ALL-DOOR BOARDING PERFORMANCE

SUMMARY

The performance of the All-door Boarding Pilot is determined by evaluating the program across a number of categories of metrics. These categories include:

1) Compliance with Procedures
2) Ridership and Revenue
3) Reliability and Dwell

The program has been in effect since March 1, 2021, and this analysis covers the period from March 1, 2021, to May 2023. Overall, compliance with the program's standard operating procedures was challenging in the early months of the program but has improved as the District has become more accustomed to the new procedures.

This report also includes findings regarding fare evasion and how evasion on lines 6 and 51B compares to the system as a whole.

COMPLIANCE WITH PROCEDURES

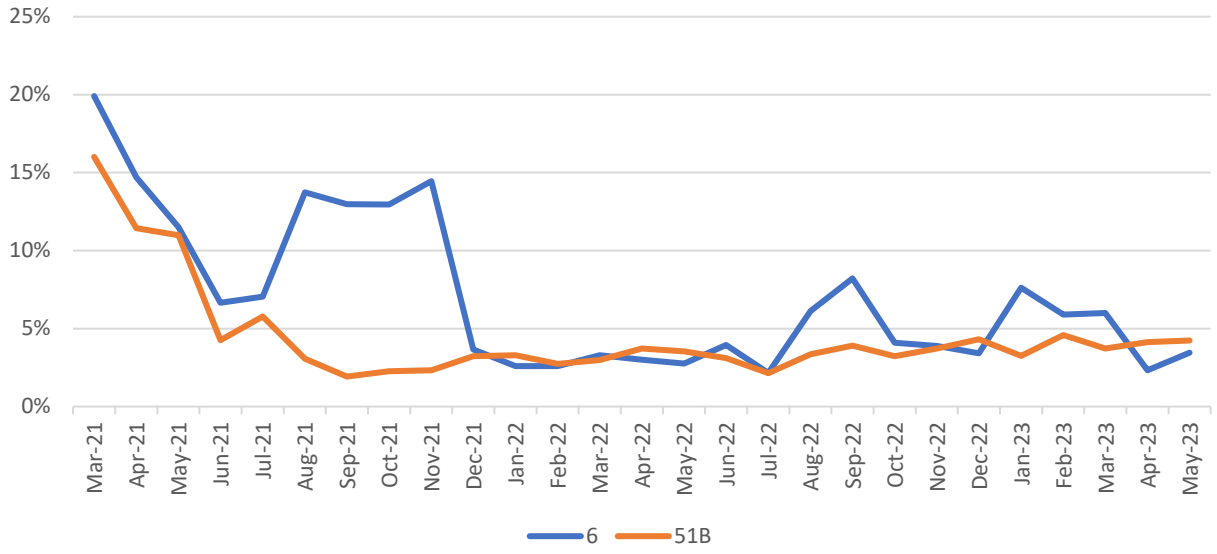
Compliance with the Standard Operating Procedures (SOP) for the All-door Boarding Pilot is crucial to the success of the program. In particular, ensuring the correct vehicles – those with rear-door Clipper readers – are assigned to lines 6 and 51B and ensuring the rear doors are actually opened so customers may board through them.

There are 25 vehicles at Division 2 in Emeryville that have been equipped with rear-door Clipper readers: Gillig Hybrid Buses numbered 1561 through 1580 and New Flyer Fuel Cell buses 7022 through 7026. Staff reviewed vehicle assignment data for those buses from March 1, 2021, to May 31, 2023, the latest date available for this report.

Beginning with the August 2021 Sign-up, the Service Development & Planning Department worked to reduce the overall system-wide bus count and in doing so increased the number of interlines at Division 2. This led to the Pilot lines being interlined with other lines not in the Pilot and making it very challenging for the Division to have "clean" (i.e., only 6 or 51B assignments) for the Pilot.

This interlining is evident in Exhibit 1 between August and December 2021 when compliance on Line 6 got worse. It's also clear the issue is limited to interlining because the vehicle assignment rate remains steady on Line 51B, which was not interlined at the same time. Since the interlining was fixed in December 2021, Line 6 compliance has matched that of Line 51B with the exception of a similar, but less drastic issue that happened during Summer 2022.

