MobilityLink Paratransit Service Improvements Study

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Dept. of Civil and Environmental Engineering
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STUDY OF MTA PARATRANSIT

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STUDY MOTIVATION

This report responds to a request by the Maryland General Assembly for review of Maryland's MobilityLink Paratransit service (Senate Bill 891, Chapter 647 2024). The study request outlined four major questions and included a set of desired metrics associated with each question. The four questions of interest were: 1) summarizing and comparing the MobilityLink service to similar entities nationwide that provide ADA paratransit services; 2) identifying the service structure of ADA paratransit services in other service areas nationwide and whether a public entity, private contractor, or hybrid model is used to provide the service; 3) analyzing the performance metrics associated with the ADA paratransit services in various service areas nationwide based on the Federal Transit Administration's ADA Guidance for metrics, and 4) analyzing the workforce metrics among the ADA paratransit services in various service areas nationwide.

BACKGROUND ON MOBILITYLINK

MDOT MTA offers paratransit shared rides service for the disabled. The service began in 1978 as a non-fixed route service and by the early 1980s was contracting out some of its services to meet increasing demand (MDOT 2017). MDOT MTA expanded its paratransit fleet in the 1990s to meet the requirements of ADA. By 2004, MTA had a dedicated fleet and a centralized control center. Since this time, MTA has employed contractors for most of its fleet service requirements.

MobiltyLink's current service area includes Arundel, Baltimore County and areas within three quarters (3/4) of a mile radius of Light RailLink or Metro SubwayLink stations. MobilityLink does not service areas proximate to commuter bus routes or the MARC Train (MTA 2022). From 2016-2019, MobilityLink ridership was stable, ranging between 150,000-200,000 monthly riders. Ridership dropped to a minimum of approximately 44,000 passengers in April 2020, then steadily rebounded to a peak of approximately 322,000 in October 2024 (MTA 2025). In 2021, the Dept. of Justice opened an investigation of MobilityLink's operations in response to complaints regarding ADA conformance. MTA provided operations data, operations procedures, training materials, service provider contracts, audit documents, and telephone data (E. Barron, 2023). In addition, publicly available information and input from MobilityLink riders and local advocates for accessible public transportation were reviewed.

By way of background, Congress enacted the ADA in 1990 "to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities." 42 U.S.C. § 12101(b)(1). Title II of the ADA prohibits discrimination against individuals with disabilities by public entities and requires that public entities, like MTA, provide accessible transportation to people with disabilities. Among other mandates, the ADA requires transit agencies with fixed route service to also provide complementary paratransit for individuals with disabilities who, due to disability, cannot use fixed route services.

There are significant challenges associated with operating ADA Paratransit. The federal regulations for ADA paratransit are highly prescriptive, with six service criteria requiring high levels of performance. The most challenging criterion has traditionally been that paratransit must operate without capacity constraints. This means that trips cannot be denied; that is, virtually all trip requests from eligible riders must be served. This requirement makes managing ridership demand challenging. The service must have high levels of on-time performance for trip pick-ups and trip drop-offs for time-sensitive trips (e.g., medical appointments, work). An on-time performance of 90% is a level accepted in the industry and is generally accepted by the FTA. Furthermore, trip travel times on-board the vehicle cannot be "excessively long." High levels of telephone availability to book trips and inquire about trip status must also be provided; telephone "hold times" cannot be long.

In 2023, the Dept. of Justice found that MTA failed to provide paratransit services at a level of service comparable to the level of service provided to individuals who use the fixed route system (E. Barron, "MTA Investigation Findings," 2023). MobilityLink was found to have capacity constraints in two areas: poor on-time performance and poor telephone performance. With respect to poor on-time performance, two aspects were identified as problematic in the Dept. of Justice letter: untimely pickups and untimely drop-offs. In September 2018, only 87.4 percent of pickups were on time, and in April 2019, only 74.2 percent of pickups were on time. During COVID-19, on-time pickup performance improved, but performance steadily fell in the post-COVID-19 period (2021-22). In September 2021, on-time performance hit a low of 59.2 percent.

The Dept. of Justice analysis for untimely drop-offs focused on a sample week (October 2-8, 2022). During this week, of those MobilityLink trips with a requested appointment time, 14.7 percent of drop-offs were after the appointment time. Approximately 5% of the late drop-offs were tardy by 16 minutes or longer. In addition, the Dept. of Justice noted that more than 25% of the trips arrived more than 30 minutes prior to the requested appointment time, also indicating a capacity constraint. In terms of meeting FTA/ADA requirements, The Dept. of Justice notes that MTA met on-time performance guidance approximately 60% of the time for the sampled week (October 2-8, 2022).

The quality of telephone service is reflected in the length of telephone call wait times. MTA operates a call center that accepts reservations from 8:00 a.m. to 5:00 p.m., seven days a week. The MTA telephone "late line," to check on the status of a late trip, is open 24 hours a day, seven days a week. Of the calls coming in through the reservation line (approximately 56%) for September 30, 2022 to November 30, 2022, 33% had wait times over three minutes. Afternoons and certain times of the month in November had wait times of over 10 minutes, with the longest wait time in November being 33 minutes and 58 seconds.

As a result of their analysis, the Dept. of Justice recommended the following remedial measures,

- Invest in additional resources, including vehicles and drivers, as well as any other operational improvements necessary, to ensure sustained on-time performance (both pickups and drop-offs) such that eligible riders no longer experience such capacity constraints.
- Revisit performance standards so that MTA MobilityLink accurately identifies and remedies service issues before they rise to the level of discriminatory capacity constraints.
- Provide adequate resources (i.e. lines, equipment) and adequate staffing of the MobilityLink call center to ensure that wait times are not a capacity constraint.
- Track and provide to the United States more detailed performance metrics.
- Improve MTA's process of reviewing annual MobilityLink demand, such that MTA plans for and provides service each year that is free from capacity constraints.

SCOPE OF REPORT

Table 1 presents the metrics requested for each of the key questions identified in the Study Motivation section. The metrics in bold are covered in this report. It is important to note that there were important limitations to our analysis, both in terms of time constraints as well as the availability of comparative data. Given the late notice of this project (early 2025), we were constrained to available, robustly assembled data. Our analysis relies on two datasets. The first data are collected by the Federal Transit Agency on routine basis. These annual data included some but not all the requested metrics. Our second dataset was provided to us from MTA. It covers years 2016 to 2024. Neither dataset includes workforce metrics. We did not have sufficient resources or time to contact each comparison agency to acquire and analyze agency specific data.

Table 1. Summary of Metrics

Request	Metrics	
Service Comparison	○ **scheduling;** ○ **operators;** ○ mechanics; ○ customer service, and ○ quality assurance and control	
Service Structure	○ **fleet ownership;** ○ **fleet maintenance**; ○ dispatch; ○ reservations;	
ADA Performance Metrics	○ **on–time performance for pick–ups and drop–offs;** ○ **missed trips;** ○ **onboard transit times;** ○ **excessive trip lengths (min)**	○ call center hold times and performance; ○ rate of customer complaints and resolution; and ○ **safety conditions and practices on paratransit vehicles;**
Workforce Metrics	○ turnover rate; ○ average length of employment; ○ absenteeism rate; ○ accidents and preventable accident rates; ○ average wages and benefits, and ○ morale and satisfaction	○ workplace injury rates; ○ workers' compensation claims rates; ○ career training opportunities; ○ career advancement opportunities

Data Sources

We used two major sources of data for our analysis. Due to time and resource constraints, these data form the basis for our analysis. For the first part of our analysis, we use detailed trip data provided by MTA. These data record every paratransit trip made between 2016 and 2024. From this information, we can examine most of the ADA-related variables (i.e., on-time performance, missed trips, onboard transit times, excessive trip lengths). While most paratransit agencies collect similar trip-based data, we could not assemble these data for comparative agencies due to IRB timing and resource constraints.

Our comparative analysis was restricted to those parameters that the Federal Transit Agency collects on routine basis. These annual data include some but not all the requested metrics. There were insufficient resources and time to contact each comparison agency to acquire and analyze agency specific data. In terms of workforce data and metrics, nearly all of MTA's paratransit service is conducted using outside contractors. We were unable to conduct interviews or surveys with these private operators due to insufficient time for acquiring IRB approval.

The second part of our analysis relies on the National Transit Database (NTD), which is collected annually from most public transportation operators in the United States. For these data, the CEO of each agency certifies the accuracy of the data and the Federal Transit Authority (FTA) may reject a transit agency's report if this report is not in full compliance with reporting requirements. The NTD is reported on by FTA. There are also time series data available, but due to time constraints we were unable to examine patterns over time. Each year, there are changes in reporting and to properly account for historical consistency would have taken additional analysis time. In second part of the analysis, we began by conducting a clustering analysis using variables in the NTD that resulted in 11 comparable transit agencies. We then compared these agencies using 2023 NTD paratransit-specific variables including fleet ownership, maintenance, operators, types of contracts and a few other notable factors.

Our report begins with Part 1, which presents a detailed examination of MTA's paratransit service over time and in Part 2, we compare available data for a clustered group of comparable agencies. In the final section, we present recommendations that the empirical evidence summarized in this report supports.

PART 1. MTA ADA PARATRANSIT PERFORMANCE

Using data provided by MTA, we examined the available MTA performance metrics between 2016 and 2024 (Table 2). As we go through the data, it is important to keep in mind a few caveats. First, we looked at weekday and weekend patterns separately but did not find strong differences. We have included plots for weekday/weekend in Appendix A. With respect to trips with long transit time, excessive trip length is calculated using a comparison of onboard transit time and the maximum onboard time for each trip. The maximum onboard time (Max OBT) is calculated using one of the Trapeze modules, which estimates a fixed-route equivalent for the trip. This module was introduced in the MobilityLink service in 2022, so onboard transit time comparisons are only available for 2022 and later. We calculated the onboard transit time using the actual pickup and drop-off times for each non-appointment trip and compared it with the trip's Max OBT. According to MTA, trips with transit time more than their associated Max OBT are considered as trips with excessive length. This definition is limited to non-appointment trips. Appointment-based trips are addressed separately, where missed appointments and late drop-offs are the critical metrics (See Appointments: Drop-off Performance). We have included charts and descriptions regarding this metrics for reference.

Table 2. ADA Performance Metrics (2016-2024)

ADA Performance Metrics	○ **on–time performance for pick–ups and drop–offs;** ○ **missed trips;** ○ **onboard transit times;** ○ **excessive trip durations (min)** ○ call center hold times and performance, and ○ rate of customer complaints and resolution

Pick-up Performance

Since 2022, MTA's on-time pickup status for PT has steadily increased from a low of 61% to about 71% in 2024 (Figure 1). This is slightly lower than 2016 through 2019, during which time on-time performance ranged between 72 and 73 percent. Late pickups (considered missed pickups) are defined by the ADA as pickups occurring more than 30 minutes after the scheduled pickup time. Late pickups in 2024 constituted about 7.7% of pickups, slightly higher than 2016-2019 (between 6.5% and 7.4%), but substantially lower than 2022 at 22.3% late or missed pick-ups.

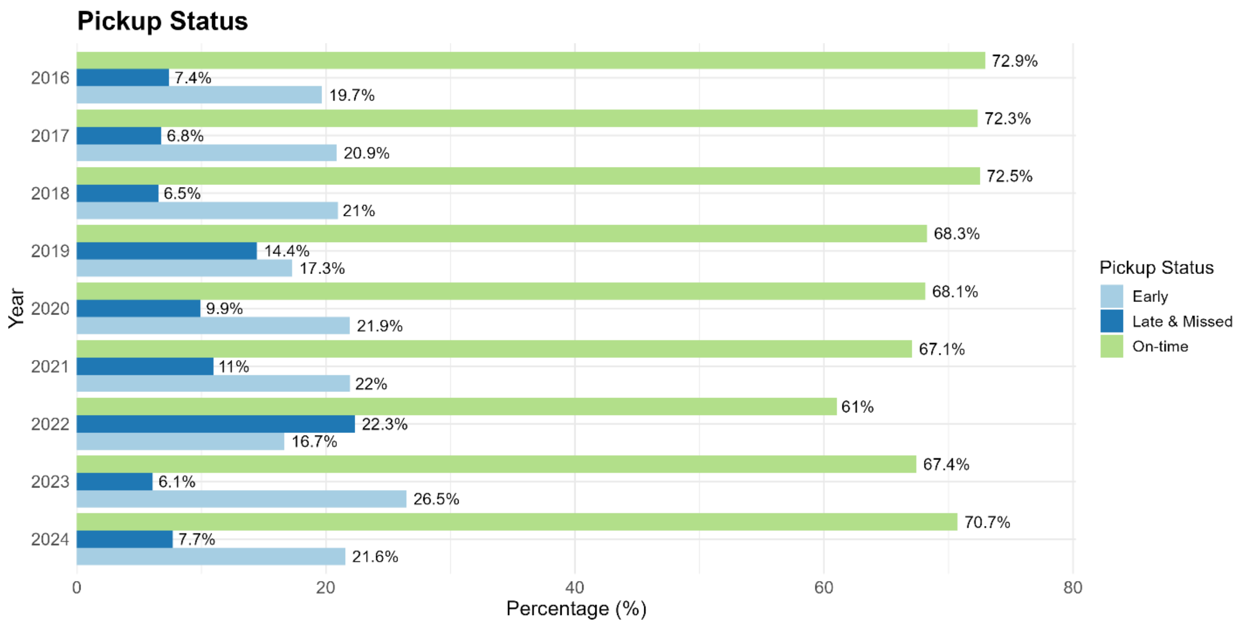

Figure 1. Status of Pickup Request (2016-2024)

If we look at trips in which pickups occurred later than 30 minutes, the distribution of late pickups increased in 2024 (Figure 1).

