INTERCITY TRANSIT DIAL-A-LIFT STUDY

Final Report

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NELSON
NYGAARD

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1 INTRODUCTION

Between 2013 and 2017, Intercity Transit experienced a decline of approximately 10.9% on its fixed route bus network while during that same timeframe, paratransit usage on the Dial-A-Lift service increased by approximately 12.2%[1]. Given this dramatic increase, Intercity Transit wanted to understand the factors responsible for this increased ridership and build a strategy to manage and plan for increased paratransit demand in the future.

This report, which summarizes the analysis that Nelson\Nygaard performed on Dial-A-Lift, is organized into six chapters.

Figure 1-1 Topic Areas Covered in Each Chapter

Chapter	Topic Areas
2	Ridership Assessment ▪ Overview of the dataset ▪ Trip- and person-level analysis results
3	Service Quality Assessment ▪ Overview of Dial-A-Lift's service quality standards ▪ Review of best practices and other transit agency standards ▪ Evaluation of Dial-A-Lift's performance
4	Eligibility Assessment ▪ Review of Dial-A-Lift's current eligibility process ▪ Examination of the riders and the trips that they take
5	Cost-Effectiveness ▪ Historical Dial-A-Lift cost trends ▪ Comparison against other fare-free paratransit systems ▪ Alternative service provisions research for paratransit
6	Ridership and Cost Forecast ▪ Estimated ridership until 2040 ▪ Anticipated O&M cost and fleet implications based on ridership estimates

[1] Computed from NTD Data.

2 RIDERSHIP ASSESSMENT

This chapter covers the findings of the ridership assessment. Specifically, this chapter includes an overview of the dataset and the results of the analysis. For the results section, the analyses are split out into three parts: basic descriptive statistics, analyses of trips, and analyses of riders.

OVERVIEW OF THE DATASET

Paratransit data from Intercity Transit was provided to Nelson\Nygaard for a period of 15 years, spanning from 2005 to 2019[2]. This dataset includes all paratransit trips taken during this time period, including specific details on the trip itself (e.g., start and end locations, number of passengers, length of trip) and the paratransit rider (e.g., age, type of mobility issue). Due to the confidential nature of this information, access to this data was restricted to immediate members of the project team and will be purged from Nelson\Nygaard's secure project file at the conclusion of this scope of work. No data references that could be tracked to specific individuals appear in this report.

One other point to mention is that the trip counts presented in this report may differ from the trip counts Intercity Transit reports to the Federal Transit Administration's National Transit Database (NTD). In a nutshell, the trip data reported in this report only includes trips made by ADA-eligible individuals. It does not include personal care attendants or travel companions that travel with the ADA-eligible individual, which are included in the NTD numbers.

Since Nelson\Nygaard's goal was to isolate the ridership growth for Dial-A-Lift from ADA-eligible individuals, it made sense to exclude personal care attendants and travel companions from the analysis. These additional riders only occur on the system because a certified individual takes a trip. So, generally, those ancillary trips grow in direct proportion to the trips made by certified individuals. What is also worth emphasizing is that before COVID and the associated social distancing, the accommodation of these ancillary trips would not increase the capacity need, the revenue hours, or number of vehicles needed to provide Dial-A-Lift service as these other riders would be occupying what would be unused space on the vehicle.

One policy change that could upset this assumption as a basis for projecting ridership, revenue hours, and vehicle needs is if Dial-A-Lift allowed personal care attendants or travel companions to have a different trip origin and/or trip destination than the ADA-certified person they are accompanying. However, we found no evidence of this occurring in the data.

A table showing the comparison between the trip counts used in this report and the NTD numbers are shown in the appendix.

[2] 2005 and 2019 data did not cover an entire year. 2005 data was excluded from this analysis while 2019 data was scaled up to approximate a full year of data.

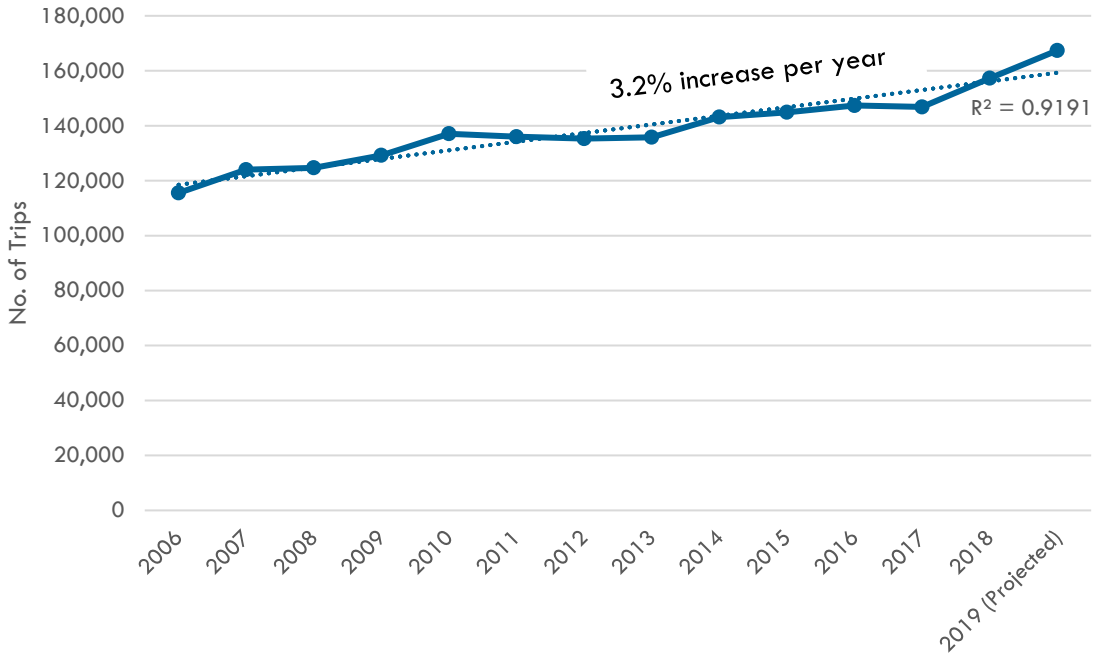
BASIC DESCRIPTIVE STATISTICS

This section presents some of the basic descriptive statistics of the analysis of the paratransit dataset. This section serves to paint a general picture of paratransit usage before diving into more deep analyses that focus on the details of the trips being taken as well as the riders themselves.

Historical Paratransit Trips per Year

Figure 2-1 shows the historical number of paratransit trips from 2006 to 2019 (2019 data was scaled up to be representative of a full year of data[3]). As the chart shows, paratransit ridership has been steadily increasing at approximately 3.2% per year.

Figure 2-1 Number of Annual Trips per Year

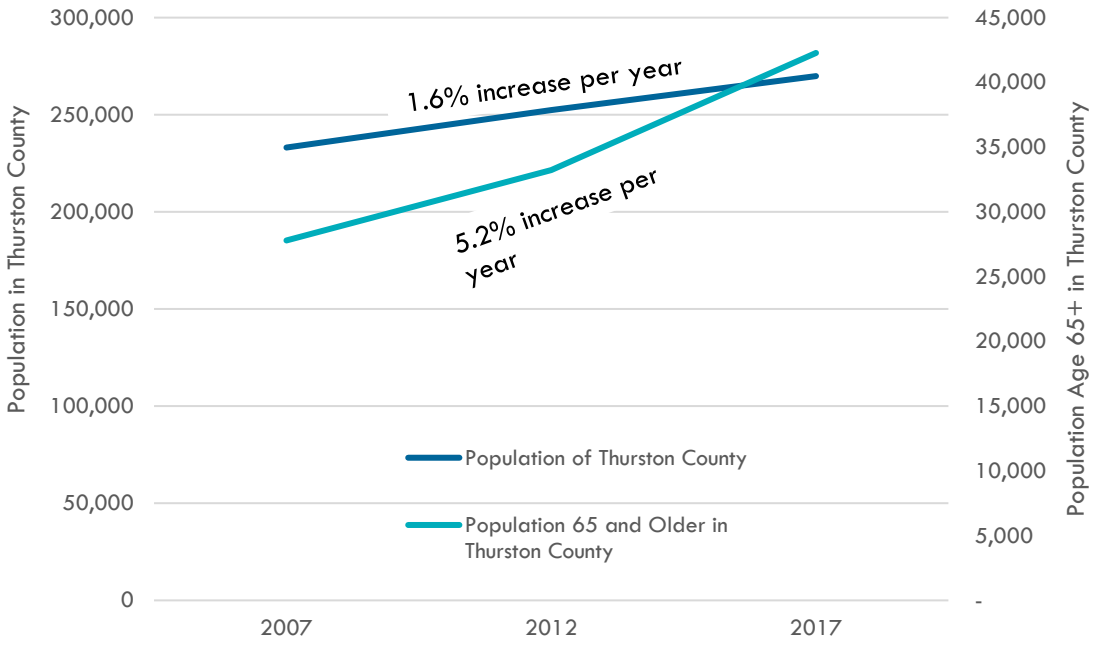


[3] 2019 data only goes up to May 30. The data was scaled up to represent a full year of data in this report where appropriate.

Historical Population Growth in Thurston County

Seeing the rise in paratransit usage, the next logical question is how this increase compares to the overall growth in population in Thurston County, as well as the growth in seniors (persons age 65+). Figure 2-2 shows the historical population growth of the county and its senior population using data from the U.S. Census Bureau's American Community Survey. When Figure 2-2 is compared to Figure 2-1, it can be seen that paratransit usage has been increasing at a faster rate than the overall population. Perhaps more surprising is that the population of seniors in Thurston County is growing at a faster rate than the population of the county.

Figure 2-2 Historical Population Growth in Thurston County



Source: ACS 2008 (3-Year Estimates), ACS 2012 (5-Year Estimates), ACS 2017 (5-Year Estimates)

Population by age cohort was also examined using Census data. The results, presented in Figure 2-3, show that during a 10-year span, while the population of the county increased by 16%, the population of seniors experienced a more dramatic increase, with a whopping 82% increase in the age 65 to 74 cohort alone. While some of this increase could be attributed to aging of the population in the county, this likely also indicates some migration to the county (either from other parts of the state or country).

While it is true that all seniors may not be eligible for Dial-A-Lift service, this finding is intriguing because there is a correlation between age and the likelihood of having some kind of disability, which in turn could make an individual eligible for using the service. This demographic change is likely a major driver in the increase in paratransit usage; however, it may not be the only one.

Figure 2-3 Percent Change in Population in Thurston County by Age Group

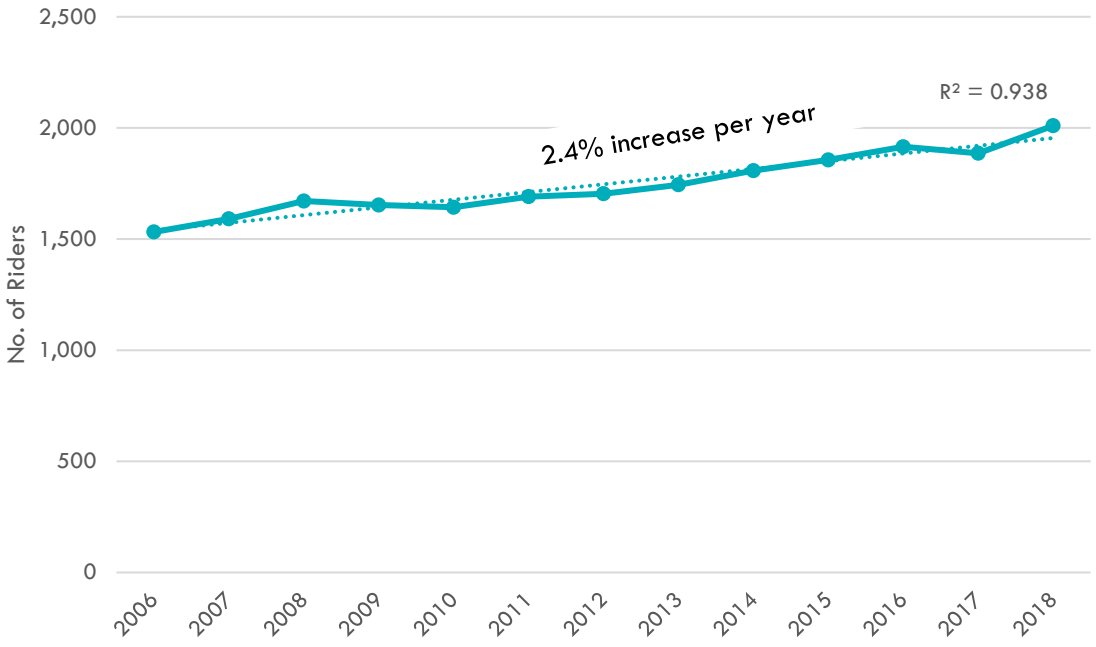
	Percent Change between 2007 and 2017
Total Population	**16%**
Under 5 Years	19%
5 to 9 Years	19%
10 to 14 Years	8%
15 to 17 Years	4%
18 to 24 Years	2%
25 to 34 Years	16%
35 to 44 Years	8%
45 to 54 Years	-3%
55 to 64 Years	30%
65 to 74 Years	82%
75 to 84 Years	28%
85 Years and Over	3%

Source: ACS 2008 (3-Year Estimates), ACS 2017 (5-Year Estimates)

Number of Unique Riders Each Year

To see how many riders are using Dial-A-Lift service, the number of unique riders using the system was identified for each year. Figure 2-4 shows that the number of unique paratransit riders each year has been steadily increasing since 2006. This finding indicates that the paratransit ridership increase is driven in part due to the increase in the number of individuals using the paratransit system each year.

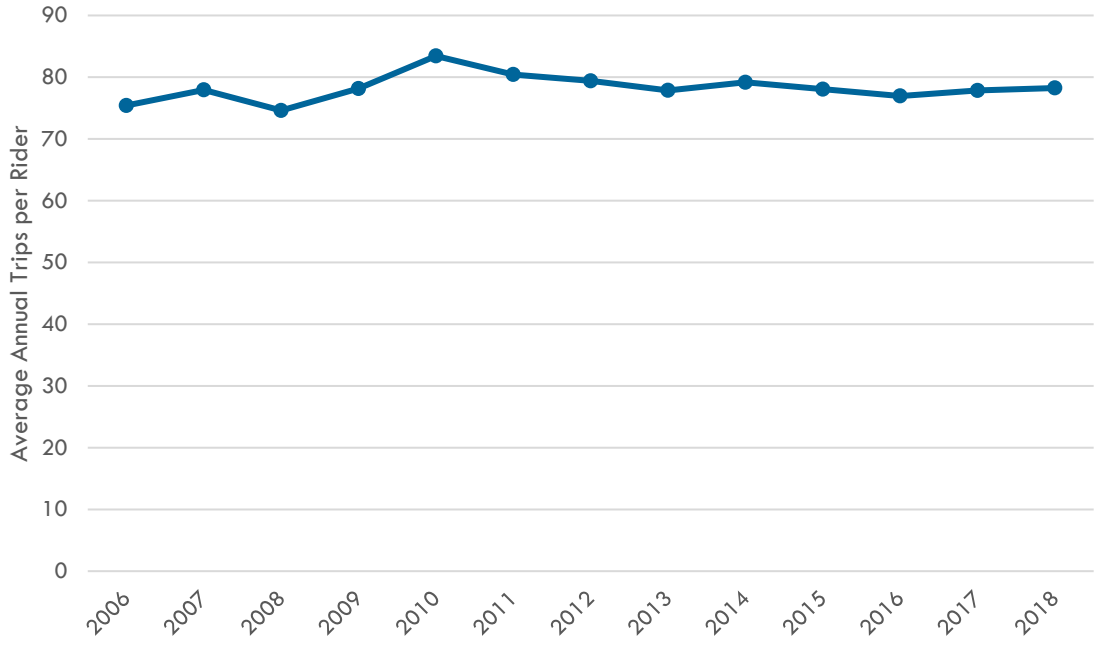
Figure 2-4 Number of Unique Riders Each Year



Average Annual Trips per Rider

Seeing the number of trips and unique riders going up, the next question to ask is whether the number of trips each rider takes each year is changing or remaining the same. Figure 2-5 shows the computed number of average annual trips per rider from 2006 to 2018[4], which has remained fairly stable. This figure is very telling because it indicates that the paratransit ridership increase appears to be more directly influenced by the number of new riders rather than an increase in the number of trips each rider makes.

Figure 2-5 Average Annual Trips per Rider



[4] 2019 data is not included in this analysis because the number of unique riders cannot be projected for the entire year.

TRIP ANALYSES

This section analyzes the various characteristics of trips taken on Dial-A-Lift, including day of the week, time of day, and trip origins/destinations. These are presented in their own respective subsections.

Usage by Day of Week

This subsection analyzes the usage of the Dial-A-Lift system by day of the week. Figure 2-6 presents the number of weekday trips per year while Figure 2-7 presents the number of weekend trips per year. While both are growing, the weekend trips are growing at a faster rate of 7.2% a year on average.

Figure 2-6 Annual Number of Weekday Trips

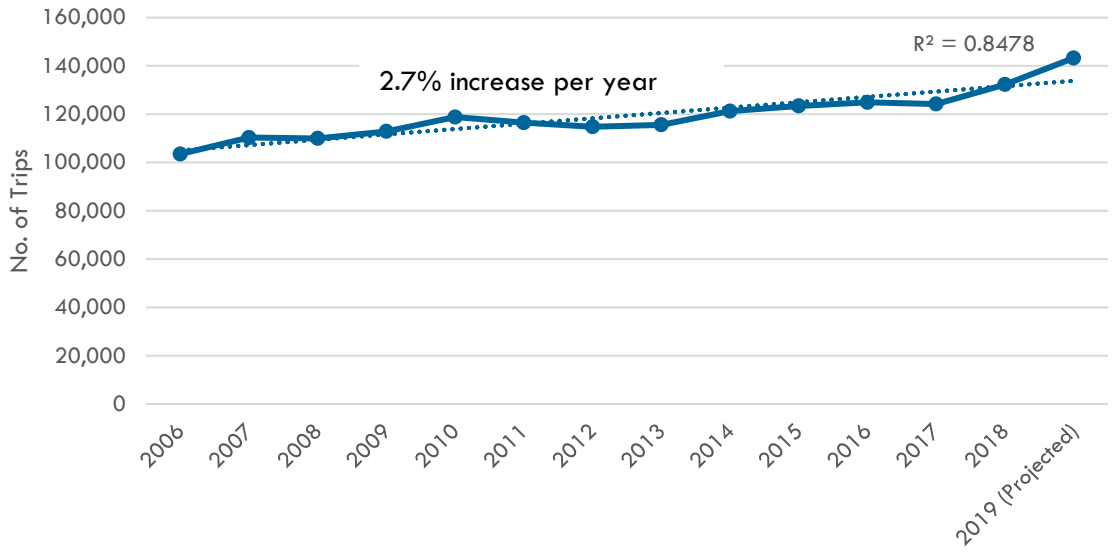
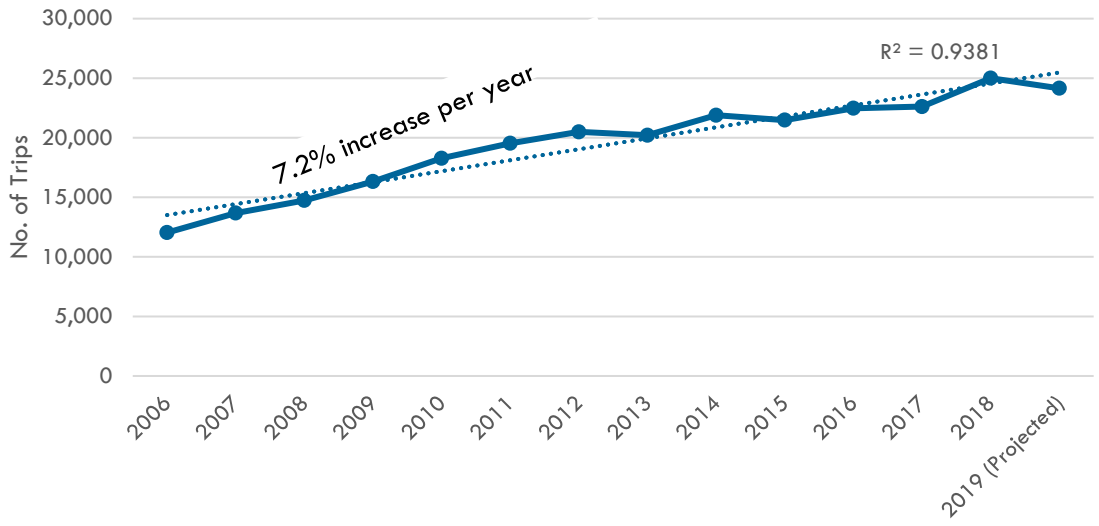


Figure 2-7 Annual Number of Weekend Trips



When the five weekdays and two weekend days are shown on combined charts (see Figure 2-8 and Figure 2-9, respectively), a couple interesting findings can be drawn. First, weekday travel, regardless of the day, all appear to be growing at roughly the same rate, with certain days continuing to be preferable days for travel over other days. Second, for weekend travel, Saturdays have historically been the more popular day to travel, however the number of Saturday trips is now roughly the same as the number of Sunday trips.

Figure 2-8 Annual Number of Trips by Day of Week (Weekdays)

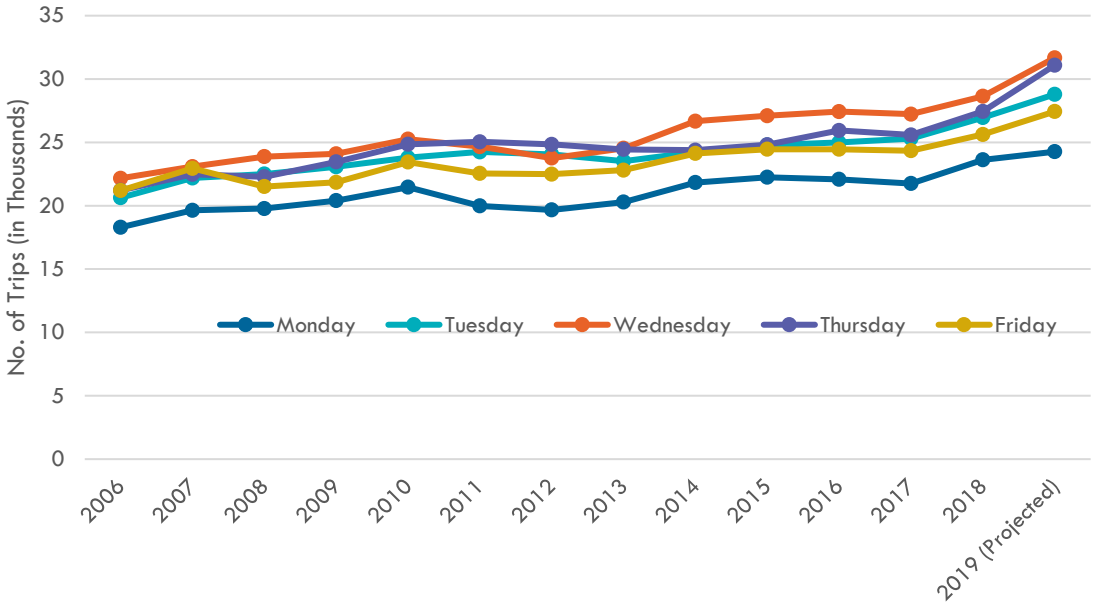
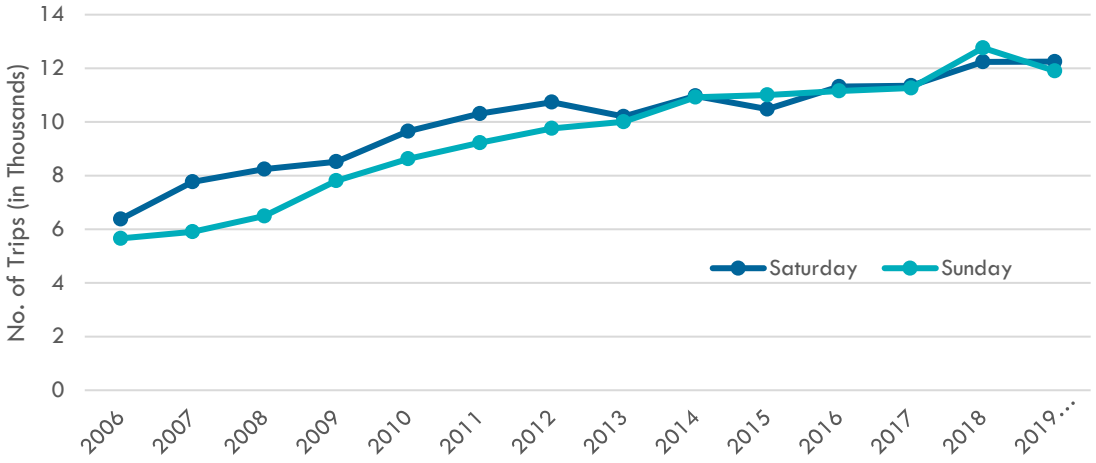


Figure 2-9 Annual Number of Trips by Day of Week (Weekends)



Temporal Distribution of Trips

This subsection presents an analysis of the historical temporal distribution of trips by days of the week to see how trip making patterns have changed between the start (2006), middle (2012), and end of the dataset (2018).

Figure 2-10 presents the historical temporal distribution of ridership for weekdays. Over time, one can see the progression from a distribution with several peaks in 2006 to a normal distribution in 2018, indicating a more gradual increase and decrease in demand throughout the day.

Figure 2-11 presents the historical temporal distribution of ridership for Saturday. While the 2018 temporal distribution is similar to that of 2006, what is interesting to note is a more concentrated peak in the morning at around 10 AM, and a reduced peak in the evening around 8 PM.

Figure 2-12 presents the distribution for Sunday. What is notable here is that while there have always been two concentrated peaks (attributable primarily to church trips), the 2018 data shows this peak intensifying, resulting in a smaller proportion of ridership occurring in the afternoon and early evening.

