Pick-up ETA (Wait Time)	9.0 minutes
Trip Cancellation	9%
Rider No-Show	2%
Rider Acceptance Rate	89%
Percentage of Rides Shared	52%
Booking Method (App / Call-In / Other)	53% / 44% / 2%

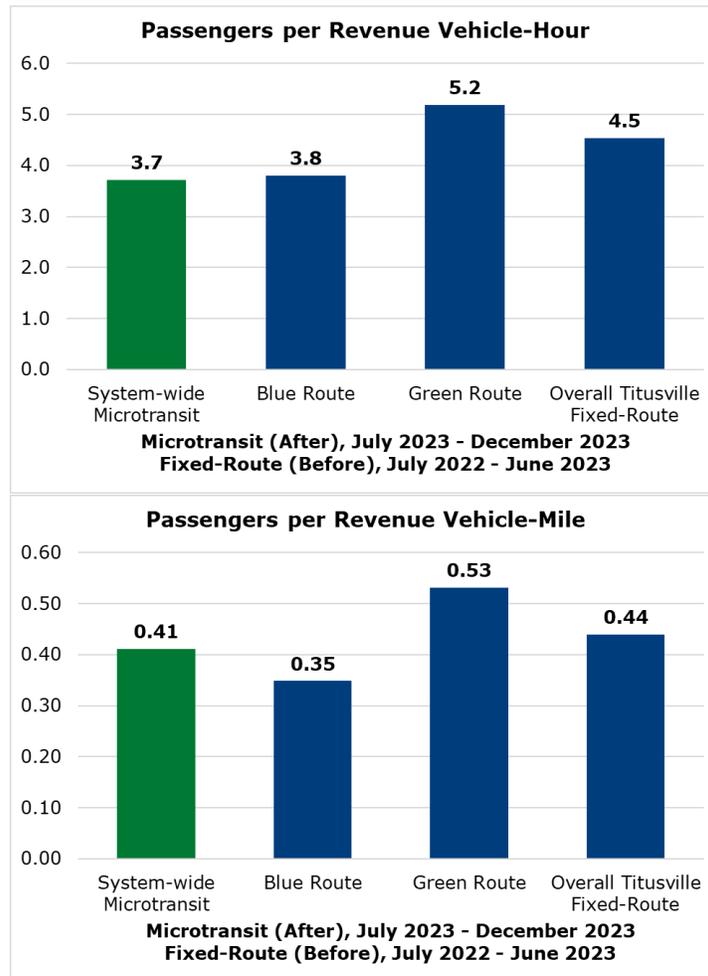Source: CATA (Centre). Microtransit data is from the inception of service to present day, January 2020 to December 2023.

Crawford Area Transportation Authority (CATA GO)

Crawford Area Transportation Authority (CATA) launched microtransit service in 2023. Unlike other systems, CATA GO operates with designated stops, meaning that users have a selection of predetermined stops to choose from. Microtransit in CATA's service area replaced two low-performing fixed routes in the Titusville area. By switching to microtransit service, CATA was able to offer a more responsive service and expand transit service availability to more people.

The performance data for the Titusville microtransit zone is shown in **Figure 16**, along with the performance data of the two routes. An overall summary of fixed-route performance in the Titusville area before microtransit is also included.

Figure 16: CATA (Crawford) Productivity, Microtransit vs. Fixed-Route

Source: CATA (Crawford), dotGrants. Fixed-route data is from July 2022 to June 2023. Microtransit data is from July 2023 to December 2023.

During its first six months in operation, the microtransit service performed better or close to the former Blue Route, while falling short of the Green Route in terms of passengers per revenue vehicle-hour. However, it served approximately 9,100 passenger trips in six months compared to approximately 11,100 passenger trips on the Blue and Green routes in the previous year.

The operating cost for CATA GO by passenger trip is shown in **Figure 17**. Microtransit cost less to operate per passenger trip compared to the fixed-route service it replaced, as well as other demand-response service types operated by CATA.

Figure 17: CATA (Crawford) Operating Cost per Passenger Trip by Service Type

Operating Cost per Passenger Trip

Service Type	Revenue per Trip	Subsidy per Trip	Total
Microtransit	$1.54	$13.97	$15.51
Fixed-Route	$1.45	$16.47	$17.91
ADA	$2.57	$45.10	$47.67
Shared-Ride	$19.47	$14.49	$33.96

Microtransit (After), July 2023 - December 2023
Fixed-Route, ADA, and Shared-Ride (Before), July 2022 - June 2023

■ Revenue per Trip
■ Subsidy per Trip
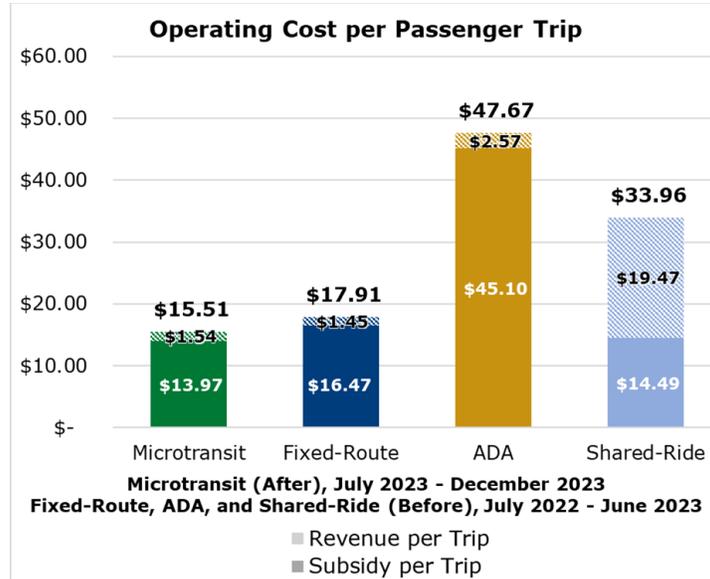
Source: CATA (Crawford), dotGrants. Fixed-route, ADA, and shared-ride data are from July 2022 to June 2023. Microtransit data is from July 2023 to December 2023.

Figure 18 shows the cost for each passenger trip for CATA's microtransit zone and the surrounding fixed-route routes it replaced.

Figure 18: CATA (Crawford) Operating Cost per Passenger Trip, by Zone and Route
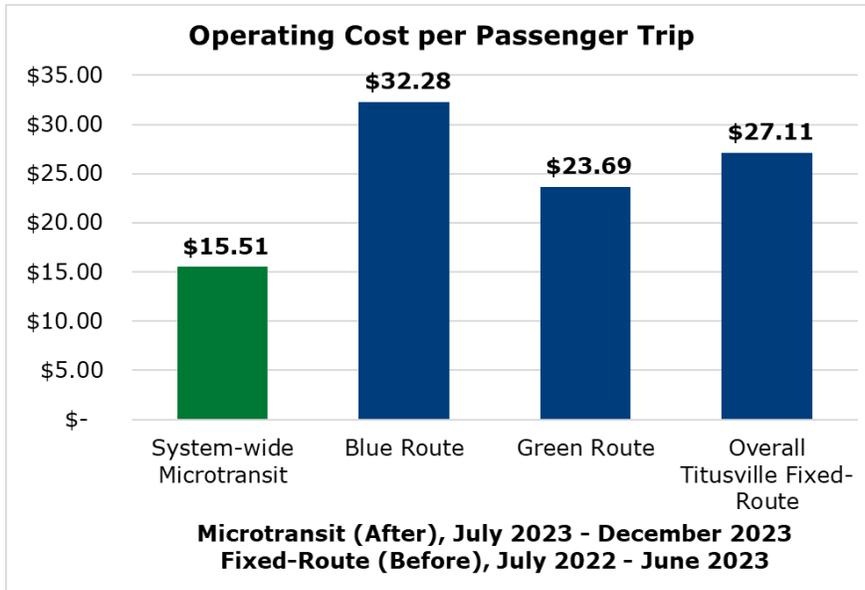
Operating Cost per Passenger Trip

	System-wide Microtransit	Blue Route	Green Route	Overall Titusville Fixed-Route
	$15.51	$32.28	$23.69	$27.11

Microtransit (After), July 2023 – December 2023
Fixed-Route (Before), July 2022 – June 2023

Source: CATA (Crawford), dotGrants. Fixed-route data is from July 2022 to June 2023. Microtransit data is from July 2023 to December 2023.

Through its software provider, CATA (Crawford) has access to additional productivity measures. **Table 7** shows additional measures of microtransit performance related to the customer experience.

Table 7: CATA GO User Experience Performance Metrics

Performance Metrics		
Average Pick-up ETA (Wait Time)	7.6 minutes	
Trip Cancellation Rate	12%	
Rider Acceptance Rate	90%	
Percentage of Rides Shared*	19%	
Booking Method (App / Call-In / Flag-Down / Web)	55% / 42% / 2% / <1%	

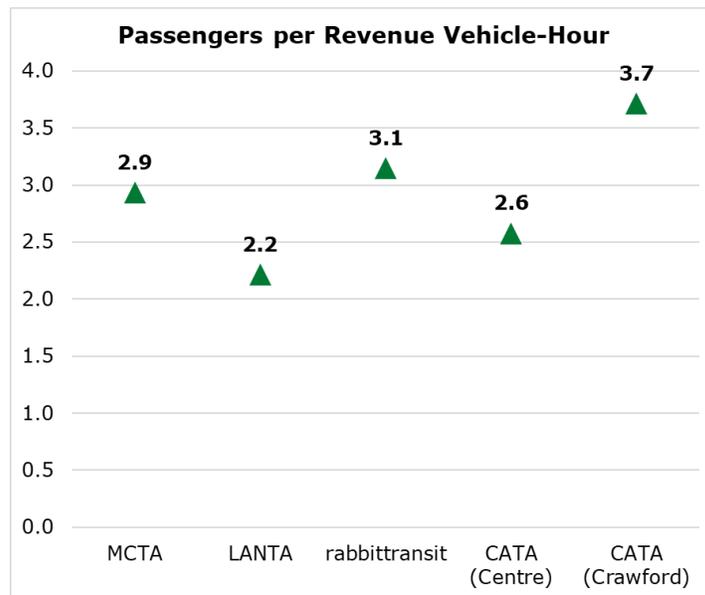Source: CATA (Crawford). Microtransit data is from July 2023 to December 2023.
*Estimated based on 1.23 passengers per trip request

Comparisons Between Systems

Comparing performance across systems has limitations because each system has different service-area characteristics, baseline costs to operate, and service goals. Nevertheless, this section compares passengers per revenue vehicle-hour, average wait time, operating cost per revenue vehicle-hour, and operating cost per passenger trip for the microtransit services that continue to operate in Pennsylvania. The cost measures are also compared to those of fixed-route service.