According to Figure 2 and Table 3, the average delay time for late pickups in 2023 is approximately 44 minutes, similar to the delays observed during 2016–2018. These years are characterized by relatively shorter delays compared to later periods. In contrast, both the longer distributional tails in Figure 2 and the higher average delay times reported in Table 3 highlight a gradual increase in delays from 2019 through 2022, peaking at an average of 54 minutes in 2022. Although a substantial improvement occurred in 2023, reducing mean delay times by nearly 10 minutes relative to 2022, the trend reversed in 2024, when the mean delay rose again to 48 minutes. This is further illustrated in Figure 2, where the 2024 distribution exhibits a longer tail and a smoother peak, indicating more trips with longer delays despite the partial recovery observed in 2023.

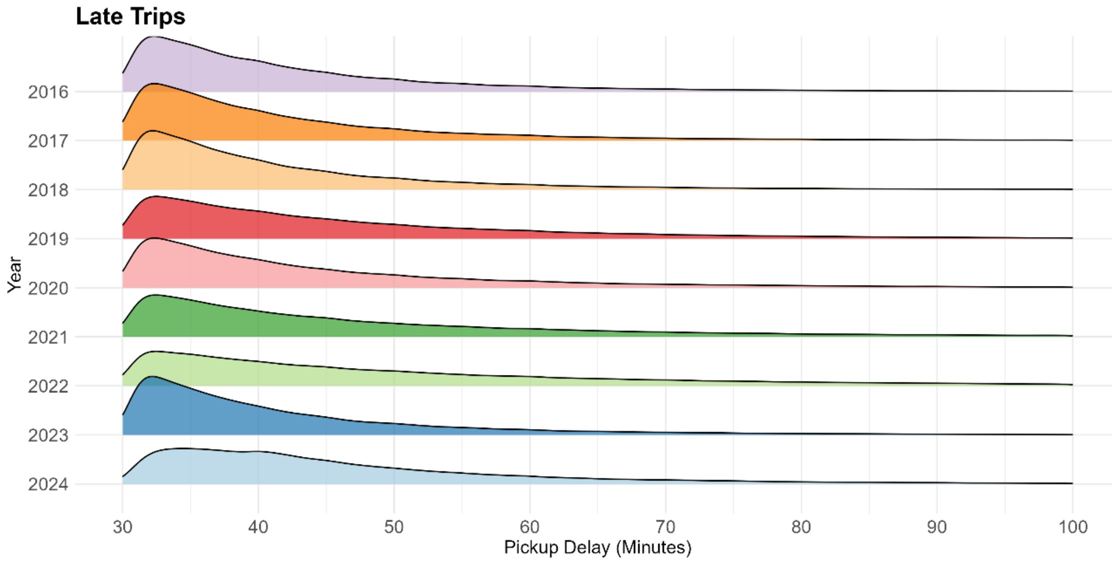

Figure 2. Distribution of delay times for late pickups (2016-2024)

The vast majority of the pickup delay times are less than 100 minutes so we use this as our cutoff for our figures and tables. There was an extreme outlier of 1400 minutes. Additionally, because pickups with delays less than 30 minutes from the scheduled time are classified as on-time pickups in the system, they are excluded from this analysis.

Table 3. Summary statistics of delay times for late pickups (2016-2024)

Year	No. Late Pickups	% of Total Pickups	Mean	Min	1st Quartile	Median	3rd Quartile
2016	121,628	7.4	42.91	31	34	39	47
2017	116,099	6.8	43.7	31	34	38	47
2018	116,673	6.5	43.06	31	34	38	46
2019	260,366	14.4	48.09	31	35	42	54
2020	144,297	9.9	46.5	31	34	40	51
2021	97,051	10.9	50.82	31	35	43	57
2022	244,633	22.3	54.46	31	37	46	62
2023	95,016	6.1	43.6	31	34	38	47
2024	132,193	7.7	48.3	31	36	43	53

In general, late pickups are geographically dispersed across the service area. Figure 3 shows the average delay time for late pickups by ZIP code for each year within the 2016-2024 study timeframe. Analysis indicates that certain ZIP codes, particularly in the south, consistently experience longer delays, reaching up to 70 minutes, while ZIP codes in the north and parts of the west tend to have shorter delays when a pickup is late. Notably, during 2021 and 2022 (the COVID period), delays uniformly increased across most ZIP codes, with late pickups averaging between 60 and 70 minutes.

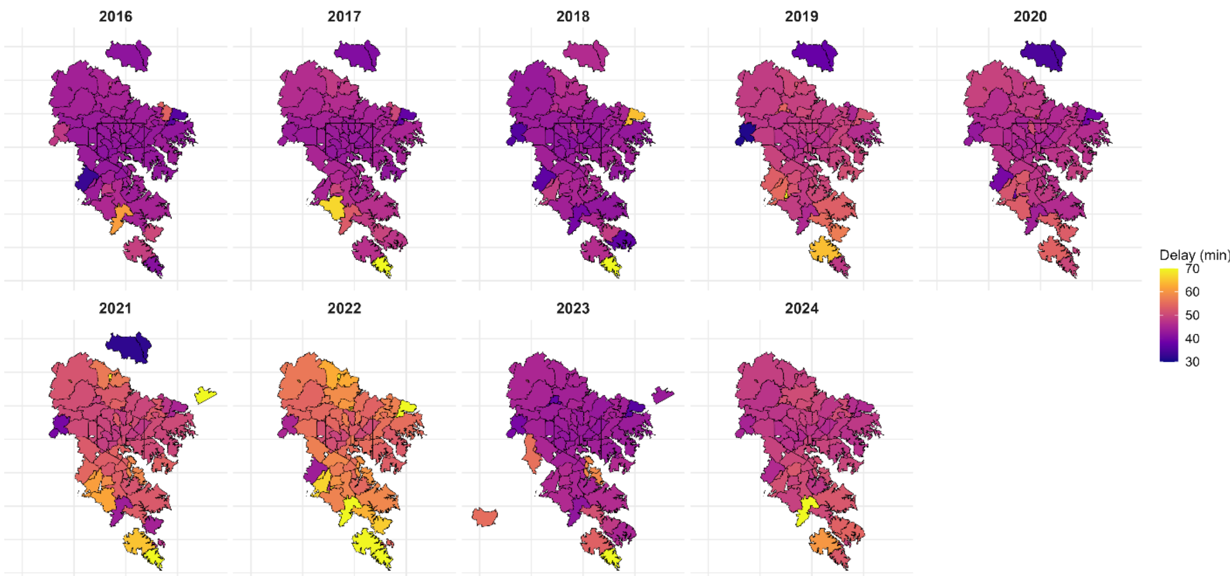

Figure 3. Spatial Distribution by ZIP Code of average delay time for late pickups (2016-2024)

Pick-up Performance by Booking Type

In this part of our analysis, we report on two types of bookings that MTA accommodates: scheduled and on-demand (Table 4). Apart from 2021, booking types were proportionally similar across the study timeframe, with approximately 70 to 75% of bookings on-demand ("On-Demand Bookings") and roughly 25 to 30% scheduled bookings ("Active Subscribers"). During 2021, bookings of both types declined significantly, with a shift to a much greater proportion of on-demand bookings than seen in previous years. After 2021, the total number of bookings dramatically rebounded.

Table 4. Bookings (2016-2024)

Year	Total Bookings	Active Subscribers	On-Demand Bookings
2016	1636076	465061 **(28%)**	1171015 **(72%)**
2017	1707462	481052 **(28%)**	1226410 **(72%)**
2018	1779520	512388 **(29%)**	1267132 **(71%)**
2019	1796701	490984 **(27%)**	1305717 **(73%)**
2020	1446229	373848 **(26%)**	1072381 **(74%)**
2021	881723	85146 **(10%)**	796577 **(90%)**
2022	1091263	204125 **(19%)**	887138 **(81%)**
2023	1548175	420747 **(27%)**	1127428 **(73%)**
2024	1704983	543262 **(32%)**	1161721 **(68%)**

Looking at the active subscriber's scheduled pickup requests over time (Figure 5), the temporal patterns of pickup requests are largely similar, with the exception of 2021 (Figure 5, Table 6), when there was a marked departure from scheduled requests. Table 6 reports, for each year, the percentage of scheduled pickups occurring in each two-hour time slot (i.e., the intraday distribution of scheduled demand (see Figure 5). Beginning in 2016, scheduled pickup requests had largely two peak times: 06:00–08:00 (~25% of daily scheduled pickups) and 14:00–16:00 (~30%). In 2021 (COVID period), the early-morning peak shifts earlier to 04:00–06:00 with a slight increase, while the afternoon peak declines to about 17%, yielding a flatter midday pattern. From 2022 onward, the distribution begins to revert toward the pre-COVID timing, though the afternoon peak remains lower than pre-2021 levels. Table 8 represents the same intraday distribution of pickups for on-demand rides, as opposed to scheduled rides.

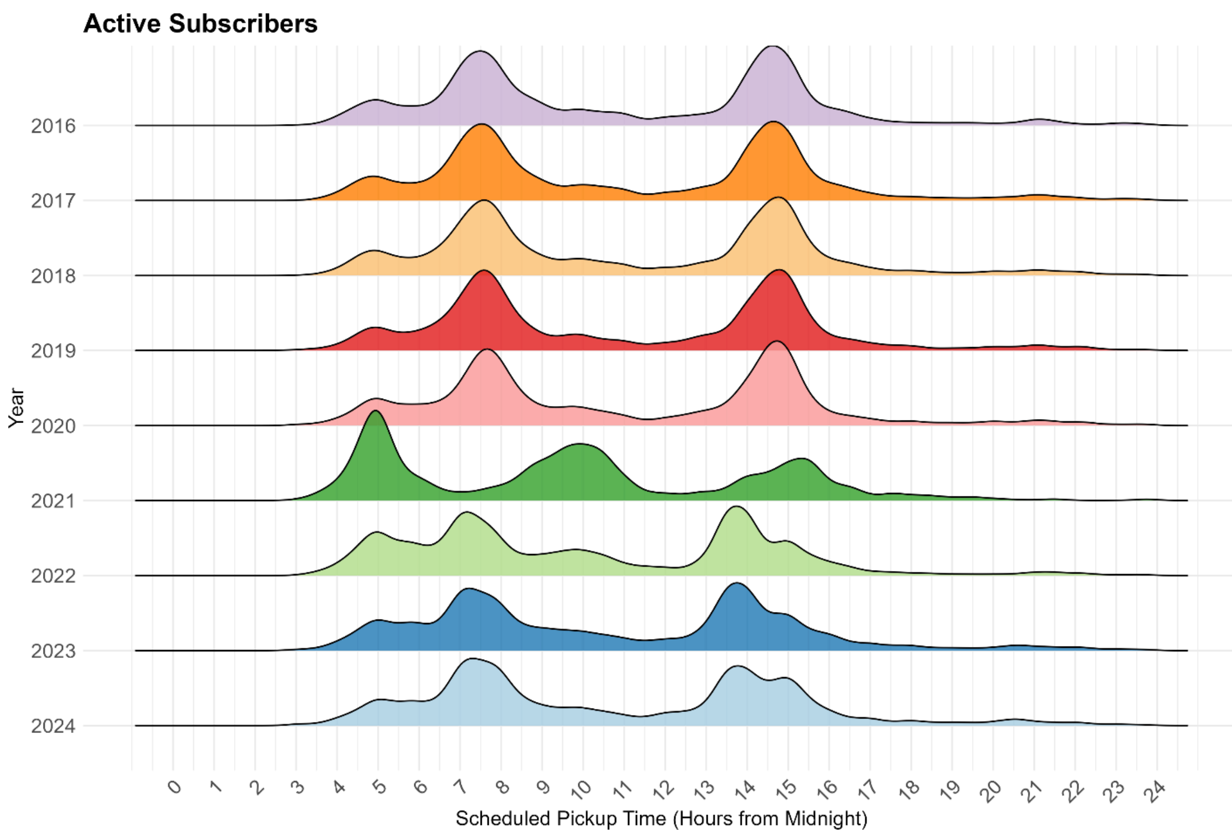

Figure 5. Scheduled Pickup Request (2016-2024)

Table 5 reports, for each year and 2-hour time slot, the share of total pickups (scheduled + on-demand) that are **scheduled**. This shows how capacity shifts between scheduled and on-demand across the day. The share of scheduled pickups is highest in the early morning—typically 25-50% between 02:00–08:00—then falls to roughly 13% from 08:00–14:00, before rising again in the 14:00–16:00 window. In 2021 (COVID period), the intraday profile shifts earlier and becomes flatter: scheduled shares are lower and more uniform throughout the day. Overall, during peak windows (early morning and mid-afternoon), scheduled pickups account for ~40–50% of total demand, whereas on-demand trips dominate mid-day (10:00–14:00) and evening (after 18:00) with a higher rate of pickups (peaks around 90%), as reflected in Table 7.