Figure 2-10 Temporal Distribution of Ridership for Weekdays (2006, 2012, 2018)

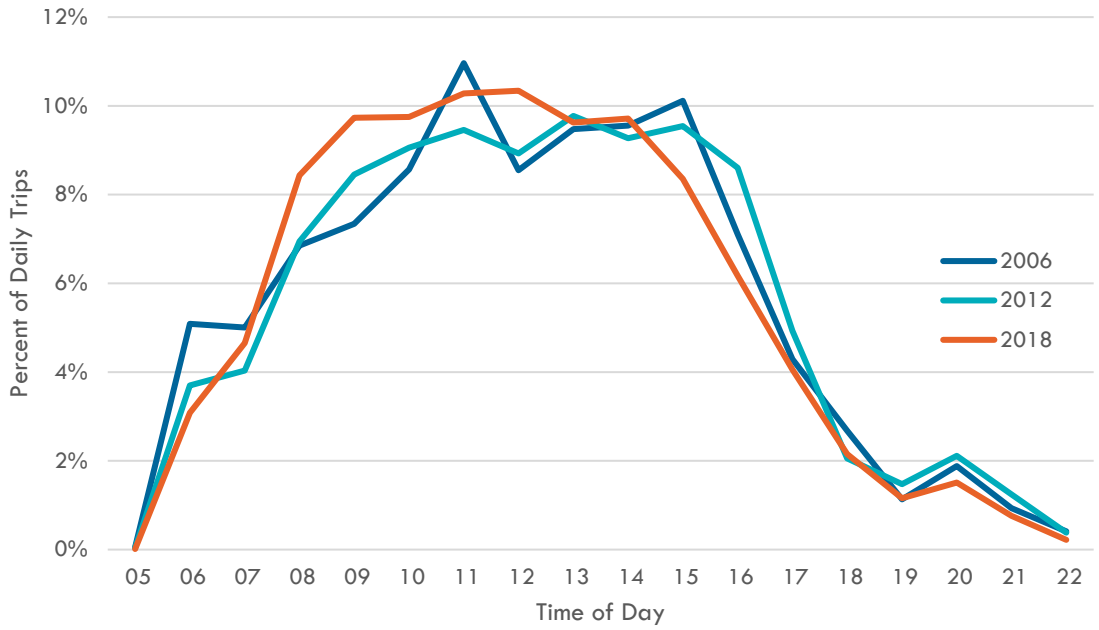


Figure 2-11 Temporal Distribution of Ridership for Saturday (2006, 2012, 2018)

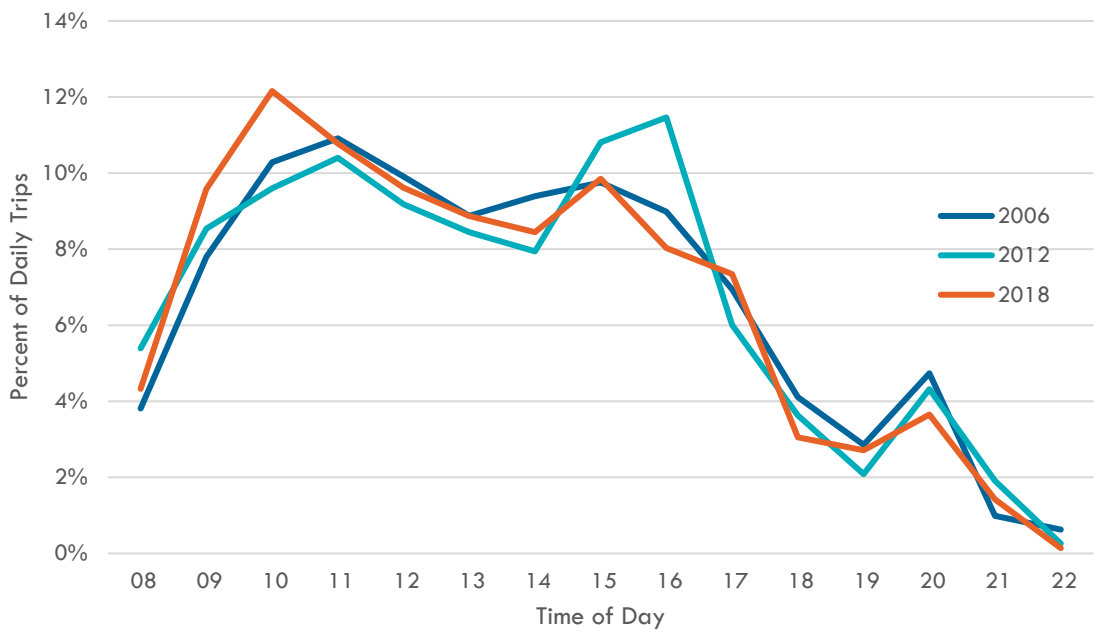
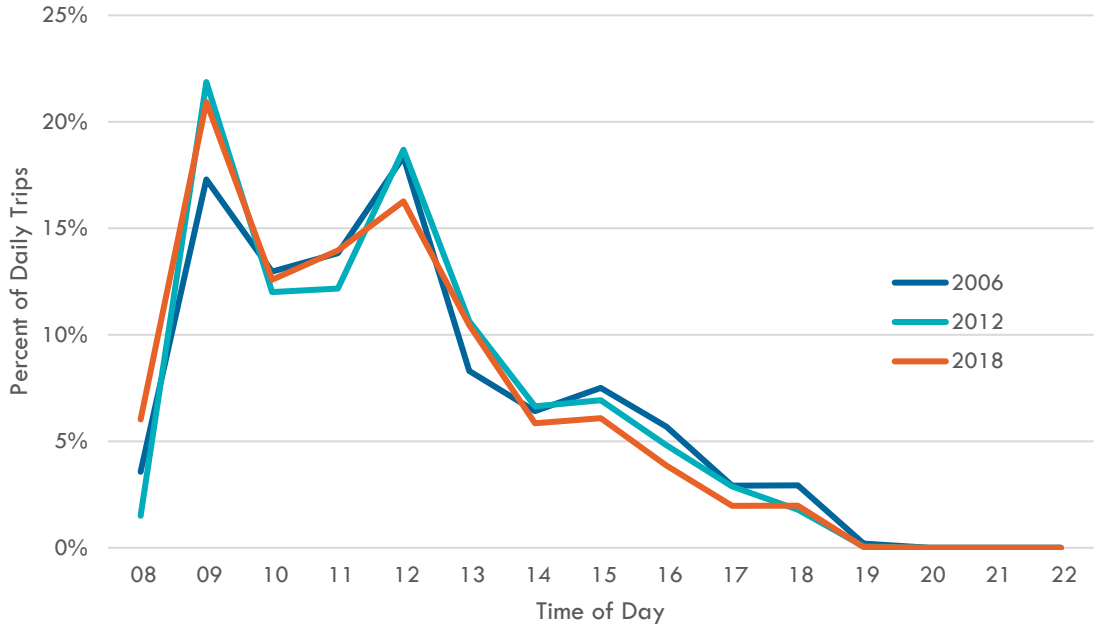


Figure 2-12 Temporal Distribution of Ridership for Sunday (2006, 2012, 2018)



The temporal distribution for each of the five weekdays was also examined for 2006, 2012, and 2018 (Figure 2-13, Figure 2-14, and Figure 2-15, respectively). Collectively, while these charts show the transformation from a service that has several peaks in 2006, to one that follow a more normal distribution in 2018, they also indicate subtle variations in travel demand depending on the

day of the week. This is particularly evident in the 2018 distribution in the 9 AM to 2 PM timeframe and again at 8 PM.

Figure 2-13 Temporal Distribution of Ridership for Weekdays (2006)

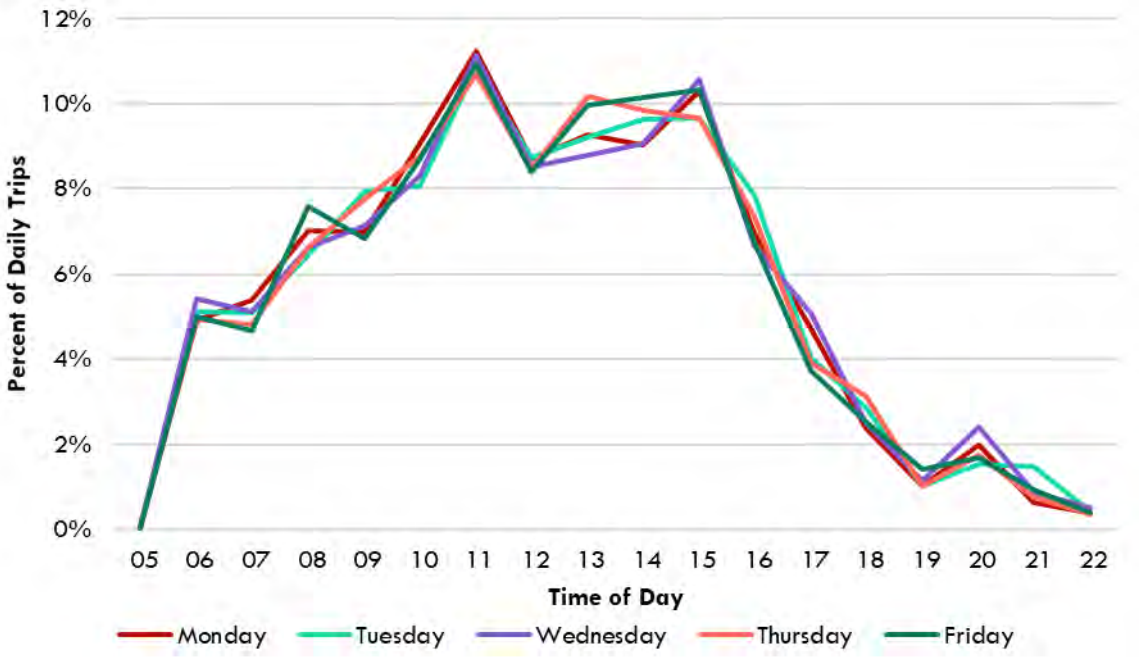


Figure 2-14 Temporal Distribution of Ridership for Weekdays (2012)

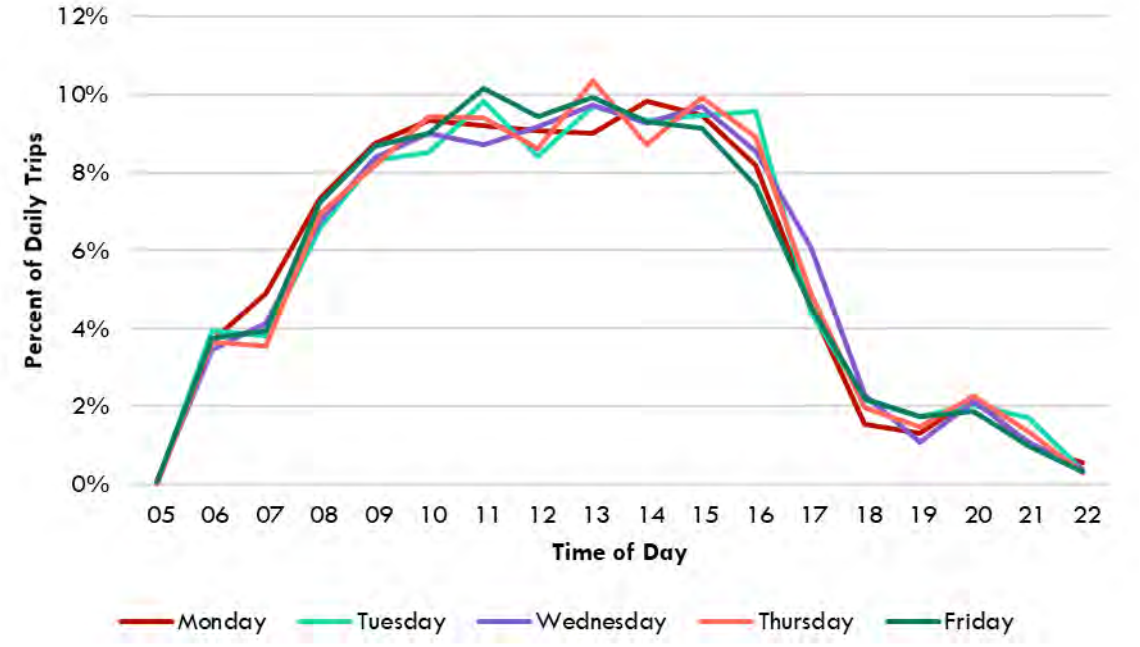
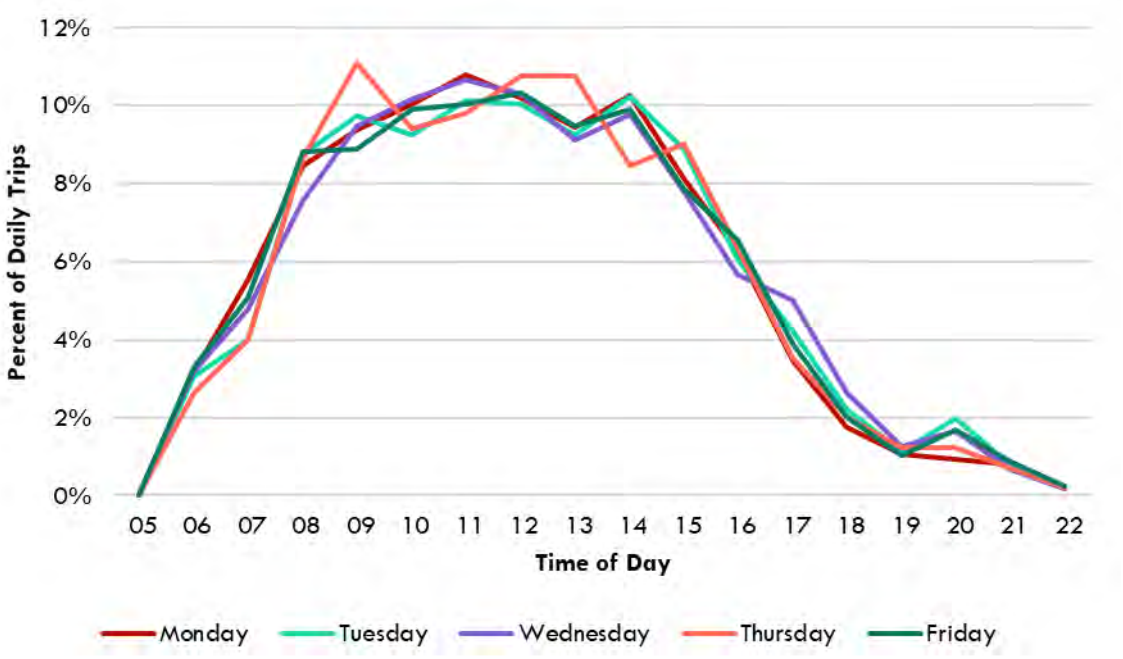


Figure 2-15 Temporal Distribution of Ridership for Weekdays (2018)



Trip Origins and Destinations

For some, but not all trips, trip origin and destination categories were recorded in the dataset. The historical aggregated results are shown in Figure 2-16 and Figure 2-17, respectively. While the origin and destination results are similar, they both show that there has been a large increase in predominantly the number of unknown trips and medical trips. Also experiencing an increase are recreational trips such as shopping, going to church, and eating at a restaurant.

Figure 2-16 Historical Top Origin Categories (2006, 2012, 2018)

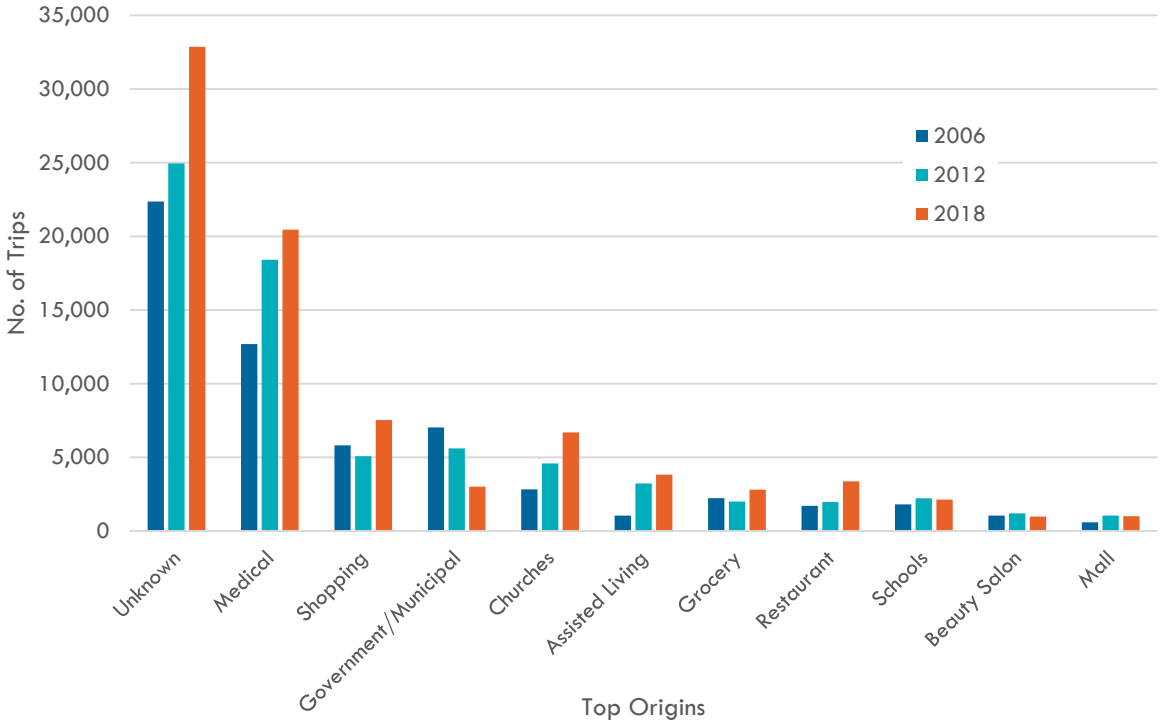
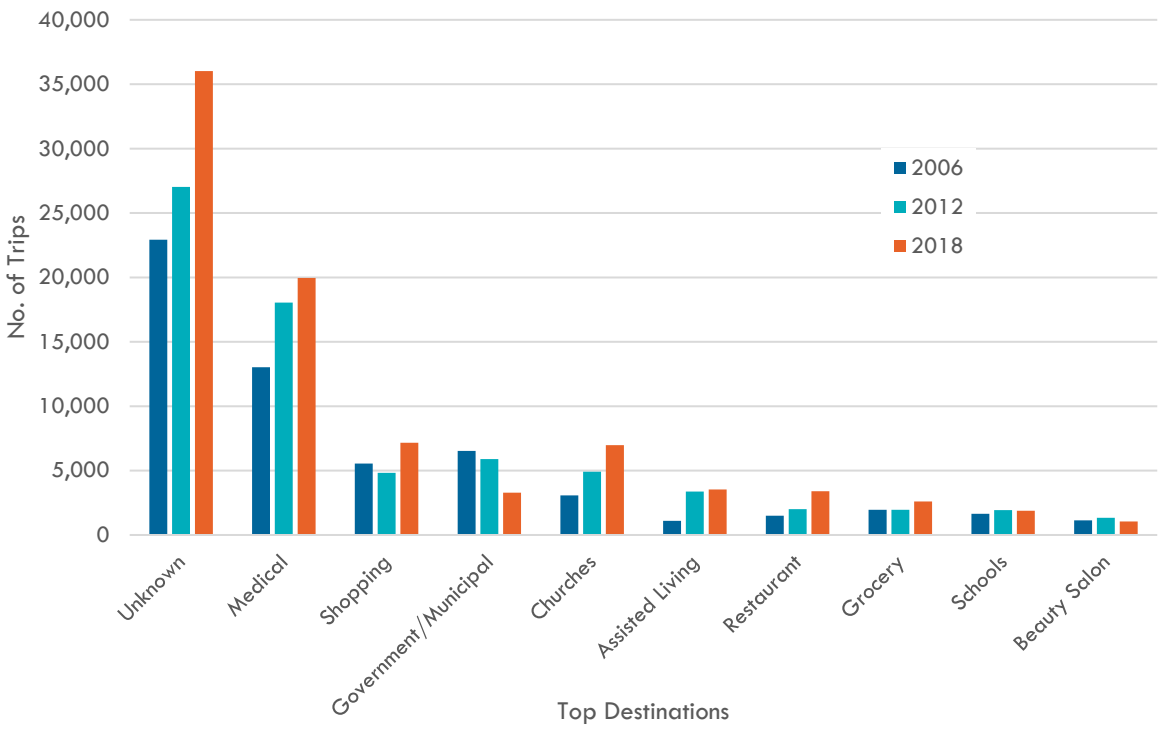


Figure 2-17 Historical Top Destination Categories (2006, 2012, 2018)



Since Dial-A-Lift weekend ridership has increased at a higher rate than weekday ridership, the top 10 origins and destinations for Saturday and Sunday trips were examined.

Saturday's top trip origins and destinations are shown in Figure 2-18 and Figure 2-19, respectively. While they are similar, they both show that aside from unknown trip types, medical and recreational trips drive demand on Saturday, with both categories showing increases since 2006.

Figure 2-18 Top 10 Origin Categories on Saturday (2006, 2012, 2018)

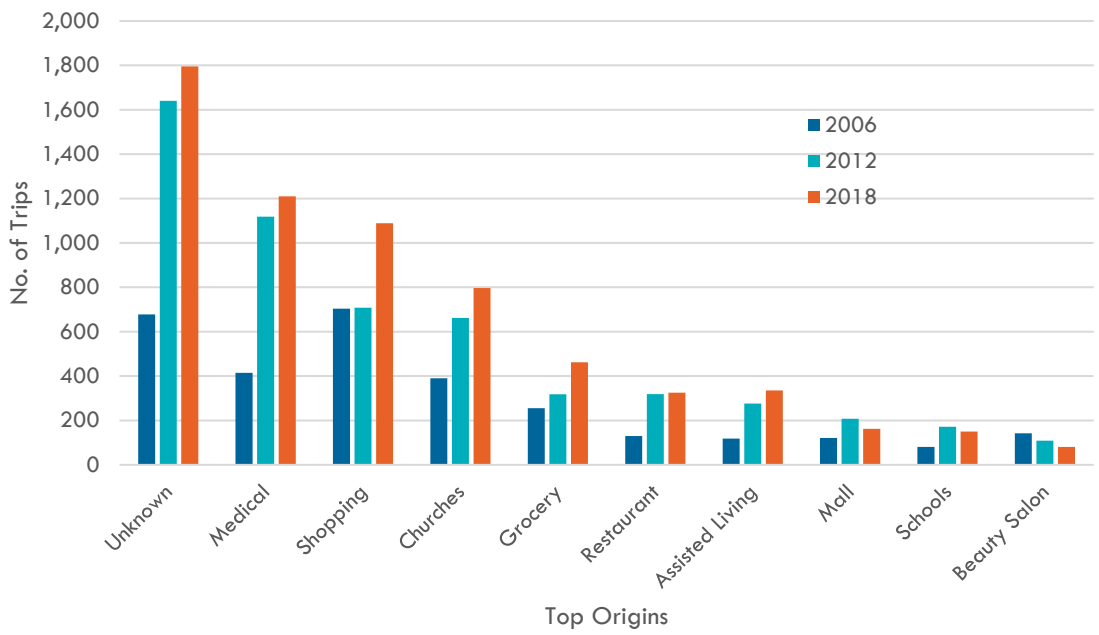
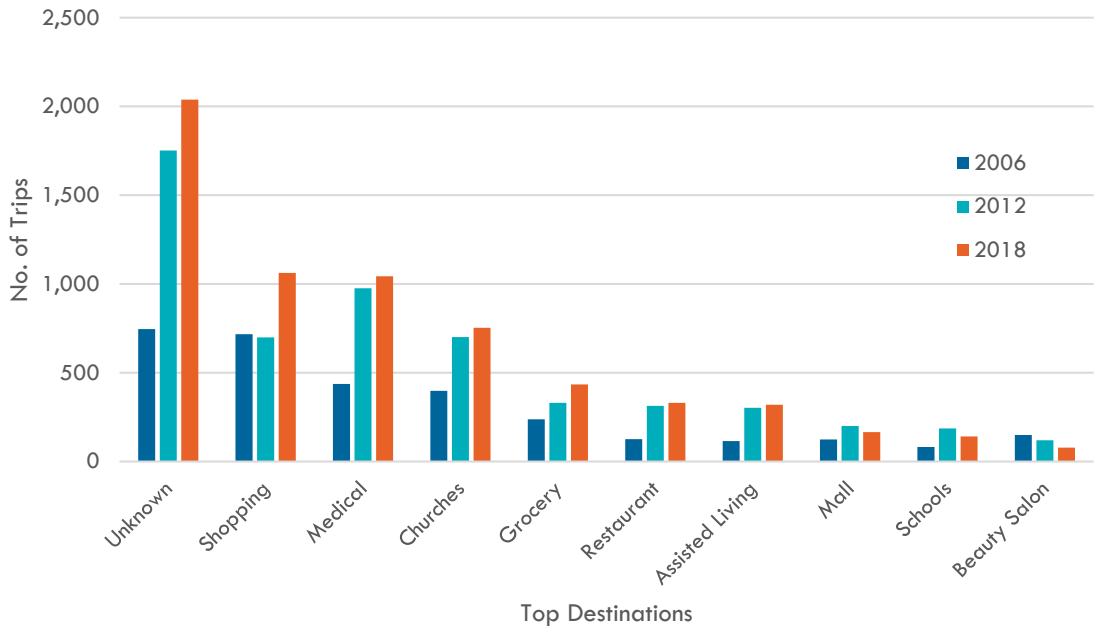


Figure 2-19 Top 10 Destination Categories on Saturday (2006, 2012, 2018)



Sunday top trip origins and destinations are shown in Figure 2-20 and Figure 2-21, respectively. Perhaps not surprisingly, trips to Church are the predominant trip purpose on Sundays and have continued to grow at a high rate since 2006.

Figure 2-20 Top 10 Origin Categories on Sunday (2006, 2012, 2018)

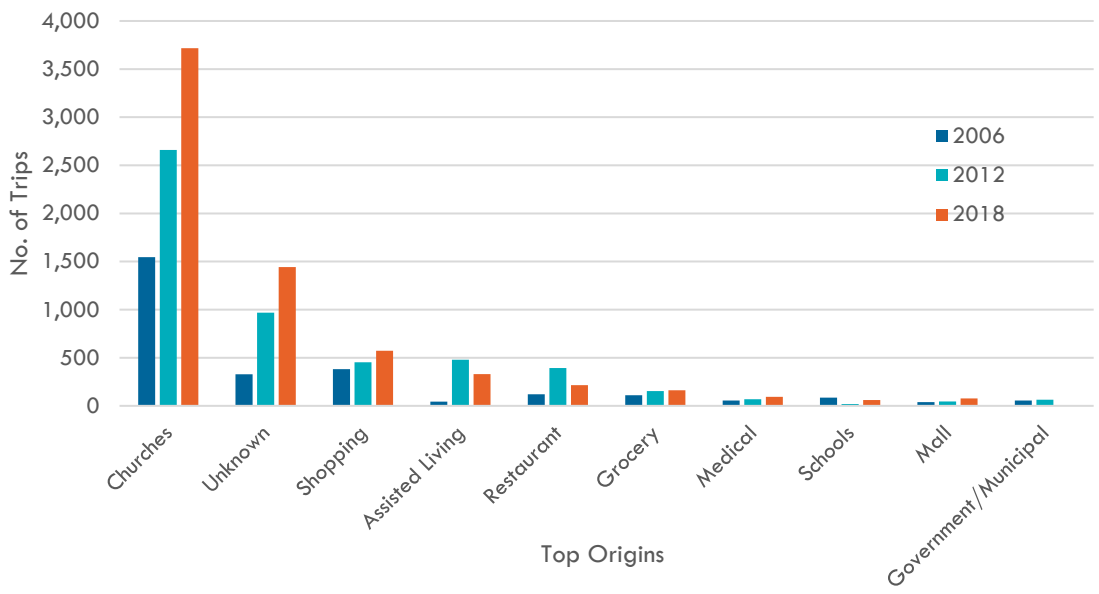
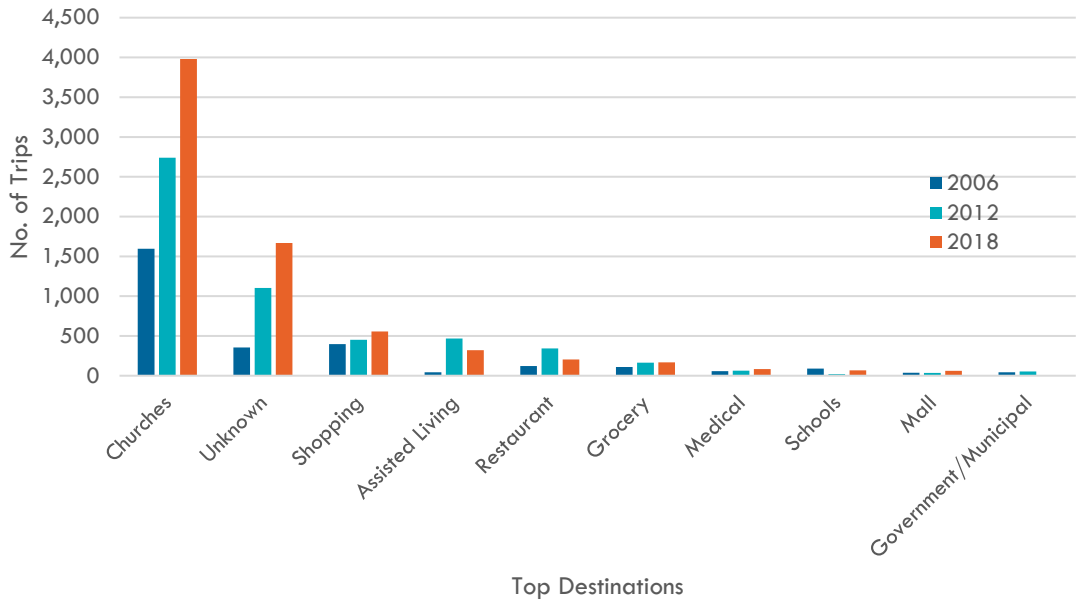
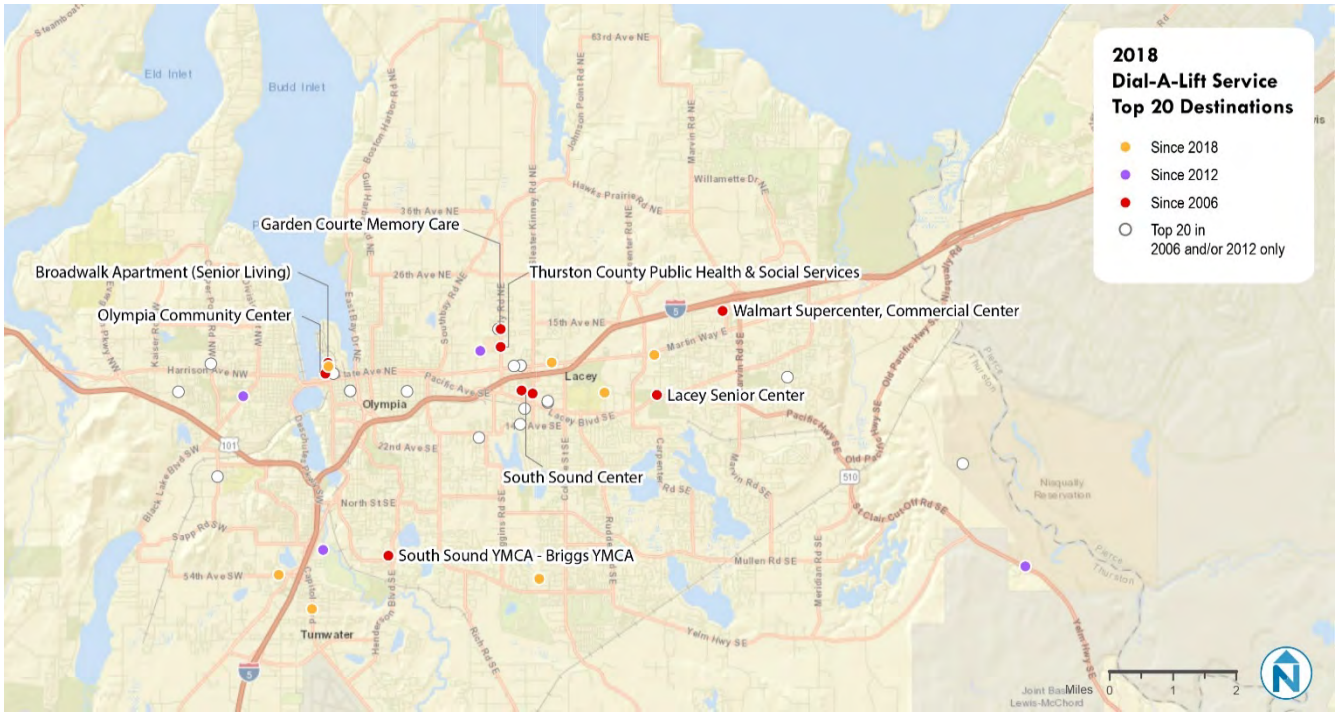


Figure 2-21 Top 10 Destination Categories on Sunday (2006, 2012, 2018)



Given the large number of unknown origins and destinations, a mapping exercise was performed on the top 20 destinations in 2006, 2012, and 2012 to understand whether travel patterns have changed over time. The results, shown in Figure 2-22, indicate there are eight top destinations that have remained in the top 20 since 2006. These top destinations make sense, given their regional importance in either providing medical care, shopping opportunities, or social/recreational activities for seniors.