For the agencies included in this study, there was an observed range of productivity for microtransit service of two to four passengers per revenue vehicle-hour (see **Figure 19**). Many agencies noted that after reaching a certain level of productivity, their fleet was unable to keep up with demand and passengers would encounter longer-than-expected wait times.

Figure 19: Performance of System-Wide Microtransit Service

Source: Data provided from agencies. Service data is from July 2022 to June 2023 except CATA (Crawford) microtransit, which is from July 2023 to December 2023.

Beyond this range, agencies reported a decrease in customer satisfaction due to increased wait times and a diminished capacity of the system to adequately schedule rides. As this point is reached, agencies should determine the cause of increased ridership and whether microtransit service should be converted to a higher-capacity service, such as fixed-route, or whether service changes should be implemented such as adding a vehicle.

Wait time is a key performance measure used by the operators. **Table 8** shows a comparison of average microtransit wait time and typical fixed-route headway, or the time between consecutive buses, in the same area. Except for LANTA, which requires scheduling trips at least two hours in advance, all microtransit services had average wait times of less than 20 minutes. This represents greater service availability to areas within the microtransit zone than fixed-route. Both CATA services had average wait times of less than 10 minutes. **Figure 20** shows that as wait time increases, productivity may decrease. While not tested or verified, a hypothesis is that shorter wait times lead to increased customer satisfaction, higher demand, and, therefore, the ability to complete more trips per hour.

Table 8: Comparison of Average Microtransit Wait Time

Agency	Microtransit Service	Average Wait Time (minutes)	Typical Fixed-Route Headway (minutes)
MCTA	Pony Plus	17	75
LANTA	LANtaFlex	Requires scheduling 2+ hours in advance	60 to 120
rabbittransit	Stop Hopper	14	30 to 60
CATA (Centre)	CATAGO!	9	30 to 40
CATA (Crawford)	CATA GO	8	60

Source: Data provided from agencies. Service data is from July 2022 to June 2023 except CATA (Crawford) microtransit, which is from July 2023 to December 2023.

Figure 20: Average Wait Time vs Productivity
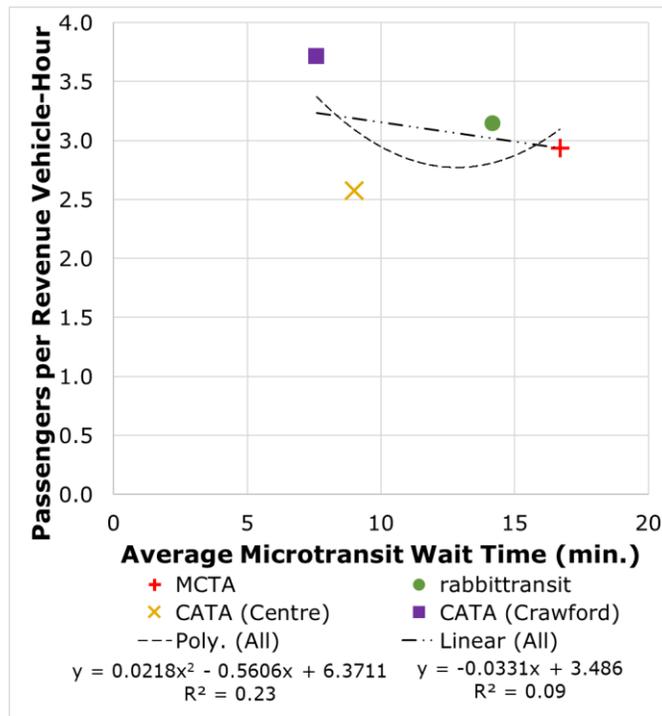
Source: Data provided from agencies. Service data is from July 2022 to June 2023 except CATA (Crawford) microtransit, which is from July 2023 to December 2023.

Figure 21 shows that microtransit is often more expensive than fixed-route on a per-passenger-trip basis. This is because microtransit has a lower maximum ridership capacity than fixed-route service so costs cannot be spread over as many trips, and there is an upper limit of how many passengers one vehicle can serve in an hour. However, microtransit costs per passenger trip are typically lower when compared to ADA and shared-ride. This is influenced by the hourly operating costs and the higher productivity of microtransit that can be achieved within a smaller zone compared to ADA and shared-ride that may serve long-distance fixed-route or countywide demand response service areas.

However, costs alone do not show the full picture. As evident through agency interviews and customer ratings and surveys, microtransit is frequently a preferred service due to its on-demand and flexible scheduling and routing. While it may cost more to operate depending on the metric, it also provides a higher-quality service and generally leads to higher customer satisfaction. Agencies must carefully weigh the benefits and total costs, and have contingency plans for funding given the uncertainty of how customers will respond to a new service type.

The choice of how service is provided and what class of drivers are operating the service can also factor into the cost of microtransit service. **Table 9** shows a variety of approaches that are used by the agencies.

Table 9: Comparison of Service Provider and Vehicle Operator Approaches

Agency	Microtransit Service	Service Provider	Vehicle Operator Class
MCTA	Pony Plus	In-House	Microtransit (but paid based on CDL* vs non-CDL certification)
LANTA	LANtaFlex	Contracted	Shared-Ride
rabbittransit	Stop Hopper	In-House	Specialized Transit Operator
CATA (Centre)	CATAGO!	Contracted	Shared-Ride
CATA (Crawford)	CATA GO	In-House	Fixed-Route and Shared-Ride
SEPTA (Past)	Owl Link	Contracted	ADA Paratransit
SEPTA (Future)	On-Demand	In-House	Fixed-Route

Source: Transit agency interviews; *commercial driver's license

Figure 21: Comparison of Operating Cost per Passenger Trip, Microtransit vs. Fixed-Route

Operating Cost per Passenger Trip

	MCTA	LANTA	rabbittransit	CATA (Centre)	CATA (Crawford)
Shared-Ride	$36.00	$44.55	$28.95		$33.96
ADA	$18.72	$54.65	$12.10	$65.36	$47.67
Microtransit	$21.11	$27.98	$21.60	$24.78	$15.51
Fixed-Route	$17.88	$10.45	$9.29	$3.47	$17.91
Shared-Ride (upper)				$86.04	

▲ Microtransit ● Fixed-Route ■ ADA ✕ Shared-Ride
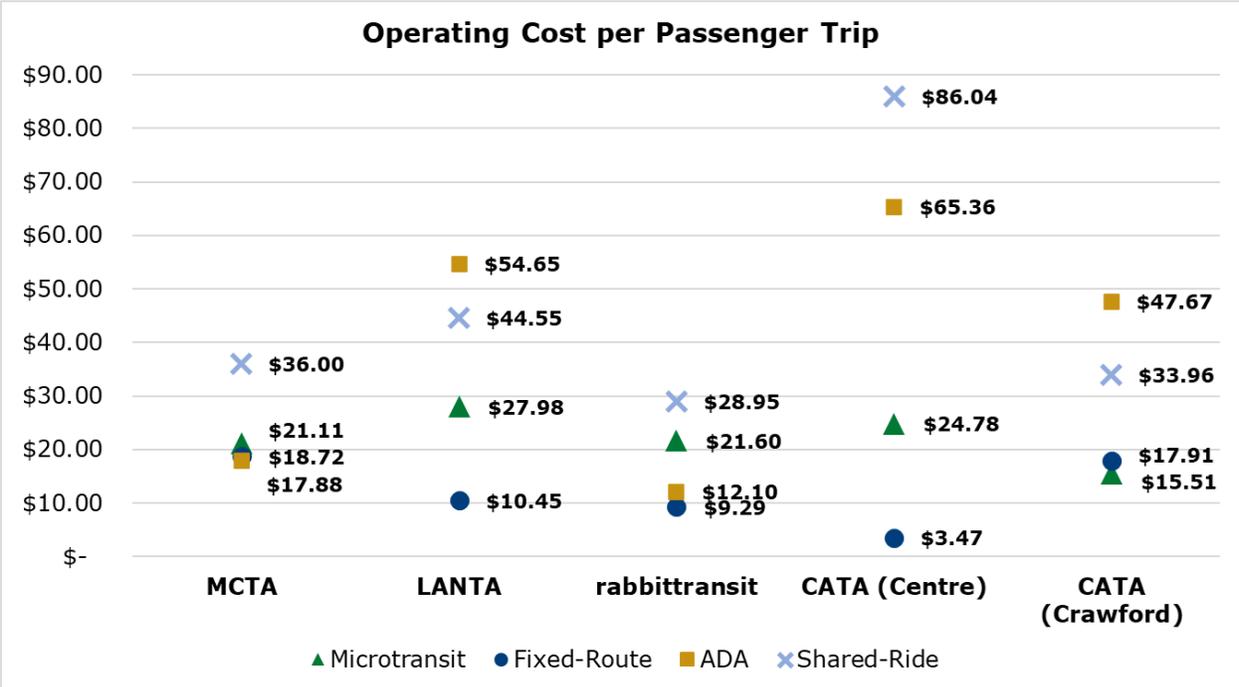
Source: Data provided by agencies and dotGrants. Service and operating cost data is from July 2022 to June 2023 except CATA (Crawford) microtransit, which is from July 2023 to December 2023. LANTA microtransit data is for the LANtaFlex service. rabbittransit fixed-route data is for the Gettysburg, Hanover, and York service area.