Note that Tables 5 and 7 reports request composition, the share of scheduled versus on-demand pickups within each time slot and year, not the volume of trips in those slots. A high share therefore does not imply many pickups if the slot itself has few trips. For example, Table 5 shows that scheduled pickups account for 22% of trips in the 22:00–24:00 slot for 2016; however, Table 6 and Figure 5 indicate that only about 1% of all daily scheduled pickups occur during 22:00–24:00. These results should be interpreted jointly: Tables 5 and 7 describe how much of the total capacity is used for different types of bookings within a slot, while Table 6 and Figure 5 show how much scheduled activity occurs across the day. Further, Table 5 and Table 7 represent complementary proportions, i.e. there are 5% scheduled pickups in 2016 from 12a-2a (Table 5), thus there are 95% on-demand pickups in 2016 from 12a-2a (Table 7).

Table 5. Scheduled Pickups as a Percentage of Total Pickups (Scheduled + On-demand) by Time of Day (2016-2024)

Year	12am-2am	2am-4am	4am-6am	6am-8am	8am-10am	10am-12pm	12pm-2pm	2pm-4pm	4pm-6pm	6pm-8pm	8pm-10pm	10pm-12am
2016	5	40	51	45	22	13	13	44	19	11	20	22
2017	10	33	48	43	22	13	14	42	18	12	21	24
2018	9	29	49	43	23	13	13	43	19	15	24	26
2019	15	35	41	42	22	11	13	43	18	12	21	25
2020	14	38	40	37	22	11	13	41	15	13	21	23
2021	5	28	31	5	10	9	3	12	7	6	3	2
2022	8	27	37	26	12	11	15	26	12	6	11	10
2023	19	36	49	39	20	15	24	34	19	14	22	21
2024	11	41	50	46	26	16	27	41	21	18	29	24

Table 6. Percent of Scheduled Pickups by Time of Day (i.e. Scheduled Pickups for each 2-hour time slots/Total number of scheduled pickups for the average day) (2016-2024).

Year	12am -2am	2am-4am	4am-6am	6am-8am	8am-10am	10am -12p	12pm -2pm	2pm-4pm	4pm-6pm	6pm-8pm	8pm-10p	10pm - 12am
2016	0	0.5	10.2	25.6	12.7	5.6	6.2	29.9	5.0	1.4	2.1	1.0
2017	0	0.4	9.3	25.9	12.7	5.5	6.7	29.8	4.9	1.5	2.2	1.1
2018	0	0.4	9.3	25.2	13.2	5.7	6.3	29.7	5.0	1.8	2.4	1.1
2019	0	0.5	8.5	26.0	13.2	5.0	7.0	30.4	4.6	1.5	2.2	1.2
2020	0	0.6	9.9	23.0	14.6	5.5	7.2	30.2	3.9	1.7	2.3	1.1
2021	0	1.7	27.3	6.3	17.9	16.4	4.5	17.6	5.1	2.2	0.8	0.3
2022	0	0.8	16.3	24.0	11.4	8.1	13.6	19.2	3.4	1.0	1.4	0.8
2023	0	0.6	12.1	23.3	12.8	7.0	15.3	19.5	4.6	1.7	2.1	1.1
2024	0	0.6	10.2	23.8	13.9	6.2	14.1	21.9	4.1	1.8	2.4	1.0

Figure 6 depicts the distribution of on-demand bookings throughout a day. Table 8 reports, for each year, the intraday distribution of on-demand bookings across two-hour time slots. Both the Table and Figure show modest, frequent fluctuations over the day, most notably between 08:00 and 18:00, with increases and decreases that are relatively subtle rather than sharply peaked. Across years, two broad peaks are evident at 08:00–10:00 and 12:00–14:00, each reaching up to 18% of daily on-demand pickups. During 2021 (COVID period), these peaks flatten and converge, yielding a more uniform mid-day profile with a single blended rise of the similar booking percentage.

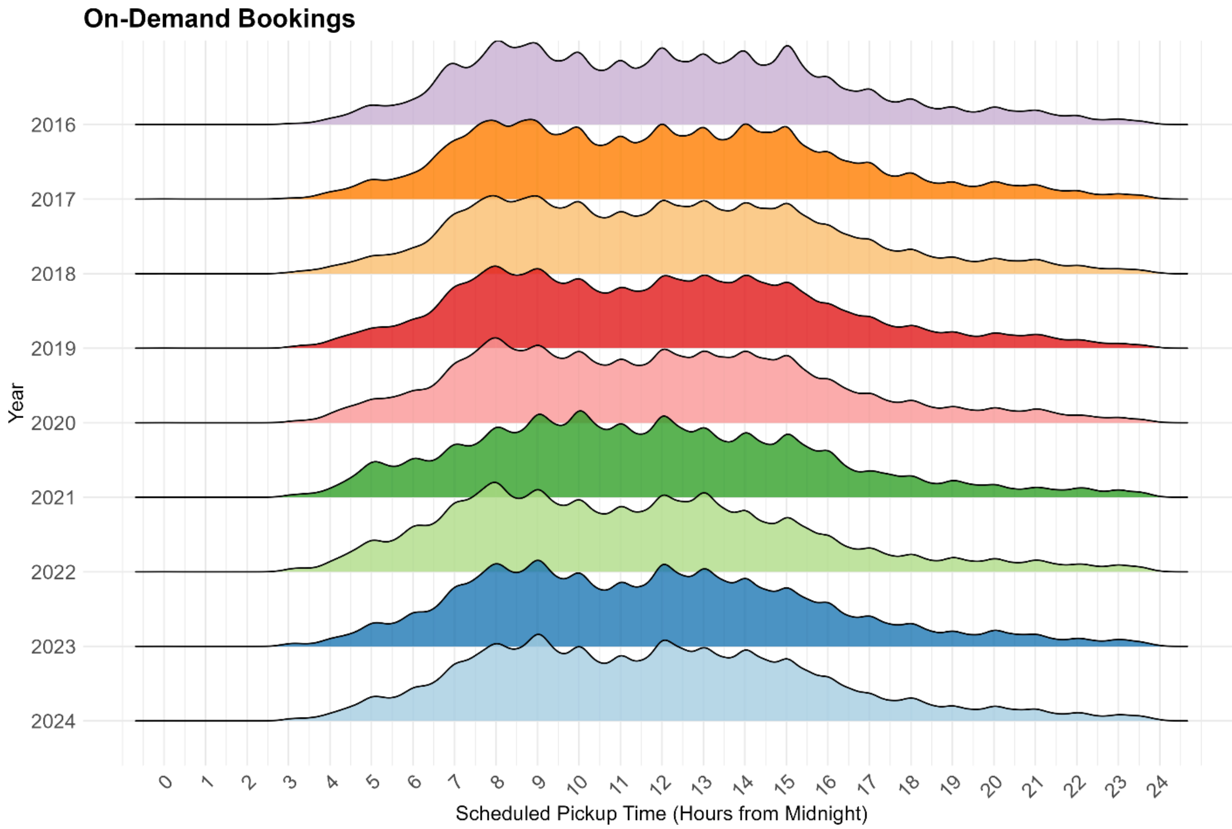

Figure 6. Distribution of On-demand Pickup Request (2016-2024)

Table 7. On-Demand Pickups as a Percentage of Total Pickups (Scheduled + On-demand) by Time of Day (2016-2024)

Year	12am-2am	2am-4am	4am-6am	6am-8am	8am-10am	10am-12pm	12pm-2pm	2pm-4pm	4pm-6pm	6pm-8pm	8pm-10pm	10pm-12am
2016	95	60	49	55	78	87	87	56	81	89	80	78
2017	90	67	52	57	78	87	86	58	82	88	79	76
2018	91	71	51	57	77	87	87	57	81	85	76	74
2019	85	65	59	58	78	89	87	57	82	88	79	75
2020	86	62	60	63	78	89	87	59	85	87	79	77
2021	95	72	69	95	90	91	97	88	93	94	97	98
2022	92	73	63	74	88	89	85	74	88	94	89	90
2023	81	64	51	61	80	85	76	66	81	86	78	79
2024	89	59	50	54	74	84	73	59	79	82	71	76

Table 8. Percent of On-demand Pickups by Time of Day (i.e. on-demand Pickups for each 2-hour time slots/Total number of on-demand pickups for the average day) (2016-2024)

Year	12am -2am	2am-4am	4am-6am	6am-8am	8am-10am	10am - 12pm	12pm -2pm	2pm-4pm	4pm-6pm	6pm-8pm	8pm-10pm	10pm - 12am
2016	0.0	0.3	3.8	12.6	18.4	15.0	17.2	15.4	8.3	4.3	3.3	1.4
2017	0.0	0.3	3.9	13.4	17.6	14.8	16.4	16.0	8.6	4.3	3.3	1.3
2018	0.0	0.4	3.9	13.3	17.6	15.0	16.9	15.9	8.4	4.1	3.1	1.3
2019	0.0	0.4	4.5	13.7	17.9	14.7	17.1	15.4	7.8	4.0	3.1	1.3
2020	0.0	0.4	5.2	13.7	17.8	15.1	16.9	15.2	7.4	4.0	3.0	1.3
2021	0.0	0.5	6.4	11.9	17.7	17.7	16.6	14.0	7.3	3.9	2.3	1.7
2022	0.0	0.5	6.5	16.0	18.5	15.5	17.5	12.4	5.8	3.2	2.5	1.5
2023	0.0	0.4	4.6	13.4	18.7	15.3	18.1	13.8	7.4	3.8	2.9	1.5
2024	0.0	0.4	4.8	13.1	18.5	15.7	17.6	14.7	7.3	3.8	2.7	1.5

Appointments: Drop-Off Performance

Next, we examined the duration of delays associated with drop-offs for appointment requests. An appointment is classified as any time-sensitive trip, such as a medical appointment or work, with a scheduled start time. Appointment trip performance is measured by drop-off timeliness, as it is most imperative that the passenger arrive to their destination on time. Delays in these trips are especially critical for evaluating MTA performance, as longer delays may result in missed appointments. According to the MTA definition, an appointment-based trip is late if the drop-off occurs 30 minutes or more after the appointment's earliest time.

As shown in Figure 7 and Table 9, the average delay time for late drop-offs in 2023 was approximately 43 minutes, consistent both with the average delay times from 2016-2018 and the 44-minute average delay time for late pickups in 2023 (Table 3). As with late pickups, 2016-2018 were characterized with shorter average delays than 2019-2022. In comparing Figure 2 with Figure 7, however, it is apparent that distributions of delays were more consistent across all years in the study timeframe for appointment drop-offs than general trip pickup. While the distribution of 2024 pickup times showed a much longer tail than previous years, the 2024 drop-off distribution shown in Figure 7 does not display such a dramatic dispersion. Rather, the trend of appointment drop-off times in 2024 shows a decreased tail of drop off times consistent with the reduction shown in 2023.

Looking at Table 9, the share of late drop-offs rose to about 28% through 2019, then fell to roughly 10% during the COVID period. In recent years it has edged back up, with a notable exception in 2023, when performance improved and only about 11% of appointment-based drop-offs were late.

However, for the late pickups, the pattern differs (Table 3). Late pickups show a substantial improvement in recent years, returning to low, pre-COVID levels (i.e., a much smaller share of pickups are late compared with the appointment-based drop-offs).

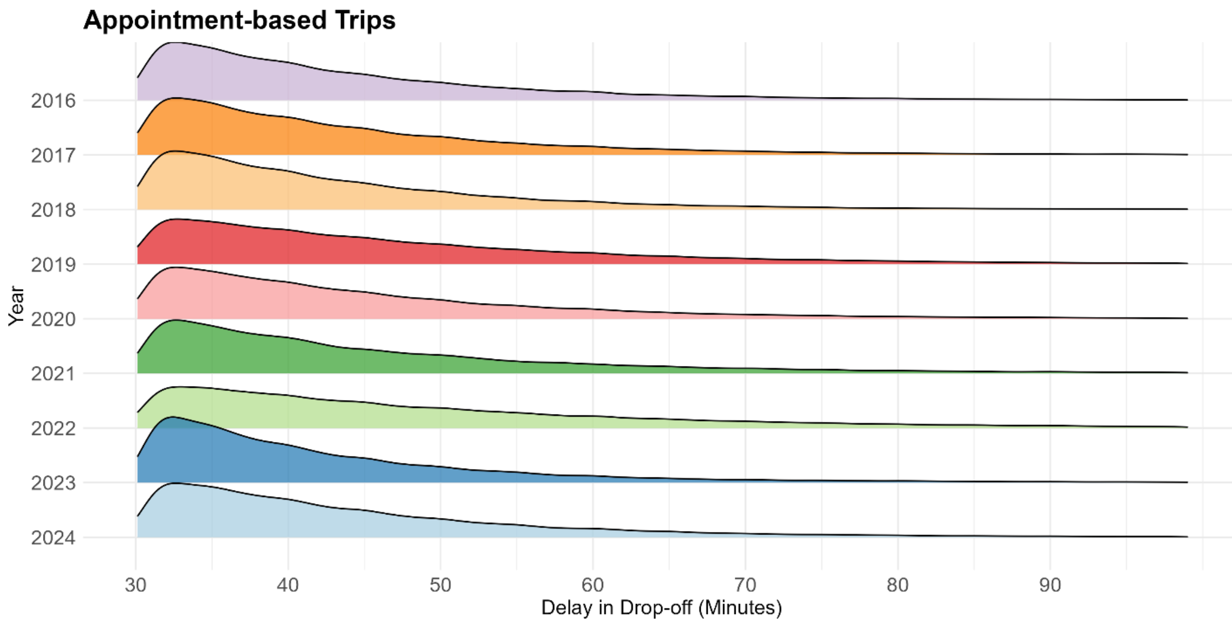

Figure 7. Distribution of delay durations in drop-offs for appointments (2016-2024)

As with Figure 2, we applied an artificial cutoff at 100 minutes to exclude extreme outliers and improve visualization of Figure 7. Drop-offs are similarly not classified as delayed until they exceed 30 minutes late, thus Figure 7 begins with 30 minutes as its leftmost axes.