Figure 2-22 Top 20 Destinations in 2006, 2012, and 2018



RIDER ANALYSES

This section analyzes the various characteristics of riders who use Dial-A-Lift, focusing on variables such as age, rider turnover, and frequency of usage. The examination of each of these characteristics are presented in their own respective subsections.

Age of Riders

The age of a Dial-A-Lift user can have an impact on their overall usage of the system. To start, the age of each unique rider was examined at three different timepoints in the dataset: 2006, 2012, and 2018. As Figure 2-23 shows, the distribution of riders is predominantly seniors (over the age of 65) and that share has increased slightly over time (60% of riders in 2006 compared to 64% of riders in 2018).

Figure 2-23 Age Distribution of Unique Riders (2006, 2012, 2018)

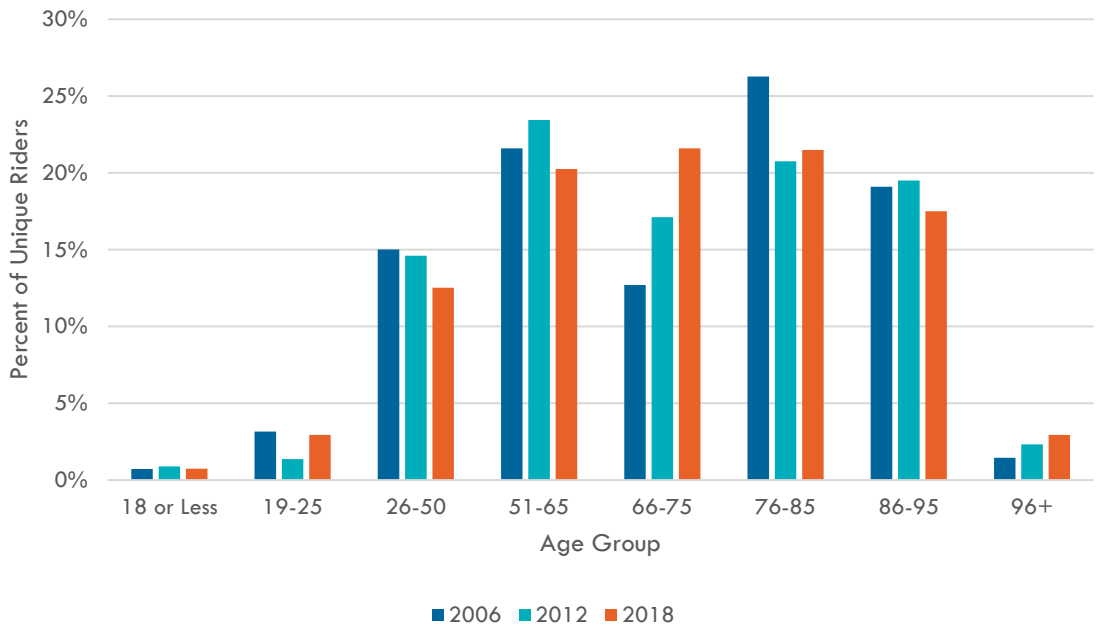
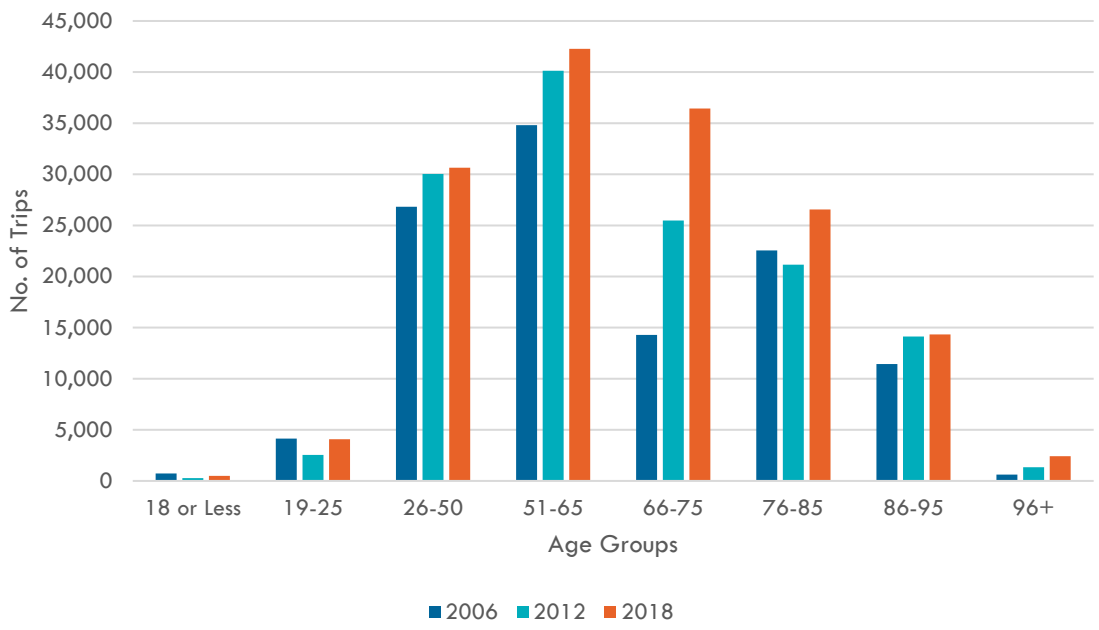


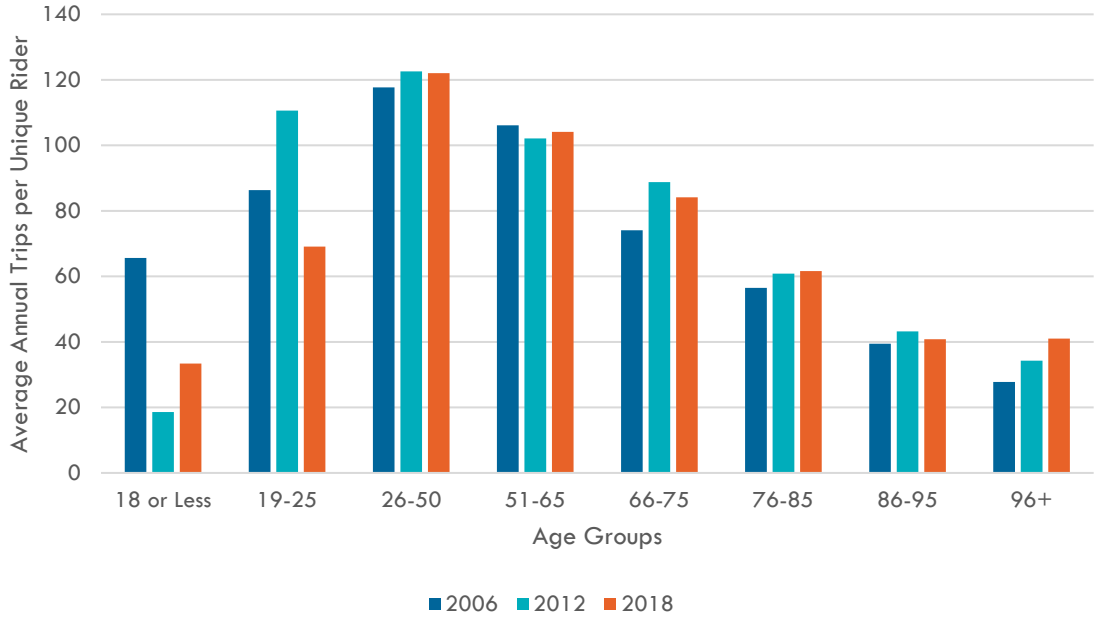
Figure 2-24 presents the number of trips taken by each age group for the three years in question. While almost all age groups have seen steady increases in trip making, the age 66 to 75 group has seen the largest increase.

Figure 2-24 Number of Trips Taken by Age Group



Calculating the average annual number of trips per unique rider helps to gain a sense of how frequently riders use the system based on their age. As Figure 2-25 shows, the average number of trips taken annually peaks when riders are in their "working years" (age 26 to 50), with gradual reductions being seen as riders get older.

Figure 2-25 Average Annual Number of Trips per Unique Rider



Rider Turnover

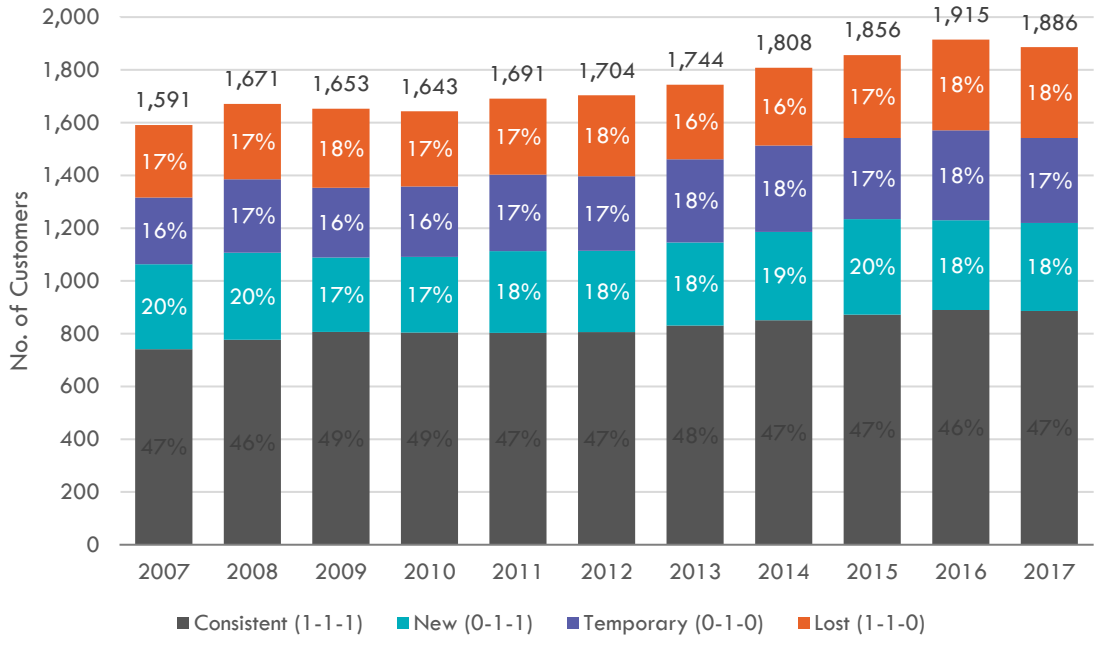
Given the eligibility requirements to use paratransit service, some riders may only use the service for a short period of time (e.g., during a temporary disability), resulting in a higher than expected turnover rate. To understand Dial-A-Lift's turnover rate, three-year increments were analyzed in the dataset, starting with 2005 to 2017. Using the methodology outlined in Figure 2-26, a customer's status was determined every year.

Figure 2-26 Methodology for Determining Customer Status

Customer Status	Did the customer take paratransit the **prior year**?	Did the customer take paratransit the **current year**?	Did the customer take paratransit the **subsequent year**?
Consistent	**Yes**	**Yes**	**Yes**
New	**No**	**Yes**	**Yes**
Temporary	**No**	**Yes**	**No**
Lost	**Yes**	**Yes**	**No**

The results, shown in Figure 2-27, indicate a consistent composition of ridership, with over half of the ridership turning over every year since 2007, consistent with other paratransit services throughout the country.

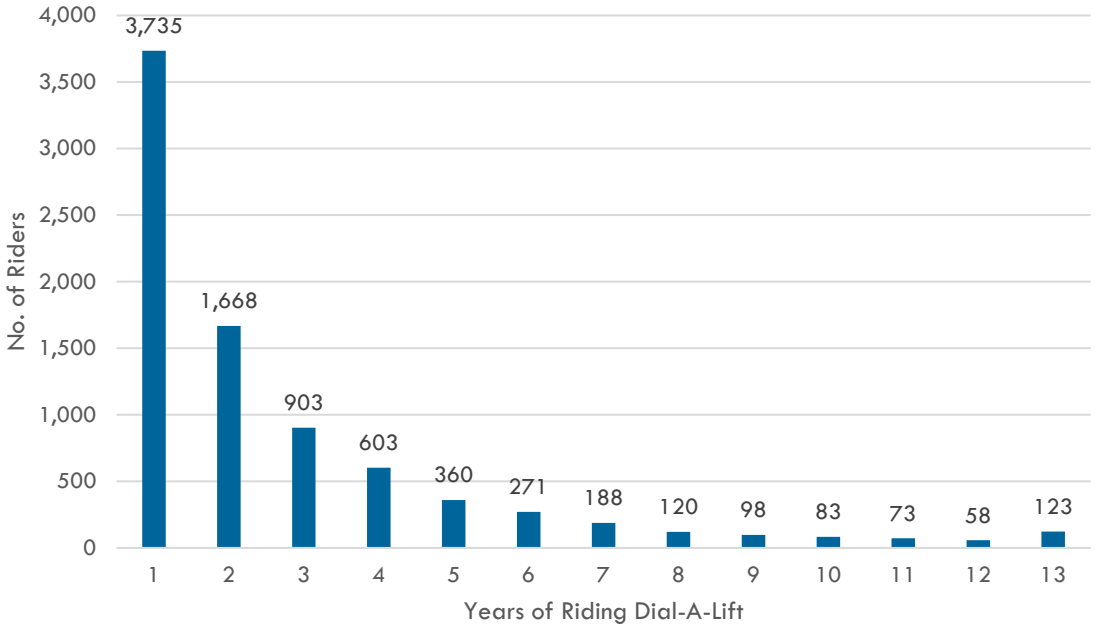
Figure 2-27 Customer Status by Year



Rider Tenure

Looking at rider tenure, or the number of years a rider has been using Dial-A-Lift, is another important metric to track when examining turnover. As shown in Figure 2-28, the vast majority of riders using Dial-A-Lift have used the system for only one year during the 2006 to 2018 period. On the other end of the spectrum is the select group of 123 riders who have ridden each year in the 13-year time span. As the figure indicates, there is a steep drop off in tenure from year 1, which continues until around year 8, after which it flattens out.

Figure 2-28 Rider Tenure from 2006-2018



Looking at the frequency of Dial-A-Lift usage and comparing it to a rider tenure is a good way to see if tenure has any impact on trip making. As shown in Figure 2-29 and Figure 2-30, as tenure increases, the likelihood of an individual to make more than 100 trips in a year increases.

Figure 2-29 Number of Trips by Rider Tenure (Years 1 to 13)

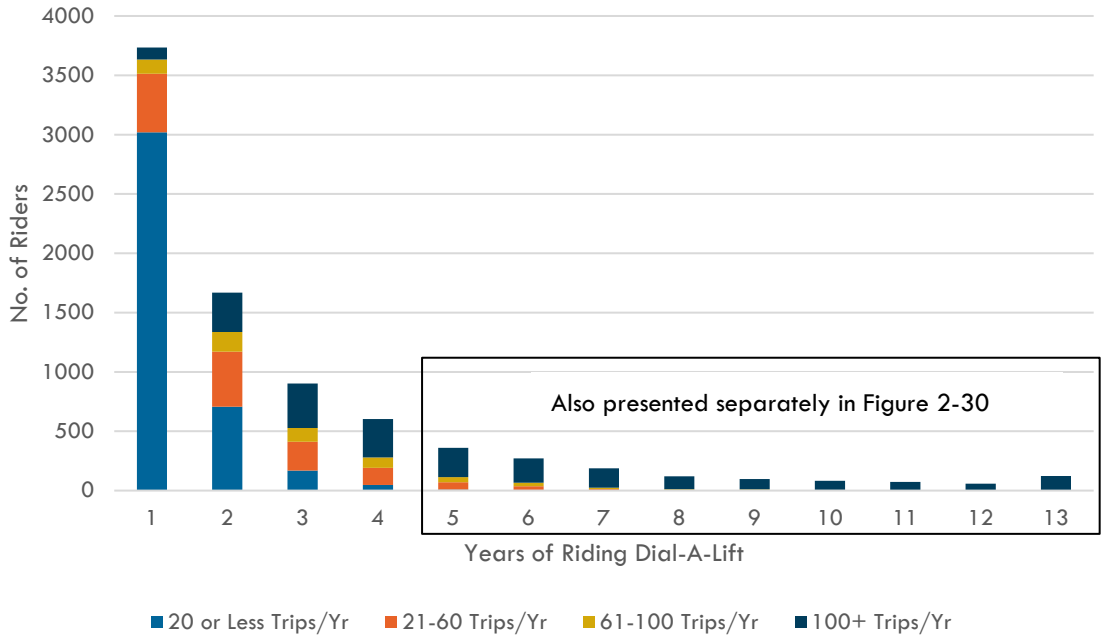
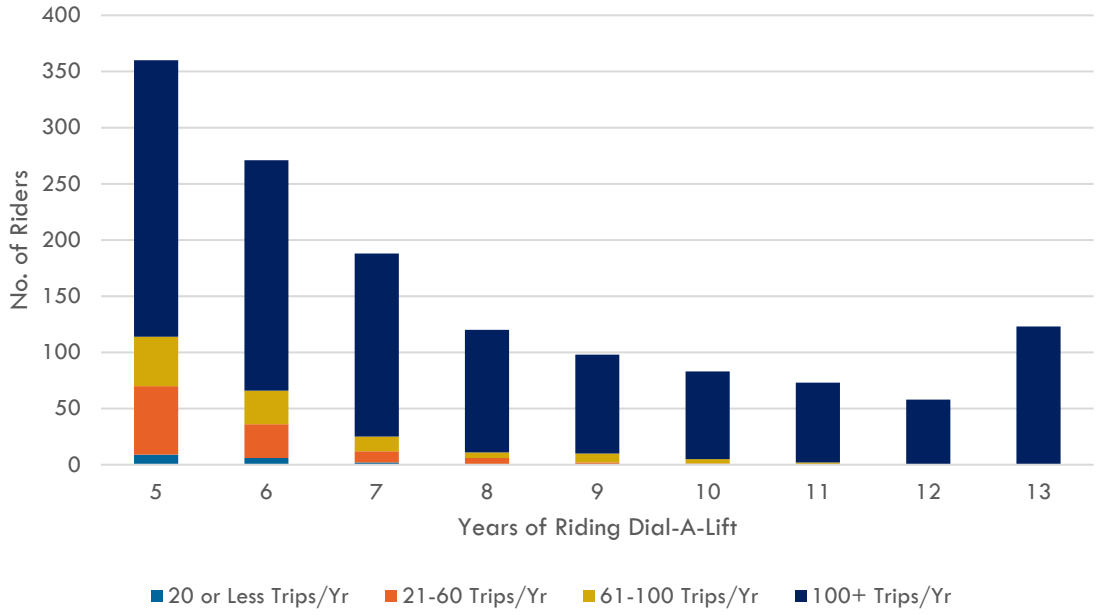


Figure 2-30 Number of Trips by Rider Tenure (Years 5 to 13)



The 13-Year Riders

Examining the riders that have used the system every year in the 13-year period of the dataset can be helpful in seeing how an individual's travel patterns may change over time as he/she gets older. Using the 123 riders that were identified as using Dial-A-Lift for each of the 13 years in the dataset, additional analyses were performed, which are presented in subsequent figures.

Figure 2-31 presents the age distribution of these 123 riders in the first year of the dataset and again at the last year of the dataset.

Figure 2-32 shows the number of trips taken by each age group while Figure 2-33 shows the average number of trips per rider in each age group. The results from Figure 2-33 are consistent with those presented in Figure 2-25, which shows the number of trips taken on Dial-A-Lift decline with age.

Figure 2-31 Unique Riders by Age Group (13-Year Riders)

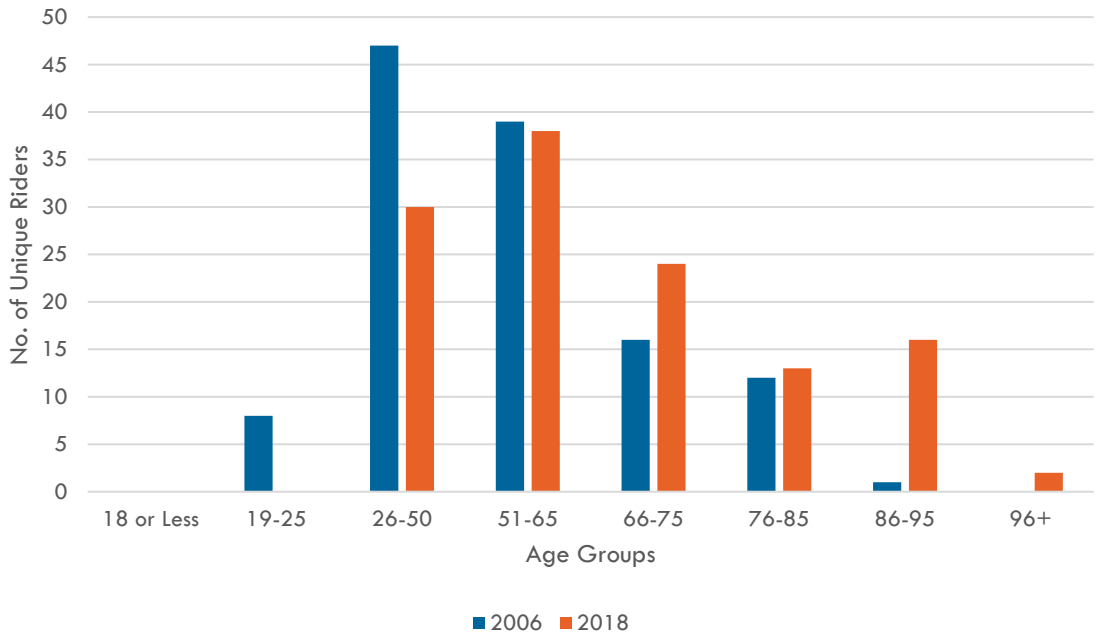


Figure 2-32 No. of Trips taken by Age Group (13-Year Riders)

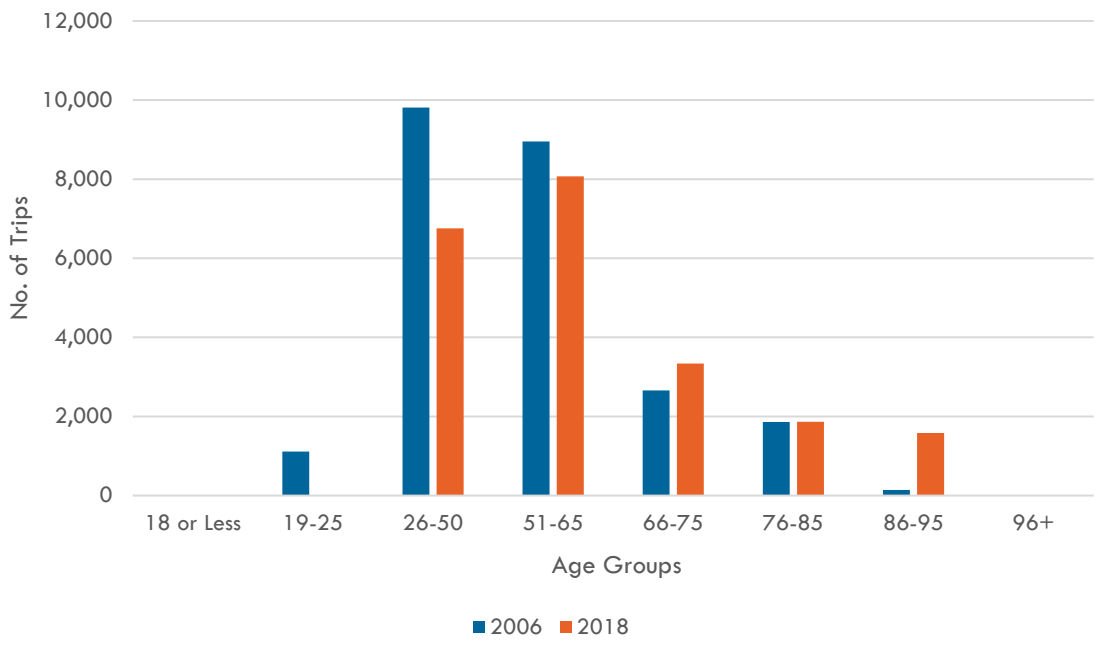
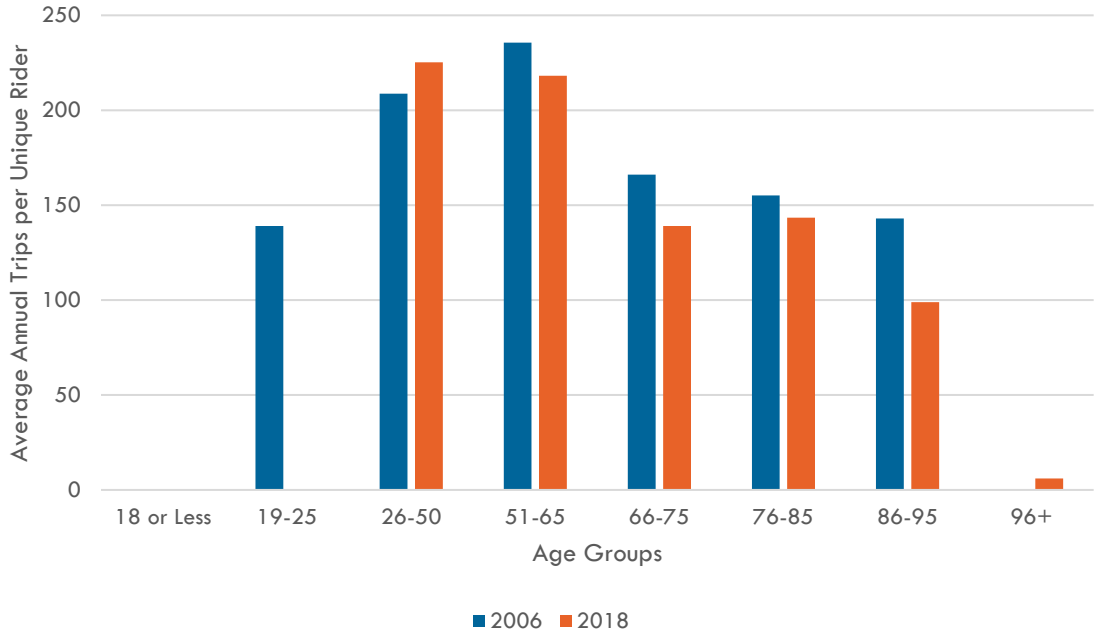
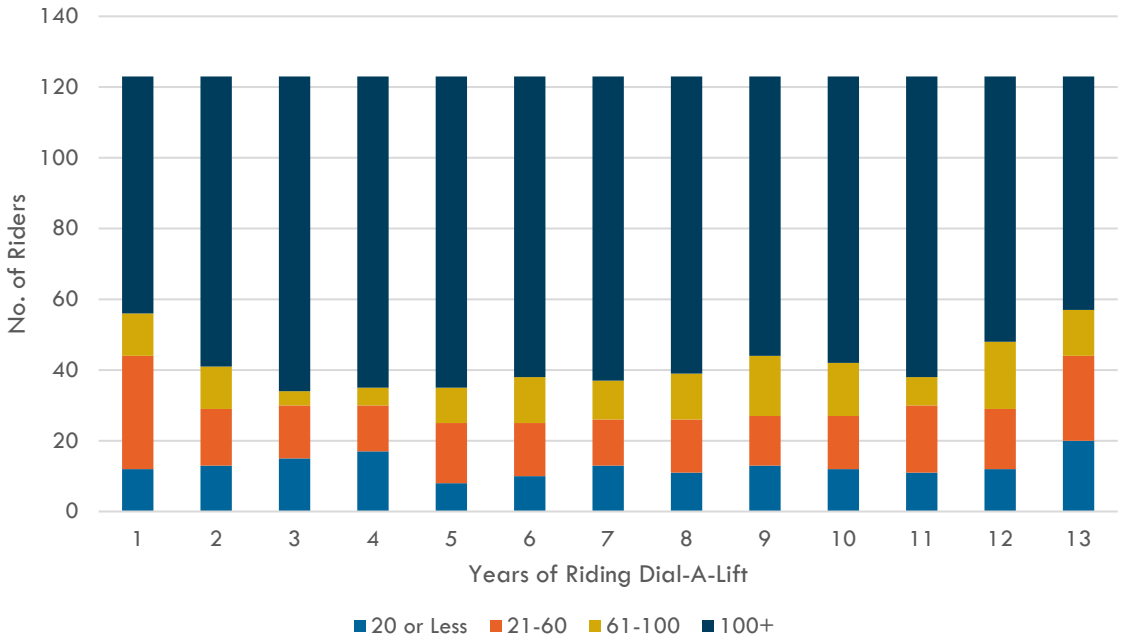


Figure 2-33 Average Annual Number of Trips per Unique Rider (13-Year Riders)



Analyzing the number of trips taken annually by year of tenure for these 13-year riders is another way to track system usage as riders get progressively older. As Figure 2-34 shows, at least half of these 13-year riders have been taking more than 100 trips per year starting in their first year.