Opportunities to Improve Data Collection and Analysis

This analysis was limited by the state of reporting standardization across Pennsylvania agencies. While care was taken to minimize the effect of data anomalies or discrepancies, future analysis would benefit from clear guidance to agencies on reporting operating statistics and the performance of microtransit services. Reporting anomalies identified included:

- Missing data under Department-Approved Service (DAS) in dotGrants reporting.
- Operating expenses that appeared to be under-allocated for DAS in dotGrants reporting, particularly for Maintenance and General Admin.
- Discrepancies between operating statistics provided directly to the project team from agency microtransit scheduling software and what was reported under DAS in dotGrants.

The following were identified as data needs or guidance that would benefit transit agencies:

Standardize operational metrics across agencies. Agencies would benefit from clear guidance on how to measure and track the success of microtransit services. While microtransit has a maximum expected productivity, it often provides a higher-quality service for passengers compared to shared-ride and, in some cases, fixed-route. Additional metrics useful in determining the value and effectiveness of the service, including average wait time, shared rides, and the average ride distance and duration, are reported consistently by each agency. As the process for evaluating microtransit evolves, PennDOT could create guidance on which metrics should be reported and standardize the process for collecting and reporting them.

Investigate the benefits and implications of co-mingling shared-ride and microtransit trips. While shared-ride and microtransit are both on-demand services, the populations they serve and their service delivery methods differ. However, agencies may identify cost-efficient ways to overlap these services. Because microtransit does not require advance reservations as the shared-ride service does, some shared-ride users may opt into the microtransit service if it is available for their trip. Other agencies may purposely aim to service both passenger types or co-mingle trips with the same vehicle and driver where possible. While co-mingling trips may produce cost efficiencies, it can make operational and financial reporting extremely difficult. Agencies need clear guidelines and best practices for reporting co-mingled trips for financial and operations reporting. Furthermore, agencies would benefit from information on the implications of this operational strategy when planning their microtransit services.

Align state and federal reporting methodology where possible. Several agencies expressed confusion and difficulty reporting because of differences between PennDOT and National Transit Database (NTD) requirements. A need for guidance, particularly around tracking and reporting costs, was also demonstrated by the anomalies in the DAS reporting for microtransit. PennDOT could provide clear guidance on how to report microtransit financial information. As more agencies are considering microtransit service, PennDOT should consider opportunities to align state and federal reporting methodologies for microtransit, where possible, and provide additional guidance to agencies regarding financial reporting.

Provide guidance on equity and Title VI implications of fixed-route replacement. Several agencies indicated there is no clear federal or state guidance on the equity and Title VI implications of replacing fixed-route service with microtransit. This uncertainty has led them to pursue supplemental service rather than replacement service. Clear guidance could help agencies navigate the complexities if they are transitioning from fixed-route service to microtransit while ensuring compliance with legal requirements and promoting equitable access to transportation services.

Key Takeaways

This analysis was conducted to characterize microtransit services operating in the Commonwealth and identify common themes that define a successful microtransit service. Microtransit is a flexible service that can suit many needs, though it is not appropriate in every location.

The following is a summary of key takeaways based on agency interviews, analysis of zone characteristics, and analysis of microtransit performance for each Pennsylvania case included in this study. These are emerging themes, and a more comprehensive analysis would benefit from more data, additional examples of microtransit, and longer-term operational information.

1. *Microtransit is a flexible tool but not a universal solution. It can be a supplement or alternative to traditional transit but should address specific goals and needs.*

   Agencies interviewed for this study implemented microtransit for various reasons but considered it as just one part of their overall service. Many acknowledged that the challenges of implementing microtransit limit its expansion. Agencies should carefully identify the specific issue they are trying to solve before concluding that microtransit is the most suitable solution. If microtransit is deemed the best option, agencies must clearly define the purpose of the service. The main service objectives observed in this study were:

   - Expand transit connections and mobility options
   - Create first- and last-mile connections to fixed-route service
   - Partially replace inefficient and infrequent fixed-route service with more responsive service
   - Investigate ridership potential in new areas

2. *Clear goals, key performance metrics, and service-level expectations should be set early in the planning process.*

   When planning for microtransit, agencies should establish clear goals and key performance metrics that align with those goals. This will determine what success looks like and how it will be measured. A well-defined plan should be in place for defining, measuring, and reporting success to funding partners. It is also important to clearly communicate the benefits and limitations of microtransit and its expected performance to manage stakeholder expectations.

   The agencies interviewed also noted the importance of setting service-level expectations with customers. Direct comparisons to ride-hailing services like Uber and Lyft should be avoided, as this can create unrealistic expectations for users unfamiliar with public transit. Instead, agencies can clearly describe how the service works from the customer's perspective and the benefits it is expected to provide for the community.

3. *Microtransit service has a productivity ceiling and can become costly and difficult to scale effectively during periods of high demand.*

   Due to smaller vehicles and the routing required between passenger trips, microtransit cannot replicate the level of productivity of most fixed-route services. Most microtransit zones analyzed in Pennsylvania have operated with productivity of two to four passengers per revenue vehicle hour. If an agency is considering replacing underperforming fixed-route service with microtransit and the route is much more productive than this, microtransit is probably not the right choice.

   Agencies should scale their microtransit service to meet demand. However, when productivity reaches the expected limit, another vehicle and driver will need to be added to the zone to meet a

similar level of service in terms of customer wait time. If an agency consistently operates its microtransit service with multiple vehicles per zone, it may be necessary to consider a change to fixed-route service.

4. ***Microtransit is often less expensive per revenue vehicle-hour, but more expensive per passenger trip compared to fixed-route service.***

Microtransit is often less expensive to run on an hourly basis than fixed-route service because it is typically operated with a shared-ride class of drivers and vehicles, which are less costly than operating the larger fixed-route buses. However, microtransit serves fewer passengers than fixed-route because of its limited service area and capacity. As a result, microtransit services see an upper limit of productivity in the range of four to six passengers per revenue vehicle-hour. When comparing microtransit and fixed-route alternatives, agencies should consider operating cost per revenue vehicle-hour, but more importantly operating cost per passenger trip and total cost.

5. ***Measuring the success of providing first- and last-mile connections is challenging.***

Although providing first- and last-mile connections to fixed-route service was often cited as an objective, agencies had very little data on the number of transferring passengers between microtransit and fixed-route service. Installing fare collection technology such as fareboxes or smartcard readers on microtransit vehicles can help, but this excludes data on cash customers and app payments, as microtransit scheduling systems are typically not integrated with fixed-route fare collection systems.

6. ***Most microtransit zones in Pennsylvania are 5 to 15 square miles, contain a mix of trip generators and land uses, and are in lower-density small-town or suburban settings.***

Productive zones in Pennsylvania tend to be between 5 to 15 square miles, with productivity increasing as zone size decreases. Productive zones have a mix of trip generators to spread trips throughout the zone and service period. Agencies found that zones designed around one major trip generator, like a large employer, can be challenging to operate due to surges in demand caused by trips with a common destination and similar schedule. They noted that microtransit can be effective in areas with dispersed origins and destinations rather than linear travel suited for fixed routes.

Most microtransit zones in Pennsylvania have a density of residents and jobs ranging from 1,000 to 3,000 per square mile (or roughly 1 to 5 per acre), which is lower than what typically supports productive fixed-routes service. These zones are often located in the lower-density peripheries of higher-density cities or encompass small towns, and they include a mix of residential, commercial, and industrial land uses. While connections to fixed-route service are often part of the service design, they are not always necessary, as some zones operate in areas without fixed-route service available.

7. ***Communicate with peer agencies when designing or altering microtransit services.***

As additional agencies in Pennsylvania consider microtransit service, they should consult with experienced agencies for advice on implementation. Interviewed agencies highlighted the benefits of learning from others' experiences to identify different operating methods, refine their approach, and avoid pitfalls experienced by others.

8. *Marketing and advertising are key for building ridership, while continuous monitoring and operational flexibility drive success.*

Most agencies indicated that marketing and advertising during initial implementation were crucial to gaining ridership. These efforts included targeted advertising and public education to teach potential riders how to use the service and to set expectations. Advertising methods included public education events, stakeholder engagement, branded services and vehicles, and traditional print and digital advertisements. As demand increases and approaches capacity, agencies may need to temper the volume of advertising to avoid overwhelming the service.

Interviewed agencies acknowledged that successful microtransit service requires continuous monitoring and operational flexibility. It also requires more monitoring than traditional fixed-route service. Agencies should be prepared to monitor ridership demand to adjust service parameters and zone boundaries to react to changes in performance. Continuous monitoring requires additional staff time and training, so agencies should have a staffing plan in place before implementing microtransit to handle the additional workload.

9. *The choice of software impacts the agency and user experience in microtransit service.*

The software used for microtransit service greatly impacts service capabilities and user experience. Agencies considering microtransit should consult peer agencies with experience using multiple software vendors to determine the most suitable functionality for their needs.

10. *Agencies have considered the efficiency benefits of co-mingling shared-ride and microtransit trips, but software integration and clear reporting guidance are needed.*

Agencies observed that shared-ride passengers elect to use microtransit service when it suits their needs. Some agencies, like LANTA, co-mingle trips whenever possible. This combination allows for better utilization of vehicles and drivers by serving microtransit and shared-ride trips together. However, this practice requires integrated scheduling software that can handle both types of trips. While microtransit can provide shared-ride users with a more responsive service compared to traditional shared-ride options, it complicates operations and reporting. Agencies have requested additional guidance on how to report shared-ride and microtransit operating statistics when trips are co-mingled.

Microtransit is a flexible alternative to traditional transit service that can help fill service gaps, but it should be viewed as one of several options for meeting community transportation needs. Successful microtransit service must be rooted in the realities of expected performance and cost and be implemented to address a specific goal and need for the community.

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Appendix

The Appendix includes the following:

- Microtransit Summary Sheets.
- Summary from interviews with Pennsylvania microtransit service providers.

Microtransit Summary Sheets

The following summary sheets serve as the Task 1 deliverable for the PA Microtransit Case Study Analysis project (E05448 WO10). The summary sheets compile a review of Pennsylvania microtransit services currently operating or that have operated in the past. The goal of this summary is to identify characteristics of microtransit services operating in the Commonwealth and the communities they serve.