Table 9. Summary statistics of delay times for late drop-offs for appointments (2016-2024)

Year	No. Late Drop-offs	% of Total Drop-offs	Mean	Min	1st Quartile	Median	3rd Quartile
2016	86001	16	43	31	35	40	49
2017	89301	16	44	31	35	40	49
2018	110774	17	43	31	34	40	48
2019	183511	28	47	31	36	43	53
2020	111859	22	45	31	35	41	51
2021	29290	10	45	31	35	41	52
2022	116478	31	48	31	36	44	56
2023	54349	11	43	31	34	39	47
2024	100773	20	44	31	35	40	49

Figure 8 illustrates delay times for drop-offs associated with appointment-based trips. The figure shows that several ZIP codes in the southwest portion of the MTA service area consistently experience longer delays for appointment-based trips, mirroring the pattern observed for delay in pickups for all trips in Figure 3. However, there are notable exceptions. For example, the ZIP code highlighted by red circle in 2020 in Figure 8 shows relatively shorter delays for appointment-based trips, despite consistently exhibiting long pickup delays for all trips across all years.

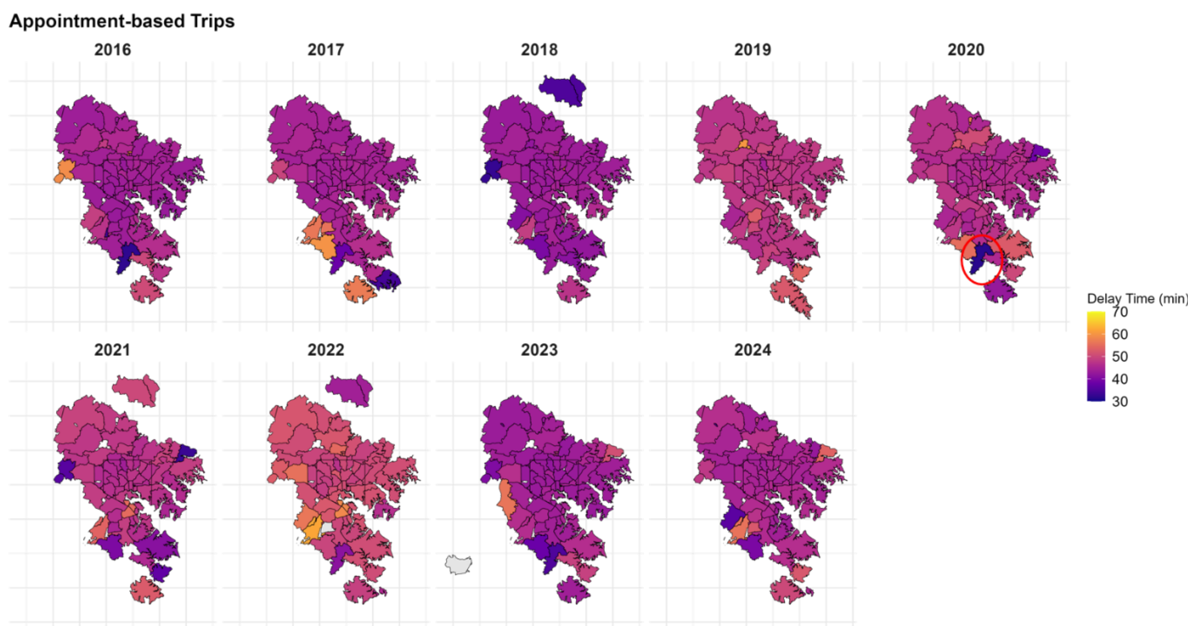

Figure 8. Distribution of delay durations in drop-offs for appointments (2016-2024)

Onboard Transit Time

For appointment-based trips, drop-off time is the key performance metric. However, for non-appointment trips, MobilityLink evaluates the onboard transit time. Figure 9 shows the distribution of onboard transit time by year (2016–2024). Onboard times dip in 2021, likely reflecting reduced traffic during COVID restrictions. Across years, most trips cluster between 10–30 minutes, but the distributions remain relatively flat with a long right tail, indicating substantial variability in trip length.

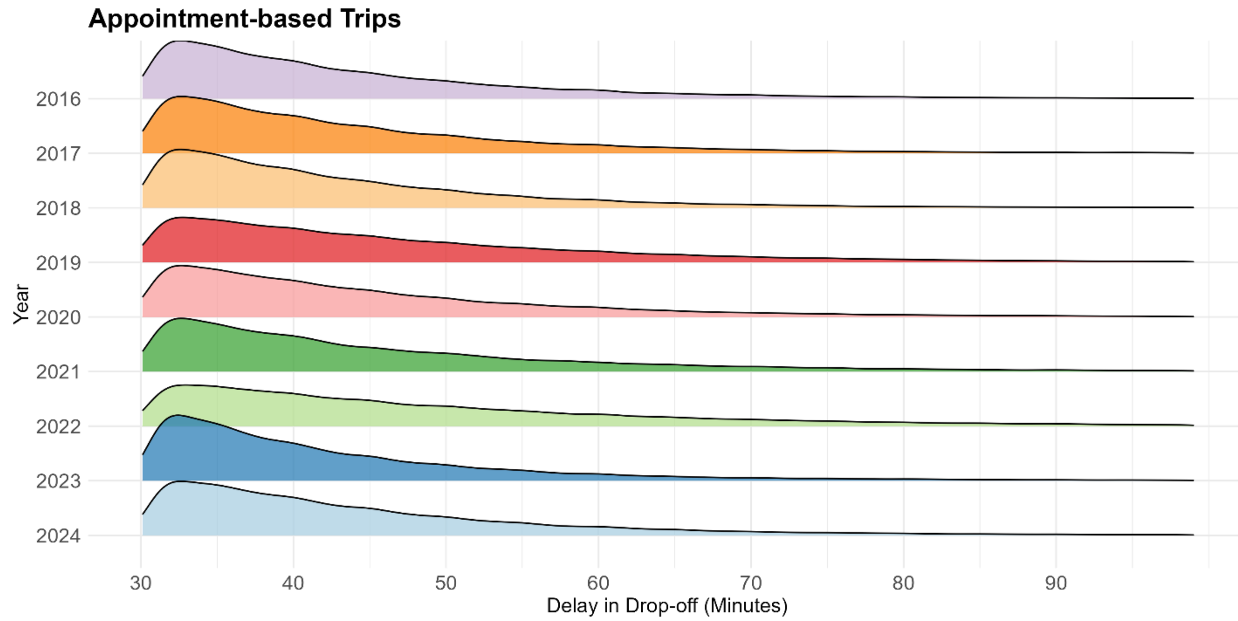

Figure 9. Distribution of Onboard Transit Time for non-appointment trips

Since 2022, the MobilityLink Service has included the maximum Onboard Transit time (Max OBT) to evaluate trip length for non-appointment trips.. Max OBT is calculated as the fixed equivalent route using one of the Trapeze Modules and is reported for years 2022 to 2024 in the dataset. . For non-appointment trips, we calculated onboard transit time using actual pickup and drop-off times and then compared it with Max OBT to evaluate trips with excessive length (i.e., longer than Max OBT).

Figure 10 illustrates the average onboard transit time for non-appointment trips for each year. It shows that the average onboard time increases in 2019, whereas it suddenly decreases in 2021 during Covid. However, it is notable that despite an increased Max OBT, the average onboard transit time of MTA service has improved since COVID, with shorter transit time in recent years compared to the pre-COVID years. According to MTA, trips with transit time more than their associated Max OBT are considered as trips with excessive length. We examine the distribution of excessive trip lengths since 2022 (when the data was first collected) in Figure 11. From 2022 to 2024, the proportion of excessively long trips increased from 9.9% to 12.4%, while the share of trips with normal transit time increased with a higher rate. This trend suggests overall improvement of MTA service, though the missing trip length data prevents making this claim with certainty and thus, there is a large margin of uncertainty.

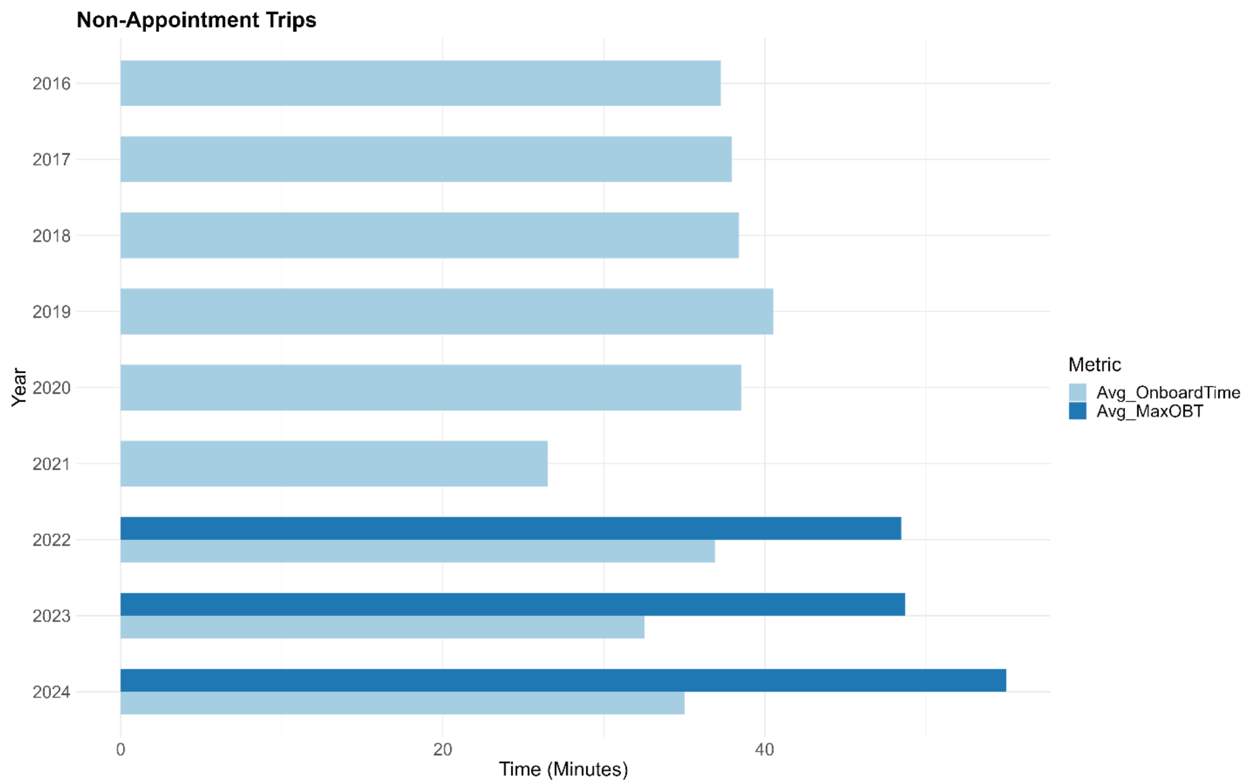

Figure 10. Average onboard transit time vs. Average Max OBT by years

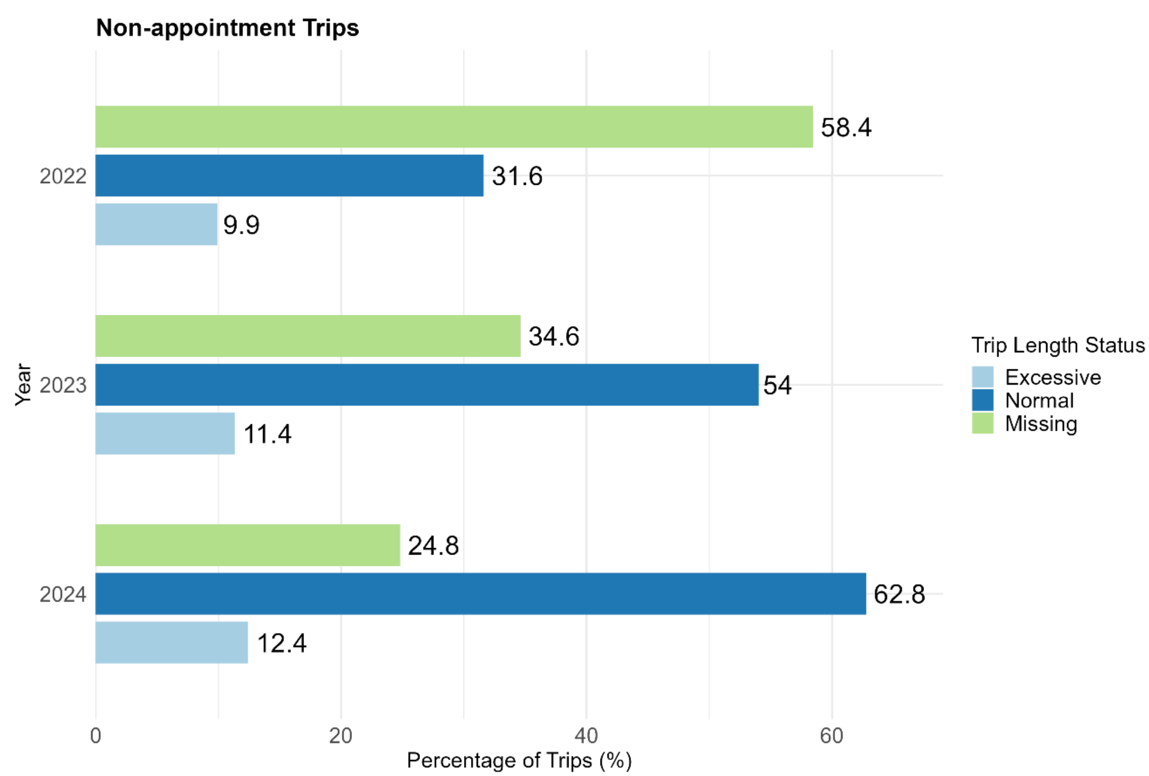

Figure 11. Excessive Trip Length by Year

Compared with the delayed pickups and drop-offs shown in Figure 3 and Figure 8 with strong delays in primarily the southwest service area, Figure 12 shows that the onboard transit times drop off radiating outwards in all directions from the inner core of the service area. In fact, the southwest service area which suffers the worst pickup delay shows the lowest onboard transit time of the region.