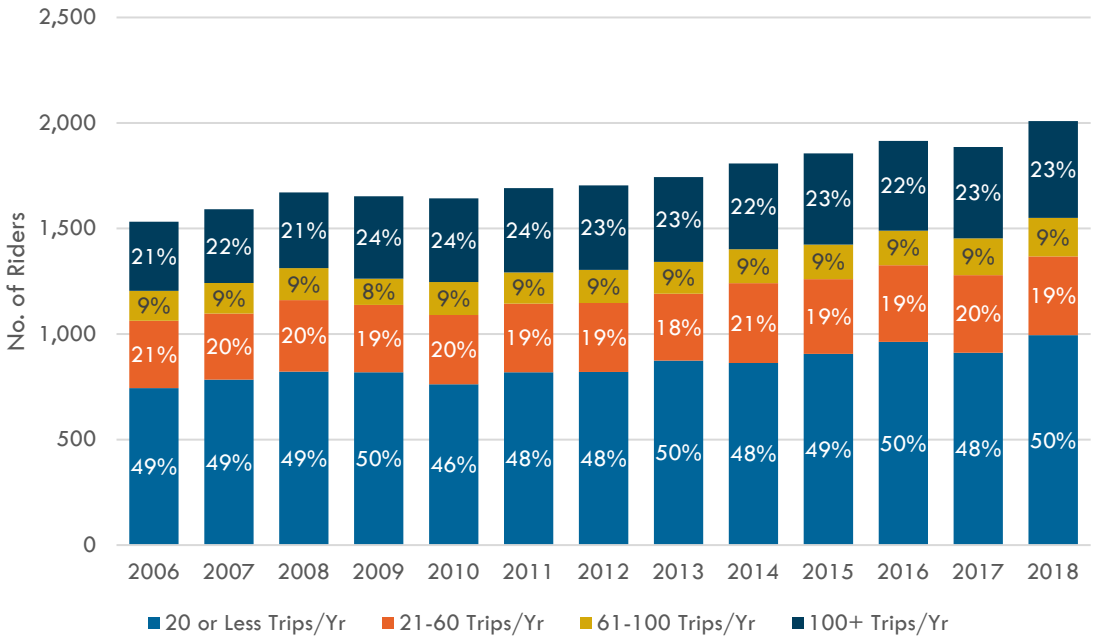
Figure 2-34 Annual System Usage by 13-Year Riders



Frequency of Usage

The final metric that was examined was how many trips Dial-A-Lift users have taken each year. As Figure 2-35 shows, the distribution of riders within each of the usage groups has been relatively steady, even after accounting for an increase in the number of riders.

Figure 2-35 Riders by System Usage (2006-2018)



CONCLUSIONS

There are several conclusions that can be drawn from this analysis, as follows:

- **Dial-A-Lift ridership is increasing faster than the population of Thurston County, likely tied to increase bin the senior population in Thurston County**

  Perhaps the biggest takeaway from this analysis is how much more growth Dial-A-Lift ridership has experienced compared to the population of Thurston County (3.2% growth annually compared to 1.6% growth annually, respectively, between 2007 and 2017). Upon further investigation, it was discovered that during that same time, the senior population in the county is also growing rapidly, with the population of individuals aged 65 to 74 increasing by a staggering 82%.

  These findings are noteworthy because it indicates that the likely driver of demand in Dial-A-Lift service is the increase in the senior population. Furthermore, the large 82% increase in the population between the ages of 65 to 74 indicates that this increase cannot be attributed solely to the aging of the population in Thurston County, and likely is due also to some migration of seniors to the county.

- **The average annual trips taken by rider has been consistent**

  Since 2006, the average number of trips taken by each rider has been remarkably consistent, hovering at around 70 trips per year. This finding supports the notion that the increasing number of trips on Dial-A-Lift are not due to more trip making for each person,

but rather more riders on the system. This finding is supported by the distribution of riders by usage each year, which has remained extremely steady since 2006. In any given year, there continues to be approximately half of the riders taking 20 or fewer trips a year, approximately a quarter of riders taking more than 100 trips a year, and the remainder falling somewhere in between.

- **Ridership on Dial-A-Lift is predominantly seniors**

  In examining the demographics of existing riders, over half of riders are seniors (age 65+). Between 2006 and 2018, that number has grown slightly from 60% to 64% of all riders.

- **Rider turnover has remained constant**

  Since 2007, Dial-A-Lift turnover has remained extremely constant, with slightly less than half of riders each year being deemed consistent riders (those having ridden every year in a three-year period).

- **Riders with more tenure tend to take more trips than new riders**

  When examining trip usage by rider tenure (number of years an individual has used Dial-A-Lift), new riders are more likely to take fewer trips than those who have more tenure. This difference is most noticeable when comparing one-year riders to 11+ year riders. In the case of one-year riders, 80% took 20 or fewer trips per year. However, in the case of 11-, 12-, and 13-year riders, all of them took more than 100 trips in a year.

- **Trips on weekends are increasing at a faster rate than trips on weekdays**

  Between 2006 and 2019, weekday trips increased by 2.7% annually, compared with 7.2% on weekends. When analyzing trip origins/destinations, it was discovered that medical and recreational trips drive appear to be driving demand on Saturdays, while church trips appear to be driving demand on Sundays. This finding suggests that more riders are now using Dial-A Lift for discretionary trips.

3 SERVICE QUALITY ASSESSMENT

This chapter documents the findings of the service quality assessment, starting first with an overview of Dial-A-Lift's standards, transitioning to a review of best practices and other transit agency standards, and finally closing out with an evaluation of Dial-A-Lift's performance.

For purposes of this analysis, the following service quality parameters were examined:

- On-time performance
- Missed trips
- Excessively long trips

OVERVIEW OF DIAL-A-LIFT'S SERVICE QUALITY STANDARDS

Dial-A-Lift currently uses the following definitions and standards as they relate to service quality:

- **Pick-Up Windows:** Dial-A-Lift uses a 30-minute pickup window that starts 15 minutes before the requested time and ends 15 minutes after the requested time. For trips where the customer has a desired drop-off time (e.g., an appointment, work), Dial-A-Lift will calculate a requested pick-up time based on an anticipated travel time between the origin and destination, which is then used to develop the pick-up window.
- **On-Time Performance:** A trip is considered on-time if the pick-up occurs within the scheduled 30-minute pick-up window. The systemwide goal for on-time performance is 95% or higher.
- **Missed Trips:** Missed trips are defined as any trip booked at least one day prior to travel but does not take place due to one of the following reasons:
  - The vehicle arrives and leaves before the beginning of the pickup window without picking up the rider and without any indication from the rider that he or she no longer wants to make the trip. A rider is not obligated to board until the beginning of the pickup window.
  - The vehicle does not wait the required time within the pickup window, there is no contact with the rider, and the vehicle departs without the rider. If during the wait time the rider indicates he/she no longer wants to take the trip, this is recorded as a "cancel at the door."
  - The vehicle arrives after the end of the pickup window and departs without picking up the rider (either because the rider is not there or declines to take the trip because it is now late).
  - The vehicle does not arrive at the pickup location at all.

  Dial-A-Lift's standard is to have no (0%) missed trips due to the fault of the agency.
- **Trip Denials:** Trip denials occur when Dial-A-Lift cannot guarantee service when the client books the ride a minimum of one day in advance. Dial-A-Lift has an established no-

denial policy, meaning they negotiate ride times to the best of their ability and utilize overflow runs to schedule rides and avoid denying service.

- **Excessively Long Trips:** As agency policy, trips taken on Dial-A-Lift should be comparable in length to trips taken on the fixed route system. Trips that exceed this comparison are considered excessively long. Dial-A-Lift does not have a systemwide goal for this metric.

BEST PRACTICES REVIEW

This section documents the results of a best practices review as it relates to service quality. This review summarizes guidance from FTA Circular 4710.1, which provides guidance on ADA paratransit operations in the U.S. Information on other transit systems examined is presented in a later section, titled "Transit Systems Comparison".

- **Pick-Up Windows:** A pick-up window of 30 minutes is the longest window that is considered acceptable. The circular states that any approach to assign the window is acceptable, including bracketing against a negotiated time (e.g., -15/+15 minutes) or placed after the negotiated time.
- **On-Time Performance:** A trip is on-time if the driver arrives at the pickup location within the established pickup window. Early pickups are defined as trips where the driver arrives and departs with the rider before the window begins. Late pickups are defined as trips where the driver arrives after the pickup window and departs with the rider. FTA Circular 4710.1 does not specify an acceptable on-time performance rate, however, in several FTA complaint resolution cases, performance in the 90 to 95% range is the expected norm.
- **Missed Trips:** Missed trips are trips that were confirmed and scheduled but do not take place because of the fault of the agency. These include vehicles arriving and leaving before the beginning of the pickup window without the rider, vehicles not waiting the required time in the pickup window, vehicles arriving after the pickup window and departing without the rider, and vehicles not arriving at all.

  While FTA Circular 4710.1 does not specify an acceptable missed trip rate, it notes that a pattern or practice of a "substantial number of missed trips" is prohibited. This is a metric which the FTA has resisted frequent calls to establish absolute parameters of performance because the ADA establishes the civil rights of people with disabilities. As such, the statutes are to be applied to every individual and not corporately. For example, if FTA were to say that 2% of trips could be missed trips, it is feasible that all of those missed trips are experienced by only a few individuals, essentially violating their civil right to access public transportation. The agency could then claim they are meeting the standard and are not discriminating against those few individuals. Consequently, the FTA has been very cautious to not establish absolute standards of performance and has relied on language such as "substantial number."
- **Trip Denials**

  Trip denials are when an agency does not accept a trip request. Trip denials can include:
  - A rider requesting a next day trip and the agency saying it cannot provide the trip or puts the person on a waiting list.
  - A rider requests a next day trip and the agency can only offer a trip outside the one hour negotiating window

  - A rider requests a round trip and the agency can only provide one leg of the trip (if the rider does not take the one-way trip, both legs are considered a denial).

  The FTA circular does not specify an acceptable trip denial rate but notes agencies must document and track denials to ensure identification of underlying causes to prevent future denials.

- **Excessively Long Trips**

  Trips taken on paratransit should not be excessively long in comparison to the time it takes to complete the same trip using the fixed route system. The circular notes that a large number of excessively long trips is an indicator of a capacity constraint and may discourage riders from using the paratransit service. The FTA gives agencies the discretion to define what excessively long means and how it is measured, but also cautions against only assessing performance on trips longer than some given amount of time.

TRANSIT SYSTEMS COMPARISON

This section compares Intercity Transit's Dial-A-Lift service quality standards against some other transit systems. Transit system data was extracted from a TCRP report produced by Project J-07, Topic SG-14, using systems that had relatively small service area populations (compared to all the agencies examined as part of the effort).

The results, presented in Figure 3-1, show that among the transit systems examined, Intercity Transit has a higher on-time performance (OTP) rate than several systems examined but has a similar missed trip rate goal. For excessively long trips, since these other systems have no consistent standard, it is difficult to benchmark Dial-A-Lift against them.

Figure 3-1 Comparison of Intercity Transit with Other Transit Systems

Municipality	Agency	Service Area Population	OTP % Goal	Missed Trip Rate Goal	Excessively Long Trips Goal
Thurston County, WA	Intercity Transit	178,328	95%	0%	No systemwide goal. Trips must not be longer than using the fixed route system.
Ann Arbor, MI	Ann Arbor Area Transportation Authority	224,916	97%	0%	Less than 5%
Pierce County, WA	Pierce Transit	555,578	90%	0%	Not Reported
Kansas City, MO	Kansas City Area Transportation Authority	788,748	92%	0.05%	0%
Milwaukee, WI	Milwaukee County Transit System	951,448	92%	Less than 0.5%	47 minutes (average)

Source: NTD (population), Project J-07, Topic SG-14 (all other data)

REVIEW OF DIAL-A-LIFT'S PERFORMANCE

This section documents the results of Dial-A-Lift's service quality performance in terms of on-time performance, missed trips, and trip length.

On-Time Performance

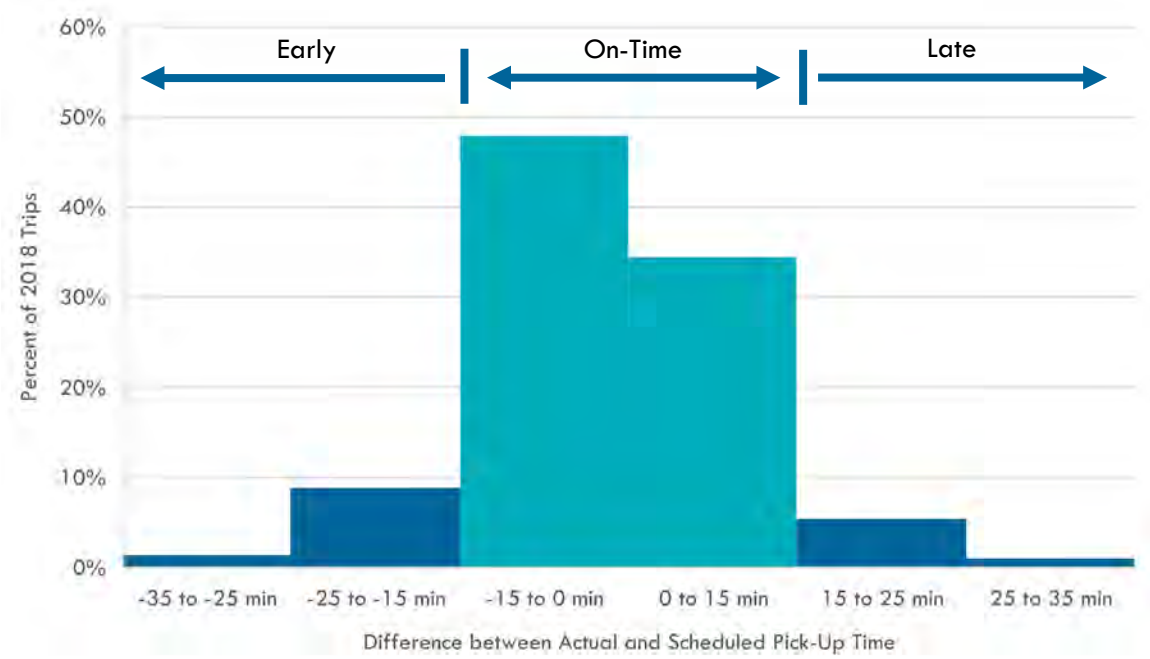
On-time performance (OTP) is often measured for pick-ups and for drop-offs when the rider requests an appointment time or an "arrive by" time. However, due to a data issue with drop-offs, only OTP for pick-ups was examined.

As mentioned previously, Dial-A-Lift has a pick-up window that starts 15 minutes before the requested time and ends 15 minutes after the requested time. A trip is considered on-time if the pickup occurs within the 30-minute pick-up window.

Figure 3-2 shows the on-time performance for all paratransit trips taken in 2018, with approximately 82% of all trips in 2018 being picked up within the pick-up window. If all early trips are included with the within window trips[5], 93% of all trips were picked up on-time. This falls short of the systemwide on-time performance goal of 95% or higher.

[5] This is an allowable practice according to FTA Circular 4710.1. However, agencies are cautioned to monitor early pick-ups to ensure the pick-up window has not been de-facto extended by a pattern and practice of early pick-ups. At nearly 11% of all trips in 2018 falling into that classification, Intercity Transit is on the threshold of a de-facto expansion of the pick-up window.

Figure 3-2 2018 On-Time Performance for All Trips



Note: Values less than 1% were captured but are not shown

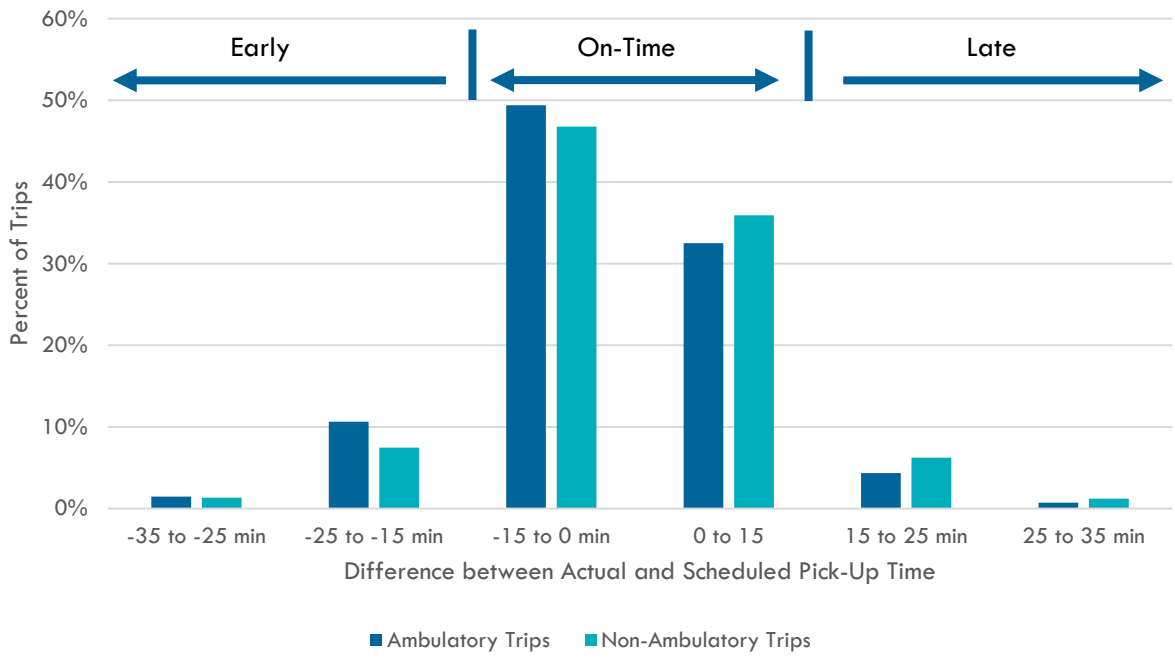
Looking at on-time performance data as far back as 2006 (Figure 3-3) reveals that while on-time performance has generally been improving, Dial-A-Lift service has never achieved the 95% on-time performance goal, even after including early pick-ups. While a 95% on-time performance rate is a commendable goal, Dial-A-Lift might consider lowering the standard especially since other systems had OTP standards that were slightly lower.

Figure 3-3 Historical On-Time Performance Rate

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Early	11%	9%	8%	9%	8%	8%	9%	9%	9%	8%	9%	10%	11%
On-Time	79%	80%	82%	82%	82%	83%	84%	85%	84%	84%	82%	82%	82%
Subtotal	*90%*	*89%*	*90%*	*91%*	*91%*	*91%*	*93%*	*94%*	*93%*	*92%*	*92%*	*93%*	*93%*
Late	10%	11%	10%	9%	9%	9%	7%	6%	7%	8%	8%	7%	7%

Looking at on-time performance for ambulatory trips (i.e., trips where the passenger could walk) and non-ambulatory trips (i.e., trips where the passenger needed to use the lift and possibly more assistance) were examined as well to see if this had an impact on performance. The results, presented in Figure 3-4, show little difference between the two types of trips, albeit ambulatory trips do perform slightly better than non-ambulatory trips (95% OTP versus 92% OTP).

Figure 3-4 2018 On-Time Performance for Ambulatory vs Non-Ambulatory Trips



Note: Values less than 1% were captured but are not shown

Missed Trips

Based on data provided by Dial-A-Lift during the one-year period from December 2017 to November 2018, the service had missed 0.3% of all trips due to the fault of the agency, which is very low. Trips that were picked up 45 minutes or more after the end of the pick-up window (or 60 minutes after the scheduled pick-up time) were also extremely low, constituting 0.03% of all trips in 2018.

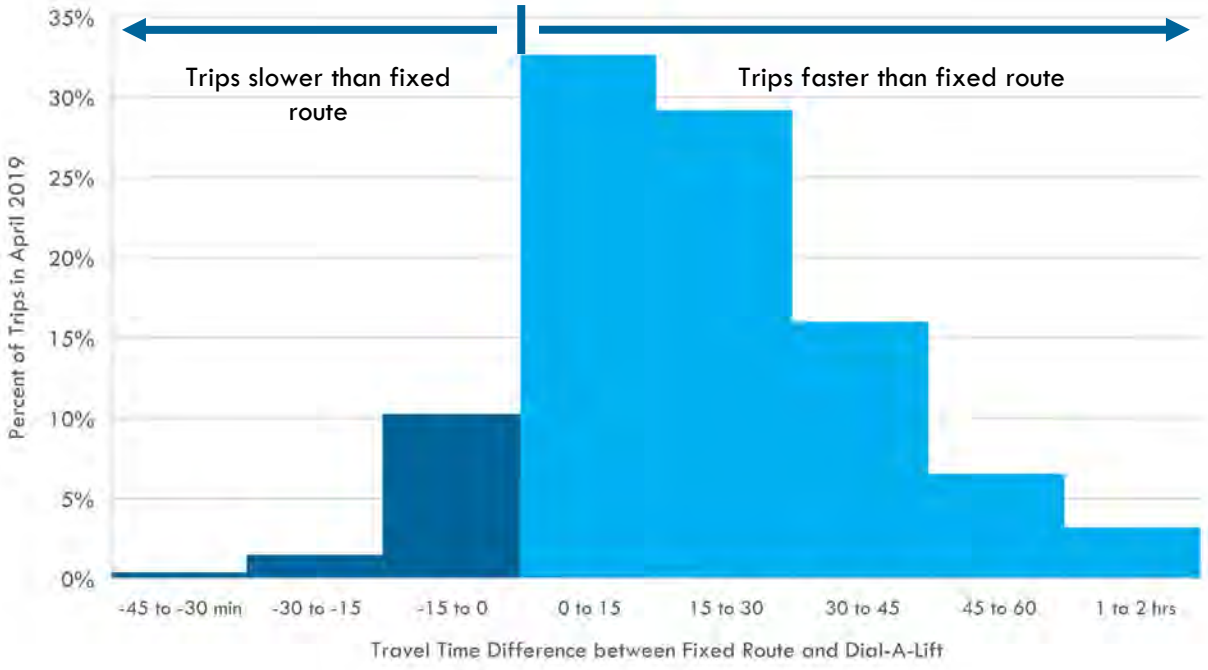
Dial-A-Lift notes that approximately 1.7% of trips during that same time were no shows due to the customer not showing up or cancelling less than two hours before their scheduled pickup window. This is much lower than other paratransit systems Nelson\Nygaard has worked with but represents an area to monitor as increases in the passenger no show rate can negatively impact operations and the customer experience.

Excessively Long Trips

Using a one-month sample of trip data provided by Dial-A-Lift, travel times on board the vehicle were computed and then compared to the travel time for the same trip using the fixed route network (the travel time includes access/egress time, wait time, and any transfer time). Travel times on Dial-A-Lift that are longer than the same trip taken on the fixed route network are defined as “excessively long”.

The results of this evaluation are shown in Figure 3-5. Collectively, 88% of all trips in April 2019 were faster or the same length as a comparable trip taken on the fixed route network, indicating there could be some room for improvement.

Figure 3-5 Travel Time Difference between Fixed Route and Dial-A-Lift for April 2019



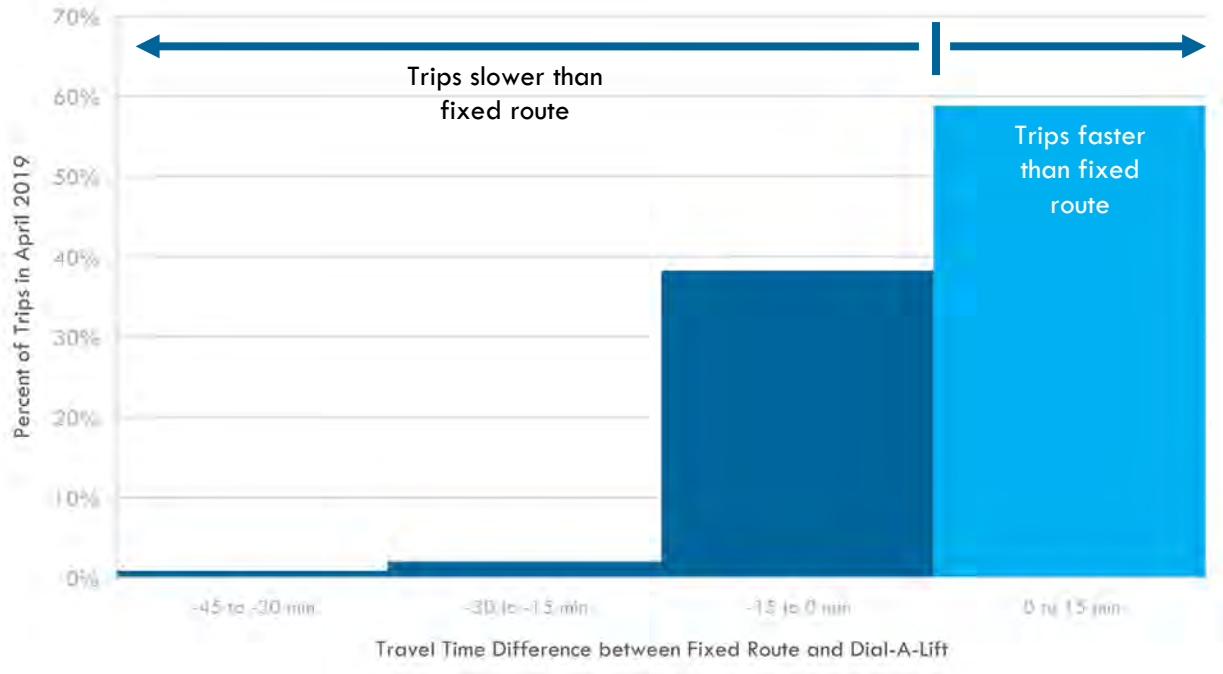
Note: Values less than 1% were captured but are not shown

Trips of varying lengths were also examined to determine if there was a correlation between the length of the trip and excessively long trips. For this analysis, trips were categorized based on the equivalent time a paratransit trip would take using the fixed route system (again, including access/egress time, wait time, and any transfer time): Short trips (15 minutes or less), medium trips (15 to 60 minutes), and long trips (more than 60 minutes). The results, presented in Figure

3-6, Figure 3-7, and Figure 3-8, respectively, show that as trip length increases, the likelihood of trips taking longer than on the fixed route network decreases. The percentage of trips taking longer than the fixed route network were computed to be 41% for short fixed route trips, 11%, for moderate fixed route trips, and 3% for long fixed route trips, respectively.

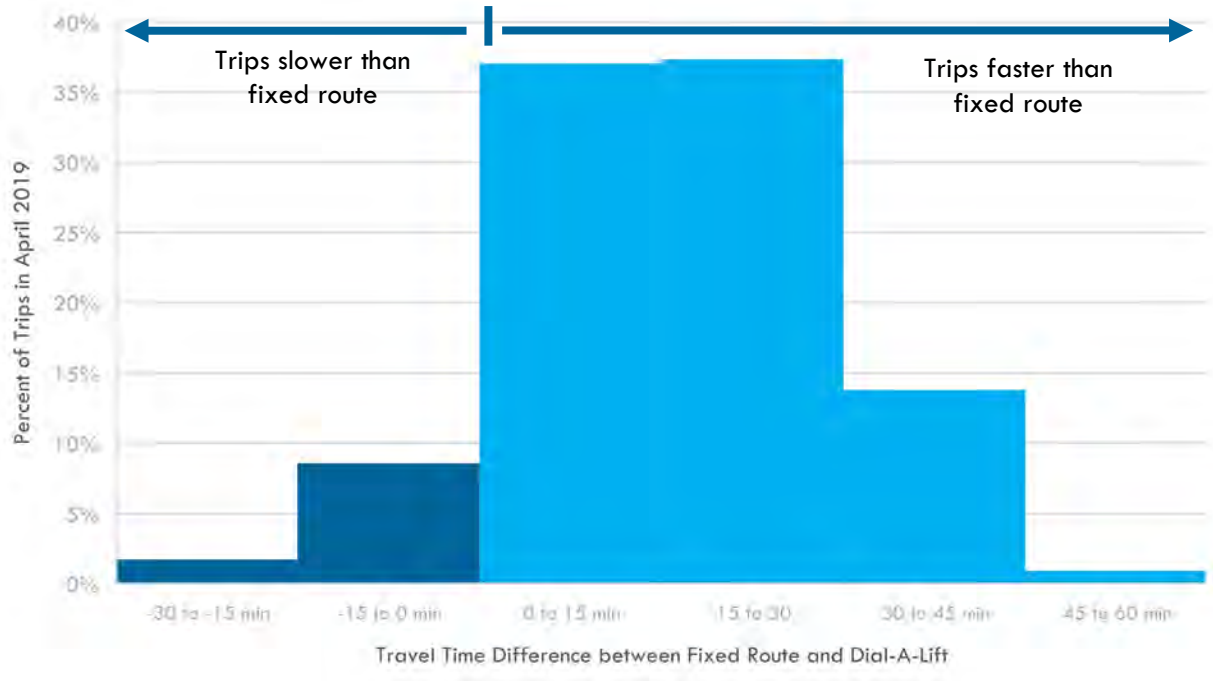
Note that the vast majority of the "longer than" trips fall within a 15-minute time of the fixed route journey, with a relatively small percentage of even longer trips falling outside that boundary. Standards for this metric are just beginning to emerge as only since the fairly universal adoption of GTFS and agencies providing fixed route data to Google Transit has it been possible to compute actual fixed route travel times in an efficient manner. This allows monitoring of this metric in an efficient manner and has resulted in a few agencies adopting standards. King County Metro, for example, has a standard that says paratransit trips should be within fixed route travel time plus 15 minutes at least 96% of the time for all trips. As a point of comparison, the data below for April 2019 indicates that Dial-A-Lift is operating well within that standard.