Exhibit 1 – Percent of Dedicated Fleet Not Assigned to Pilot Lines



The next critical SOP compliance measure is how often the rear doors of the buses are opened. The SOP says the following in section I.A.:

> *Open all doors on the bus at each stop where passengers are present and waiting for the bus.*

To evaluate compliance with this section, staff reviewed data from the Automatic Passenger Counter (APC) system about whether the rear doors were opened whenever the front doors were opened. The SOP doesn't leave room for operators to make a decision about whether to only open the front doors if there is only a single customer standing near the front door of the bus, for example. Rather, the procedure is more similar to that of the TEMPO BRT system where operators are required to open all doors of the bus at every station or stop. The key difference is the all-door boarding pilot doesn't require the buses to stop at every stop even if no passengers are waiting.

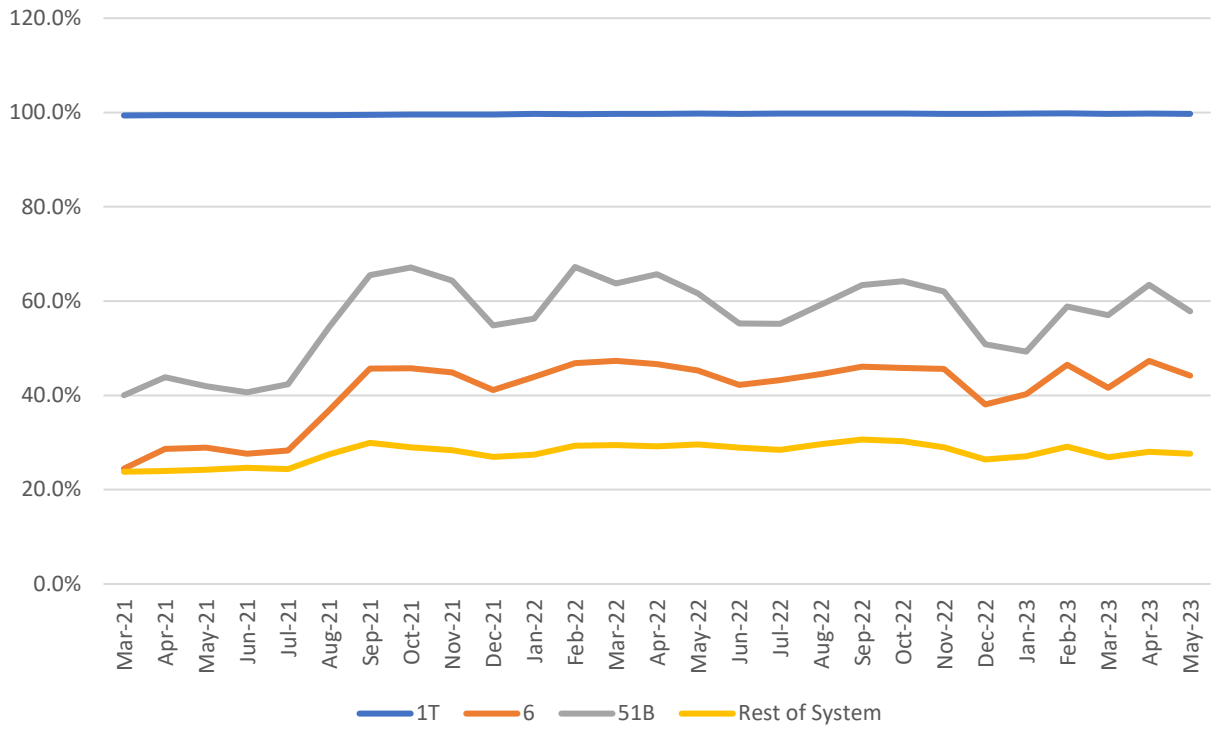
Staff first broke down the percentage of time when the rear doors were opened in conjunction with the front doors opening. Staff compared lines 6 and 51B to the system as a whole and broke out the TEMPO Line 1T separately to see what full compliance looks like and to ensure the data source was an accurate means of evaluating this compliance measure.

Exhibit 2 shows the two pilot lines and how they compare with 1T and the system as a whole. Line 1T had nearly 100 percent compliance across most of the period covered by the dataset.