Six Pennsylvanian agencies were included:

- Monroe County Transit Authority (MCTA)
- Centre Area Transportation Authority (CATA)
- Crawford Area Transportation Authority (CATA)
- rabbittransit
- Lehigh and Northampton Transportation Authority (LANTA)
- Southeastern Pennsylvania Transportation Authority (SEPTA)

The information within the summary sheets is compiled from data requests and interviews with the agencies, along with demographic information sourced from the U.S. Census Bureau's 2022 American Community Survey. Each agency's microtransit service is described, including its technology, vehicle fleet, outreach programs, and funding sources. Where applicable, a breakdown of information by zone is provided.

The service-area characteristics, including population and employment density and land use, are detailed for each zone. Additionally, the demographic makeup of the areas served by microtransit is outlined. A summary table comparing the service characteristics of each zone in Pennsylvania is included following the summary sheets.

Additionally, summary sheets for microtransit activity occurring in three other states—Virginia, North Carolina, and Texas—are included to identify key takeaways applicable to Pennsylvania service. While example case studies are highlighted for each state, these are not intended to be an exhaustive review of all activities. Several sources were consulted, including:

- Websites of local microtransit service providers in each state
- Virginia Department of Rail and Public Transportation, Rural Microtransit Case Study and Report, 2023
- NC State University, Public Microtransit Pilots in the State of North Carolina, 2023
- TxDOT, Texas Rural Microtransit Guidebook, 2023

Task 2 of the project will involve analysis of available before-and-after service data, and a summary technical memorandum documenting case studies, findings, common characteristics of successful microtransit services, and overarching themes from the analysis.

Pony Plus

GENERAL INFORMATION
- **Status:** Pilot
- **Service Provider**: In-House
- **Service Start Date:** August 1, 2022
- **Number of Zones:** 2
     Tri-Boro Connector
     Pocono Summit Connector
- **Service Hours:** 6:30 a.m.–6:30 p.m. (M-F)
- **Stop Locations:** Curb-to-curb
- **Fare:** $2.00
- **Transfer Policy**: N/A
- **Payment Options**: Cash, in-app (credit card)
- **Service Objectives:** Expand transit connections with more responsive, faster, and flexible service, including in an area that was historically served with fixed-route.
- **Relation to Fixed-Route:** Replacement and supplement

TECHNOLOGY AND SCHEDULING
- **Technology Provider:** Via
- **Booking Methods:** App, Call
- **ADA Requests:** App, Call
- **Advance Scheduling:** Up to two weeks in advance
- **Recurring Trips:** Yes
- **Target Wait Time:** No

VEHICLES
- **Fleet Size:** 5
- **Vehicle Types:** Ford Transit Vans (8-passenger), ADA-accessible
- **Vehicles Operated at Peak/Off-Peak Service:**
     Tri-Boro Connector: 2 / 1
     Pocono Summit Connector: 2 / 1
- **Acquisition Approach:** Purchased New

MARKETING AND EDUCATION
- Social Media, TV & Radio, Print Brochures, Stakeholder Outreach, Branded Vehicles
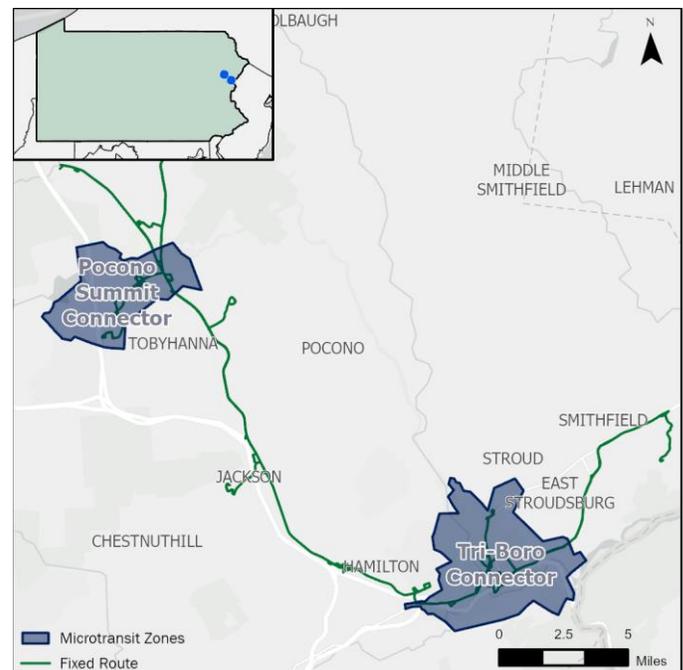
FUNDING SOURCES
- PA Act 44: Section 1513

SERVICE-AREA CHARACTERISTICS

	Tri-Boro Connector	Pocono Summit Connector
Size (sq mi)	12.5	7.8
Land Use	Mixed	Mixed
Area Type	Small City/ Suburban	Town/Rural
Population	20,830	3,190
Pop. Density (per/sq mi)	1,670	410
Emp. Density (jobs/sq mi)	960	300
Fixed-Route Connections	Yes	Yes
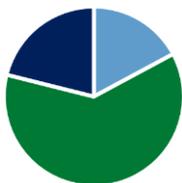
Population Age
17% Under 18
62% 18 - 64
21% 65 and Older

37% Non-White

16% with a Disability

2% Limited English Proficiency

11% Zero-Car Households

12% Below Poverty

CATAGO!	Centre Area Transportation Authority (CATA) Centre County, PA

GENERAL INFORMATION

- **Status:** Operational
- **Service Provider**: Contractor (MTM Transit)
- **Service Start Date:** January 11, 2020
- **Number of Zones:** 3
- **Service Hours:**
  - **Centre Area West and Boalsburg:** 6:00 a.m. - 8:00 p.m. (M-F), 9:00 a.m. - 8:00 p.m. (Sat)
  - **Bellefonte/Pleasant Gap:** 6:00 a.m. - 11:00 p.m. (M-F), 6:00 am.–8:00 p.m. (Sat)
- **Stop Locations:** Curb-to-curb; several designated stops
- **Fare**: $2.20
- **Transfer Policy**: Free
- **Payment Options**: Cash, tokens, passes (physical and mobile)
- **Service Objectives:** Partially replace inefficient and infrequent fixed-route services with a lower cost, higher quality, and more efficient service. Alleviate fixed-route vehicle shortages.
- **Relation to Fixed-Route:** Partial replacement and supplement

TECHNOLOGY AND SCHEDULING

- **Technology Provider:** Via
- **Booking Methods:** App, Call
- **ADA Requests:** App, Call
- **Advance Scheduling:** Up to two weeks in advance
- **Recurring Trips:** Yes
- **Target Wait Time:** 8-10 min on average

VEHICLES

- **Fleet Size:** 29 total between shared-ride and microtransit
- **Vehicle Types:** Ford Transit Vans and Vanpool Vans, ~85% ADA-accessible
- **Vehicles Operated at Peak/Off-Peak Service:**
  - **Centre Area West:** 2 / 2
  - **Boalsburg:** 2 / 1
  - **Bellefonte/Pleasant Gap:** 7 / 2
- **Acquisition Approach:** Repurposed Vanpool Vans, Leased New

MARKETING AND EDUCATION

- Digital - Social Media and How-To Videos, Printed Flyers, Stakeholder Outreach, Community Outreach Events, Municipality Promotion

FUNDING SOURCES

- PA Act 44: Section 1513, FTA Section 5307

SERVICE-AREA CHARACTERISTICS

	Centre Area West	Boalsburg	Bellefonte/ Pleasant Gap
Size (sq mi)	9.4	6.5	17.3
Land Use	Residential	Residential	Mixed
Area Type	Suburban	Suburban/ Rural	Town/Rural
Population	16,230	2,990	14,960
Pop. Density (per/sq mi)	1,730	460	860
Emp. Density (jobs/sq mi)	630	140	430
Fixed-Route Connections	Yes	Yes	Yes
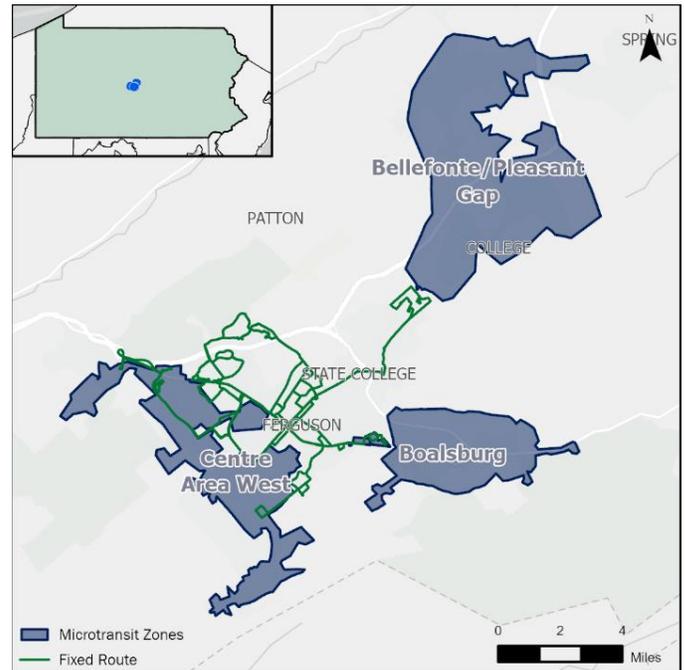
Population Age
17% Under 18
67% 18 - 64
16% 65 and Older

20% Non-White

9% with a Disability

2% Limited English Proficiency

7% Zero-Car Households

7% Below Poverty

CATA GO

Crawford Area Transportation Authority (CATA)
Titusville, PA

GENERAL INFORMATION
- **Status:** Operational
- **Service Provider**: In-House
- **Service Start Date:** July 10, 2023
- **Number of Zones:** 84 stops
- **Service Hours:** 7:30 a.m.–7:30 p.m. (M-F), 12:00 p.m.–5:00 p.m. (Sat)
- **Stop Locations:** Designated stops
- **Fare**: $1.50 (in-town), $5.00 (to airport)
- **Transfer Policy**: N/A
- **Payment Options**: Cash, in-app (credit), pass (mobile)
- **Service Objectives:** Replace inefficient fixed-route service with a more responsive, lower cost, and improved service in an expanded area.
- **Relation to Fixed-Route:** Replacement