Figure 3-6 Travel Time Difference between Fixed Route and Dial-A-Lift for Short Trips (Less than 15 Mins)



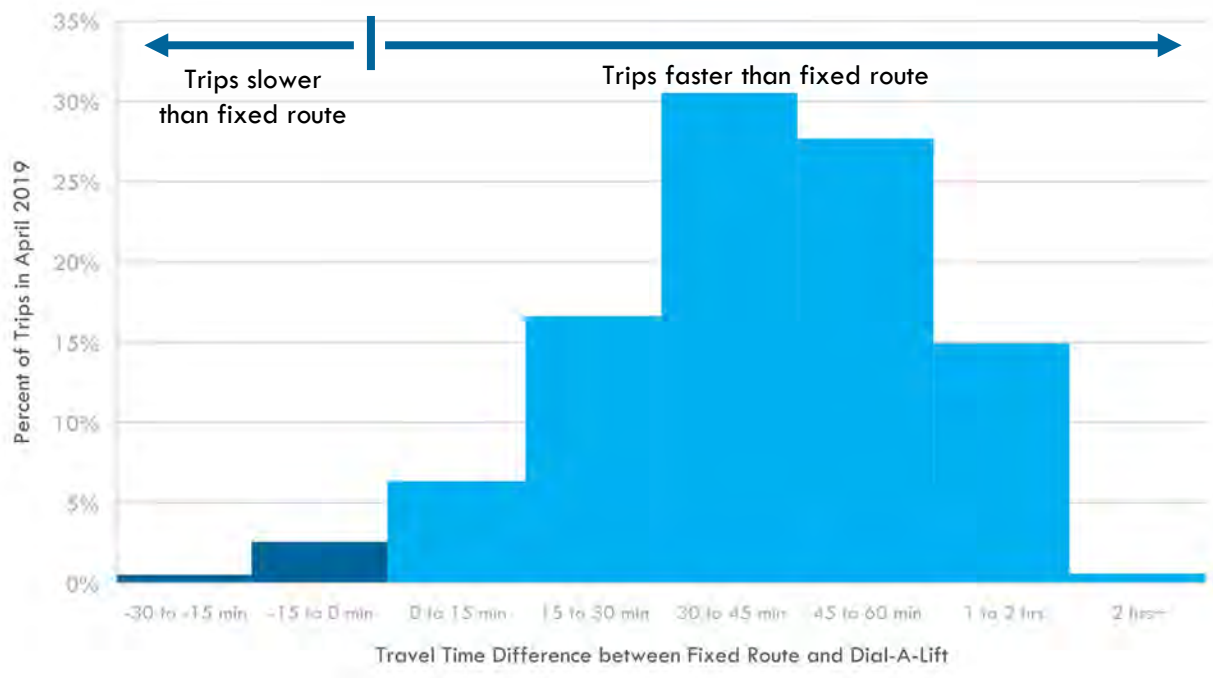
Note: Values less than 1% were captured but are not shown

Figure 3-7 Travel Time Difference between Fixed Route and Dial-A-Lift for Medium Length Trips (15 to 60 Mins)



Note: Values less than 1% were captured but are not shown

Figure 3-8 Travel Time Difference between Fixed Route and Dial-A-Lift for Long Trips (More than 60 Mins)



Note: Values less than 1% were captured but are not shown

CONCLUSIONS

Overall, the review of Dial-A-Lift's performance relative to its own service quality standards as well as those of the other transit agencies is generally positive. Below are the key takeaways for each of the metrics:

- **On-Time Performance:** Dial-A-Lift's current 93% OTP rate falls short of its 95% goal. In reviewing historical OTP data (back to 2006), Dial-A-Lift has never met this goal. Compared to some of the other transit systems examined, Dial-A-Lift's 95% OTP goal is on the higher end. Both facts make the case that Dial-A-Lift should perhaps adjust their OTP goal down slightly, or at least understand the resource commitment necessary to achieve the standard.

  It is also noted that Dial-A-Lift does not have a method to monitor the performance of trips where customers have requested an arrive-by time (appointment time), rather than a pick-up time. This appears to be an artifact of a data issue that should be addressed to allow performance monitoring of appointment-based trips.
- **Missed Trips:** Dial-A-Lift's goal of having no (0%) trips missed due to the fault of the agency was not met, with approximately 0.3% of all trips being missed. However, where data is available from other systems and assuming that the missed trips are not falling on a small number of individual riders, this is an acceptable level of performance and needs no attention. Dial-A-Lift's customer no show rate of 1.7%, while much lower than other paratransit systems Nelson\Nygaard has worked with, represents an area to continue to monitor as increases in the passenger no show rate can negatively impact operations and the customer experience.
- **Excessively Long Trips:** In examining one month of data (April 2019), 88% of all trips were faster or comparable to using the fixed route network. The 12% that are longer mostly fall into trips that exceed comparable fixed route trips by 15 minutes, or less. Shorter trips on Dial-A-Lift (trips less than 15 minutes long on the fixed route system), in particular, were identified as being the most likely to be longer than comparable fixed route trips, with 41% of all "short" trips in April 2019 taking longer than the same trip being taken on the fixed route network. Although, only about 3% of those trips exceed more than 15 minutes longer. While there is no absolute guidance on this issue from the FTA, agencies that have adopted standards for on-board times have set those standards at 90% or better. For example, King County Metro has established a performance standard of 96% of all trips to be completed within a comparable time to fixed route service plus 15 minutes. From the April 2019 sample, Dial-A-Lift appears to be operating within that standard. What is important is that Intercity Transit consider and adopt a standard and then monitor performance against that standard to ensure there is no degradation of service quality with respect to trip length.

4 ELIGIBILITY ASSESSMENT

This chapter covers the findings from the review of the eligibility assessment, specifically a review of the users and trips taken on the system based on eligibility status.

OVERVIEW OF ELIGIBILITY TYPES

Dial-A-Lift's paratransit users are grouped into one of three eligibility categories: conditionally eligible, fully eligible, or temporarily fully eligible (ranging from one month to a year).

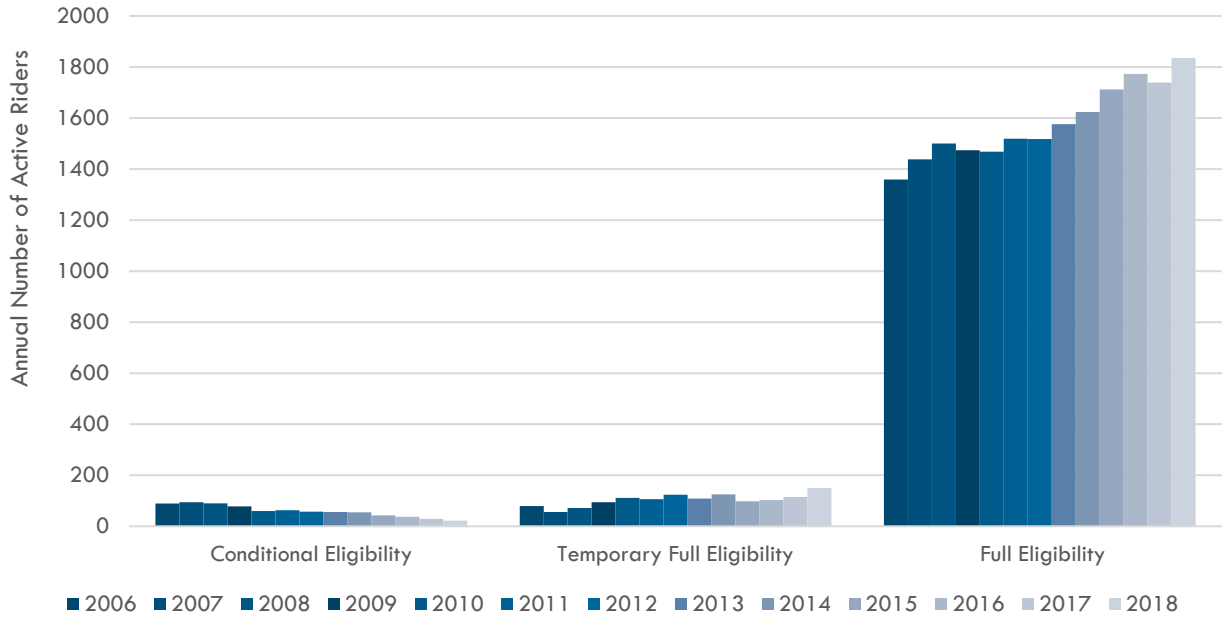
Riders are deemed conditionally eligible if they can use the fixed route network for some trips but require Dial-A-Lift paratransit service for other trips. Reasons for needing paratransit service can range from trips that cannot be taken due to physical ability (e.g., terrain too steep), visual acuity (i.e., difficulty seeing at night), weather/climate (e.g., too hot, too cold), or not being travel trained on a particular trip.

Dial-A-Lift does not currently encourage riders who are conditionally eligible to opt for fixed route trips, but available data does track whether an individual is conditionally eligible or fully eligible for any given trip. While Dial-A-Lift tracks conditional eligibility status, reasons for the conditional eligibility status have been inconsistently recorded. This lack of detail prevents Nelson\Nygaard from examining the trips made by conditionally eligible riders to determine whether all trips are indeed falling within the conditions of each rider's conditional eligibility status. Moving forward, it is recommended that the reason(s) for conditional eligibility be recorded for each user in the database in case Dial-A-Lift later decides to encourage greater use of conditional eligibility, or is at least able to better predict the impact of doing so.

RIDER ANALYSES

Looking at users by eligibility type, Figure 4-1 shows the historical number of active riders for each of the three eligibility categories. As can be seen, the total number of active riders has been steadily increasing, mostly driven by the number of new fully eligible riders. Also worthy to note is that the number of conditionally eligible riders has decreased over time, some of which can be attributable to a shift in eligibility status from conditional to full eligibility.

Figure 4-1 Annual Number of Riders per Year by Eligibility Status



There are also several individuals that maintain conditional or full eligibility status with Dial-A-Lift but do not take any rides. To understand how many inactive riders there are, an analysis was performed for both the conditional and full eligibility groups. The results are shown in Figure 4-2 and Figure 4-3, respectively. For purposes of this analysis, riders were assumed to be inactive if they had eligibility at some point each year but did not take any trips.

The charts show that the proportion of inactive riders for the conditionally eligible group has been decreasing since 2006 while generally staying consistent for the fully eligible group.

Figure 4-2 Historical Conditional Eligibility by Active and Inactive Users

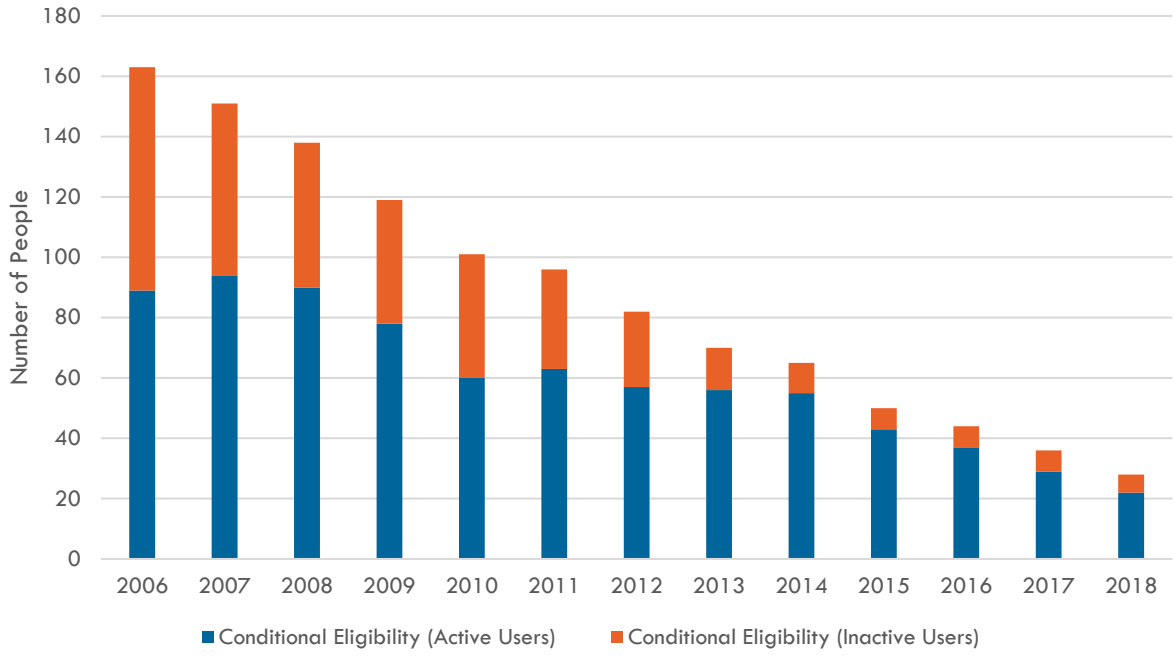
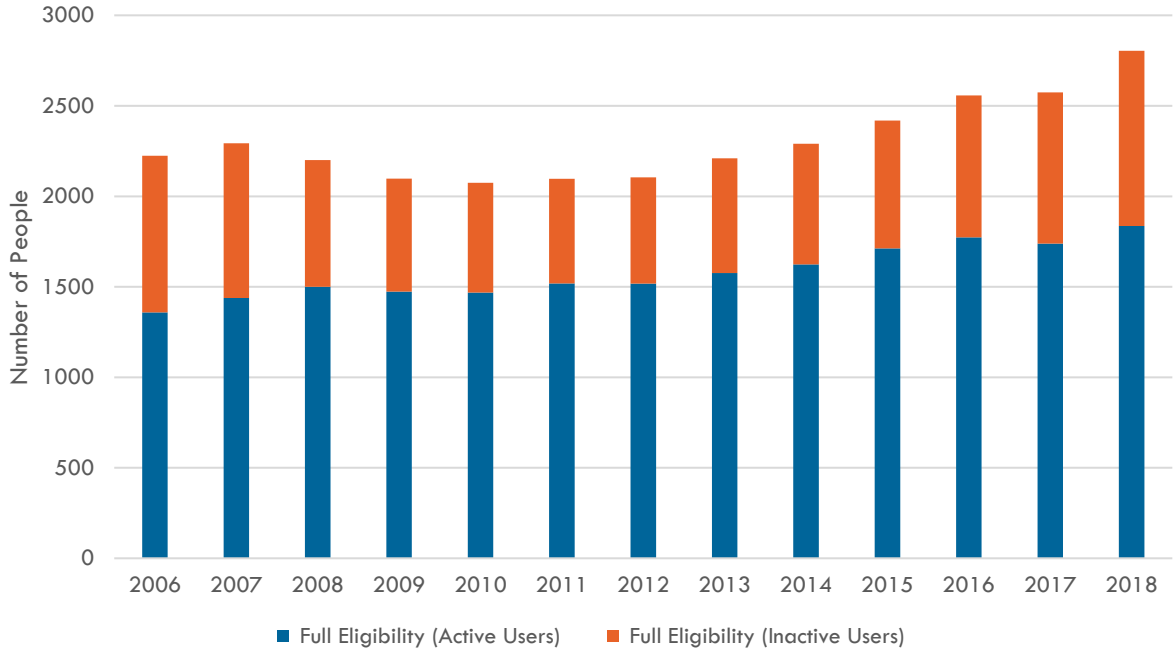


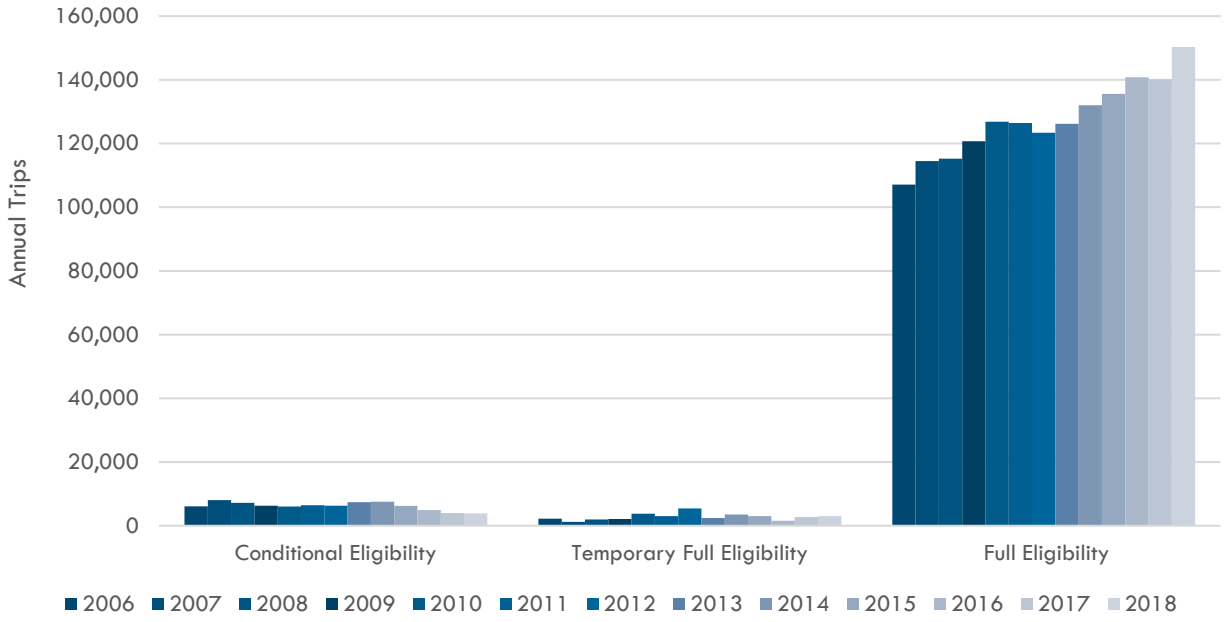
Figure 4-3 Historical Full Eligibility by Active and Inactive Users



TRIP ANALYSES

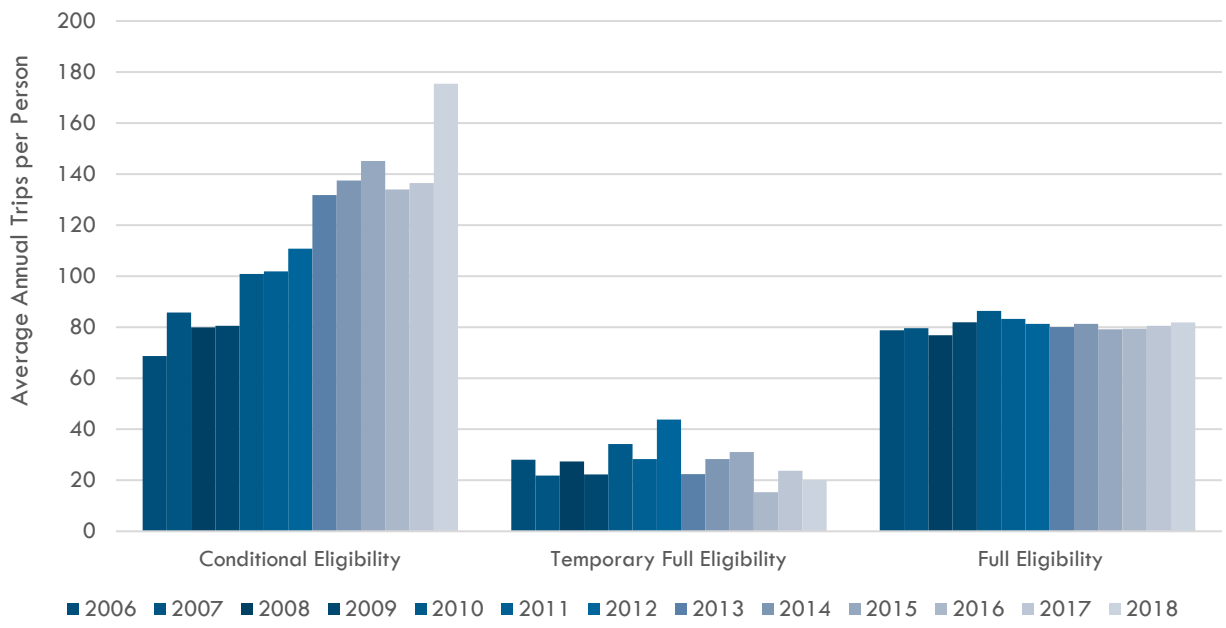
Using the historical trip making dataset provided by Dial-A-Lift, an analysis was run to examine trips taken on the system. Figure 4-4 shows the total number of trips taken annually by each group of riders. The figure shows that the number of conditionally eligible trips per year has decreased slightly while the trip count for the remaining two groups has increased.

Figure 4-4 Annual Number of Trips per Year by Eligibility Status



When looking at the data on both the number of active riders and number of trips taken each year, the average annual number of trips per rider can be computed. The results, shown in Figure 4-5, indicate that the trip rate for conditionally eligible users has been rising dramatically while the trip rate for remaining two groups has been relatively constant. This experience is consistent with what Nelson\Nygaard has seen at other paratransit agencies throughout the country.

Figure 4-5 Average Annual Number of Trips per Person by Eligibility Status



CONCLUSIONS

The key takeaway from this eligibility evaluation is that both the number of users and trips on Dial-A-Lift are continuing to increase over time. However, when trip rate per person is examined, trip rates are generally holding steady for the temporarily fully eligible and fully eligible groups but growing for the conditionally eligible group.

The trip rate finding should be of importance to Dial-A-Lift, particularly if costs become an issue. With a growing trip rate per conditionally eligible rider that is higher than for fully eligible riders, that group has the potential to have a disproportionately large impact on Dial-A-Lift's operating costs.

With conditional eligibility currently not being enforced and not recorded in the eligibility database, it is not possible at the current time to ascertain what trips (if any) could be shifted to the fixed route system and no longer taken on Dial-A-Lift. It is recommended that Dial-A-Lift start consistently recording the reason(s) for conditional eligibility in the database for future enforcement and/or analysis.

5 COST-EFFECTIVENESS REVIEW

This chapter covers the findings from the cost-effectiveness review. Specifically, this review looks at the historical cost for Dial-A-Lift, a comparison of cost against other fare-free paratransit systems, and an examination of alternative service delivery methods (with their associated costs).

HISTORICAL DIAL-A-LIFT COST TRENDS

Historical trends can help to understand how a system is performing and where the trend is headed. In this section, ten years of historical productivity and cost data for Dial-A-Lift obtained through NTD is presented. The four metrics that were examined were:

- Passenger trips per revenue hour
- Operating expense per passenger trip
- Operating expense per revenue mile
- Operating expense per revenue hour

To provide context with these metrics, historical passenger trips and revenue hours were also collected. The passenger trips and revenue hour data are shown in Figure 5-1 and Figure 5-2 while the four productivity and cost metrics are presented in Figure 5-3 to Figure 5-6, respectively.

Collectively, the data shows that productivity of the system (as measured in passenger trips per revenue hour) has been steady over time, while costs are rising faster than the growth in ridership, regardless of how cost is normalized.

Figure 5-1 Historical Dial-A-Lift Passenger Trips

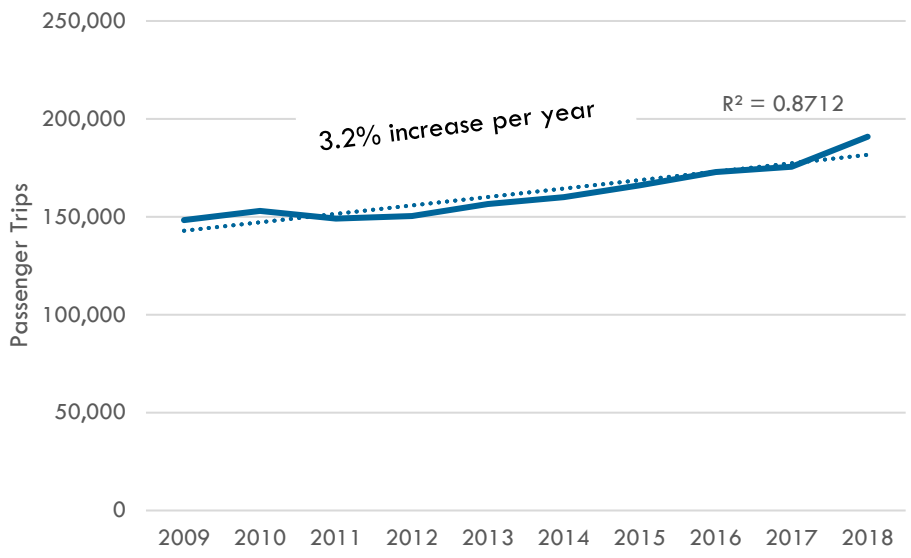


Figure 5-2 Historical Revenue Hours Supplied

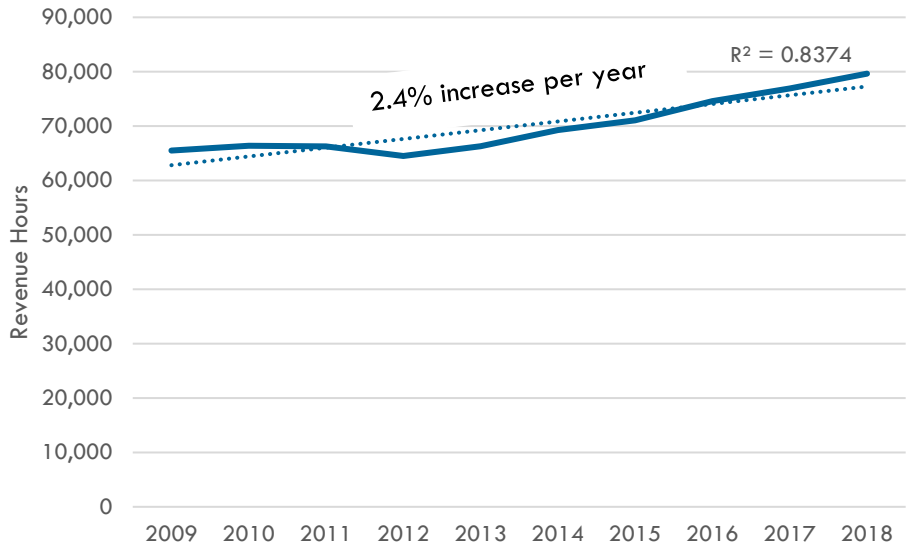


Figure 5-3 Historical Passenger Trips per Revenue Hour

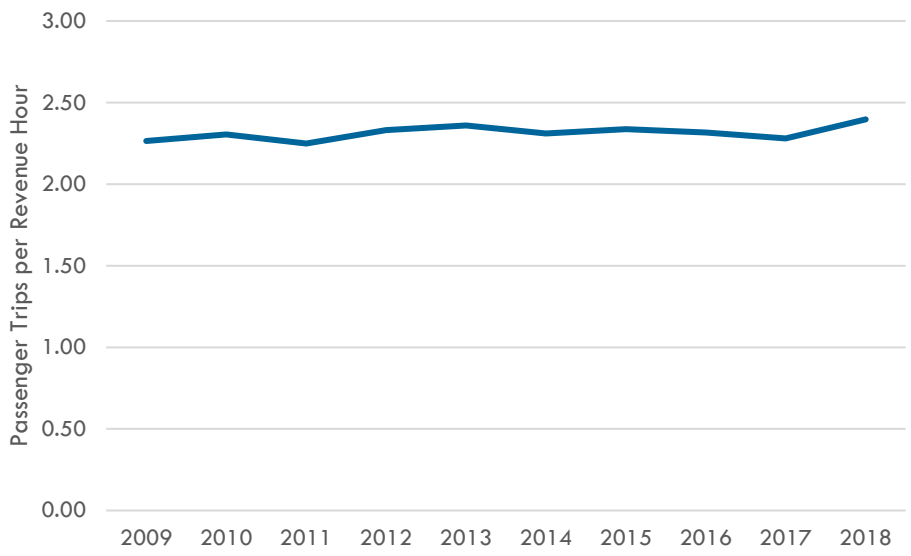


Figure 5-4 Historical Operating Expense per Passenger Trip

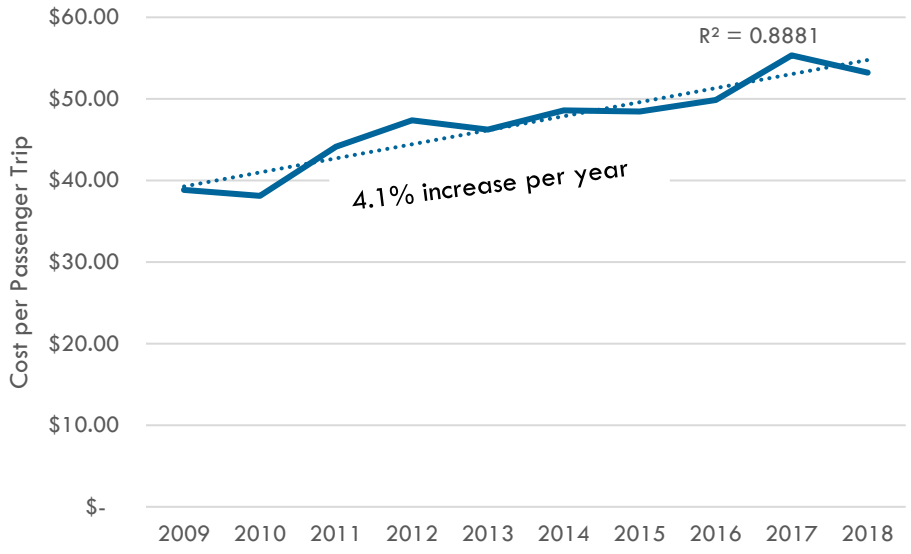


Figure 5-5 Historical Operating Expense per Revenue Mile

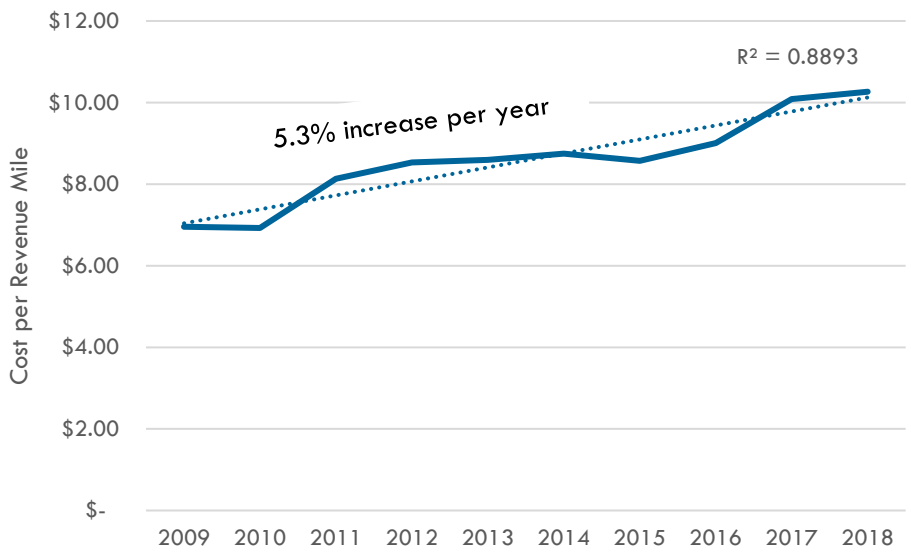
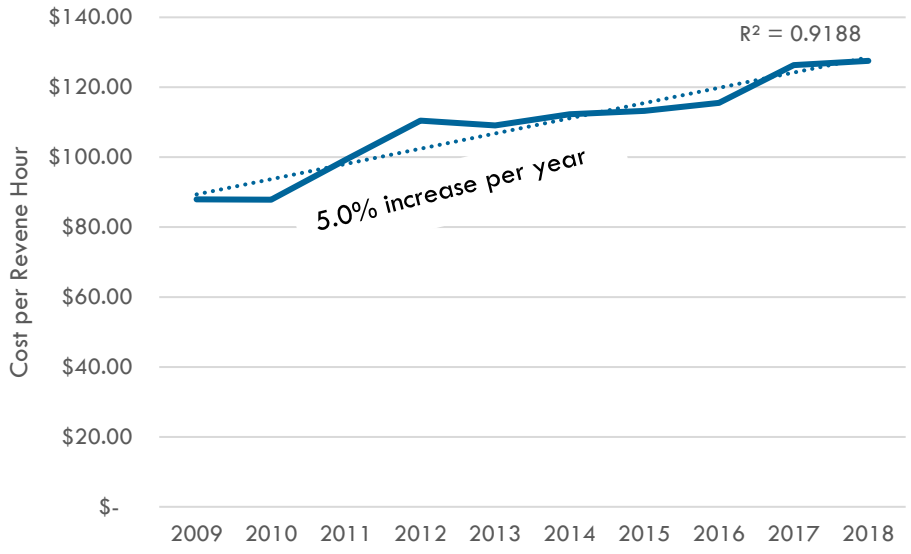