Line 51B generally had the rear door opened at stops around 60 percent of time. This is above the system as a whole (around 30 percent) but well below the 90-100 percent level that should be expected given

the language in the SOP. Compliance was lower on Line 6, with it generally bouncing around below 50 percent. It appears the rates of rear-door opening are now fairly stable and will remain in the current ranges absent a significant push on SOP compliance.

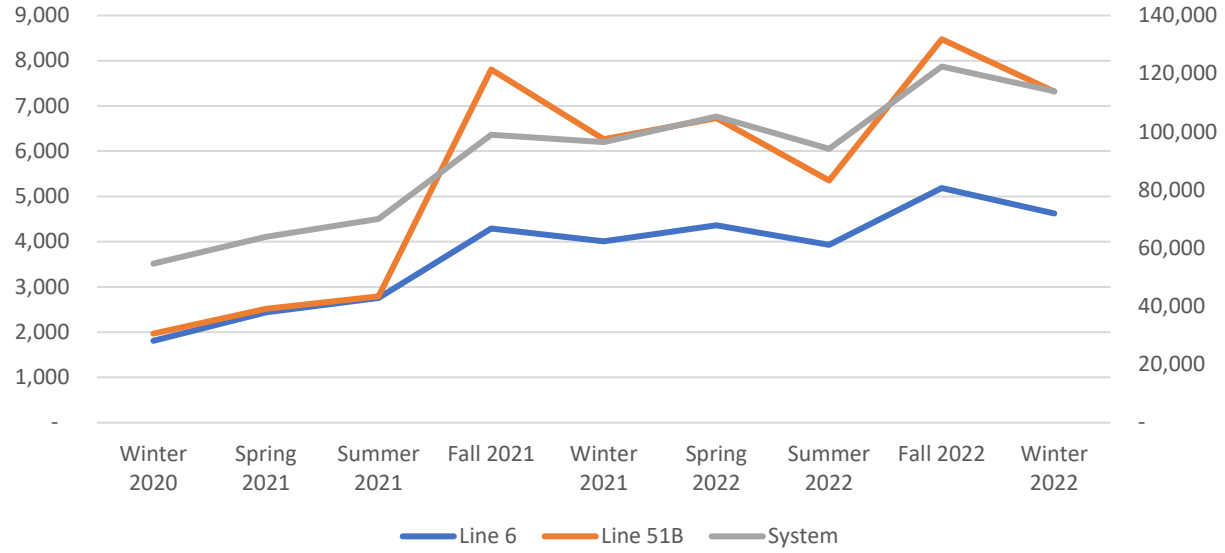
Exhibit 2 – Rear-Door Openings by Line



RIDERSHIP AND REVENUE

Impacts on ridership – positive or negative – can be challenging to parse in this chaotic operating environment in the middle of a pandemic. Staff evaluated ridership on all service days on lines 6 and 51B and both went up on weekdays as seen in Exhibit 3 below and tracked on the left-side Y axis. Average weekday ridership dropped dramatically at the beginning of the pandemic and then increased from around 2,000 riders on each line at the beginning of 2021 to over 4,500 riders on Line 6 and 7,500 riders on Line 51B by the end of March 2023 (they carried 6,000 and 11,000 riders, respectively each weekday pre-COVID). Meanwhile, system-wide ridership (seen in Exhibit 3 below and tracked on the right-side Y axis) followed a similar trend. The significant jump in ridership across these two lines as well as the system is attributable to reopening of the region in part, but primarily to the return of in-person instruction at UC Berkeley. Lines 6 and 51B are critical services for UC Berkeley students and faculty, and their ridership growth reflects that. These two lines also play a significant role in the overall increase in system-wide ridership (along with other major trunk lines like 1T, 40, 51A, and the 72s). This is beneficial to the performance of the pilot as the more boardings that occur at each stop, the greater the discrepancy between all-door boarding lines and non-pilot lines.

Exhibit 3 – Weekday Ridership by Line



Ridership on Saturday and Sunday (Exhibits 4 and 5) followed the same trend but with a much more pronounced increase on Line 51B when compared to the rest of the system, which has been steadily increasing since the beginning of 2021. The overall drop in March 2020 was less pronounced on weekends as a higher proportion of essential workers likely worked on weekends than those who had the privilege to work from home.