TECHNOLOGY AND SCHEDULING
- **Technology Provider:** Spare Labs
- **Booking Methods:** App, Call
- **ADA Requests:** App, Call
- **Advance Scheduling:** Up to one week in advance
- **Recurring Trips:** No
- **Target Wait Time:** < 15 min

VEHICLES
- **Fleet Size:** 3
- **Vehicle Types:** Ford Transit Van (4-passenger) and Chrysler Minivans (3-passenger), ADA-accessible
- **Vehicles Operated at Peak/Off-Peak Service:** 3 / 1
- **Acquisition Approach:** Purchased New
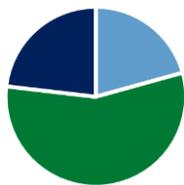
MARKETING AND EDUCATION
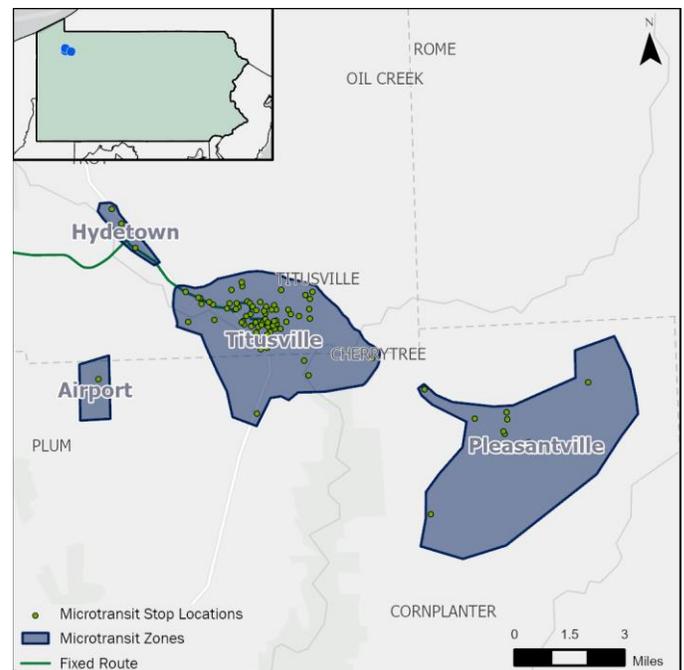- Print, Stakeholder Outreach, Community Outreach Events

FUNDING SOURCES
- PA Act 44: Section 1513, FTA Section 5311

SERVICE-AREA CHARACTERISTICS

	Within ¼-Mile from Stop
Size (sq mi)	6.4
Land Use	Mixed
Area Type	Town/Rural
Population	5,400
Pop. Density (per/sq mi)	840
Emp. Density (jobs/sq mi)	310
Fixed-Route Connections	Yes

Population Age
21% Under 18
56% 18 - 64
23% 65 and Older

5% Non-White

26% with a Disability

0% Limited English Proficiency

19% Zero-Car Households

21% Below Poverty

Stop Hopper	rabbittransit Franklin, York, Snyder, Northumberland, Columbia, Montour, Snyder, and Union Counties, PA

GENERAL INFORMATION
- **Status:** Varies by Zone - Operational and Pilot
- **Service Provider**: In-House
- **Service Start Date:** August 27, 2018
- **Number of Zones:** 6*
  - Chambersburg
  - Red Lion/East York*
  - Selinsgrove/Sunbury
  - Danville/Bloomsburg
  - Lewisburg/Milton

*Red Lion and East York are two distinct zones but are combined for reporting
- **Service Hours:** 6:30 a.m.–6:30 p.m. (M-F)
- **Stop Locations:** Curb-to-curb, walk-ons allowed
- **Fare**: $2.00
- **Transfer Policy**: $ 0.40 / transfer
- **Payment Options**: Cash, in-app (credit), passes (mobile)
- **Service Objectives:** Expand mobility options by introducing a new type of service. Create first- and last-mile connections to fixed-route service and investigate ridership potential in new areas.

Relation to Fixed-Route: Supplement

TECHNOLOGY AND SCHEDULING
- **Technology Provider:** Via
- **Booking Methods:** App, Call, Walk-On
- **ADA Requests:** App, Call
- **Advance Scheduling:** No, not available
- **Recurring Trips:** No
- **Target Wait Time:** < 45 min

VEHICLES
- **Fleet Size:** 17
- **Vehicle Types:** Ford Transit Vans (8-passenger) and MV-1 Vans (4-passenger), ADA-accessible
- **Vehicles Operated at Peak/Off-Peak Service:**
  - **Chambersburg:** 2 / 1
  - **Red Lion/East York:** 4 / 2
  - **Selinsgrove/Sunbury:** 1 / 1
  - **Danville/Bloomsburg:** 2 / 1
  - **Lewisburg/Milton:** 1 / 1
- **Acquisition Approach:** Repurposed Shared-Ride, Purchased New
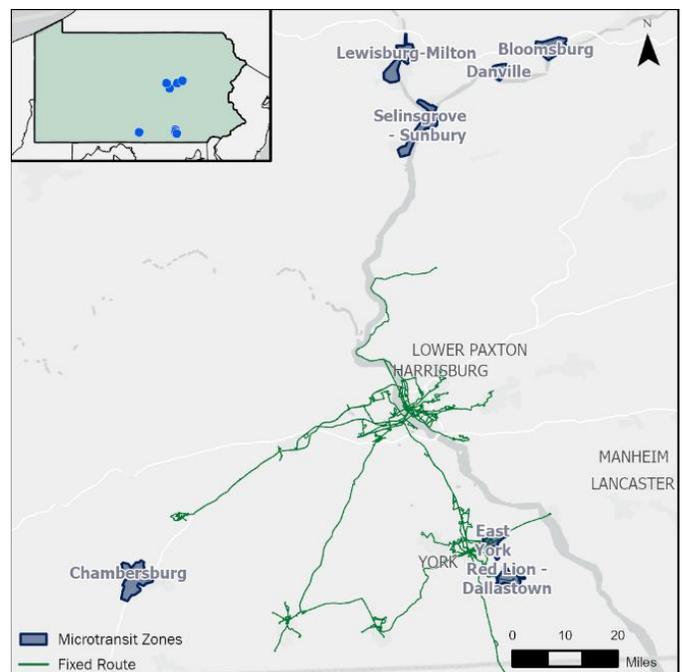
MARKETING AND EDUCATION
- Digital - Social Media and How-To Videos, Community Outreach Events, Fare Promotions

FUNDING SOURCES
- PA Act 44: Section 1513, FTA Section 5307, FTA Section 5311, FTA CARES Act

SERVICE-AREA CHARACTERISTICS

See Next Page

rabbittransit
**Franklin, York, Snyder, Northumberland, Columbia, Montour, Snyder, and Union Counties, PA**

SERVICE-AREA CHARACTERISTICS

	Chambersburg	Red Lion/ East York	Selinsgrove/ Sunbury	Danville/ Bloomsburg	Lewisburg/ Milton
Size (sq mi)	14.7	10.9	10.7	12.4	10.4
Land Use	Mixed	Mixed	Mixed	Mixed	Mixed
Area Type	Small City/ Suburban	Suburban	Town	Small City/ Suburban	Town/Rural
Population	25,520	28,320	19,670	17,580	15,450
Pop. Density (per/sq mi)	1,740	2,600	1,840	1,420	1,490
Emp. Density (jobs/sq mi)	1,350	2,030	1,000	910	990
Fixed-Route Connections	No	Yes	No	No	No
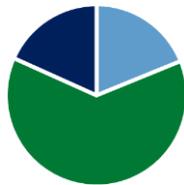
Population Age
19% Under 18
63% 18 - 64
18% 65 and Older
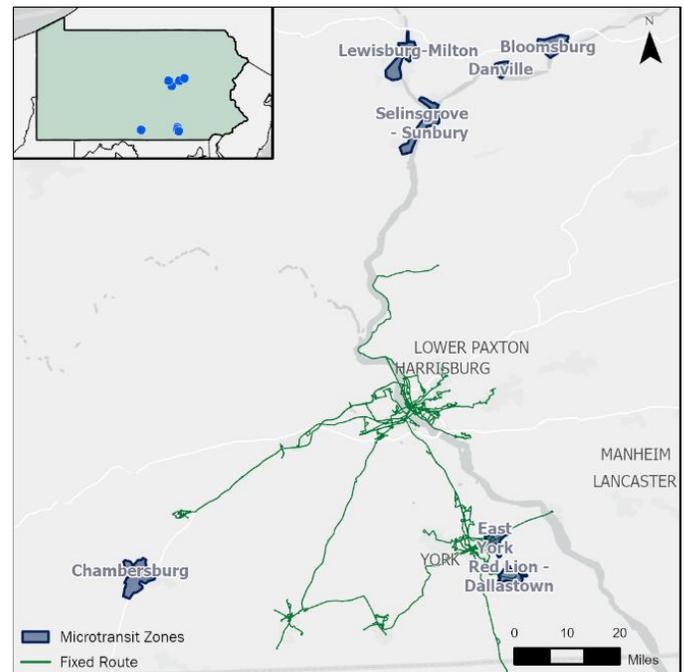
16% Non-White

16% with a Disability

2% Limited English Proficiency

9% Zero-Car Households

13% Below Poverty

LANtaFlex	**Lehigh and Northampton Transportation Authority (LANTA)** **Lehigh and Northampton Counties, PA**