Figure 5-6 Historical Operating Expense per Revenue Hour



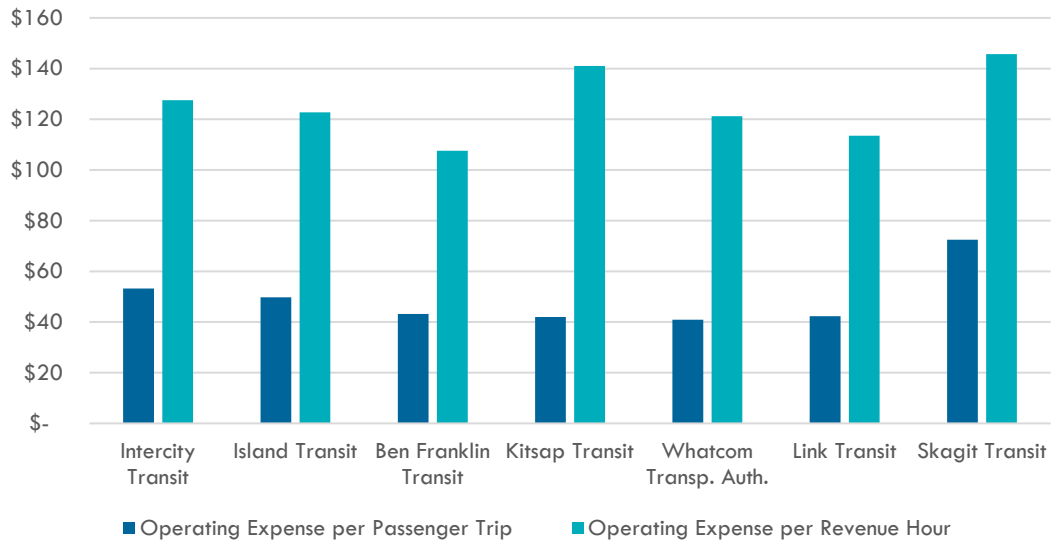
COMPARISON AGAINST OTHER PARATRANSIT SYSTEMS

To provide some context to Intercity Transit's numbers, NTD data was collected for two groups of transit systems. One group was comprised of six other similar size (or smaller) transit agencies within the State of Washington. The second group was comprised of three other systems that operate fare-free paratransit service.

Washington State Transit Agencies

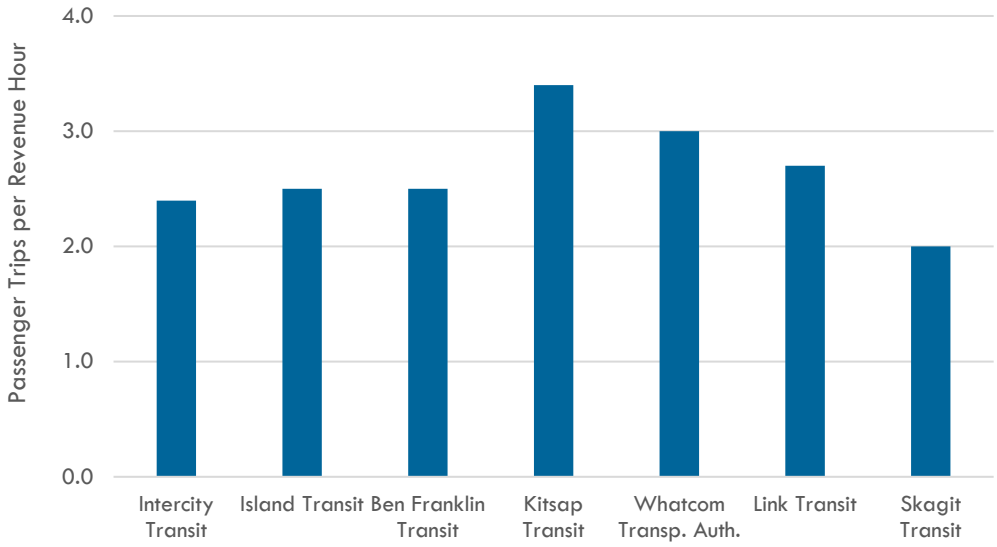
Six other similar size or smaller agencies within the State of Washington were used for comparison against Intercity Transit. As Figure 5-7 and Figure 5-8 illustrate, Intercity Transit's paratransit service is comparable to the agencies selected and do not indicate any efficiency or productivity issues.

Figure 5-7 2018 Comparison of Operating Expense per Passenger Trip and Revenue Hour with Washington State Agencies



Source: NTD Data

Figure 5-8 2018 Comparison of Passenger Trips per Revenue Hour with Washington State Agencies



Source: NTD Data

Fare-Free Paratransit Systems

Data on three paratransit systems that do not charge a fare were also collected and used for comparison to Intercity Transit. The data on the three systems are shown in Figure 5-9. While the most recent year of NTD data is 2018, thus preceding the establishment of Dial-A-Lift's implementation of fare-free paratransit service, the comparison is still a useful benchmark.

In examining Intercity Transit's productivity (as measured in passenger trips per revenue hour) against these other systems, productivity is comparable and quite good (values exceeding 2 passenger trips per revenue hour are good). In terms of cost, Intercity Transit does rank the highest among the agencies examined across the three cost metrics. However, these costs are in line with other transit agencies in Washington State so this is likely due to a geographical difference and should not be a cause for concern.

Figure 5-9 2018 Comparison of Productivity and Cost Data for Fare-Free Paratransit Systems

	Intercity Transit (Thurston County, WA)	Island Transit (Island County, WA)	Missoula Urban Transportation District (Missoula, MT)	AppalCart (Watauga County, NC)
Passengers Trips per Revenue Hour	2.4	2.5	2.1	2.7
Operating Expense per Passenger Trip	$53.21	$49.77	$28.51	$17.17
Operating Expense per Revenue Mile	$10.27	$8.44	$5.46	$3.05
Operating Expense per Revenue Hour	$127.55	$122.73	$60.45	$46.50

Source: NTD Data

ALTERNATIVE SERVICE PROVISIONS RESEARCH/CASE STUDIES

Transit agencies across the country are slowly rolling out alternative services that provide new ways for paratransit riders to get around. Some of these services are exclusively for eligible paratransit users, intended as supplemental paratransit service instead of a replacement to ADA paratransit service. Some of these services are open to public, including paratransit customers, and are often billed as a "microtransit" service.

Nine case studies were examined that spanned these two different categories. The four case studies that focus on alternative paratransit services are presented first, followed by the remaining five case studies that cover microtransit services.

The key takeaway from these case studies is that there is no one size fits all approach. Many transit agencies are learning and improvising as these services are rolled out or tested. The only way to know whether such a service would be successful for Thurston County would be to test it on a trial basis.

Paratransit Alternative Service Delivery Methods

Alternative means of providing paratransit service are slowly being adopted or tested by various transit agencies. This can take many forms, including using TNCs (e.g., Uber, Lyft) to accommodate some paratransit trips, or having private, non-shared paratransit service. Four different agencies, selected for their diverse service offerings, were researched. These agencies, along with the services they offer, are summarized in Figure 5-10.

Detailed summaries of each of the four agencies are highlighted in subsequent pages.

Figure 5-10 Summary of Agencies and Alternative Service Delivery Methods Examined

Agency	Alternative Service Delivery Methods Offered
MBTA – Boston, MA	Longest-running pilot program that is using Uber/Lyft/Curb as an alternative to traditional paratransit service
JTA – Jacksonville, FL	Offers traditional paratransit and private, same day paratransit service
Big Blue Bus – Santa Monica, CA	Overhauled its paratransit system and now uses Lyft for ambulatory trips and wheelchair accessible vehicle for non-ambulatory trips
GRTC – Richmond, VA	Offers traditional paratransit (¾ mile from fixed route), expanded paratransit (outside ¾ mile buffer), and on-demand paratransit

MBTA – Boston, MA

Figure 5-11 Summary of MBTA's Traditional Paratransit and On-Demand Service

	Traditional Paratransit	On-Demand Service
	MBTA (The Ride)	MBTA (On-Demand)
Cost to the Passenger	$3.35 or $5.60 for premium trips	Maximum subsidy of $40. Passengers pay the first $2 ($1 for Uber Pool) and then anything over $42
Cost per Trip for Agency	$45.00	$17.00
Booking Window	At least 1 day in advance	On-demand
Geographic Coverage	3/4 mile of local fixed route transit and beyond (premium trips)	3/4 mile of local fixed route transit
Eligibility Criteria	Physical disabilities, such as the need for a wheelchair or mobility device, as well as other sensory or mental disabilities that require curb-to-curb transportation service	Same as The Ride
Limit on No. of Trips	No	Caps depending on past usage and if rider is a new customer
Span of Service	Daily - 5:00 AM - 1:00 AM	24 x 7
Shared Ride	Yes	Shared rides if the pool service is used
Operated by Agency?	No	No

Key Points

- The On-Demand pilot program started in September 2016 and has been extended till September 2020. There are plans to make this permanent.
- While the pilot is structured to serve non-ADA trips, customers do have access to a wheelchair accessible vehicle (WAV). Wait times for these WAVs are improving with average wait times around 13 minutes.
- The pilot started as an opt-in with 400 riders. For pilot customers, there has been an 18 percent reduction in traditional The Ride trips since the start of the program.
- Customers participating in the pilot were taking about 55% more trips than when they use the traditional paratransit service, necessitating the need for trip caps.
- Cost using the on-demand service is cheaper than the traditional paratransit service ($17 versus $45 per passenger trip). Accounting for increased trip making with on-demand service, the MBTA is currently saving about 1% in costs through the pilot program, essentially breaking even.

JTA – Jacksonville, FL

Figure 5-12 Summary of JTA's Traditional Paratransit and On-Demand Service

	Traditional Paratransit	On-Demand Service
	JTA (Connexion)	JTA (Connexion Plus)
Cost to the Passenger	$3 (ADA Fare), $3.50 (Transportation Disadvantaged), $6 Out-of-County Fare	$6 per passenger one way
Cost per Trip for Agency	$38.40	$22.09
Booking Window	At least 1 day in advance	Two hours before pick-up time
Geographic Coverage	Anywhere within County limits	Anywhere within County limits
Eligibility Criteria	Category I Applicants who cannot independently use JTA bus or rail service, even with training. Category II Applicants who can use or learn to use an accessible public transit system, but the system is not fully accessible. Category III Applicants who have a specific impairment that prevents them from getting to or from a bus stop or rail station.	Same as JTA Connexion
Limit on No. of Trips	N/A	N/A
Span of Service	Regular fixed route system hours	Daily – 5:30 AM – 10:00 PM
Shared Ride	Yes	No
Operated by Agency?	No	No

Key Points

- The Connexion Plus program started on April 1, 2019. This service is designed for eligible customers who want private, same-day, door-to-door service to anywhere in Duval County. Any customer who is eligible for Connexion may also use Connexion Plus
- The geographic coverage for both Connexion and Connexion Plus spans the entire county. JTA adopted this policy because they wanted to create opportunity for all its customers to travel the entire county regardless of the nature of the trip.
- JTA's operator for Connexion Plus is with UZURV. The operating agreement has JTA pay per mile, along with a booking fee, at a minimum cost of $17 per trip.
- JTA offered the following words of advice: "Put some limitations on the service whether it be distance limitations, operational hours, or days until you can gauge how popular the service will be. It is easier to expand the service then it is to put limitations after the fact."

Big Blue Bus – Santa Monica, CA

Figure 5-13 Summary of Big Blue Bus's Paratransit Service

	Paratransit Service
	Big Blue Bus (Mobility On-Demand Every Day Program)
Cost to the Passenger	Low-Income Fare: $0.75, Regular Fare: $1.50
Cost per Trip for Agency	$12.06 per TNC trip $22.45 per wheelchair van trip
Booking Window	One to six days in advance for handicapped passengers. Book trip on-demand on Lyft for all others.
Geographic Coverage	Anywhere within city limits + select shopping and medical centers in Los Angeles
Eligibility Criteria	At least 65 years old or at least 18 years old with disability
Limit on No. of Trips	30 one-way trips per month (wheelchair van and Lyft shared ride)[6]
Span of Service	8:00 AM - 6:00 PM (Weekdays), 8:30 AM - 3:30 PM (Saturday), 8:00 AM - 1:30 PM (Sunday)
Shared Ride	Yes
Operated by Agency?	No for both modes

Key Points

- The Mobility On-Demand Every Day (MODE) program started on July 1, 2018 and replaced the previous traditional dial-a-ride paratransit service. Since complementary ADA paratransit service for Los Angeles County is provided by Access, MODE and the previous Big Blue Bus traditional paratransit service are considered supplemental paratransit service.
- The motivation for establishing this new program was because the previous, traditional paratransit system was "costly to operate, highly subsidized, and over-utilized during weekday mornings, yet under-utilized at all other times." The new service was aimed to improve the customer experience, reduce the number of service refusals, provide a more on-demand option, and reduce the costs to the transit agency.
- Prior to July 2018, there were 2,223 registered riders but only 157 were regular users of the system (taking at least one trip a month). Under the previous system, six wheelchair accessible vehicles were needed to provide service to all customers, yet only 10% of the trips were non-ambulatory trips (the other 90% were ambulatory trips).
- Under the MODE program, only two wheelchair accessible vehicles are needed, and the rest of the capacity is provided by Lyft vehicles.

[6] Complementary ADA paratransit service is provided Los Angeles County's LA Access service which does not cap the number of rides for eligible riders

- MODE is carrying more than twice as many riders per day than the former Dial-a-Ride (DAR) program, while operating under the same budget.
- The transition to MODE has resulted in approximately 100 new participants signing on each month.
- The new program has resulted in more ridership both in terms of trips per day (78 before to 250 after) and annually (21,384 before and 55,682 after). Average cost per passenger trip has also gone down ($22.45 in 2018 to $12.06 per trip in 2019).

GRTC – Richmond, VA

Figure 5-14 Summary of GRTC's Traditional Paratransit and On-Demand Service

	Traditional Paratransit		On-Demand Service
	Greater Richmond Transit Company (CARE)	Greater Richmond Transit Company (CARE Plus)	Greater Richmond Transit Company (CARE On-Demand)
Cost to the Passenger	$3 (City of Richmond & Henrico County residents)	$6 (City of Richmond residents) $3 (Henrico County residents)	Initial $6 for passenger and anything above $21
Cost per Trip for Agency	$28.19	$28.19	$26.05
Booking Window	At least 1 day in advance	At least 1 day in advance	On-demand
Geographic Coverage	Operates within GRTC's fixed route coverage area and including 3/4 of a mile beyond GRTC's fixed route bus lines	Operates if the origin or destination location is more than 3/4 of a mile from GRTC's fixed route bus line, or if travel is desired to a destination in Henrico County on a day or time when GRTC's fixed route buses are not running in Henrico County.	Operates within GRTC's fixed route coverage area and including 3/4 of a mile beyond GRTC's fixed route bus lines
Eligibility Criteria	At least 80 years old or persons with disabilities	At least 80 years old or persons with disabilities	Age 80 or older; persons with disabilities
Limit on No. of Trips	N/A	N/A	N/A
Span of Service	Daily - 5:00 AM - 1:00 AM* (City of Richmond residents) Daily - 6:00 AM - 8:00 PM (City of Richmond residents if traveling in Henrico County) Daily - 6:00 AM - 11:00 PM* (Henrico County residents)	Daily - 6:00 AM - 8:00 PM (City of Richmond residents) Daily - 6:00 AM - 11:00 PM* (Henrico County residents)	Monday - Friday from 5:30 AM to 10:00 PM (UZURV) Saturday - Sunday from 7:30 AM to 7:30 PM (UZURV) Daily - 7:00 AM to 11:00 PM (Round Trip)
Shared Ride	Yes	Yes	No
Operated by Agency?	No	No	No

*Note: Hours may vary depending on fixed route bus service at the desired time of travel. Additionally, one fixed route does operate until 4:00 am on weekdays.

Key Points

- The CARE Plus program was implemented as a result of the jurisdictions (Richmond, Virginia and Henrico County, Virginia) wanting to provide paratransit service to customers who wanted to go to and from destinations that were beyond the federally mandated ¾

mile. Thus, the expansion of the service area allows for customers to travel anywhere within the City of Richmond and Henrico County even if there is not any local fixed route service.

- The CARE On-Demand service, which started on August 1, 2017, began as a result of GRTC looking for a way to provide paratransit customers with an option when traveling within the service area. The goal was to have at least 10% of the paratransit service move to the CARE On-Demand service. The CARE On-Demand trips cost less than the traditional service which provides a cost savings for GRTC. This has also freed up resources for the traditional paratransit service.
- The benefits of CARE On-Demand to customers include: direct, non-stop service; ability to request a trip for same-day service; flexibility to schedule a reservation up to 30 days in advance; freedom to ride solo; ability to travel anywhere within the GRTC CARE service area; and the option to request favorite driver(s).
- In 2019, trips on CARE On-Demand resulted in an annual savings of approximately $387,000.
- GRTC offered the following words of advice: “Do your homework and makes sure that the service is a good fit for the service area. Also, considering that many paratransit customers are not smartphone savvy, you have to make sure there is a call center option.”

Microtransit Service Delivery Methods

Microtransit services is the umbrella term for transit services that are open to the general public and generally operate on-demand. Microtransit can take many forms, including using TNCs (e.g., Uber, Lyft), contracted vehicles and drivers, agency vehicles and drivers, or something in-between. Five different agencies, selected for their diverse service offerings, were researched. These agencies, along with the services they offer, are summarized in Figure 5-15.

Detailed summaries of each of the four agencies are highlighted in subsequent pages.

Figure 5-15 Summary of Agencies and Alternative Service Delivery Methods Examined

Agency	Microtransit Service Overview
King County Metro – King County, WA	Via to Transit: A program operated by Via offering first- and last-mile connectivity to transit service. Rides are requested on-demand and takes customers to/from transit stations in Southeast Seattle and Tukwila.
Cherriots – Salem, OR	Cherriots Shop and Ride Shuttle: Open to seniors (age 60 and older) and people with disabilities to go shopping. The shuttle provides service to two different grocery stores in the Salem area. The Cherriots service area is divided into four zones and each zone is given two shopping times per week. West Salem Connector (Discontinued): Was an on-demand service that operated as a pilot service for two years. Riders could book trips anywhere within the defined service area.
SacRT – Sacramento, CA	SmaRT Ride: On-demand service using SacRT vehicles and drivers with a third-party scheduling service that provides service within designated zones.
Marin Transit – Marin County, CA	Connect: On-demand service that uses agency vehicles that are operated by a third-party service provider. Riders can request trips anywhere in the service area.
LAVTA – Dublin-Pleasanton-Livermore, CA	Go Tri-Valley: Uber and Lyft subsidy program covering 50% of the cost for each ride within the defined service area, up to $5. Riders must use the shared ride feature (UberPOOL or Lyft Line) to be eligible for the subsidy.

King County Metro – King County, WA

Figure 5-16 Summary of King County Metro's Via to Transit Program

	Via to Transit
Cost to the Passenger	Adults (19 or older): $2.75 Youth (6 to 18 years): $1.50 ORCA LIFT Cardholders (Income qualification: $1.50 RRFP Cardholders (Registered seniors, Medicare, disabled): $1.00 Free transfer to buses and light rail
Cost per Trip for Agency	~$8 as of October 2019
Eligibility Criteria	Open to public
Limit on No. of Trips	None
Span of Service	Southeast Seattle: Mon-Sat, 5 AM to 1 AM; Sun, 6 AM to Midnight Tukwila: Mon-Fri, 6 AM to 9 AM & 3:30 PM to 6:30 PM
Shared Ride	Yes (shared rides are temporarily suspended due to COVID-19)
Operated by Agency?	No

Key Points

- Via to Transit is a pilot on-demand service that launched in April 2019 is currently in its second year. It is designed to improve access to transit by providing feeder service to three transit stations in Southeast Seattle and Tukwila.
- Funding was primarily provided by the Federal Transit Administration's Mobility on Demand Sandbox Grant.
- Service is operated by Via but drivers are considered independent contractors who are paid a minimum of $30 per hour. They receive a $200 weekly bonus for working more than 30 hours per week to cover insurance, retirement, and paid time off.
- Riders may request a ride through the app or by phone. Wheelchair accessible vehicles are available upon request.
- Riders may be asked to walk to a pickup spot to reduce the amount of deviations a vehicle needs to take. Riders will not be asked to walk after 10 PM or before 6 AM.
- Average wait times have been 8 minutes for all trips and 14 minutes for wheelchair accessible vehicles.
- Approximately 5 passenger trips per vehicle per hour can be achieved.

Cherriots – Salem, OR

Figure 5-17 Summary of Cherriots's Shop and Ride and West Salem Connector Services

	Cherriots Shop and Ride Shopper Shuttle	West Salem Connector (On-Demand Service) – Discontinued in 2018
Cost to the Passenger	$1.25 per trip	Unknown
Cost per Trip for Agency	Unknown	$17.65 (2017$) for Connector $9.40 (2017$) for fixed route
Eligibility Criteria	Open to seniors (age 60 and older) and persons with disabilities	Open to public
Limit on No. of Trips	None	Unknown
Span of Service	Tuesday through Friday. First pickup is at 8:15 AM and last dropoff is at 5:15 PM.	Unknown
Shared Ride	Yes	Yes
Operated by Agency?	Yes	Partially. Labor was contracted out but used agency vehicles.

Key Points

- The Shop and Ride Shopper Shuttle provides service to two different grocery stores in the Salem area. The Cherriots service area is divided into four zones and each zone is given two shopping times per week.

  Riders may book their trip as early as 14 days in advance or as late as 5 PM the day before they want to travel. Riders were given a 30-minute pickup window.
- The West Salem Connector was an on-demand service that operated as a pilot service for two years. It was discontinued in January 2018 and replaced with fixed route service after it became evident that the service could not accommodate demand using just one vehicle and that it was cheaper to replace with fixed route service.

  Scheduling could be done up to 2 weeks or as little as 30 minutes in advance. The service accommodated four boardings per hour.

SacRT – Sacramento, CA

Figure 5-18 Summary of SacRT's SmaRT Ride Service

	SmaRT Ride
Cost to the Passenger	$2.50 per trip unless eligible for $1.25 discounted fare (seniors age 62+, persons with disabilities, and K-12 students) Groups of 5 or more ride free
Cost per Trip for Agency	Unknown
Eligibility Criteria	Open to the public
Limit on No. of Trips	None
Span of Service	Monday through Friday. Hours of operation vary by zone but can be as long as 6 AM to 10 PM
Shared Ride	Yes
Operated by Agency?	Yes

Key Points

- The SacRT SmaRT Ride program is unique in that it is structured to provide on-demand service through a third-party scheduling service (TransLoc, recently transitioned to Via) while using SacRT vehicles and drivers. SacRT estimates that this arrangement costs them 40% less than if the private sector were to run the entire operation. This service is likely one of the first microtransit programs in this country with this unique operating arrangement.
- Service commenced in February 2018 as a pilot program for one service area and has been expanding to new areas incrementally due to its continued success. Currently, there are nine service areas in operation.
- Riders can summon a vehicle through the app or by calling on their phone (roughly a third of riders are booking with the app, with the remainder choosing to call in). Riders are provided with corner-to-corner service, except one service area that operates curb-to-curb.
- The TransLoc platform allows for SacRT to use big data to estimate ridership demand and vehicle needs prior to deploying a new zone.
- While intended as an alternative to paratransit service, ADA paratransit is still provided to areas that fall within the mandated ¾ mile buffer of a fixed route.
- SacRT notes that the SmaRT Ride program is more efficient than their traditional paratransit program on a passengers per hour basis.
- The service has a goal of less than 30-minute wait times and less than 30 minutes on board a vehicle.

Marin Transit – Marin County, CA

Figure 5-19 Summary of Marin Transit's Connect Service

	Connect
Cost to the Passenger	Non-Marin Access Users: $4 per mile or $80 pass per month Marin Access Users: $3 per trip or $40 pass per month
Cost per Trip for Agency	Varies depending on rider. -Senior/ADA Trips: $40.05 -Employer Sponsored Trips: $5.89 -Regular/Other Riders: $9.96
Eligibility Criteria	Open to public
Limit on No. of Trips	None
Span of Service	Weekdays, 6:00 AM to 7:00 PM
Shared Ride	Yes
Operated by Agency?	No

Key Points

- Connect was started in May 2018 as a pilot program to provide fully accessible on-demand transportation to Marin County. The service had three major goals: provide riders with disabilities an option for making same-day trips, increasing first and last mile connectivity with fixed routes, and connecting transit riders to their place of employment.
- The service uses four Marin Transit vehicles that are operated by a third-part service provider, Whistlestop. The scheduling and booking system was handled by Via until it was transitioned to Uber in July 2020.
- Service can be requested in the app or by calling the customer service line.
- The system was setup for a maximum wait time of 30 minutes although the average wait time in FY 2019/2020 was 7.73 minutes.
- For May 2019, the most recent month data is available, the service averaged 2.39 passenger trips per revenue hour.