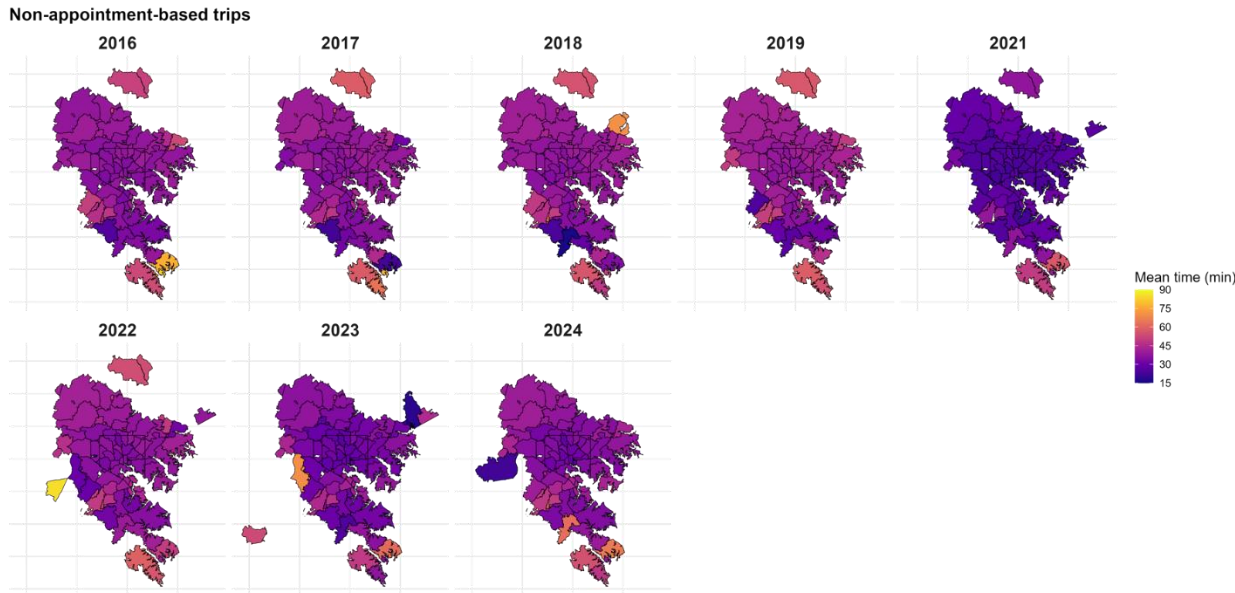

Figure 12. Onboard Transit Time by Year and Zipcode

Weekends Vs. Weekdays

An important question when considering trip delays is that of trip variability across weekends and weekdays. Table 10 displays summary statistics of onboard transit time for non-appointment trips made from 2016-2024 both on weekends and on weekdays. Within the study timeframe, there is a consistent average of approximately 84 percent non-appointment trips requested on the weekends as on the weekdays. Despite this dramatic decrease in trip number, average trip length only decreases by an average of 4 minutes from the weekday to the weekend. Though there is some evidence that this variation is due to the volume of trips – take 2021, with the lowest total volume of trips and both the lowest average trip length and the lowest range in mean trip length between weekend and weekend trips – there is not a strongly linear relationship between trip volume and mean trip length.

Table 10: Summary Statistics of Onboard Transit Time for Non-appointment Trips throughout the Week

Year	Time Period	No. of Trips	Mean	Min	Q1	Median	Q3	Max
2016	Weekday	1,418,127	38	1	20	34	52	1,488
	Weekend	220,107	36	1	19	32	49	1,244
2017	Weekday	1,479,249	39	1	20	35	53	702
	Weekend	229,454	35	1	18	31	48	445
2018	Weekday	1,538,952	39	1	20	35	53	1,353
	Weekend	244,164	35	1	18	31	48	240
2019	Weekday	1,552,742	41	1	21	36	56	736
	Weekend	247,112	36	1	19	32	50	1,297
2020	Weekday	1,253,597	39	1	19	33	53	1,321
	Weekend	194,174	34	1	18	30	46	738
2021	Weekday	758,484	26	1	15	22	32	1,381
	Weekend	124,853	25	1	14	22	31	640
2022	Weekday	945,914	38	1	19	32	51	4,967
	Weekend	144,524	33	1	17	28	44	1,358
2023	Weekday	1,330,934	33	1	18	28	44	1,467
	Weekend	219,700	30	1	17	26	38	1,451
2024	Weekday	1,457,376	36	1	19	31	48	1,167
	Weekend	252,380	32	1	17	28	42	1,492

PART 2. MTA COMPARISON TO SIMILAR PARATRANSIT OPERATIONS

To conduct our comparative analysis, as noted earlier, we use the National Transit Database (NTD) which serves as the repository for data related to financial, operating and asset conditions of US transit agencies. The latest full year of data are the 2023 National Transit Database (NTD) Annual Data Products. These data include information on ridership, safety, operating expenses, service levels, and funding sources, among others from transit providers. The data are not specifically aimed at paratransit operations but do include several critical comparative data for paratransit.

We use the results from a cluster analysis to identify agencies that are comparative to MTA operations. Agencies falling within the same cluster as MTA are shown in Table 11. The cluster analysis is described in Appendix A and used a mix of total operation data (buses, light rail, etc) and paratransit data. We included data that signaled the size of the transit agency to help contextualize the full range of operations and paratransit specific data to capture agency-specific services. From Table 11, we can see that compared to other agencies in the cluster, MTA has one of the largest total service populations (only New Jersey Transit is larger), but one of the smaller service areas. In terms of the reported number of peak paratransit vehicles in service, MTA reports availability of 1,550 vehicles (buses, etc) for peak service. This compares with New Jersey Transit with 3,248 paratransit vehicles at the high end and Honolulu at the low end with 145 vehicles.

Table 11.Transit Characteristics of Comparable Agencies

Agency Name	City	Density	Service Area (TotPop)	Service Area (SqMi)	No.Peak Service Vehicles
Capital Metropolitan Transportation Authority	Austin	2,921	1,359,922	620	657
City and County of Honolulu	Honolulu	5,886	1,016,508	145	688
Dallas Area Rapid Transit	Dallas	3,281	2,530,800	1,747	783
Denver Regional Transportation District	Denver	4,168	3,098,079	645	968
King County	Seattle	3,607	2,347,800	983	2,270
Maryland Transit Administration	Baltimore	3,377	7,811,145	655	1,550
Massachusetts Bay Transportation Authority	Boston	2,646	3,109,308	1,656	2,208
New Jersey Transit Corporation	Newark	5,981	10,594,013	3,248	3,282
Pace, the Suburban Bus Division of the Regional Transportation Authority	Arlington Heights	3,709	4,635,858	2,338	1,191
Santa Clara Valley Transportation Authority	San Jose	6,436	1,894,783	285	512
Southeastern Pennsylvania Transportation Authority	Philadelphia	3,001	3,475,337	1,898	1,952

Paratransit Service Structure

We use data provided to the National Transit Database to examine characteristics among the cluster agencies. The data we use in this analysis have been routinely collected over many years. In 2023, FTA began requiring those transit agencies with Demand Response modes to provide geographic area coverage data to describe where the service operates, schedules, and passenger eligibility information. These data have been made available in three sets of information: Counties and Places, which details places and counties served by Demand Response (DR) modes for each applicable agency and type of service (TOS); 2) Service Schedules which details service schedules for Demand Response (DR) modes for each applicable agency and type of service (TOS); and 3) Passenger Eligibility and Fares which outlines passenger eligibility and requirements for Demand Response (DR) modes for each applicable agency and type of service (TOS). We have not used these new datasets. They were initially released in Feb 2025, but data are still being reviewed for quality control. Our initial review of the data suggests that agencies may have reported inconsistently across the newly required information. As a result of this review, we have constrained our analysis to those variables which have been collected over a long period of time and can be considered robust.

Fleet Characteristics

In Table 12, each of the comparable agencies are listed alongside critical service characteristics. Beginning with the number of vehicles operating at maximum service (VOMs) and number of vehicles available at maximum service (VAMs), **MTA reports the number of vehicles for both maximum service and maximum availability well above the comparable agency average in both categories.** The maximum number of vehicles reported for both VOM/VAM is by PACE, which oversees a largely suburban operation.

Some agencies also report on the use of capital funds for revenue and service vehicles (Use of Capital: Revenue/Service). Per the NTD Data Dictionary, the reported capital expenditures on revenue vehicles includes “the floating and rolling stock used to provide revenue services for passengers,” including both existing service and expansion of service. Likewise, the reported use of capital on service vehicles includes funds spent on “vehicles used to support revenue vehicle operations and that are not used to carry transit passengers”(*National Transit Summaries and Trends - 2021 Edition* 2021). MTA reports on the use of these funds because the operating fleet vehicles are operated by MTA. As will be discussed, most of the agencies contract out paratransit services and thus report no use of capital for revenue or service vehicles. The distribution of capital funds used by the agencies is visualized in Figure 14. It should be noted that the lack of capital funds spent on either revenue or service vehicles does not indicate a lack of vehicle ownership by the agency. For example, Capital Metropolitan Transportation Authority reports $0 spent on service vehicles but also reports ownership of 4 service vehicles specifically serving Demand Responsive transit.

Finally, in terms of vehicle reliability, there are two types of mechanical failures reported annually: major failures and other failures. Both categories represent failures of a mechanical element of a revenue vehicle, which prevent the vehicle from completing or starting a scheduled revenue trip. Failures of a mechanical nature that are caused by collision, natural disaster, or vandalism are not reported. Major Failures are failures that prevent a revenue vehicle from either starting or completing a scheduled trip, either because the vehicle’s physical movement has been impaired or the mechanical failure creates a safety concern. Other Failures prevent the revenue vehicle from completing a scheduled revenue trip or from starting the next scheduled revenue trip even though the vehicle is physically able to continue in revenue service. This might include, for example, a malfunction in a vehicle’s farebox or air conditioner. Total Failures represents the sum of the two. MTA’s failures reported in 2023 were significantly higher than average across the other agencies, due in largest part to the Other Failures of MTA vehicles. MTA Major Failures were 56% higher than the average of all comparable agencies in 2023, while MTA Other failures were 123% higher than the average.

Table 12. Fleet Characteristics of Comparable Agencies

Agency Name	VOMs	VAMs	Use of Capital Rev. Veh	Use of Capital Serv. Veh	Major Failures	Other Failures	Total Failures
Capital Metropolitan Transportation Authority	183	249	$4,786,740	$0.00	564	803	1,367
City and County of Honolulu	193	270	$252,911	$0.00	597	705	1,302
Dallas Area Rapid Transit	193	237	$0.00	$0.00	20	225	245
Denver Regional Transportation District	310	470	$0.00	$0.00	130	275	405
King County	317	389	$1,894,350	$0.00	428	461	889
Maryland Transit Administration	457	500	$7,600,404	$65,981	509	1,013	1,522
Massachusetts Bay Transportation Authority	460	792	$0.00	$0.00	311	984	1,295
New Jersey Transit Corporation	372	628	$16,074,580	$0.00	445	272	717
Pace, the Suburban Bus Division of the Regional Transportation Authority	750	1,006	$0.00	$0.00	261	354	615
Santa Clara Valley Transportation Authority	116	144	$0.00	$0.00	23	6	29
Southeastern Pennsylvania Transportation Authority	240	423	$0.00	$0.00	315	158	473
Cluster Averages	**326**	**464**	**---**	**---**	**327**	**477**	**805**