GENERAL INFORMATION

- **Status:** Operational
- **Service Provider**: Contractor (TransDev)
- **Service Start Date:** August 29, 2011
- **Number of Zones:** 8
- **Service Hours:**
  - **501 Macungie & 505 Coopersburg:** 6:00 a.m.–6:00 p.m. (M-Sat)
  - **502 Slatebelt & 506 Bethlehem-Gracedale:** 6:00 a.m.–9:00 p.m. (M-Sat)
  - **503 Slatington/Walnutport & 508 New Smithville/Trexlertown:** 6:00 a.m.–6:30 p.m. (M-Sat)
  - **504 Coplay/Egypt Airport:** 7:30 a.m.–6:00 p.m. (Sat)
  - **507 West/South Easton:** 5:30 a.m.–6:30 p.m. (M-Sat)
- **Stop Locations:** Curb-to-curb
- **Fare**: $2.00
- **Transfer Policy**: $0.25 / transfer
- **Payment Options**: Cash, passes (physical and mobile)
- **Service Objectives:** Provide a lifeline service in smaller urban areas with a service that is more productive than fixed-route, feed fixed-route lines, and investigate ridership potential in new areas.
- **Relation to Fixed-Route:** Varies - replacement and supplement

TECHNOLOGY AND SCHEDULING

- **Technology Provider:** Ecolane
- **Booking Methods:** Call
- **ADA Requests:** Call
- **Advance Scheduling:** All trips must be scheduled at least two hours prior (but one day prior for 503 and 504). Trips may be scheduled up to two weeks in advance.
- **Recurring Trips:** Yes
- **Target Wait Time:** 15 min

VEHICLES

- **Fleet Size:** Pooled with ADA Patratransit program, approximately 94 total vehicles
- **Vehicle Types:** Paratransit Vehicles, ADA-Accessible
  Vehicles Operated at Peak/Off-Peak Service: LANTA does not dedicate vehicles to zones or to flex service because they are pooled with paratransit. Given existing demand, flex trips do not typically consume more than one vehicle per zone at any given time.
- **Acquisition Approach:** Shared Vehicle Pool with Shared-Ride
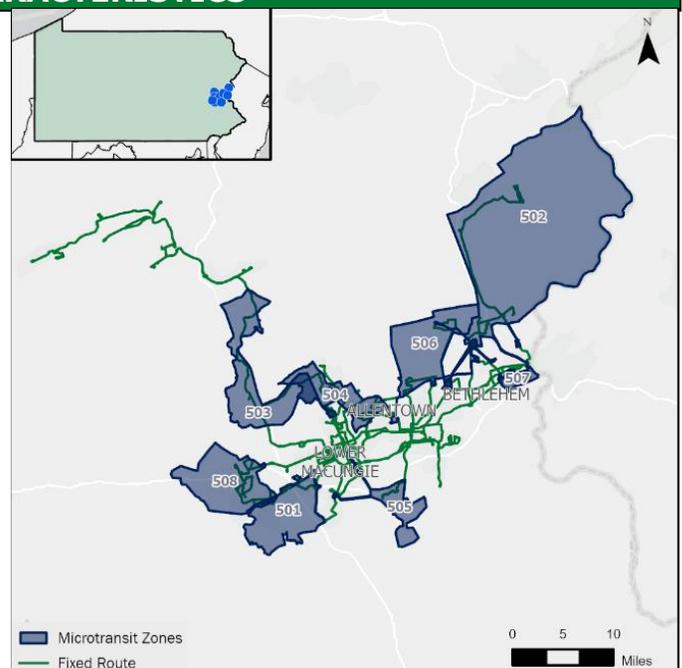
MARKETING AND EDUCATION

- Similar approach to other services it operates

FUNDING SOURCES

- PA Act 44: Section 1513


SERVICE-AREA CHARACTERISTICS

See Next Page

Microtransit Zones
Fixed Route

SERVICE-AREA CHARACTERISTICS

	501	502	503	504	505	506	507	508
Size (sq mi)	20.5	129	26.2	13.4	8.7	24.2	2.75	23.4
Land Use	Mixed	Mixed	Residential	Mixed	Mixed	Mixed	Mixed	Industrial
Area Type	Suburban	Suburban/ Rural	Suburban/ Rural	Suburban	Suburban/ Rural	Suburban/ Rural	Suburban	Suburban/ Rural
Population	38,880	45,040	19,080	21,790	9,360	16,830	13,390	14,400
Pop. Density (per/sq mi)	1,900	350	730	1,630	1,070	700	4,870	620
Emp. Density (jobs/sq mi)	1,030	140	250	1,230	700	930	680	840
Fixed-Route Connections	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Population Age
22% Under 18
59% 18 - 64
20% 65 and Older

Microtransit Zones
Fixed Route
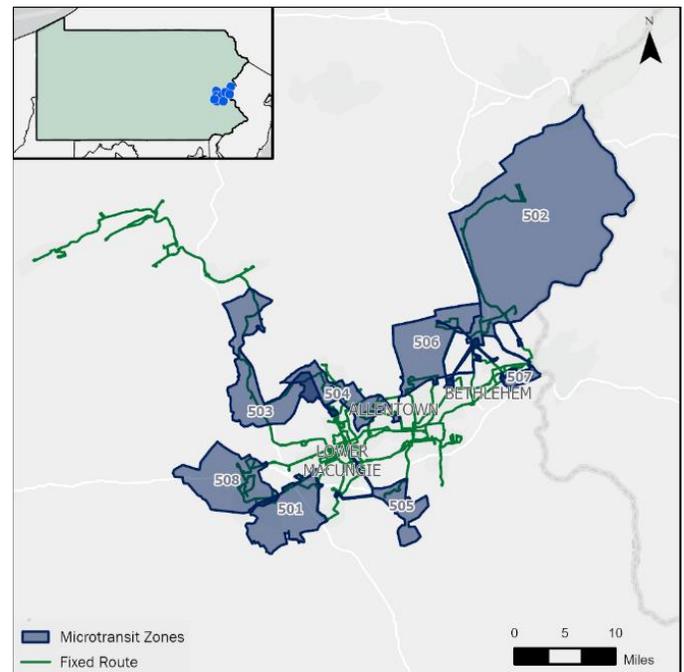
17% Non-White

12% with a Disability

2% Limited English Proficiency

5% Zero-Car Households

8% Below Poverty

Owl Link

GENERAL INFORMATION
- **Status:** Pilot Discontinued - February 12, 2022
- **Service Provider**: Contractor (Easton Coach Company)
- **Service Start Date:** May 10, 2021
- **Number of Zones:** 1
- **Service Hours:** 10:30 p.m.–6:00 a.m. (every day)
- **Stop Locations:** Curb-to-curb
- **Fare**: No Fare
- **Transfer Policy**: N/A
- **Payment Options**: N/A
- **Service Objectives:** Provide safe, reliable, and affordable last-mile service from fixed-routes to local businesses for overnight workers.

  Ended after pilot period due to low demand and challenges from launching during COVID-19 pandemic.

- **Relation to Fixed-Route:** Supplement

TECHNOLOGY AND SCHEDULING
- **Technology Provider:** Via
- **Booking Methods:** App, Call
- **ADA Requests:** App, Call
- **Advance Scheduling:** Up to one week in advance
- **Recurring Trips:** No
- **Target Wait Time:** No

VEHICLES
- **Fleet Size:** 4
- **Vehicle Types:** Paratransit Vehicles, ADA-Accessible
- **Vehicles Operated at Peak/Off-Peak Service:** 1 / N/A
- **Acquisition Approach:** Repurposed paratransit

MARKETING AND EDUCATION
- Stakeholder Outreach, Community Outreach, Employer Outreach, Branded Vehicles

FUNDING SOURCES
- PA Act 44: Section 1513

SERVICE-AREA CHARACTERISTICS

Size (sq mi)	33.8
Land Use	Mixed
Area Type	Suburban
Population	95,071
Pop. Density (per/sq mi)	2,810
Emp. Density (jobs/sq mi)	1,350
Fixed-Route Connections	Yes

Population Age
20% Under 18
64% 18 - 64
16% 65 and Older
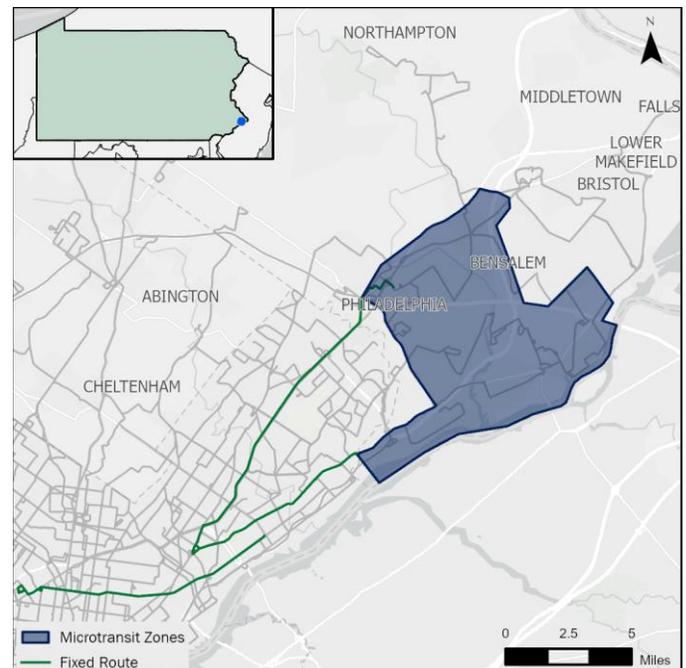
Fixed-routes that operated during the late-night hours and that connected to the microtransit zone are highlighted