LAVTA – Dublin, Pleasanton, Livermore, CA

Figure 5-20 Summary of LAVTA's Go Tri-Valley Service

	Go Tri-Valley (Formerly Go Dublin)
Cost to the Passenger	Subsidy covers half the fare, up to $5. Passenger is responsible for the remainder.
Cost per Trip for Agency	Up to $5 per trip. The average cost under the old Go Dublin service in May 2017 was $3.30 per trip (compared to $7.66 per trip on the fixed route network).
Eligibility Criteria	Open to public
Limit on No. of Trips	No limit
Span of Service	24 hours a day, 7 days a week
Shared Ride	Yes (program requires the use of UberPOOL or Lyft Line). However, due to COVID-19, single rider trips are temporarily eligible for the program.
Operated by Agency?	No

Key Points

- The Go Dublin service was launched by LAVTA in January 2017 as a pilot program in conjunction with the elimination of several low productivity bus routes (5 to 8 boardings per hour) in the City of Dublin. The pilot was supposed to end in June 2018 but was extend to June 2019 due to its success. In 2020, the program was expanded to include the entire LAVTA service area and renamed the Go Tri-Valley program.
- The program started with three providers (Lyft, Uber, and DeSoto Cab) but now only has Lyft and Uber. Wheelchair accessible vehicles are available through Uber WAV.
- Funding is provided through LAVTA marketing funds and the Bay Area Air Quality Management District (AQMD).
- For prospective riders that do not have a smart phone, there are two options. The first is to apply for a California program that assists riders with getting a smart phone. The other option is to pay for a calling service that will make ride requests via the phone.
- Most of the trips were from neighborhoods to BART rapid transit stations, confirming the program was serving its intended purpose.

CONCLUSIONS/RECOMMENDATIONS

An examination of historical Dial-A-Lift data shows that productivity (as measured in passenger trips per revenue hour) is holding steady, while costs are rising, regardless of how its normalized (passenger trip, revenue mile, revenue hour). When compared to the growth of ridership, costs are rising at a slightly higher percentage each year. This finding highlights the need for Dial-A-Lift to examine opportunities to control cost increases due to rising ridership demand by exploring cost management practices, including the use of supplemental service providers.

When Dial-A-Lift is compared to other agencies that offer fare-free paratransit service, productivity (as measured in passenger trips per revenue hour) is comparable. However, in terms of cost, Intercity Transit ranks the highest among other transit agencies across the three cost metrics (cost per passenger trip, per revenue mile, and per revenue hour). While it is unknown why that is, differences in geography and even reporting methodologies (in terms of how O&M costs are allocated between fixed route and paratransit services), among other reasons, can explain these differences.

The nine case studies highlighted the different alternative services being implemented by transit agencies throughout the country. Some of these services are supplemental paratransit service while some are microtransit service. The key takeaway from these case studies is that while these alternative means are cheaper and offer greater convenience/spontaneity in securing a ride than traditional paratransit, there is no one size fits all approach. Many transit agencies are learning and improvising as these services are rolled out or tested. This could be a potential solution to reduce costs for Dial-A-Lift but the only way to know whether such a service would be successful would be to test it on a trial basis.

6 RIDERSHIP AND COST FORECAST

The previous chapters focused on examining the Dial-A-Lift system is operating and how it compares with other transit agencies. This sets the stage for the ridership and cost estimation piece that is contained in this chapter. The chapter first starts off with presenting the ridership forecasts from the present day to the year 2040. It then transitions to talking about the estimated O&M costs based on projected ridership estimates, before finishing with estimated vehicle requirements.

RIDERSHIP ESTIMATES

This section presents two sets of ridership estimates, one developed before the COVID-19 pandemic hit (hereafter referred to as the pre-COVID estimates) and one developed once the effects of COVID-19 began to become more apparent (hereafter referred to as the post-COVID estimates).

It is important to note that estimating ridership is an imprecise science, and as such, is presented as a range rather than an absolute number. With the occurrence of COVID-19, new uncertainty is introduced into estimating ridership, particularly since no one knows how this pandemic will impact travel in Thurston County, much less the paratransit industry in general. To the extent possible, the post-COVID ridership estimates reflect assumptions that Nelson\Nygaard felt appropriate and reasonable at the time this report was prepared.

Pre-COVID Ridership Estimates

The pre-COVID ridership estimates start in 2020 and assumed a continuation of historical ridership trends into the future. The lower bound of the ridership estimate accounts for the following:

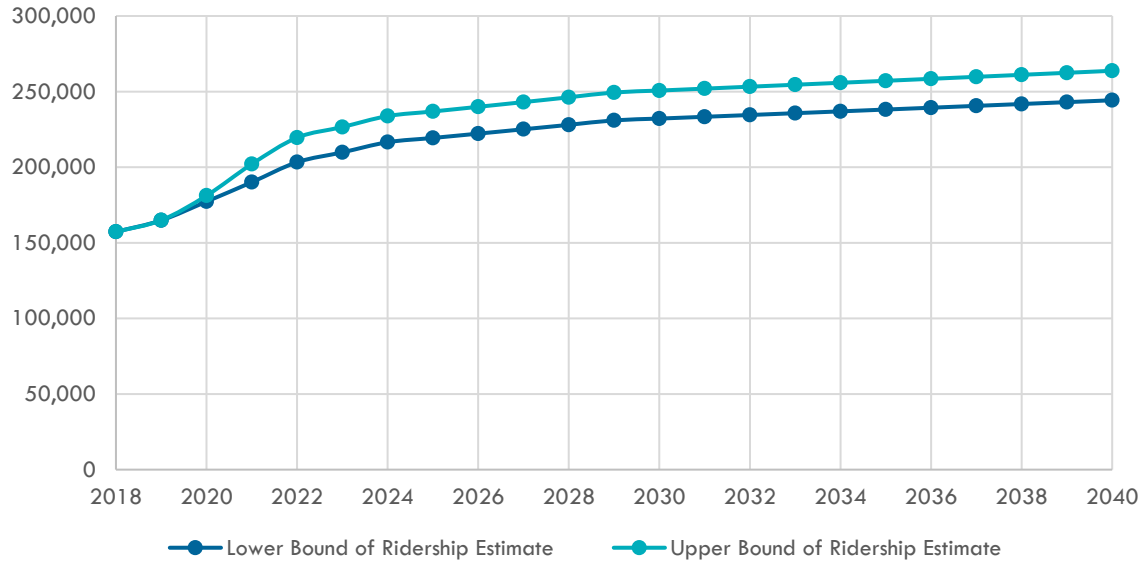
- An increase in ridership due to the elimination of Dial-A-Lift fares, effective January 2020 (estimated using January and February 2020 Dial-A-Lift data)
- Growth in ridership due to an increase in the eligible population that qualifies for Dial-A-Lift service (estimated using Thurston County population forecasts by age)

The upper bound of the ridership estimate includes:

- Everything in the lower bound estimate but includes a larger ridership response to the elimination of fares on Dial-A-Lift
- Ridership from implementation of an Innovative Service Zone service in 2021 (estimated using existing trip rates and computed net new area for paratransit service)

The ridership estimate is presented in Figure 6-1.

Figure 6-1 2040 Pre-COVID Projected Ridership on Dial-A-Lift



Post-COVID Ridership Estimates

The post-COVID ridership estimates include the same components of the pre-COVID estimates but assumes a substantial dip in ridership in 2020 due to the pandemic. The lower and upper bounds reflect two potential ridership responses once the pandemic is over.

The lower bound of the ridership estimate assumes that Dial-A-Lift ridership does not recover to levels seen before the pandemic. It uses January through April 2020 Dial-A-Lift ridership data to develop a 2020 ridership estimate that assumes ridership would be depressed from March 2020 to July 2020 before slowly recovering through the end of the year. [7] Similar to the pre-COVID estimate, this lower bound includes an increase in ridership due to the elimination of Dial-A-Lift fares (albeit a smaller amount than under the pre-COVID estimate) and a growth in ridership due to an increase in the eligible population that qualifies for Dial-A-Lift service.

The upper bound of the ridership estimate assumes a gradual return to ridership that results in 2023 ridership being equal to what was experienced in 2019. It includes everything in the lower bound plus the implementation of an Innovative Service Zone service in 2021.

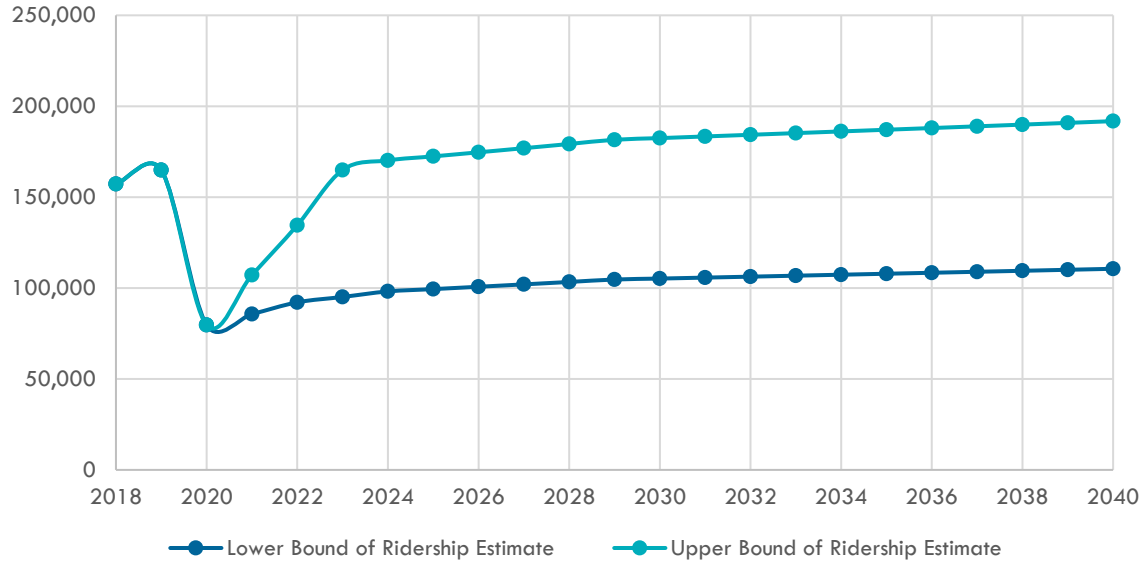
The ridership estimate is presented in Figure 6-2.

It is crucial to note that the ridership and financial projections apply only to ridership and service requirements related to ADA paratransit. The current situation, as a result of the 2020 public health crisis, where about 80% of Dial-A-Lift riders are non-ADA eligible riders to create a safety net for essential trips not presently possible on fixed route service, is not included in these forecasts in any way. This is an impact that should be acknowledged and understood to a much

[7] Ridership for 2020 was projected using compounded annual growth rates (CAGR) from 2013-2018 for months of August to December. These CAGRs were reduced by 50% to account for the reduced growth during the COVID-19 pandemic.

greater degree. The final paragraph of this report contains a recommended approach to that situation.

Figure 6-2 2040 Post-COVID Projected Ridership on Dial-A-Lift

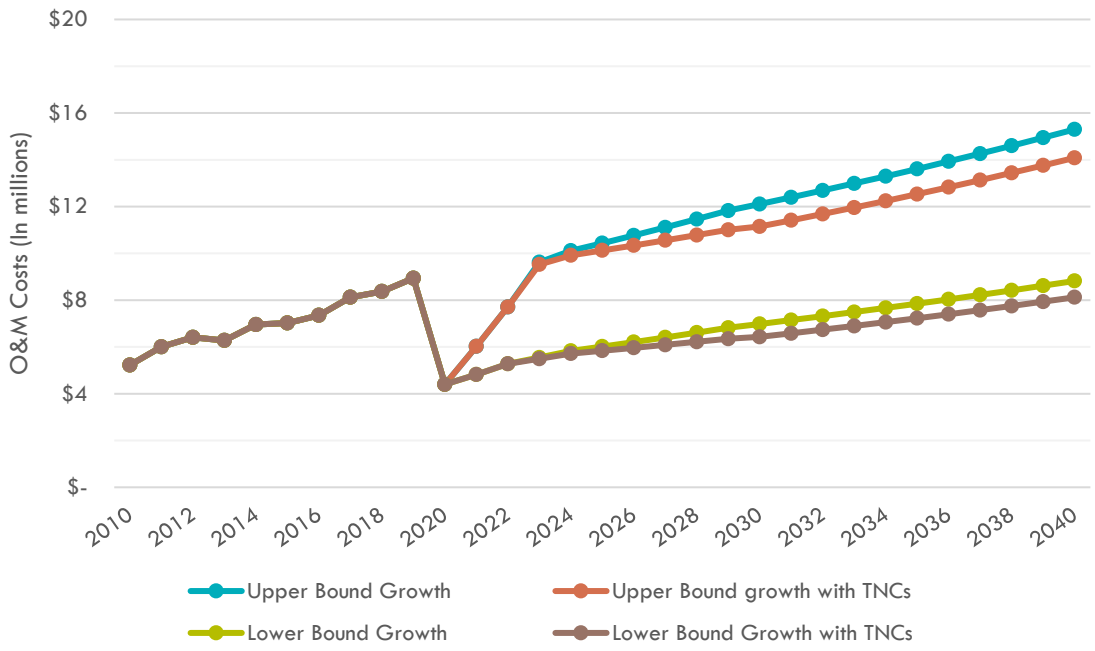


O&M COST ESTIMATES

This section presents the annual O&M cost estimates for the post-COVID ridership estimates using two scenarios. The first scenario assumes “business as usual” with all paratransit trips continuing to be served by Dial-A-Lift and historical cost increases continuing until 2040. The second scenario assumes a slow transition of some paratransit trips onto TNCs, starting with 2.5% of all trips in the first year and increasing by 2.5% per year until maxing out at 20% of all trips in the eighth and following years. This second scenario takes cost data collected in Chapter 5 from other transit systems to compute a reduced cost for each trip accommodated on a TNC. Both scenarios do not account for inflation.

The results, shown in Figure 6-3, illustrate the range in expected costs in the years leading up to 2040. It can also be seen that shifting some trips to TNCs has the potential to cut costs by almost 9% in 2040.

Figure 6-3 Projected 2040 O&M Cost (Not Adjusted for Inflation)



ESTIMATED VEHICLE REQUIREMENTS

This section presents an estimate of the number of vehicles needed to operate maximum service assuming no trips are shifted onto alternate modes. These estimates relied on partial year 2019 fleet deployment data (January 2 to November 8, 2019). An analysis of the fleet data revealed vehicle deployment generally peaks in the midday, with weekdays experiencing higher peaks than on the weekend (see Figure 6-4 to Figure 6-10). The maximum fleet deployment for each day of the week is shown in Figure 6-11. It is important to highlight that the maximum fleet deployment (Figure 6-11) represents the total number of vehicles needed just to accommodate demand in the peak hour and is lower than the total fleet needs for the entire day, which is presented later in this section. The peak hour and daily vehicle requirements differ because Dial-A-Lift drivers do not always share a vehicle with another driver or operator scheduling does not always provide an opportunity for vehicle sharing. This practice increases actual daily fleet deployment above the values indicated in the figures below as the figures below are reporting the number of unique vehicles observed in each hour, as opposed to the accumulated number of unique vehicles for all hours, which is the analysis that follows.

Figure 6-4 Vehicles in Service by Time of Day – Mondays in 2019

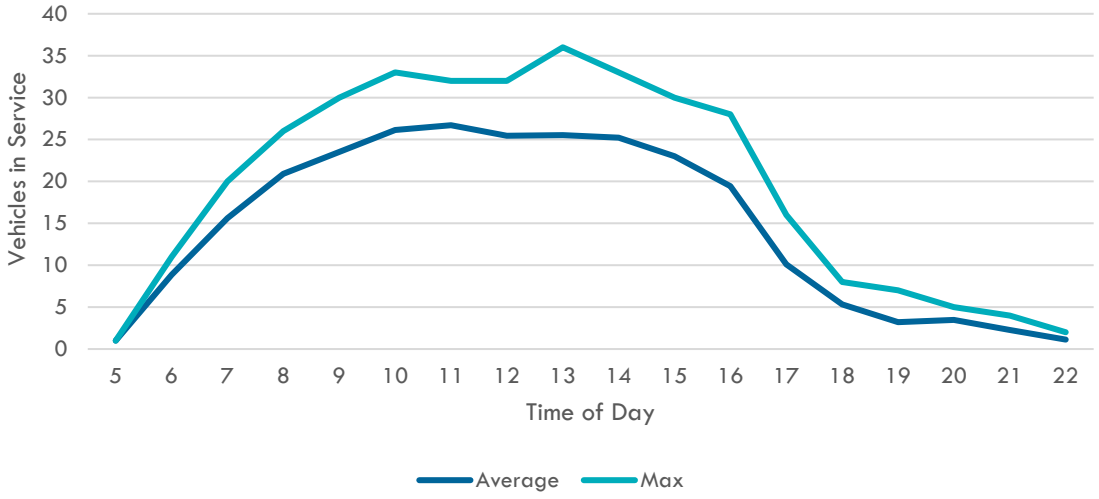


Figure 6-5 Vehicles in Service by Time of Day – Tuesdays in 2019

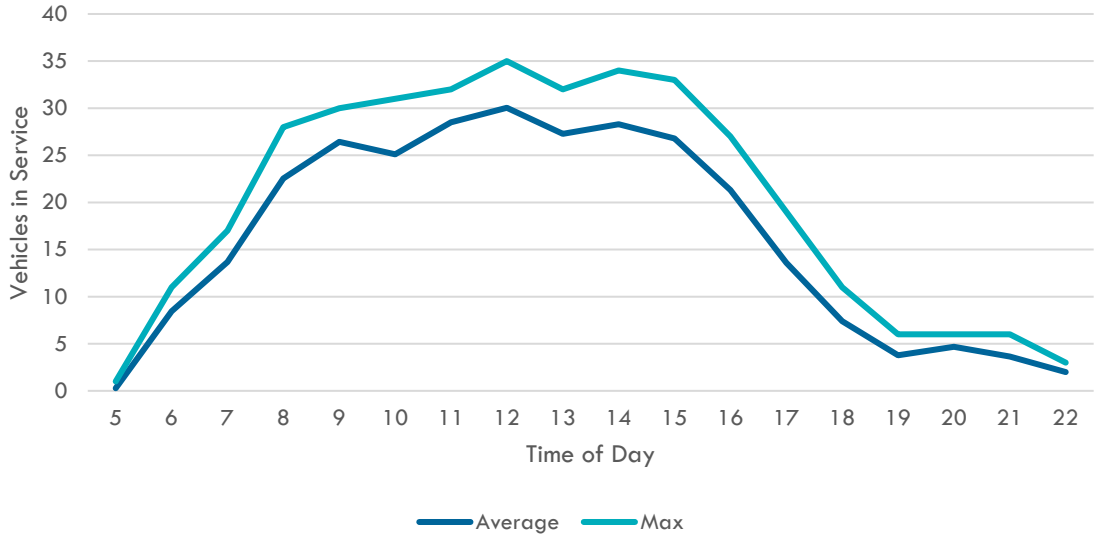


Figure 6-6 Vehicles in Service by Time of Day – Wednesdays in 2019

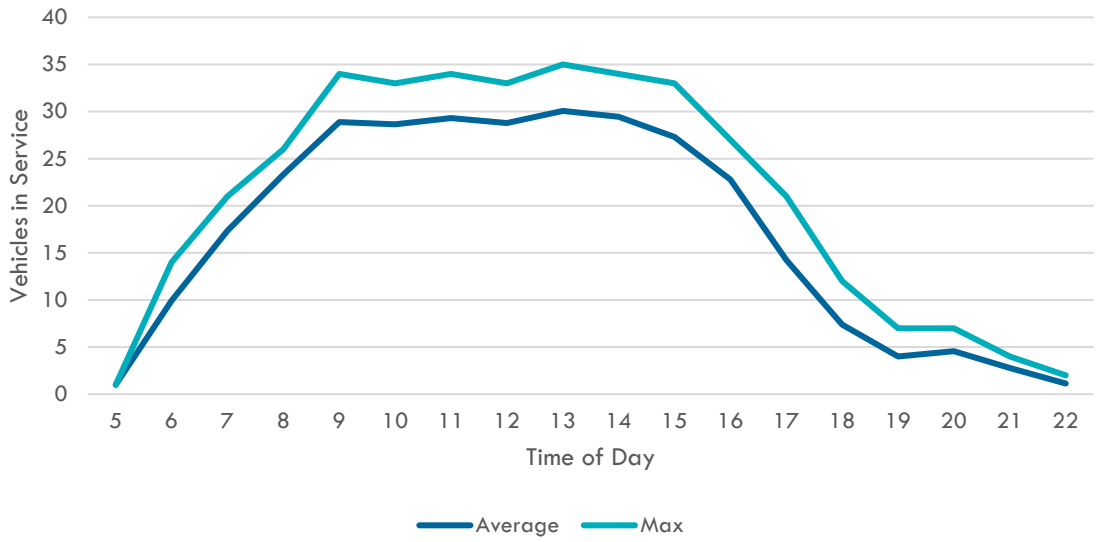


Figure 6-7 Vehicles in Service by Time of Day – Thursdays in 2019

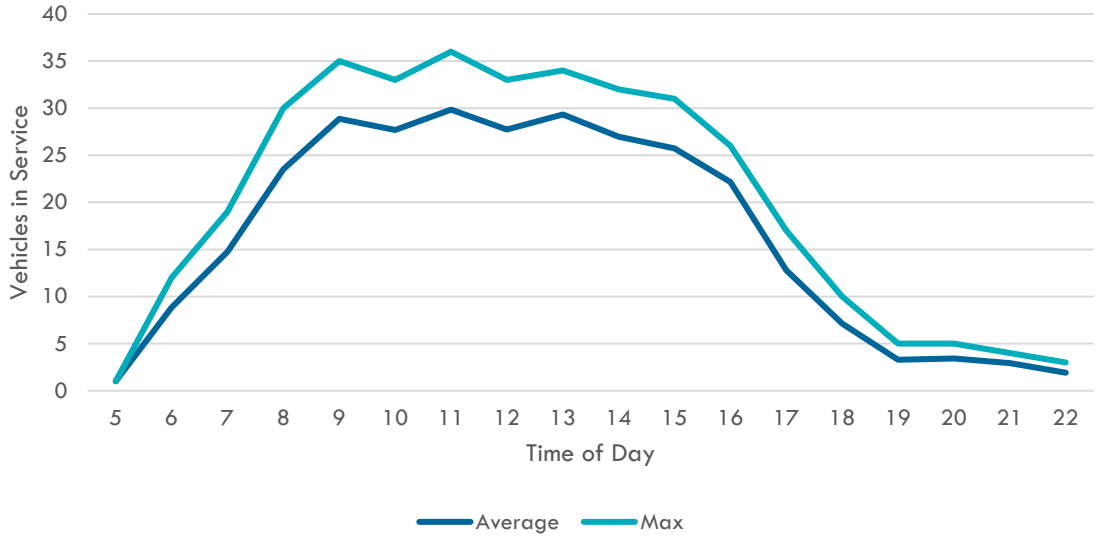


Figure 6-8 Vehicles in Service by Time of Day – Fridays in 2019

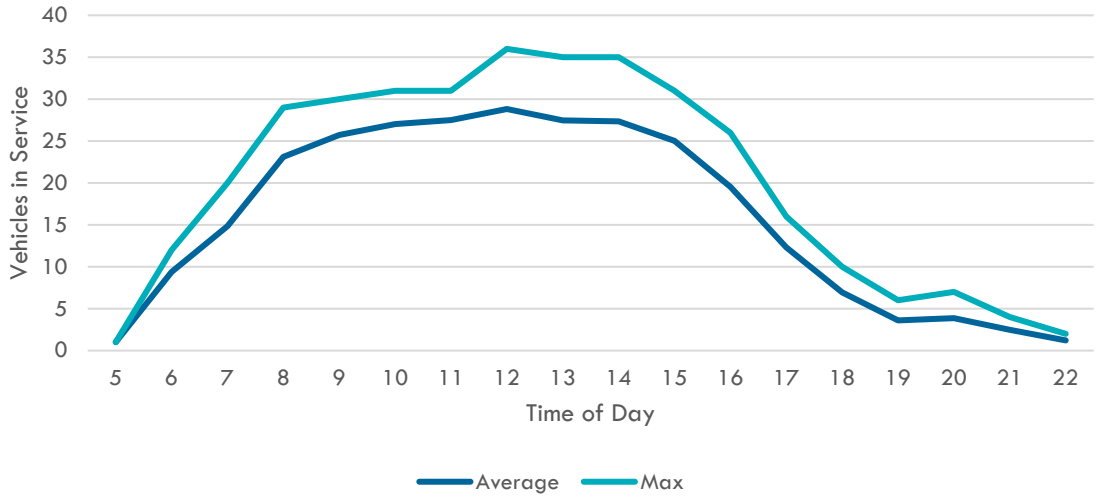


Figure 6-9 Vehicles in Service by Time of Day – Saturdays in 2019

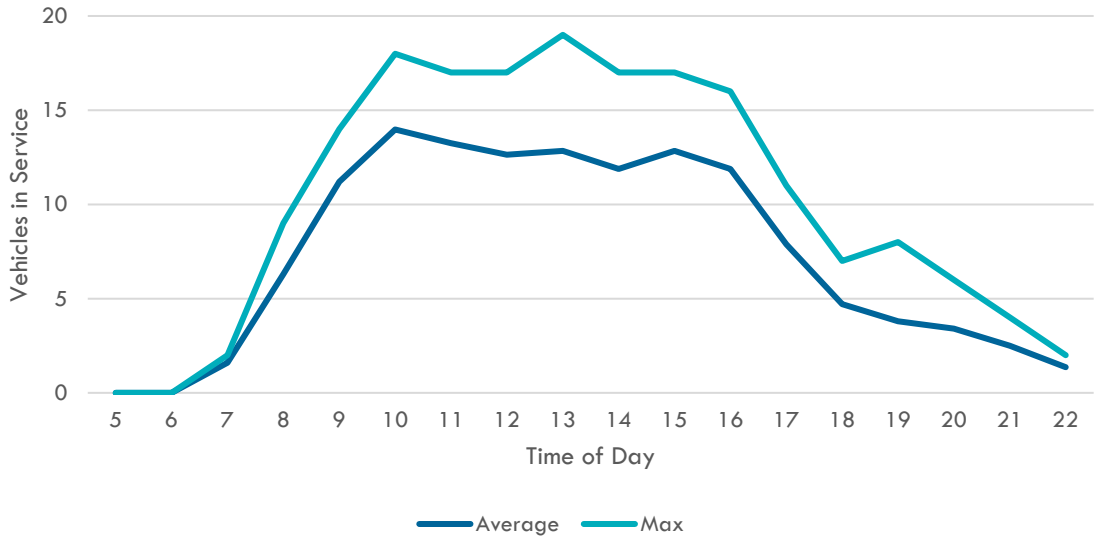


Figure 6-10 Vehicles in Service by Time of Day – Sundays in 2019

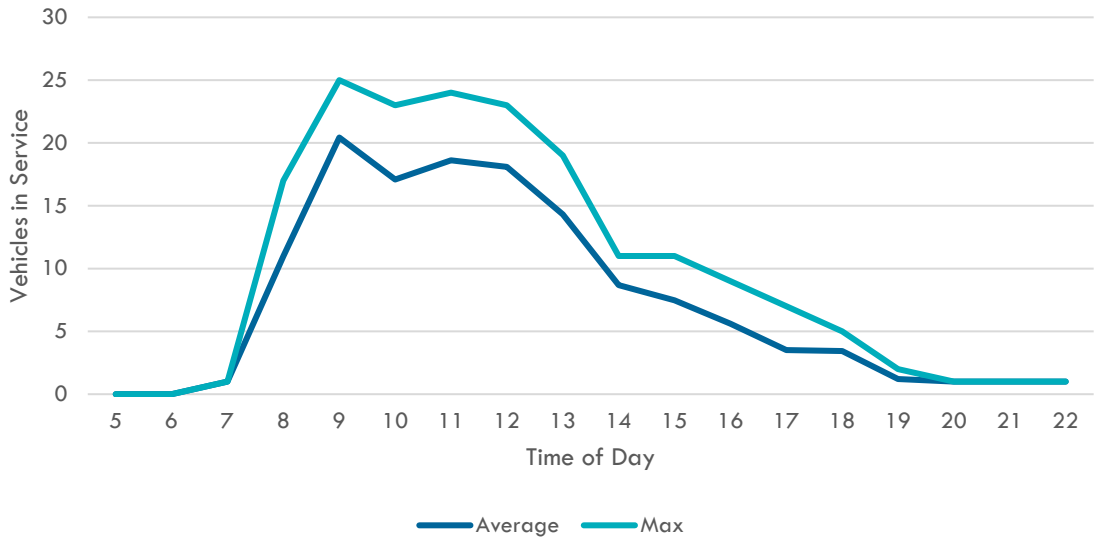
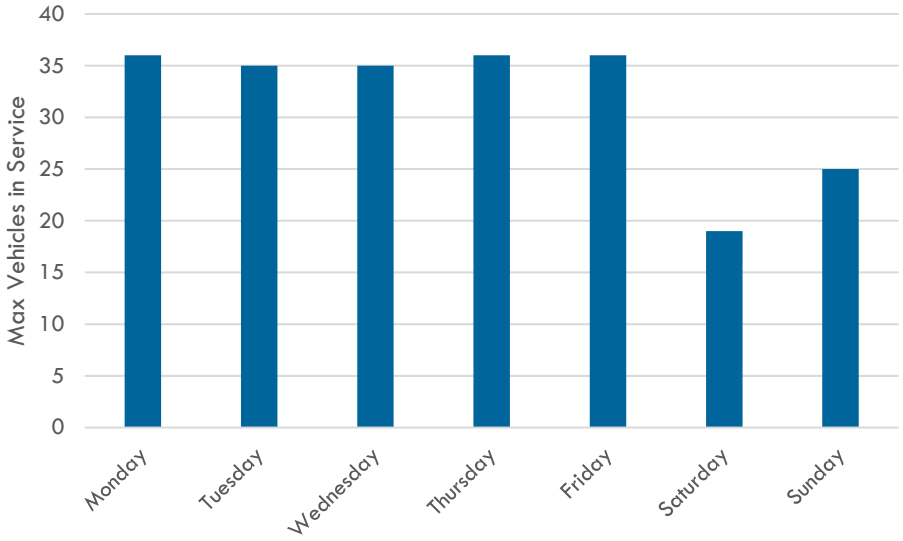


Figure 6-11 2019 Maximum Number of Vehicles in Service by Day of the Week



To better understand how Dial-A-Lift is utilizing their fleet, Nelson\Nygaard performed several additional analyses.