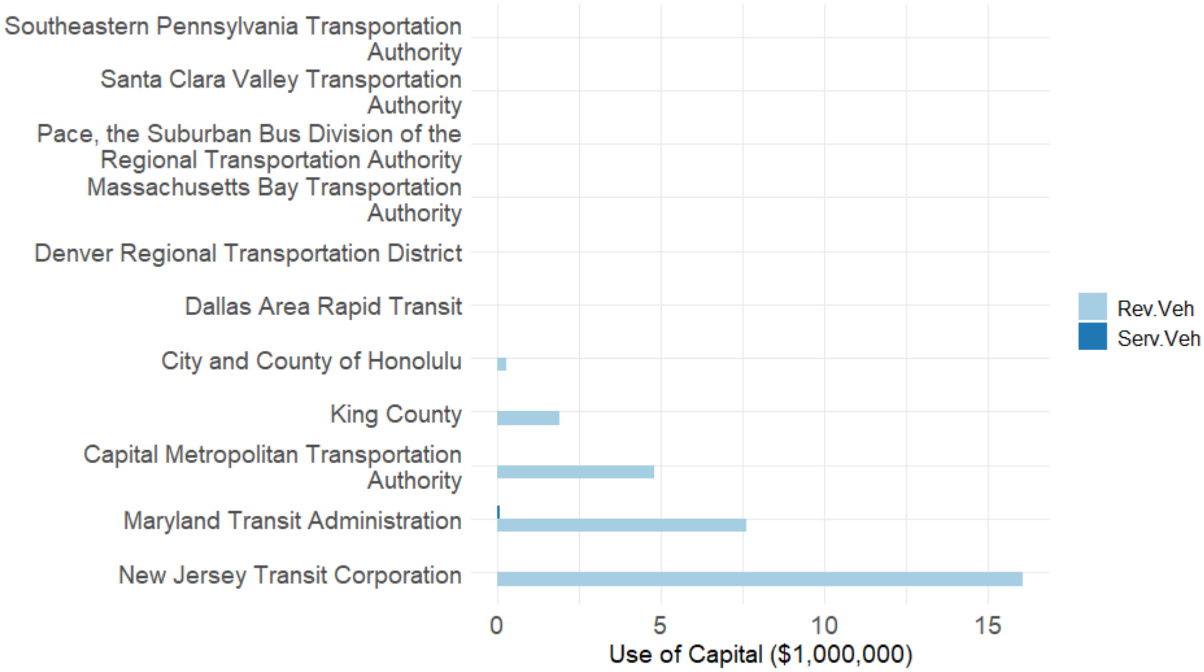

Figure 13: Bar Plot of Use of Capital in Fleets by $1,000,000; ordered by Rev. Vehicle Spending

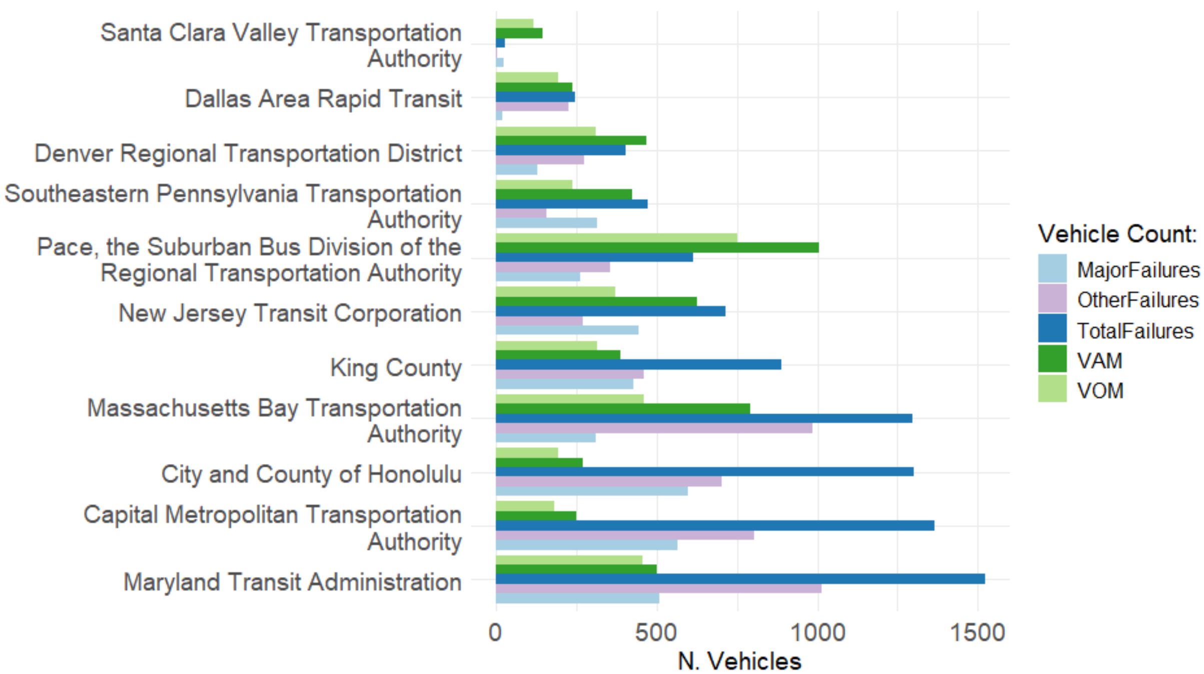

Figure 14: Bar Plot of Fleet Vehicle Characteristics of Comparable Agencies; ordered by Total Failures

Expense Characteristics

Looking at a comparison of expense characteristics across comparable agencies, in Table 13, we compiled data for three key variables that capture important dimensions in paratransit operations: Other Salaries/Wages, PT Funds and ADA Expenses. Other Salaries/Wages are expenses that include the cost of labor, excluding paid absences and fringe benefits, of administrative staff, transit managers, and other employees of the transit agency who are not classified as revenue vehicle operators or maintenance workers. In reviewing the data, none of the comparable agencies reported operator or crewmember (maintenance, administrative, manager) salaries as direct labor charges. The PT Funds captures the payments or accruals to sellers or providers of service, including fare revenues retained by the seller. Roughly speaking, this is the outside contracting costs for service vehicles. MTA has the second highest costs associated with contracting. Finally, ADA Expenses represents those attributable to ADA-required service; in MTA's case one hundred percent of the operating expenses (for paratransit) is attributable to ADA-required service. This is the case for most of the agencies in the peer group, as shown in Figure 15. One notable exception is the New Jersey Transit Corporation where total paratransit operating expenses are reported as $128,346,967, of which approximately $93m is for ADA-required service.

Table 13. Expense Characteristics of Comparable Agencies

Agency Name	Other Salaries/Wages	PT Funds	ADA Expenses
Capital Metropolitan Transportation Authority	$10,179,545	$43,392,538	$42,358,534
City and County of Honolulu	$583,241	$59,062,857	$63,853,957
Dallas Area Rapid Transit	$5,193,320	$42,725,961	$50,641,647
Denver Regional Transportation District	$1,143,621	$54,154,300	$59,640,770
King County	$2,735,949	$58,365,096	$65,363,053
Maryland Transit Administration	$12,866,729	$109,830,221	$140,039,703
Massachusetts Bay Transportation Authority	$474,974	$98,715,372	$97,086,285
New Jersey Transit Corporation	$11,253,494	$72,896,766	$93,119,358
Pace, the Suburban Bus Division of the Regional Transportation Authority	$4,206,295	$153,528,560	$172,304,229
Santa Clara Valley Transp. Authority	$470,385	$21,916,570	$23,462,989
Southeastern Pennsylvania Transportation Authority	$4,444,542	$44,153,675	$30,653,186
Cluster Average	**$4,868,372**	**$68,976,538**	**$76,229,428**

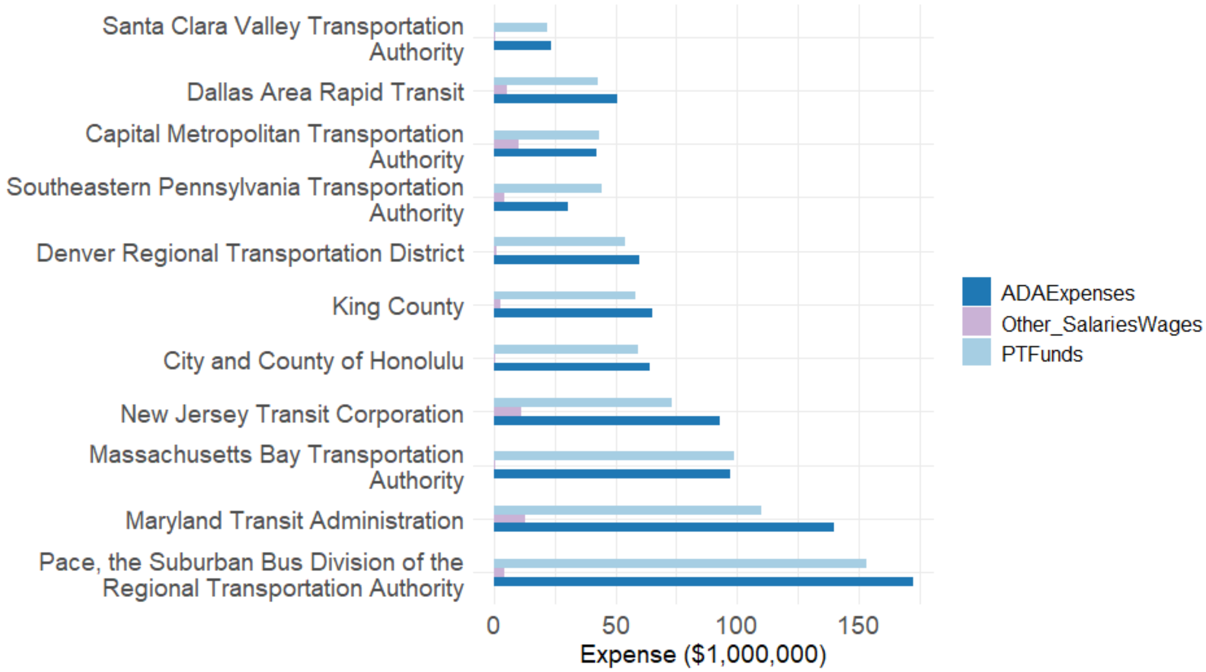

Figure 15: Bar Plot of Agency Expense Characteristics by $1,000,000; ordered by PT Funds

Contractual Relationships Characteristics

The agencies in the comparable group contract out their paratransit operations. These contracts are either competitively bid or negotiated. The competitive bid contracts include sealed bids, a request for proposal, and typically a two-step procurement process. If contracts are initially competitively bid and in subsequent years negotiated, the contract will still be denoted as competitive. At the time of the 2023 data availability, MTA had two contracts. They currently operate with three contracts, all of which are noted as competitively bid. The paratransit fare revenues (averaged over contracts if there is more than one contract) derive from the transit services provided under the purchased transportation (PT) agreement. These revenues are reported regardless of whether fares are retained by the seller or returned to the buyer. MTA's absolute revenues are among the lowest in its cohort. Table 14 summarizes the overall contractual characteristics of agencies within the comparable cluster group. In Table 15, we look at these relative to the number of revenue vehicles operating. The subsidy represents the payment for services less fare revenues and capital leasing expenses, while modal expenses reflect the total cost (contract and subsidy, plus other operating expenses). MTA's reported subsidy and expenses are in the higher tier of the comparable agencies. This is clear in Figure 16, which graphs the standardized contractual characteristics by the agency's number of revenue vehicles.

Table 14. Contractual Characteristics of Comparable Agencies

Agency Name	Type of Contract	Avg PT Revenue	Avg. PT Subsidy	Avg Modal Expenses	No. Contracts
Capital Metropolitan Transportation Authority	Competitively-Bid	$806,155	$43,599,776	$71,945,708	1
Capital Metropolitan Transportation Authority	Negotiated Contract or Agreement	$19,027	$1,433,898	$2,372,915	1
City and County of Honolulu	Competitively-Bid	NA	423917	570112	5
City and County of Honolulu	Negotiated Contract or Agreement	$1,793,364	$57,503,952	$63,918,121	1
Dallas Area Rapid Transit	Competitively-Bid	$2,427,151	$42,991,682	$56,783,230	1
Dallas Area Rapid Transit	Negotiated Contract or Agreement	$24,448	$374,268	$489,020	2
Denver Regional Transportation District	Competitively-Bid	$546,168	$13,455,389	$17,777,469	4
King County	Competitively-Bid	$408,446	$29,833,721	$38,166,738	2
Maryland Transit Administration	Competitively-Bid	$56,678	$56,121,523	$72,517,693	2
Massachusetts Bay Transportation Authority	Competitively-Bid	$1,679,430	$49,357,686	$55,616,255	2
New Jersey Transit Corporation	Competitively-Bid	$1,390,304	$36,592,635	$65,852,292	2
Pace, the Suburban Bus Division of the Regional Transportation Authority	Competitively-Bid	$981,103	$21,308,886	$26,348,132	8
Pace, the Suburban Bus Division of the Regional Transportation Authority	Negotiated Contract or Agreement	$22,403	$519,578	$622,044	14
Santa Clara Valley Transportation Authority	Competitively-Bid	$1,201,999	$21,916,570	$24,664,988	1
Southeastern Pennsylvania Transportation Authority	Competitively-Bid	$806,420	$11,227,417	$14,994,635	4

Table 15. Standardized (per VOM) Contractual Characteristics of Comparable Agencies

Agency Name	Type of Contract	Avg PT Revenue per VOM	Avg Subsidy per VOM	Avg Expenses per VOM	No. Contracts
Capital Metropolitan Transportation Authority	Competitively-Bid	$4,504	$243,574	$401,931	1
Capital Metropolitan Transportation Authority	Negotiated Contract or Agreement	$4,757	$358,475	$593,229	1
City and County of Honolulu	Competitively-Bid	NA	$34,448	$49,531	5
City and County of Honolulu	Negotiated Contract or Agreement	$13,484	$432,361	$480,587	1
Dallas Area Rapid Transit	Competitively-Bid	$12,842	$227,469	$300,440	1
Dallas Area Rapid Transit	Negotiated Contract or Agreement	$12,224	$187,134	$244,510	2
Denver Regional Transportation District	Competitively-Bid	$6,901	$170,004	$217,946	4
King County	Competitively-Bid	$2,113	$189,037	$232,040	2
Maryland Transit Administration	Competitively-Bid	$249	$245,442	$317,199	2
Massachusetts Bay Transportation Authority	Competitively-Bid	$7,311	$214,121	$241,298	2
New Jersey Transit Corporation	Competitively-Bid	$7,989	$191,593	$345,501	2
Pace, the Suburban Bus Division of the Regional Transportation Authority	Competitively-Bid	$7,688	$152,942	$194,021	8
Pace, the Suburban Bus Division of the Regional Transportation Authority	Negotiated Contract or Agreement	$4,049	$70,622	$93,044	14
Santa Clara Valley Transportation Authority	Competitively-Bid	$10,362	$188,936	$212,629	1
Southeastern Pennsylvania Transportation Authority	Competitively-Bid	$11,821	$175,645	$231,679	4