31% Non-White

15% with a Disability

5% Limited English Proficiency

7% Zero-Car Households

10% Below Poverty

Table 1: Microtransit Service Area Characteristics Comparison

Transit Agency	MCTA		CATA (Centre)			CATA (Crawford)	rabbittransit					LANTA								SEPTA
Microtransit Zone	Tri-Boro Connector	Pocono Summit Connector	Centre Area West	Boalsburg	Bellefonte/ Pleasant Gap	Titusville	Chambers-burg	Red Lion/ East York	Selinsgrove /Sunbury	Danville/ Bloomsburg	Lewisburg/ Milton	501 Macungie	502 Slatebelt	503 Slatington/ Walnutport	504 Coplay/ Egypt Airport	505 Coopers-burg	506 Bethlehem-Gracedale	507 West/South Easton	508 New Smithville/ Trexlertown	Owl Link
Size (sq mi)	12.5	7.8	9.4	6.5	17.3	6.4	14.7	10.9	10.7	12.4	10.4	20.5	129	26.2	13.4	8.7	24.2	2.75	23.4	33.8
Land Use	Mixed	Mixed	Residential	Residential	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Residential	Mixed	Mixed	Mixed	Mixed	Industrial	Mixed
Area Type	Small City/ Suburban	Town/Rural	Suburban	Suburban/ Rural	Town/Rural	Town/Rural	Small City/ Suburban	Suburban	Town	Small City/ Suburban	Town/Rural	Suburban	Suburban/ Rural	Suburban/ Rural	Suburban	Suburban/ Rural	Suburban/ Rural	Suburban	Suburban/ Rural	Suburban
Population	20,830	3,190	16,230	2,990	14,960	5,400	25,520	28,320	19,670	17,580	15,450	38,880	45,040	19,080	21,790	9,360	16,830	13,390	14,400	95,071
Pop. Density (per/sq mi)	1,670	410	1,730	460	860	840	1,740	2,600	1,840	1,420	1,490	1,900	350	730	1,630	1,070	700	4,870	620	2,810
Emp. Density (jobs/sq mi)	960	300	630	140	430	310	1,350	2,030	1,000	910	990	1,030	140	250	1,230	700	930	680	840	1,350
Fixed-Route Connections	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population <18	17%		17%			21%	19%					22%								20%
Population between 18-64	62%		67%			56%	63%					59%								64%
Population 65+	21%		16%			23%	18%					20%								16%
Non-White Population	37%		20%			5%	16%					17%								31%
Population with a Disability	16%		9%			26%	16%					12%								15%
Limited English Proficiency Households	2%		2%			0%	2%					2%								5%
Zero-Car Households	11%		7%			19%	9%					5%								7%
Population Below Poverty Line	12%		7%			21%	13%					8%								10%

Overall Pennsylvania Demographic Characteristics

The following are population characteristics for Pennsylvania as a whole, which can be helpful context when comparing areas with microtransit service.

24% Non-White

15% with a Disability

7% Limited English Proficiency

11% Zero-Car Households

13% Below Poverty

Population Age
20% Under 18
60% 18 - 64
20% 65 and Older

Virginia

Virginia has seen a rapid expansion of microtransit service throughout the Commonwealth. This has been in part driven by grants from the Virginia Department of Rail and Public Transportation (DRPT) and the U.S. Department of Transportation. Since 2020, microtransit pilots have launched in Newport News, Virginia Beach, Richmond, Gloucester County, Norton, Charlottesville, Manassas, and Quantico, and feasibility studies have been completed in Winchester and Lynchburg. These communities represent the range of population centers in Virginia, from deeply rural communities such as Norton and Gloucester County to major cities like Richmond and Virginia Beach. All past and current pilots in Virginia are operated either as a software as a service (SaaS) or transportation as a service (TaaS) delivery models. The SaaS model has proven more popular, with most agencies opting to license software and operate the vehicles themselves rather than contract out operations.

Key Takeaways:

- Microtransit use cases exist in both urban and rural settings and can be successful in either when designed well.
- Virginia examples exist primarily in areas that did not previously have transit service and for first- and last-mile connections to fixed routes. There are some examples of replacement service for fixed-route.
- Agencies with existing infrastructure and sufficient funds typically opt for a SaaS operating model.
- The majority of rides during pilots were not shared (i.e., majority are single-passenger trips).
- Vehicle utilization typically fell between 2 to 4 passenger trips per vehicle revenue-hour.
- Where fares were charged, farebox recovery ratio was minimal, typically below 10%.
- DRPT has developed a rural microtransit suitability checklist, use cases, and toolkit.

Example Case Studies

Bay Transit
Gloucester County, VA

Bay Transit was awarded an Integrated Mobility Innovation (IMI) grant by the U.S. Department of Transportation in 2020 which funded a microtransit pilot launched in June 2021. Bay Transit operated three six-seat vehicles in a small zone in Gloucester County. The zone covered the small community of Gloucester and surrounding rural areas.

In October 2022, the service zone was expanded to the south to incorporate Gloucester Point, which resulted in a large increase in ridership. Prior to the expansion ridership averaged around 500 rides per month. In December 2022, after three full months of the expanded zone, ridership had jumped to almost 1,300 rides per month.

Over the first 12 months of the pilot, the most popular destinations were hospitals, supermarkets, and government services. The expansion added three new supermarkets to the service zone while also adding a community of over 9,000 people and providing them access to a hospital and urgent care already in the zone.

Bay Transit initially used a corner-to-corner model, which led to many riders walking up to a quarter-mile to access the service. After determining that the efficiency gains of corner-to-corner rides were not sufficient to justify the lower level of service, Bay Transit reconfigured its microtransit service to provide curb-to-curb service.

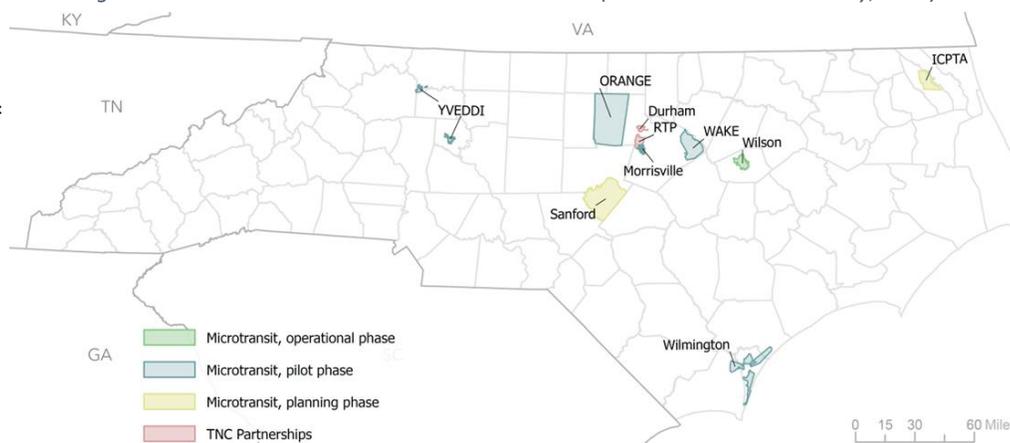### Greater Richmond Transit Company (GRTC)
Richmond, VA

GRTC launched its zone-based on-demand microtransit service, LINK, in the first of five zones in November 2023. The microtransit service is funded by MPO funds collected by a regional sales tax. As a result, some zones are in Richmond's inner suburbs while others are further out in exurban communities, like Powhatan, or in separate towns, such as Ashland. Microtransit service is also fare-free like the rest of the GRTC bus system.

The suburban zones in Henrico and Chesterfield counties overlap with GRTC's fixed-route system, enabling the service to function as a first- and last-mile connection. It also means GRTC has existing infrastructure to store and maintain vehicles to serve the zones, and as such these zones will operate as a SaaS model. However, the zones outside these counties will operate as TaaS models because GRTC does not have the infrastructure to operate service in the exurban communities.

The TaaS zones are expected to launch in Spring 2024. The use of two different operating models under the same brand is an innovation for Virginia microtransit services.

North Carolina

Microtransit in North Carolina exists in communities ranging in size from 5,000 to 150,000 people and with various levels of development, from rural to urban. Around the Research Triangle—the area between Raleigh, Durham and Chapel Hill—there are several microtransit services operating. In this region, all three main service delivery models are in use: SaaS and agency-operated,

Figure 1: Microtransit Service Areas in North Carolina (Source: NC State University, 2023)

turnkey TaaS for software and operations, and separate contracts for software and operations. In more urban zones, GoTriangle and GoDurham use a partnerships with transportation network companies to provide a subsidy for riders booking Uber or Lyft trips to and from specific locations. Further into suburban areas, such as in Orange County and Morrisville, local governments opted to use a SaaS model for software but the local transit agency to operate the system. In other jurisdictions, such as Wake County and Wilson, microtransit service is operating using a TaaS system. There is a broad range of partners that provide the software used by North Carolina agencies, including Via, Moovit, TransLoc, and CTS. In certain cases, the software providers have partnered with other private transportation companies such as Buggy and Bus.com to provide TaaS operations.

Key Takeaways:

- Microtransit is most appropriate in small service areas with low population densities, relative to other modes.
- Looking to the future of the service is important; a strength of microtransit is uncovering latent demand which can be used to plan future fixed-route bus service when microtransit can no longer meet demand.
- Identifying long-term funding sources that can scale in size is important because microtransit costs grow with ridership much faster than costs for fixed-route transit.
- Establishing a strong initial user base through extensive marketing campaigns and partnering with major regional employers increases the chance of success for microtransit zones.

Example Case Study

RIDE
Wilson, NC

RIDE in Wilson has been one of the most successful microtransit services in North Carolina. RIDE is a turnkey service that encompasses the entire City of Wilson and a few large employers outside of the city limits. It achieves an average monthly ridership of over 13,000—more than 10 times the ridership of peer services—with a fleet of nine vehicles. For comparison, the microtransit system in Wilmington, NC, includes areas with a larger population but has a significantly lower ridership. This may be attributed in part to the service goals. In Wilmington, the objective is to connect riders into fixed-route service. In Wilson, RIDE replaced a previous fixed-route bus service.

Prior to implementing microtransit service in Wilson, the fixed-route system began requiring reservations during the COVID-19 pandemic, therefore riders were already familiar with one of the main features of microtransit before RIDE launched. This familiarity with features of microtransit and an existing base of transit riders set RIDE up for success.

RIDE has become so popular within the community that 95% of respondents to a survey completed in December 2021 said they would be disappointed if they were unable to continue to use RIDE. The majority of respondents indicated that they use RIDE for its affordability.

Texas

Microtransit in Texas has a longer history than in most states. One of the more well-known case studies for microtransit is in Arlington, TX, where Via has been operating a citywide microtransit system since 2017. Since then, microtransit services have been spreading around the state. In Denton, microtransit service was used to create connections between fixed-route and rail transit to underserved industrial parks. In San Antonio, a pilot contracted with RideCo was launched to replace suburban fixed-route buses with microtransit. The cities of Kyle and Pflugerville, both outside of Austin, subsidize Uber trips, which is a similar on-demand transportation service model.