First, the five weekdays with the maximum fleet deployment during the data period (January 2 to November 8, 2019) were examined. The results, shown in Figure 6-12, indicate that Dial-A-Lift is deploying 35 or 36 vehicles on peak days to maintain service.

Figure 6-12 Vehicle Deployment on Peak Hour of Max Fleet Day

Day	Peak Hour	Max Fleet Day	Max Vehicles Deployed during Peak Hour
Monday	13:00-13:59	10/21/2019	36
Tuesday	12:00-12:59	9/3/2019	35
Wednesday	13:00-13:59	6/5/2019	35
Thursday	11:00-11:59	8/22/2019	36
Friday	12:00-12:59	9/27/2019	36

Next, the scheduled runs of the five days with maximum fleet deployment were compared against the actual runs. This helps to determine how “close to plan” Dial-A-Lift is operating. The 9000 series runs are called out separately because they are “filler” trips that are scheduled just before the day of service as demand warrants. The results are presented in Figure 6-13. It shows that some of the 9000 Series runs are used to cover for scheduled runs that did not operate. However, even accounting for that, Dial-A-Lift is still operating more runs than it had pre-scheduled.

Figure 6-13 Scheduled Versus Actual Run Summary for Max Fleet Days

Day	Max Fleet Date	Scheduled Run Summary	Actual Run Summary		
		Scheduled Series	Scheduled Series	9000 Series	Total
Monday	10/21/2019	35	34	10	44
Tuesday	9/3/2019	36	35	6	41
Wednesday	6/5/2019	37	37	7	44
Thursday	8/22/2019	37	37	7	44
Friday	9/27/2019	35	34	8	42

Run data was also examined to determine how many vehicles were used for service on each of the max fleet days, as well as how many vehicles were used for more than one run. Sharing vehicles is not a common practice in the paratransit industry; however, it is one way to reduce the number of vehicles needed if runs are scheduled to allow this to happen.

The results, shown in Figure 6-14, indicate a small number of runs share a vehicle. Again, it is important to emphasize that these unique vehicle totals are the number of vehicles needed to operate service for each max fleet day. The day with the highest deployment (Monday) drives the fleet needs for the entire Dial-A-Lift system. This is because Wednesday and Thursday, also equal in terms of total number of peak runs (Figure 72) present opportunities to make adjustments in scheduling, as discussed below, to decrease the total fleet need. Monday, due to the demand and scheduling pattern may also present such opportunities, but the options are not immediately obvious.

Figure 6-14 Vehicles Used for More than One Run on Max Fleet Days

Day	Max Fleet Date	Total Vehicles Deployed throughout Entire Day	
		Unique Vehicles	Vehicles Used for More than One Run
Monday	10/21/2019	41	3
Tuesday	9/3/2019	38	3
Wednesday	6/5/2019	39	5
Thursday	8/22/2019	39	5
Friday	9/27/2019	39	3

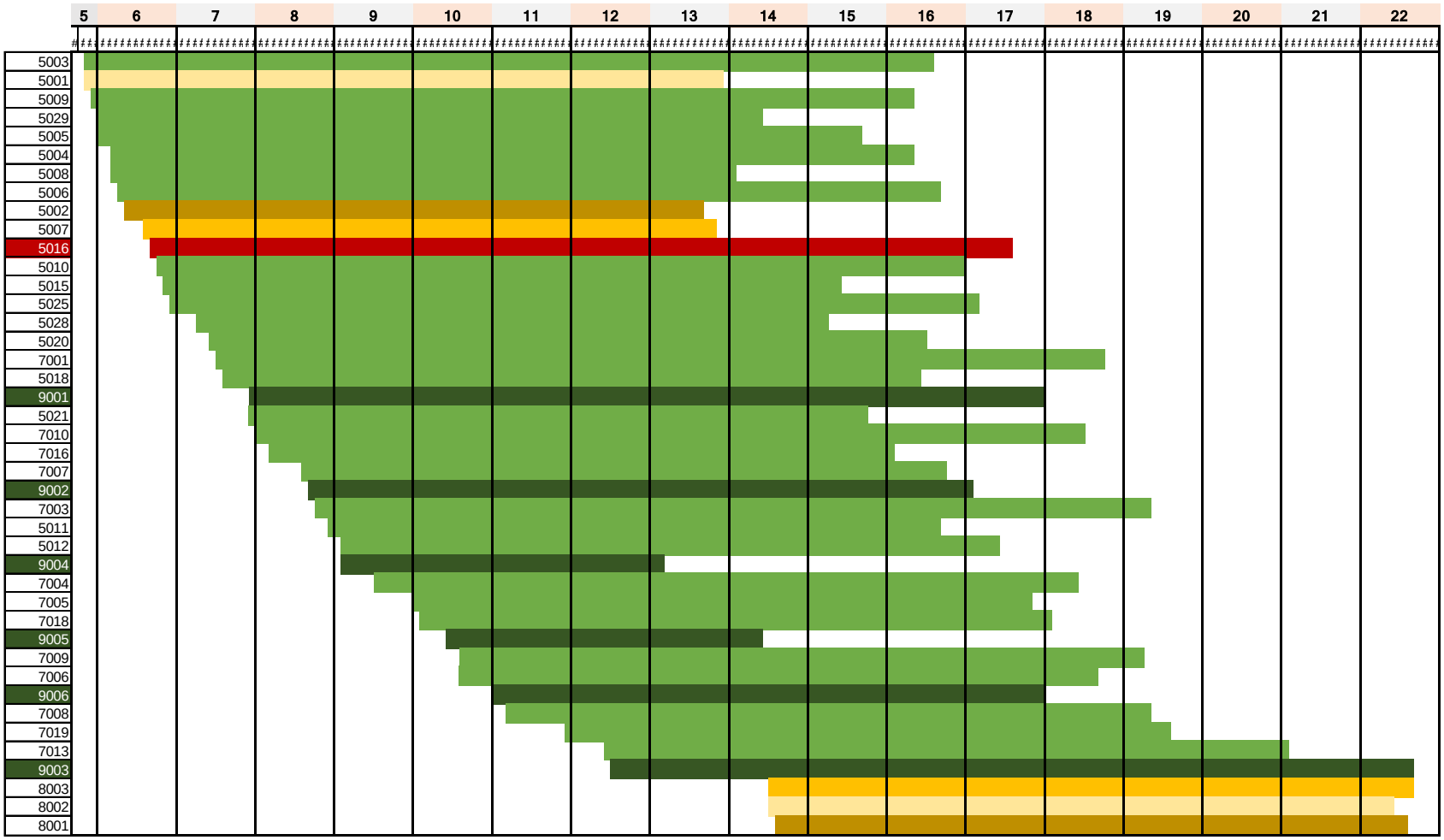
To better understand how the paratransit runs are scheduled and identify any potential improvements, Nelson\Nygaard graphically plotted the runs for the five days with maximum fleet deployment. The graphs are shown in Figure 6-15 to Figure 6-19. One key finding from the graphs is that there is some potential to adjust run start and end times to allow for more vehicle

sharing. There are also opportunities to vehicle share between regular runs and 9000 runs. On Monday, for example, regular run 5018 could share a vehicle with run 9003 and 7015 with 9005, this reducing fleet deployment by two vehicles. While the capital savings would be marginal (reducing vehicles purchases by a few vehicles), such savings could make a difference over the long-term by reducing maintenance requirements and the need for expanding storage/maintenance facilities. Taking these points of focus to reduce overall fleet deployment could yield dividends as Dial-A-Lift operations begin to recover post-pandemic.

Figure 6-15 Monday (10/21/2019) Run Summary

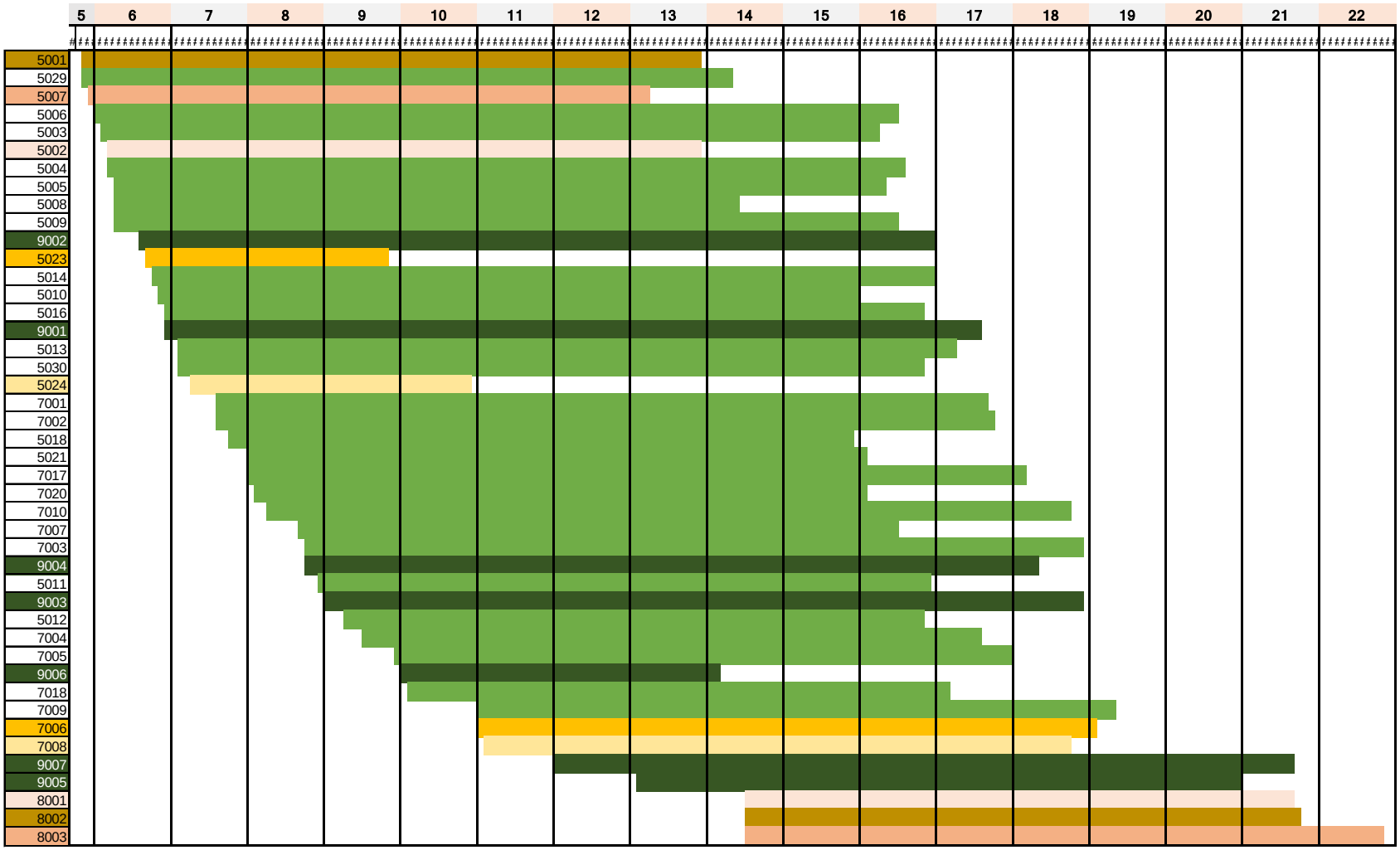
Note: Light green shading=scheduled runs, dark green shading: 9000 series runs, orange shading: runs that share a vehicle, red shading: scheduled runs that did not operate

Figure 6-16 Tuesday (9/3/2019) Run Summary



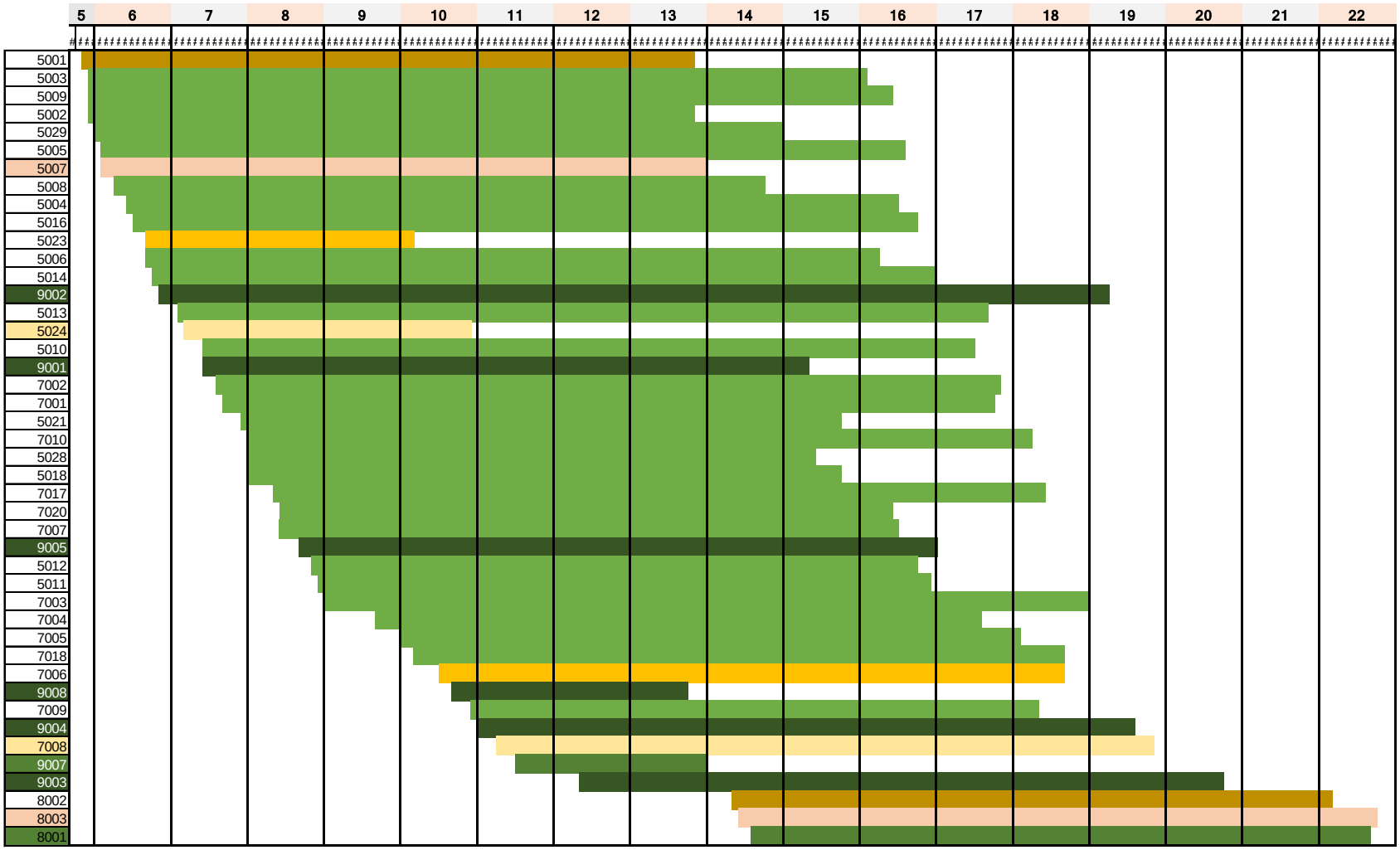
Note: Light green shading=scheduled runs, dark green shading: 9000 series runs, orange shading: runs that share a vehicle, red shading: scheduled runs that did not operate

Figure 6-17 Wednesday (6/5/2019) Run Summary



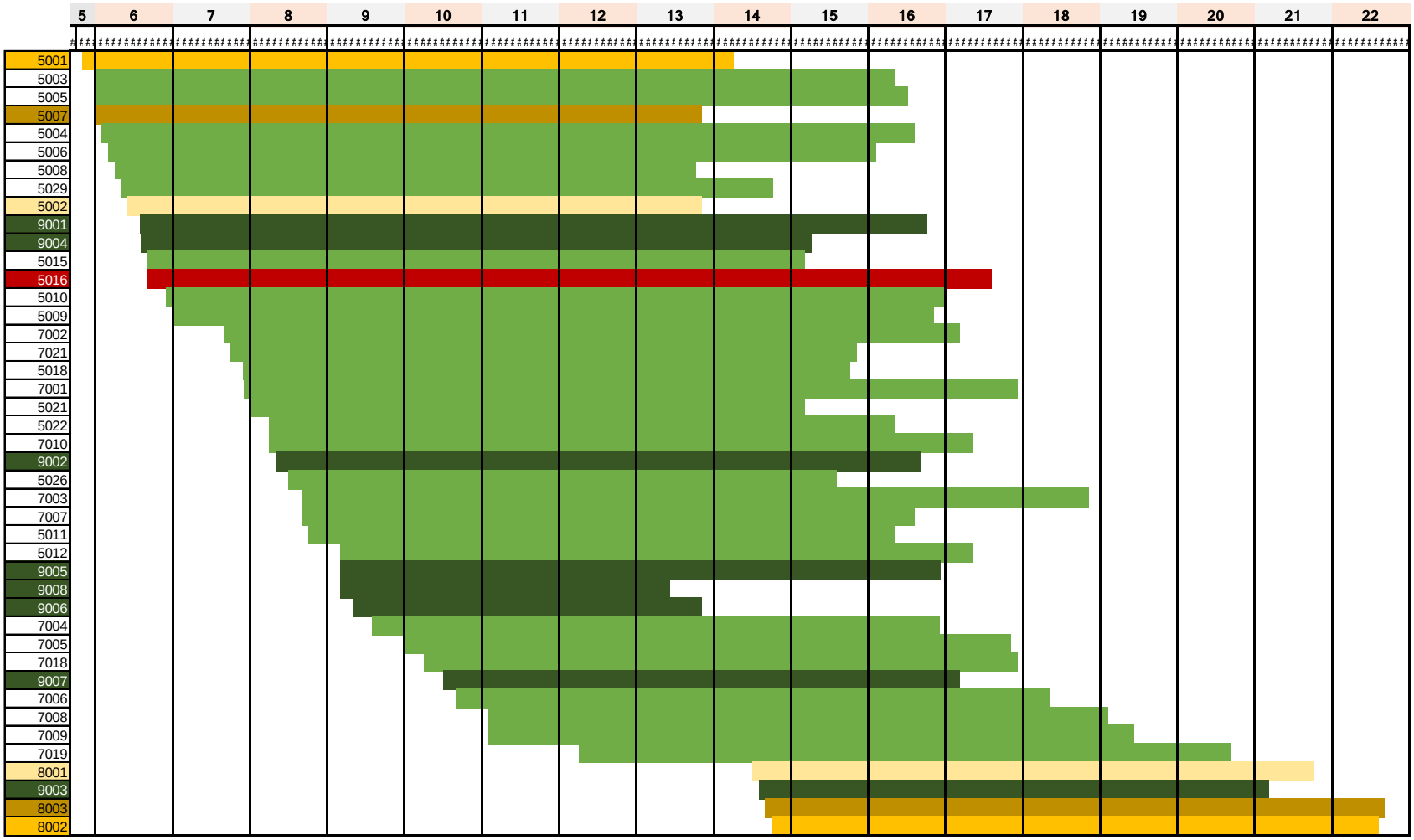
Note: Light green shading=scheduled runs, dark green shading: 9000 series runs, orange shading: runs that share a vehicle, red shading: scheduled runs that did not operate

Figure 6-18 Thursday (8/22/2019) Run Summary



Note: Light green shading=scheduled runs, dark green shading: 9000 series runs, orange shading: runs that share a vehicle, red shading: scheduled runs that did not operate

Figure 6-19 Friday (9/27/2019) Run Summary



Note: Light green shading=scheduled runs, dark green shading: 9000 series runs, orange shading: runs that share a vehicle, red shading: scheduled runs that did not operate

Nelson\Nygaard also looked at Dial-A-Lift's productivity by hour to identify if productivity changed throughout the day. Due to the time-intensive nature of this process, only Monday (10/21/2019) was examined as it was one of the days with the highest fleet deployment. In this case, productivity was measured as the percent of revenue hours with at least one passenger on-board the vehicle. This metric is useful in determining if productivity fluctuates throughout the day, which could be indicative of scheduling issues. Based on the results shown in Figure 6-20, productivity is at 41% during the hour with max vehicle deployment (13:00 hours). This indicates that Dial-A-Lift is operating with good productivity when demand is highest. Other periods of the day with lower productivity levels, such as the 11:00 hour, could benefit from closer examination into scheduling practices (e.g., operator lunch breaks) to determine if additional efficiencies can be gained. Allowing for the fact that the times being used are not totally precise, this analysis likely understates the actual deployment. For example, a rider has a trip scheduled for pick up to 1:15, the operator arrives at 1:05 and the passenger relates that they will not be ready for pickup until 1:15. Is that 10 minute difference an inefficiency or simply part of scheduling for paratransit riders? The analysis below would report that time as not having a passenger on board, yet from a practical standpoint, the operator and vehicle are engaged in the pickup process. Nevertheless, even accounting for those realities, the analysis suggests that randomly choosing a vehicle at peak deployment presents about a 50% chance that the vehicle will have a passenger on board. Disassembly of the detail of scheduling practices is beyond the scope of this investigation. However, this finding is suggestive that marginal improvements in efficiency and fleet deployment may be possible given the margins of opportunity.

Figure 6-20 Percent of Time Vehicles are Carrying Passengers by Hour (10/21/2019)

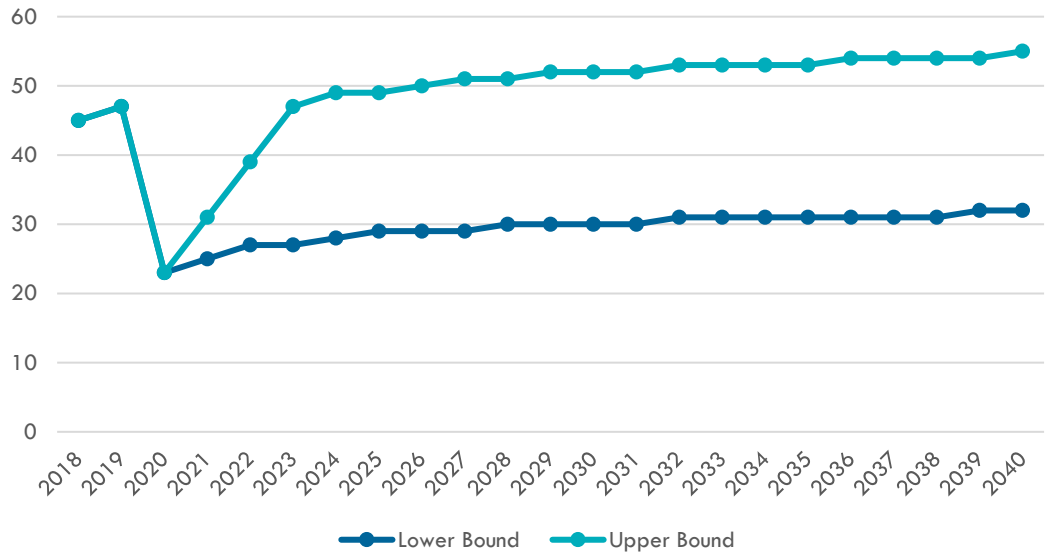
	Hour of the Day																
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Sum of Revenue Hours with Passengers On-Board the Vehicle	2.42	6.50	10.75	10.25	13.66	11.08	13.75	15.25	14.50	14.17	9.83	6.42	2.67	2.42	1.67	0.67	0.17
Sum of Revenue Hours (With or Without Passengers On-Board)	10.6	18.8	25.4	30.7	35.5	38.5	38.5	37.1	36.2	35.2	27.2	17.0	10.2	7.5	4.8	2.6	0.6
Percent of Revenue Hours with Passengers On-Board	23%	35%	42%	33%	38%	29%	36%	41%	40%	40%	36%	38%	26%	32%	35%	26%	28%
Vehicles Deployed	9	18	25	30	34	31	34	36	33	32	30	17	7	8	6	2	1

For fleet planning purposes, the maximum fleet deployment for the busiest peak hour of the entire week must be used to ensure that there are enough vehicles available to handle customer demand. The steps taken to estimate fleet needs were as follows:

- Take the future annual ridership projections (lower and upper bound) from the post-COVID ridership estimate and estimate the average daily peak hour ridership by day of the week. This was done by applying distribution factors that were computed from the 2019 dataset.
- Convert the average ridership to max ridership using a factor computed from the 2019 dataset.
- Examine the day of the week with the highest fleet needs (Monday) as it is the controlling scenario for each year of the projection.
- Apply a productivity factor (passengers per vehicle per hour) to determine fleet need. The productivity of the Monday peak hour was used, which was 1.8 passengers per vehicle per hour.
- Assume a spare ratio of 20%. Note, this is close to the 2019 fleet spare ratio without exceeding the FTA limit of 20% spares.

The results from the projection are presented in Figure 6-21. As can be seen, as many as 55 vehicles could be needed in 2040 to accommodate the demand in the upper bound ridership estimate.

Figure 6-21 Estimated Vehicle Requirements for Maximum Service



CONCLUSIONS/RECOMMENDATIONS

The results from the ridership estimate exercise show how dramatically the projections have changed due to the impact of COVID-19. In the pre-COVID estimates, the ridership figures showed that ridership would follow known trends with a high degree of certainty (hence the smaller range between the upper and lower bounds). In the post-COVID scenario, there is greater uncertainty about ridership given the change in trip making behavior thus making the range between the upper and lower bounds much larger. It is worth pointing out that in 2040, the upper

bound of the post-COVID scenario is intentionally lower than the lower bound of the pre-COVID estimate, reflecting that some ridership is lost forever and will not be recovered by the system.

The O&M cost estimate highlights how Dial-A-Lift costs will continue to increase in the years ahead, even with the impacts of COVID-19 being considered. It also shows how a modest 20% shift in trips onto TNCs, or other supplemental programs, can result in a noticeable decrease in costs, especially once the alternate program reaches full maturity.

The number of vehicles needed for maximum service is also an important consideration. As projected under the worst-case scenario, Dial-A-Lift will need as many as 8 more vehicles in 2040 for maximum service. Aside from the capital costs with purchasing additional vehicles, there are also storage and maintenance needs to consider, especially with a larger fleet.

An examination of the scheduling of paratransit runs revealed that Dial-A-Lift is currently sharing vehicles for some runs. There is the opportunity to adjust the run schedule slightly to allow for more vehicle sharing to happen, thus reducing fleet needs somewhat. A review of the system productivity data highlighted that Dial-A-Lift is operating quite efficiently during the time of maximum fleet deployment. However, there is an opportunity to examine the scheduling of operator breaks to try and bring other hours of the day with lower productivity numbers up. There is also an opportunity to further improve overall scheduling efficiency. That effort needs to be undertaken considering use of alternate modes as well as improved scheduling practices to increase the percentage of each hour that operators and vehicles are deployed with passengers on board.

Dial-A-Lift needs to consider the capital needs in conjunction with O&M costs as the future of the system is contemplated. As shown through the inclusion of alternate modes in the analysis, there is the potential bring down O&M costs compared to the status quo. It is recommended that Dial-A-Lift investigate the feasibility of transitioning some paratransit trips onto alternate modes, and if feasible, what percentage of trips would be appropriate to achieve the desired cost savings. As recommended in Chapter 5, an alternate mode pilot program could be useful in determining the viability of such a service for Dial-A-Lift before a firmer commitment is made.

Finally, in light of current operating practice to utilize Dial-A-Lift operations as a safety net for essential trips in the fixed route system, the inclusion of a supplemental provider, such as Lyft or Uber, could provide a way for Intercity Transit to continue to provide this safety net service. It is possible the present activity is actually the first application of an innovative service zone. It just may be very different than what was originally envisioned. It is also very likely that Intercity Transit will be faced with a difficult decision to do away with the “gap fill” service as ADA demand recovers. At the same time, it is likely that some portion of riders using the Dial-A-Lift option will continue to need or want access to this service as the community evolves to the “new normal.” It is strongly suggested that the three to four months of data available on non-ADA trips taken on Dial-A-Lift be examined in detail to observe trip making patterns (geo-spatially and temporally) to see what can be learned about the future need for these services even as fixed route operations start returning to higher and longer levels of service.

APPENDIX - COMPARISON OF TRIP COUNTS

Year	ADA Trips (What was used in this report)	NTD Trips - Includes Personal Care Attendants and Travel Companions	ADA Trips with Personal Care Attendants and Travel Companions
2005	49,065*	117,621	117,621
2006	115,537	135,704	102,335
2007	124,007	134,948	134,948
2008	124,677	133,847	133,847
2009	129,209	148,312	148,312
2010	137,081	152,977	152,977
2011	136,013	149,079	143,797
2012	135,301	150,374	150,374
2013	135,800	156,477	156,477
2014	143,140	160,046	154,429
2015	144,878	166,062	161,594
2016	147,369	172,852	164,238
2017	146,821	175,596	170,714
2018	157,279	190,907	186,891
2019	167,399*	215,834	209,227

*Note: 2005 and 2019 data did not cover an entire year. 2005 data was excluded from this analysis while 2019 data was scaled up to approximate a full year of data.