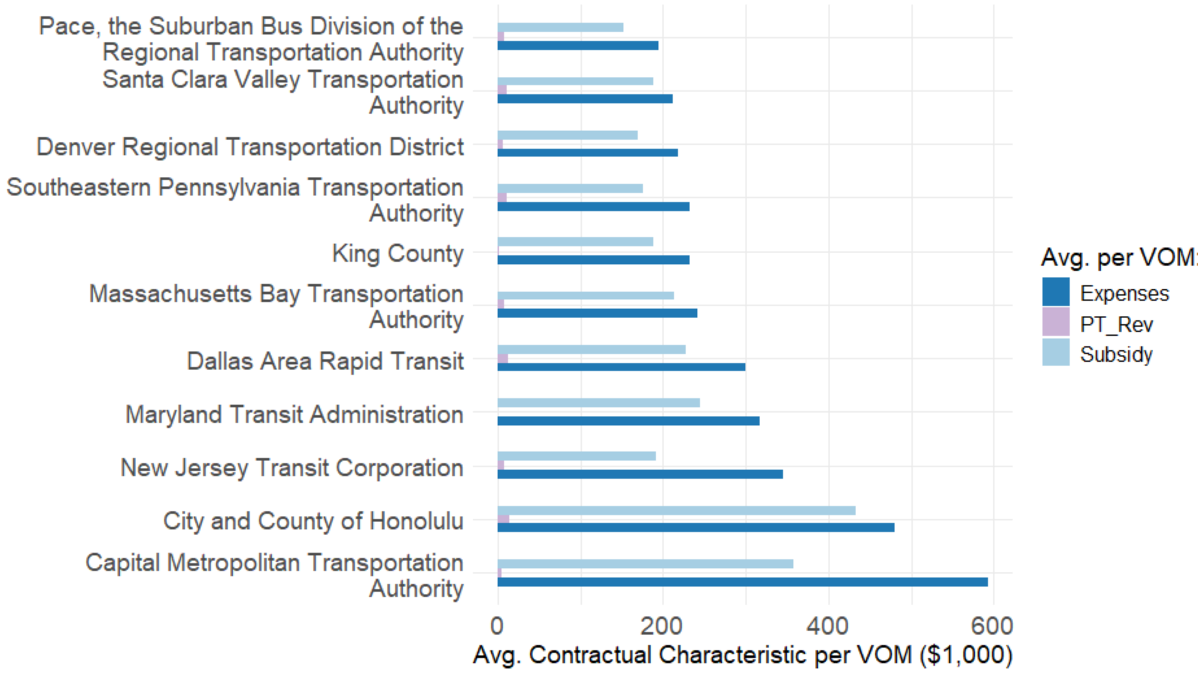

Figure 16: Bar Plot of Standardized (per VOM) Contractual Characteristics ($1,000)

CONCLUSION AND RECOMMENDATIONS

MDOT MTA began offering paratransit services to the disabled in 1978, expanding the service in 1990 following the enactment of the ADA (MDOT 2017), and, as of October 2024, serves approximately 322,000 monthly riders within the MobilityLink service area (Maryland Transit Administration 2025). There are significant challenges associated with running a paratransit system compliant with ADA standards, and in 2023, the Dept. of Justice found the MTA in violation of the ADA mandate to offer paratransit service of a comparable level of service as the transit agency's fixed route system (E. Barron, "MTA Investigation Findings," 2023). Specifically, the on-time performance and telephone performance of MobilityLink were found to be deficient.

This report responds to a request by the Maryland General Assembly for review of Maryland's MobilityLink Paratransit service (Maryland General Assembly 2024), in this report, we analyze MobilityLink's performance via various performance criteria and then provide a comparison of MTA's ADA operations against comparable agencies across the country. We presented our findings first, with an analysis of MobilityLink's performance based on several performance metrics, followed by a comparative analysis of MTA's ADA operations, and finally, operations at comparable transit agencies nationwide. These findings respond to the request for:

1. Summarizing and comparing the MobilityLink service to similar entities nationwide that provide ADA paratransit services.
2. Identifying the service structure of ADA paratransit services in other service areas nationwide and whether a public entity, private contractor, or hybrid model is used to provide the service.

3. Analyzing the performance metrics associated with the ADA paratransit services in various service areas nationwide based on the Federal Transit Administration's ADA Guidance for metrics.
4. Analyzing the workforce metrics among the ADA paratransit services in various service areas nationwide.

The scope of our report was constrained by both time (we received the request for a report in January 2025) and resources. We also note that we were unable to respond to some of the requests embedded in the legislation due to resource and time constraints. In particular, the data needed to respond to most of the requests for recommendations were not aligned with data needed to respond to the request for analysis of metrics, which essentially doubled the size of the study. We discuss these scope limits in the limitations section below. For this study, which focuses on analysis of the metrics, we relied on available data provided by MTA and data reported each year to the FTA by all transit agencies.

In general, analysis of performance metrics indicates that while spatio-temporal patterns of ridership changed dramatically during the COVID-19 pandemic, ridership is beginning to return to pre-pandemic trends. While rates of early pickups remain slightly elevated, rates of late and missed pickups have returned to pre-pandemic levels. The typical morning peak hour (6 am – 8 am) has returned for scheduled trip pick-ups; we see a wider dispersion of afternoon peak-hour trip requests than pre-pandemic, with requests dispersed from 12 pm – 4 pm instead of largely 2 pm – 4pm. Furthermore, late appointment drop-off rates are relatively consistent with pre-pandemic levels, but the percent of late drop-offs in 2024 (20%) is much higher than the percentage of overall late trip pick-ups (7.7%). This finding warrants further evaluation to understand if there is a common cause to delay appointment-based trip drop-offs more than trip pickups.

While the performance metrics are returning to pre-pandemic levels, the total number of requested trips is much higher. Monthly ridership ranged from 150,000-200,000 riders on average before the pandemic (2016-2019), dropped to 44,000 riders in April 2020, but has since increased to over 300,000 monthly riders in the last quarter of 2024 (Maryland Transit Administration 2025). One trend of pre-pandemic ridership that we also see continued in current years is that the best average system performance based late pickups, drop-off delays, and on-board travel time consistently occurs in central core of the service area, with the worst and most variable service metrics occurring in the south and southwest of the service area (see Figures 3, 8, and 12).

On-board transit time (i.e. the average duration of a non-appointment based MobilityLink trip) is also consistent with pre-pandemic trip lengths. While the proportion of excessively long trips (measured by maximum on-board transit time) has slightly increased since 2021, the proportion of normal trip lengths is increasing more rapidly, which may indicate an overall improvement in MTA service despite a greater number of trips.

However, the increase in excessively long trips should still be examined to evaluate avenues for overall system improvement. One key takeaway from this analysis is the stringency placed upon the ADA 30-minute pickup window. Under this performance metric, a trip that lasts 31 minutes is classified as a late pickup and treated the same as 2 hours. Though the 30-minute "on time" window is set by ADA standards, a more fitting short-term goal may be to reduce excessively long trips or excessively delayed pickups/drop-offs. **By examining root cause of excessively long trips or late pickups/drop-offs, MTA**

could target specific interventions to reduce trip durations. This general practice could then work to reduce system-wise bottlenecks in vehicle availability. Evidence to the efficacy of this strategy is shown in Figure 17, which illustrates the distribution of pickup times compared to the scheduled trip pickup time for all MobilityLink trips from 2016-2024. In this figure, the grey box highlights the 0-30 min "on time" window, while the volume of the curve outside the box is classified as an early or late pickup. An interesting phenomenon in the 2024 pickup distribution is shown in the pickup uptick at the 30-minute mark of the graph. These trips straddle the border of on-time and late pickups and may indicate agency pressure for on-time pickups. **Additional analysis would help to understand what, if anything, was done differently in 2024 to allow for this late-stage increase in on-time pickups.**

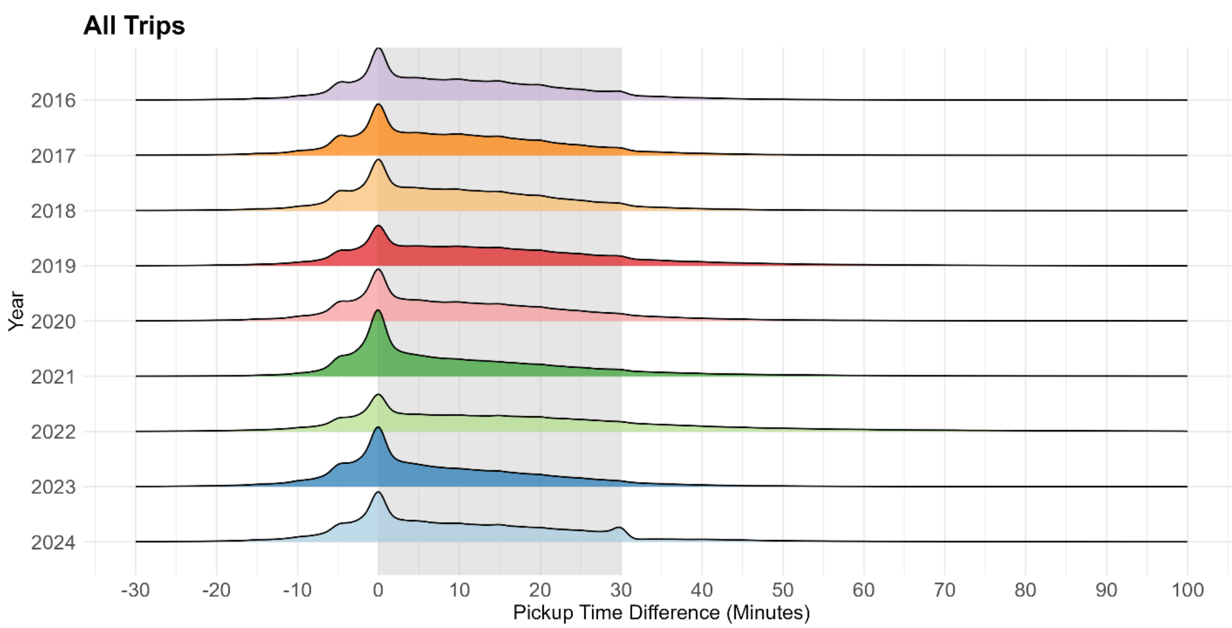

Figure 17: Distribution of pickup timeliness across all trips (2016-2024)

In addition to MobilityLink-specific metrics, we also evaluated characteristics of the MTA ADA service against comparable agencies nationwide. The set of agencies for comparison was determined based on a cluster analysis of all agencies within the National Transit Database based on operations and paratransit data. The resulting cluster that includes MTA represents mid-sized and large urban transit agencies with similar operating budgets and fleet sizes. While the service population of the MTA is second only to New Jersey Transit, the service area and vehicle fleet fall near the cluster's averages. In comparison to other agency characteristics, MTA spends a roughly average amount on paratransit contracts per vehicle operated. However, both the revenue per operating vehicle and the absolute revenue from MTA's ADA operations are well below average compared to the peer group. Conversely, MTA spends more on PT Funds and ADA Expenses than any agency other than the Pace Regional Bus Division outside of Chicago, which is largely a suburban paratransit operation. **The discrepancy between higher spending with lower revenue should be evaluated in more detail to assess budgetary differences between MTA and the peer group of agencies and ascertain if funds could be spent more effectively.**

The most notable difference between MTA ADA and the peer group, though, is in the number of Total Failures. MTA reports the highest number of Other Failures (i.e. failures that prevent a trip from finishing or from starting, but without putting the vehicle completely out of service) of any agency within the identified cohort cluster. The high number of Other Failures also caused MTA to report the highest number of Total Failures within the group in 2023. While MTA's number of Major Failures was only 56% higher than peer agencies, the number of Other Failures was 123% higher than average and Total Failures was 89% elevated above average. **This observation would benefit from further analysis in conjunction with the MobilityLink pickup and drop-off delays evaluated in Part 1 of this report to determine if the excessive number of vehicle failures is related to the increased spread in delay times seen in 2023** (see Figure 2 and Figure 11).

In summary, while MobilityLink's performance is trending towards pre-pandemic norms, the system faces new challenges due to increased demand and persistent geographic disparities in service quality. Our comparative analysis highlighted budgetary and operational inefficiencies that warrant further exploration, particularly the high rate of vehicle failures and the mismatch between spending and revenue. Addressing these issues, alongside a more nuanced analysis of corresponding service delays, could lead to meaningful improvements in service delivery. Further studies should prioritize the qualitative data collection recommended but limited in this study due to time constraints, as this input, along with time-series fiscal analysis, could help to enhance system efficiency and the rider experience, and to most importantly ensure ADA-compliance.

Scope Limitations

We were unable to address the following requests for several reasons, the most prominent of which was that the request for metric analysis did not match the request for specific recommendations. That is, data collected for an evaluation of the requested metrics does not significantly overlap the data needed to address the recommendations (e.g., long-term cost data). There were also resource and time constraints which are described in greater detail in the limitations section.