Exhibit 4 – Saturday Ridership by Line

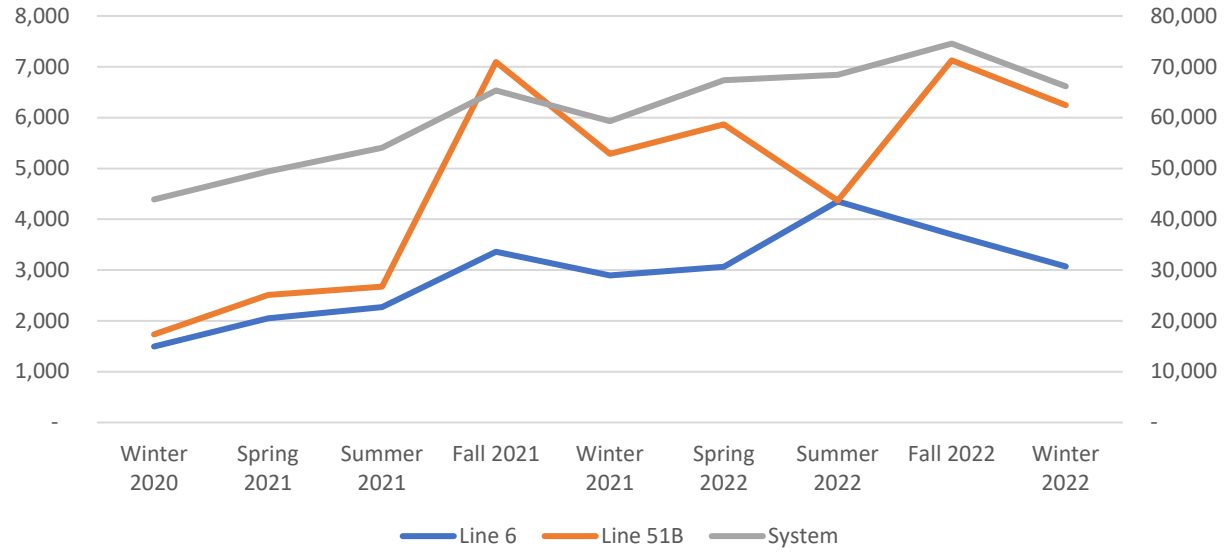
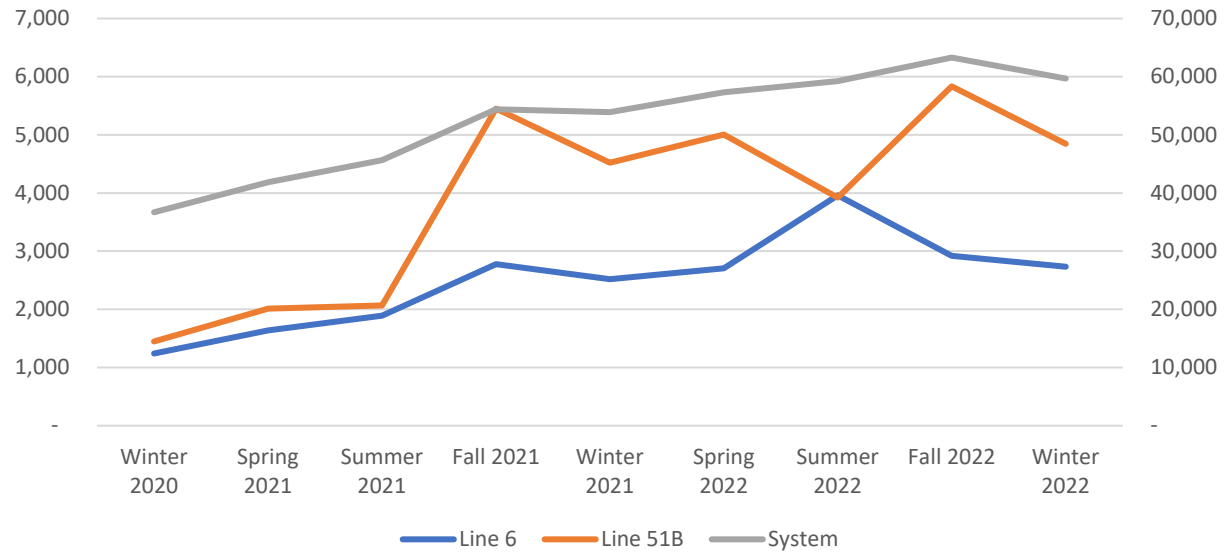