Key Takeaways:

- Experience is critical. CARTS attributes part of its success to experience developing an on-demand system in partnership with Capital Metro, which allowed leadership to make informed decisions while developing CARTS Bastrop.
- Acquiring technology that is already being used in operations elsewhere will streamline training and may lead to efficiencies in service.
- Existing paratransit service can be incorporated into microtransit service, which can give more people access to transit and improve the rider experience, with little to no increased cost. Care should be taken to ensure there are no impacts to accessibility if services are comingled.
- In communities where existing fixed-route transit has less the six one-way trips per hour, microtransit is suitable for consideration.
- Concentrations of varied trip generators that drive local travel demand within a zone will create a sustainable ridership base.

Example Case Study

CARTS NOW
Bastrop, TX

CARTS is the Capital Area Rural Transportation System serving nine rural counties around Austin and operating fixed-route buses connecting rural communities to each other and to Austin. During the COVID-19 pandemic, CARTS launched a microtransit pilot in Bastrop, a city of almost 10,000 people spread over 10 square miles. It replaced existing transit in the city which had declining ridership, further reduced by the pandemic.

In January 2021, CARTS NOW began operating curb-to-curb service within the city and now has higher ridership than the pre-pandemic transit service. While planning the service in Bastrop, CARTS emphasized building strong community support. As a result, it pulled together a large coalition of local leaders, businesses, and medical providers to support the service. This support resulted in an ongoing financial contribution of almost $50,000 annually from the city and the conversion of a downtown parking facility into a mobility hub for CARTS NOW.

CARTS found the process it went through to develop the service in Bastrop to be so successful it went on to replicate it in three other small cities which are all seeing comparable average productivity (2 to 4 passenger trips per vehicle revenue-hour). TxDOT used the experience as the basis for its guidebook for developing rural microtransit.
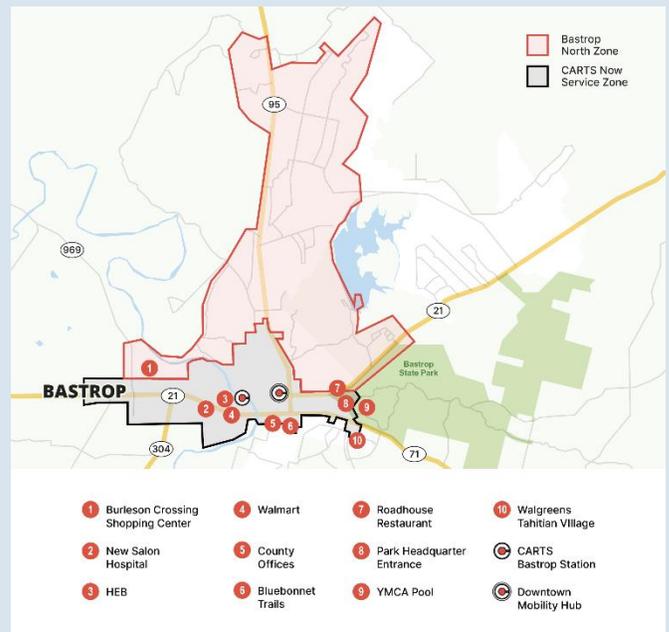
Transit Agency Interview Meetings - Takeaways

1) Agencies Interviewed (January 24-25, 2024)
   a) rabbittransit – David Juba
   b) CATA (Crawford) – Kristin Hauser
   c) MCTA – Rich Schlameuss, Guy LaBar
   d) LANTA – AJ Jordan
   e) CATA (Centre) – Derek Sherman

2) Discussion Topics
   a) **What were the primary motivations for implementing microtransit?**
   - Expanding mobility ecosystem
   - Inefficiencies of fixed route for low-density or lower demand areas
   - First/last mile connections that are inefficient to serve with fixed route
   - Testing transit service for new areas, and using valuable origin-destination data generated from microtransit (rabbittransit, LANTA)
   - Serving areas that require a smaller vehicle (rural, road or bridge constraints, etc.)
   - Sometimes, but not always, paired with changes to fixed route service. In most cases, microtransit service was deployed as standalone or to supplement fixed route rather than replace it. There is some hesitation to fully replace fixed route with microtransit—unclear guidance from FTA, unsure of what needs to be considered for Title VI, etc.
   - Several different models are being used: curb-to-curb is most common; CATA (Crawford) is using designated stop; CATA (Centre) is zone to stop; rabbittransit allows walk-ons

   b) **Please share any insights into the specific needs or challenges of the community that led to the start of microtransit service?**
   - Knew there was potential demand for transit (either through data analysis or community requests), but not enough to support a fixed route
   - In some cases, there were special generators like apartment buildings, shopping centers, medical centers, or warehouses that generated the need for service

   c) **Were your agency's expectations for microtransit service met? Have there been any unexpected challenges or benefits?**
   - All agencies said their expectations were met or exceeded
   - Unexpected benefits
     - Ability to deploy flexibly and quickly—use case of temporarily supplementing fixed route during road construction
     - Many agencies have seen shift from shared-ride to microtransit due to its responsiveness, and welcome this—requires customer education to make them aware of options
   - Unexpected challenges
     - Scaling to demand
     - Need to be aware of 'tipping point' when fixed route needs to be considered instead—could be based on productivity, wait time, or total ridership
     - Reporting differences between NTD and PennDOT

d) How has the community responded to microtransit service compared to previous transit options?
- The community response has been very positive and receptive in most cases
- In some cases, the community was initially reluctant, but communicating the improved service availability over fixed route helped
- LANTA continues to experience challenges with negative customer perceptions—may be related to use of paratransit vehicles that are not specially branded and mismatch of customer expectations
- When negative comments are received, it's typically related to lengthy wait times and uncertainty in arrival time when traveling on a fixed schedule (work, appointments)
- Many agencies also report positive feedback from drivers and dispatchers—more personal experience with customers, easier to drive a smaller vehicle. There can be challenges with drivers transitioning to new technology. Drivers are most commonly the same as shared-ride service.

e) In what portions of your service area do you see microtransit being most effective? What are characteristics of these areas?
- The majority of microtransit zones in PA are small urban (relative to surrounding rural area) communities with several points of interest such as grocery stores, medical facilities, and employment sites
- However, LANTA's most productive zone is a very large rural area due to limited road network and alternative options
- Effective when travel patterns are primarily within the microtransit zones, but offer connections to fixed route too
- It works best for riders with inconsistent schedules and with dispersed origins and destinations
- Often need to keep zones small to manage demand—MCTA recommended no more than ~five miles in any direction to keep ride times manageable
- Important to understand road network constraints, areas of congestion, etc.

f) What lessons have you learned regarding planning and implementing microtransit? If you could do it again, what would you do differently?
- Research all technology options. Agencies that started with a different software provider said they would have used Via first if they could do it again.
- Common software used: Via is the most popular choice; Transloc was good initially but does not have the flexibility and customization of Via; Ecolane was seen as a better paratransit solution than for microtransit; Spare Labs is used by CATA (Crawford)
- Do not rush transitioning between software providers
- Marketing and customer educations is a critical component
- Would not deploy it in a very urban area—difficult to keep up with demand
- Communication with fixed route operators is important—make it clear jobs are not at stake
- Microtransit should not be the go-to solution for everything or a land use problem. Agencies should work with municipalities and developers earlier to encourage sidewalk to existing transit options.

g) How are you measuring the success of microtransit service? What performance measures do you track?
- Agencies typically have metrics of passengers per hour (target is often 2.5 to 3), wait time, ride time, operating cost per revenue hour, ride sharing

- Performance should be somewhere between fixed route and paratransit, but be cautious about making direct comparisons
- Need to monitor *total* cost, not just per trip or hour. When scaling has resulted in greater costs, some agencies view this as acceptable since a better quality of service is being provided than the alternative.
- Customer satisfaction or trip rating is valuable metric—not all software provides this option, and it can make responding to customer issues easier
- Target wait times are typically 15-20 minutes
- Comingling microtransit trips with shared-ride can help with costs but makes reporting extremely challenging

h) **What marketing and customer education activities have you used? What has been most effective?**
- In general, very targeted approach rather than mass advertising
- In-person—bring vehicle out to community to demonstrate service, word of mouth, outreach at transfer locations
- Digital—how-to videos, social media
- Print—brochures on buses and distributed to community
- Stakeholders—businesses, municipalities, visitors bureau, school districts, hospitals
- Promotions—first roundtrip free, free trips for first two weeks
- Branded vehicles
- Unique perspective of LANTA—do not want to inflate demand when trying to use microtransit to collect data on actual demand in an area, and also don't want to promote it too much and overwhelm the service

i) **Please share any insights into the financial sustainability of microtransit compared to services it replaced or that you currently operate. Have there been any challenges with scalability?**
- There's an upper limit of about 4-5 passengers per vehicle hour that will trigger the need for another vehicle
- Act 44 targets may make agencies reluctant to put lower productivity services out
- Several agencies have reported challenges scaling when services have become more popular than expected
- Scheduling becomes very complicated when there are periods of very high demand (shift changes, etc.)
- Needs constant monitoring—much more regularly than traditional service

j) **What recommendations would you have for other transit agencies considering microtransit service?**
- It is another 'tool in the toolbox' but is not the 'silver bullet' solution for everything
- It should be deployed for a very specific purpose. Have sound goals to guide service but recognize these may need to evolve.
- Reach out to peer agencies when designing and implementing service
- Have contingency plans for funding
- Set expectations with customers and the community (e.g., not an 'Uber experience')
- Make sure the solution works for people of all abilities—consider booking methods, payment options, etc.
- Software plays a very important role—understand the benefits and limitations of different providers

- Utilize vehicles that can be used on other types of services (e.g., ADA-accessible) if no longer needed for microtransit
- If you are going to contract out service, you need really consistent communication with service operator
- Agencies need to have a champion for it to succeed, and really have to pay attention to the service

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