1. Fiscal Analysis of ADA Service Models: Analysis was requested of both the short- and long-term fiscal costs and savings associated with each type of ADA paratransit service model, including a comparison of the quality of service and reliability of each service model. Time constraints prevented analysis of time-series data from the National Transit Database.
2. Service Recommendations for the Three-Quarter Mile Buffer: Recommendations were requested for service improvements to individuals located at least three-quarters of a mile from or in areas outside of three-quarters of a mile of a fixed transportation route. We cannot comment on individual home locations within the service area.
3. Interjurisdictional Service Restriction Recommendations: Similarly, recommendations were requested to address interjurisdictional restrictions to paratransit services, including restrictions relating to medical appointments that cross jurisdictional lines. We did not have access to location-based data to evaluate home location as compared to medical appointment location.
4. Public Input: A request was made to solicit input and comments from the public and riders of the Administration's MobilityLink paratransit service. There was insufficient time to develop a survey and/or interview protocol and solicit IRB approval.

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APPENDIX A – DEFINING COMPARABLE PARATRANSIT SERVICES

To identify a comparison group for MTA, we gathered available financial, operational, and service-related characteristics for more 100 paratransit agencies. Data are reported to FTA and we use 2022 information. Our work here aims at identifying groupings of transit agencies with similar operational scales, budget structures, and performance outcomes. We have a large set of variables and use Principal Component Analysis (PCA) to reduce dimensionality and to standardize before applying clustering models. Our final results show that Maryland's paratransit operations fall into a cluster with ten other agencies (Table A1). We use these agencies to compare different operational features in the main report. We also briefly summarize the details of our PCA/clustering process in the next section.

Table A1. MTA Paratransit: Comparable Agencies

Capital Metropolitan Transportation Authority
City and County of Honolulu
Dallas Area Rapid Transit
Denver Regional Transportation District
King County
Maryland Transit Administration
Massachusetts Bay Transportation Authority
New Jersey Transit Corporation
Pace, the Suburban Bus Division of the Regional Transportation Authority
Santa Clara Valley Transportation Authority
Southeastern Pennsylvania Transportation Authority

Overview of PCA/Clustering Process

Our data included upwards of 30 variables. Some of these were descriptive and others were quantitative. We applied PCA and reduced our variables to three dimensions (Table A2), accounting for slightly more than 74% of the variance. The **top contributing features to PC1** include *Total Capital Funds*, *Uses of Capital (Existing Section)*, *Guideway*, *Passenger Stations*, and *Revenue Vehicles*. These features suggest that PC1 primarily represents **capital investment (expansion) and scale of infrastructure**. **PC2** is dominated by *PT Fare Revenues/Passenger Fees*, *Direct Payment/Agency Subsidy*, *Contract Capital Leasing Expenses*, and *Total Modal Expenses*, indicating it reflects an agency's **funding structure and revenue model**, including reliance on subsidies or fares. Finally, **PC3** is characterized by *Other Failures*, *Total Failures*, *Organization Paid Fares*, and *Major Failures*, pointing toward **operational performance and reliability**.

Table A2. Principal Components Results

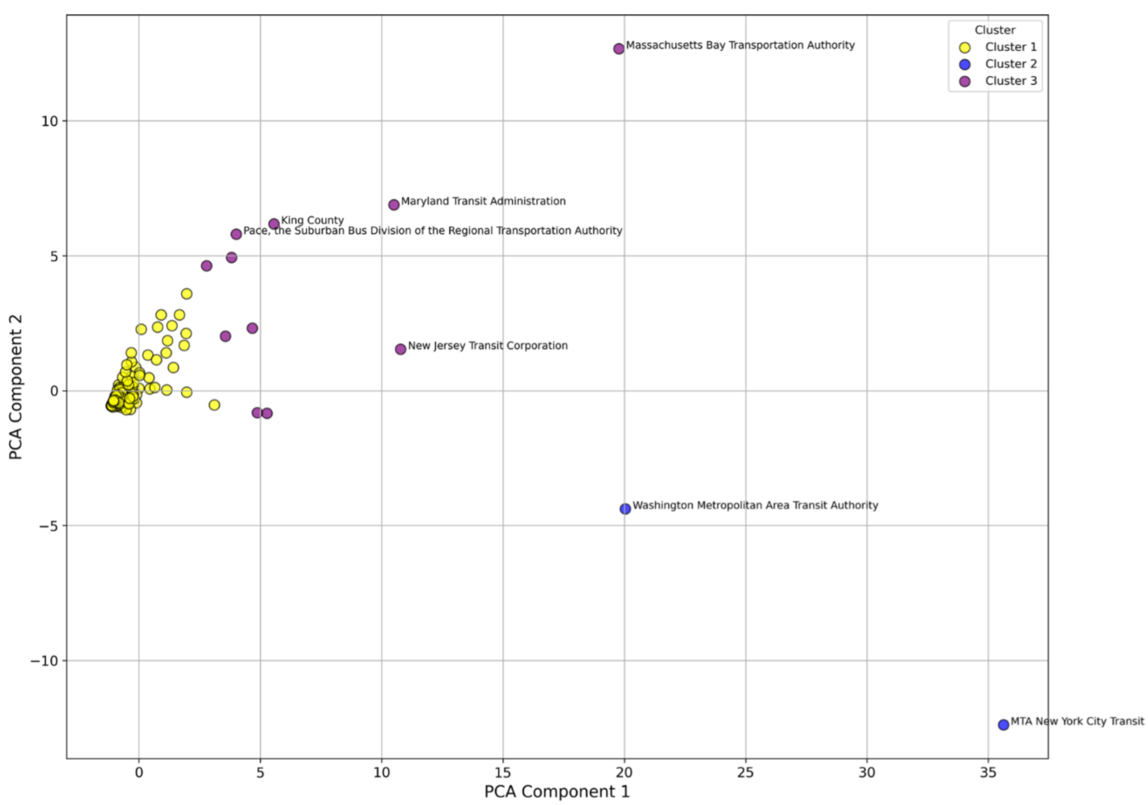
Component	PC1 (54.4%)	PC2 (12.7%)	PC3 (7.1%)
Contributing Variables	Total Capital Funds	PT Fare Revenues	Other Failures
	Capital: Existing	Direct Payment/Agency Subsidies	Total Failures
	Guideway	Contract Capital Leasing Expenses	Org Paid Fares
	Passenger Stations	Total Modal Expenses	Major Failures
	Revenue Vehicles	Capital: Expansion	Capital: Expansion

Main Themes	capital investment and scale of infrastructure	funding structure and revenue model	operational performance and reliability

A K-means clustering analysis was conducted on the PCA data. Three meaningful clusters were established. The cluster analysis was replicated using GMM and DBSCAN clustering analyses, both of which confirmed a three-cluster result. Figure A1 displays the results of the K-Means clustering on the PCA-reduced features, visualized using the first two principal components. Each point represents a single transit agency, color-coded by cluster assignment.

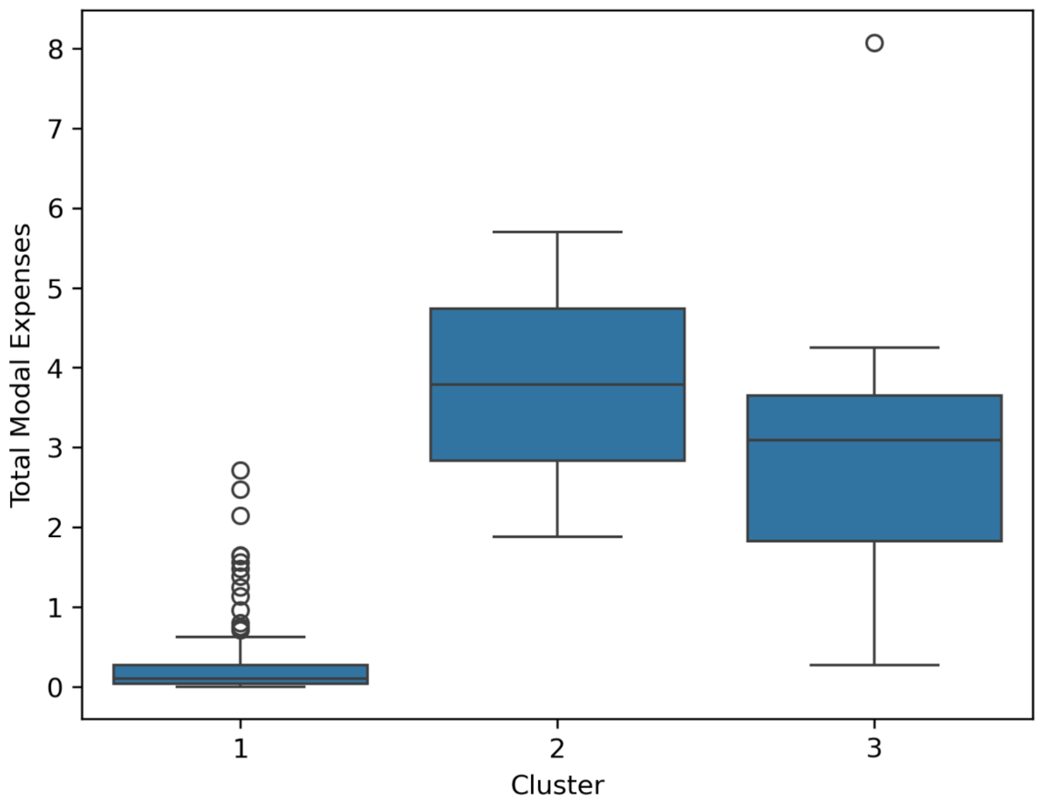
- **Cluster 1 (Yellow)** includes a large number of agencies operating at a relatively small or regional scale. These agencies tend to have lower budgets, smaller fleets, and fewer reported failures.
- **Cluster 2 (Blue)** is composed of outlier systems with significantly higher operational capacity and complexity — notably, MTA New York City Transit, which stands far apart on the PCA axis due to its massive scale.
- **Cluster 3 (Purple)** represents mid-sized and large urban agencies such as Maryland Transit Administration, the Chicago-based Pace Suburban Bus, and Massachusetts Bay Transportation Authority. These agencies are distinct in terms of budget, vehicle count, and infrastructure investment.

Figure A1. Clustering Results (PC1 and PC2)



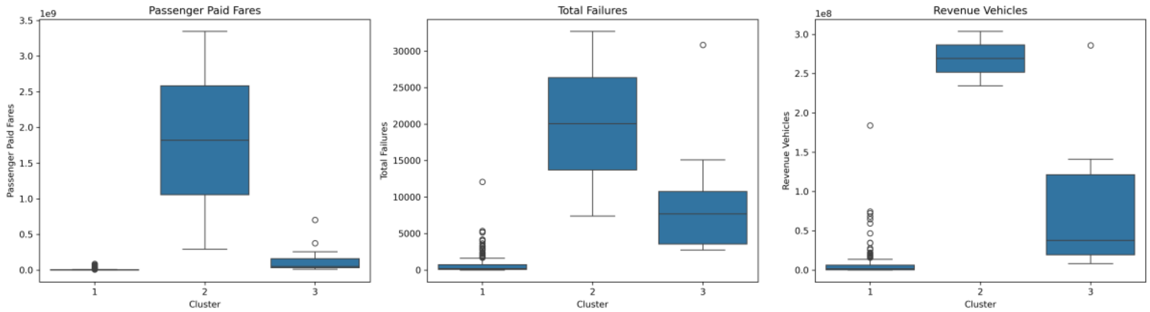
We also examined critical variables across the three clusters to ensure that agencies were reasonably categorized. We present a few examples of the clustering based on these variables. Beginning with a boxplot comparison of expenses across clusters, we can see that the three clusters are distinct. Figure A2 compares the **Total Modal Expenses** across the three K-means clusters on PCA-compressed features. It offers insights into how spending varies significantly among grouped transit agencies. The first cluster (left) includes the most budget-constrained agencies, with a tight grouping around lower expenditures relative to the other two clusters. This cluster represents those agencies with smaller operations. The second cluster (middle) has the highest median expenses with a large interquartile range, suggesting this group includes major metropolitan or state-wide agencies with broader service coverage. Finally, the third cluster (right) has a high median operating expense, but also at least one extremely high outlier, likely attributable to an agency with exceptional operational demands. The scale of budget is a strong differentiator among transit clusters.

Figure A2. Modal Expense Comparison



This next set of boxplots (Figure A3) illustrates how key operational and performance metrics vary across the clusters. Across all three variables, Cluster 2 stands out with the highest paid fare and highest volume of mechanical failures, consistent with the scale of operations and larger fleets. This is representative of agencies with extensive fleets (revenue vehicles), as displayed in the third panel. These observations suggest that the cluster contains midsize paratransit operations that exhibit strong revenue (through higher paid fares) but must operate with a larger fleet of vehicles, which increases the odds of higher vehicle failures.

Figure A3. Comparison of Fares, Failures and Vehicles Across Clusters



In short, the clustering analysis suggests three clusters of transit paratransit operations: a smaller set of agencies (Cluster 1) in terms of passengers, revenue and vehicles; a second set of agencies (Cluster 2) that very large (e.g., New York), with higher paid fares and fleet size, and a set of agencies that operate a more regional model with more revenue vehicles but with fares on the lower end (Cluster 3). MTA's paratransit operations belong to Cluster 3, and we use this cluster of agencies to compare the various aspects called out in the request for analysis.