Exhibit 5 – Sunday Ridership by Line

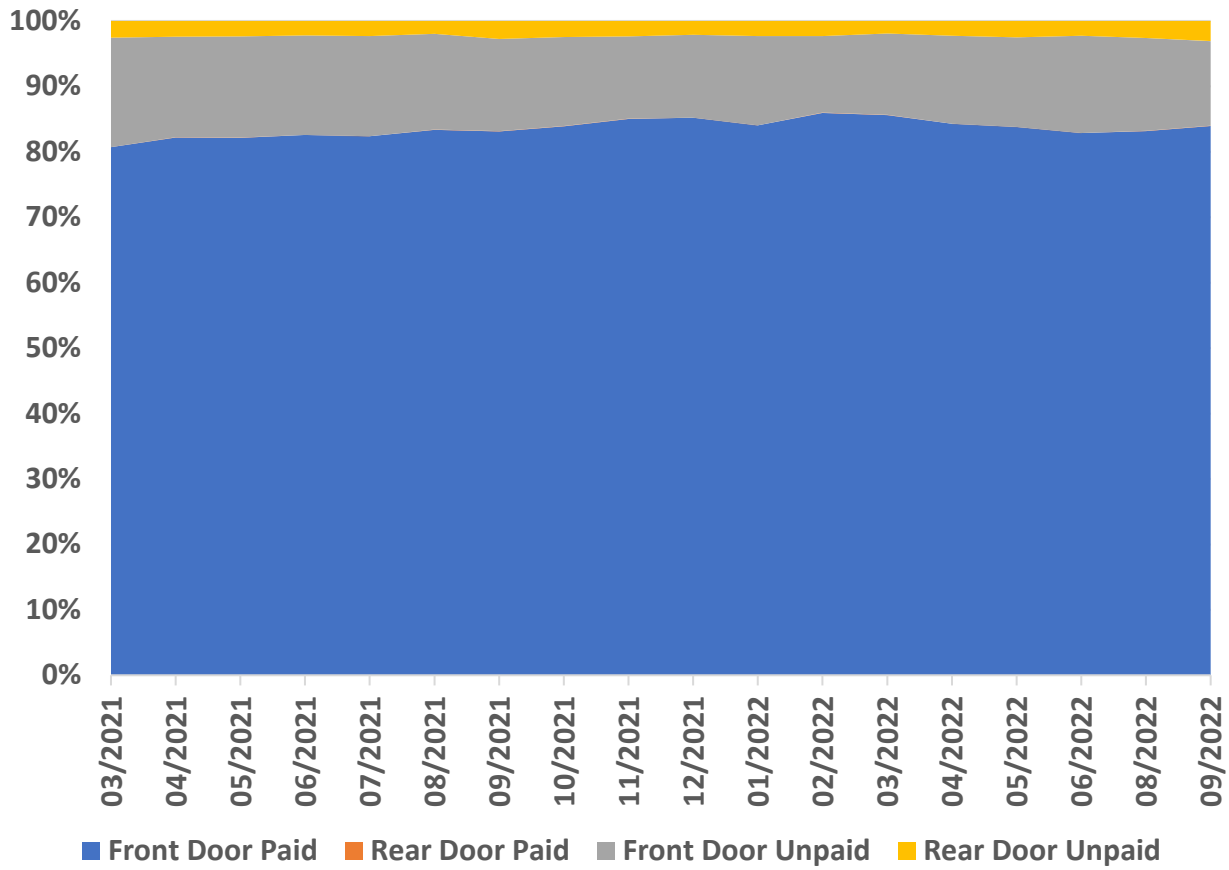


FARE EVASION

To quantify fare evasion on the buses and determine whether allowing riders through the rear door increases fare evasion, staff combined data from the farebox, Clipper, and Automatic Passenger Counters (APCs) for every local bus trip in the system from March 2021 to September 2022. Data from the APC provided a baseline of how many total boarding occurred during the period. Farebox data provided the count of non-Clipper passengers who paid cash or any other non-Clipper media at the front door, and Clipper tags provided a count of boardings using that product at the front and rear doors. Lines 6 and 51B were separated from the system as a whole and compared to each other and the remaining regular local bus lines.

First staff looked at the system as whole (minus Lines 6 and 51B). More than 80 percent of riders paid a fare, either via Clipper or the farebox. The remainder – 15 to 17 percent depending on the month – did not pay the fare. Of those who didn't pay the fare, 2-3 percent boarded through the rear door and 13-15 percent boarded through the front door.

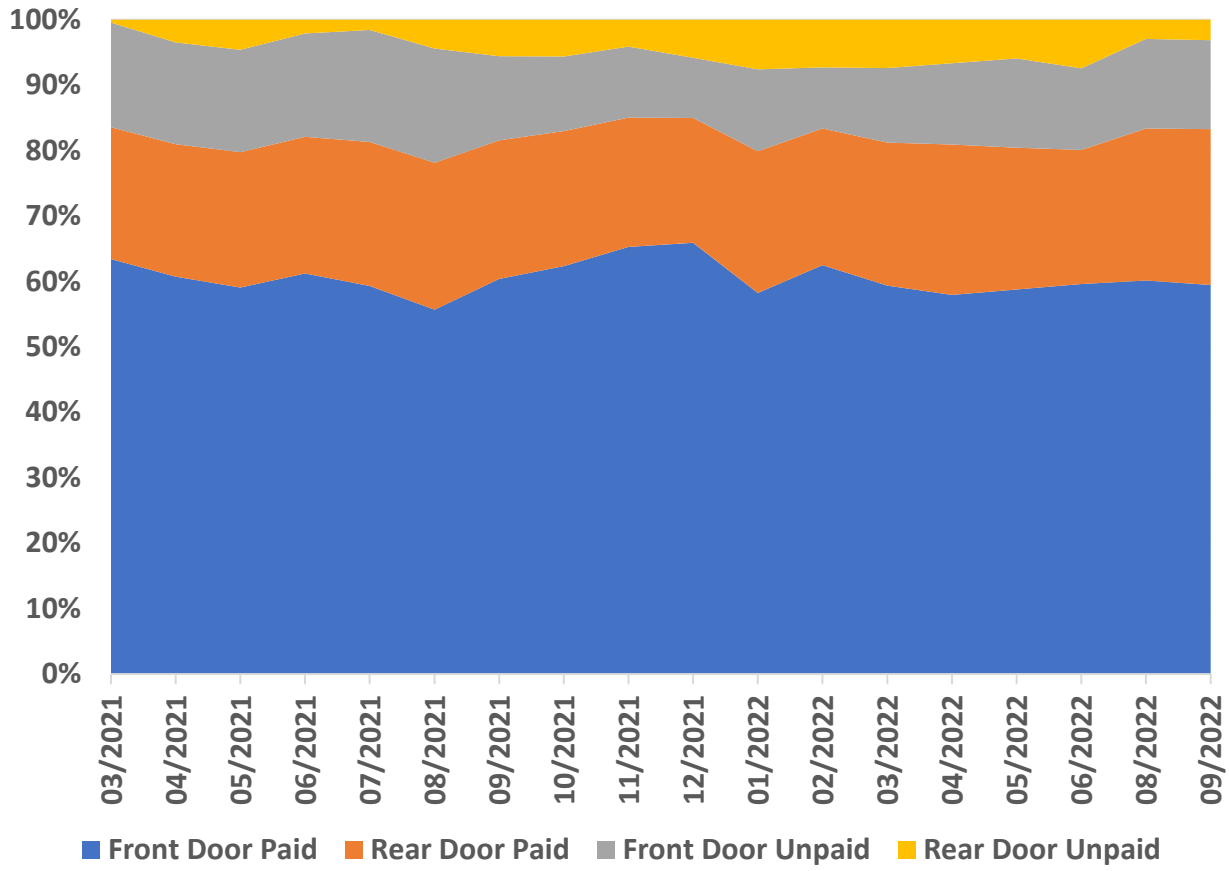
Exhibit 6 – System-wide Fare Evasion



Next, staff reviewed the same data for Line 6. The first thing one notices is the emergence of rear-door fare payment, which is Clipper-only. About 20 percent of Line 6 riders used the rear door to board and

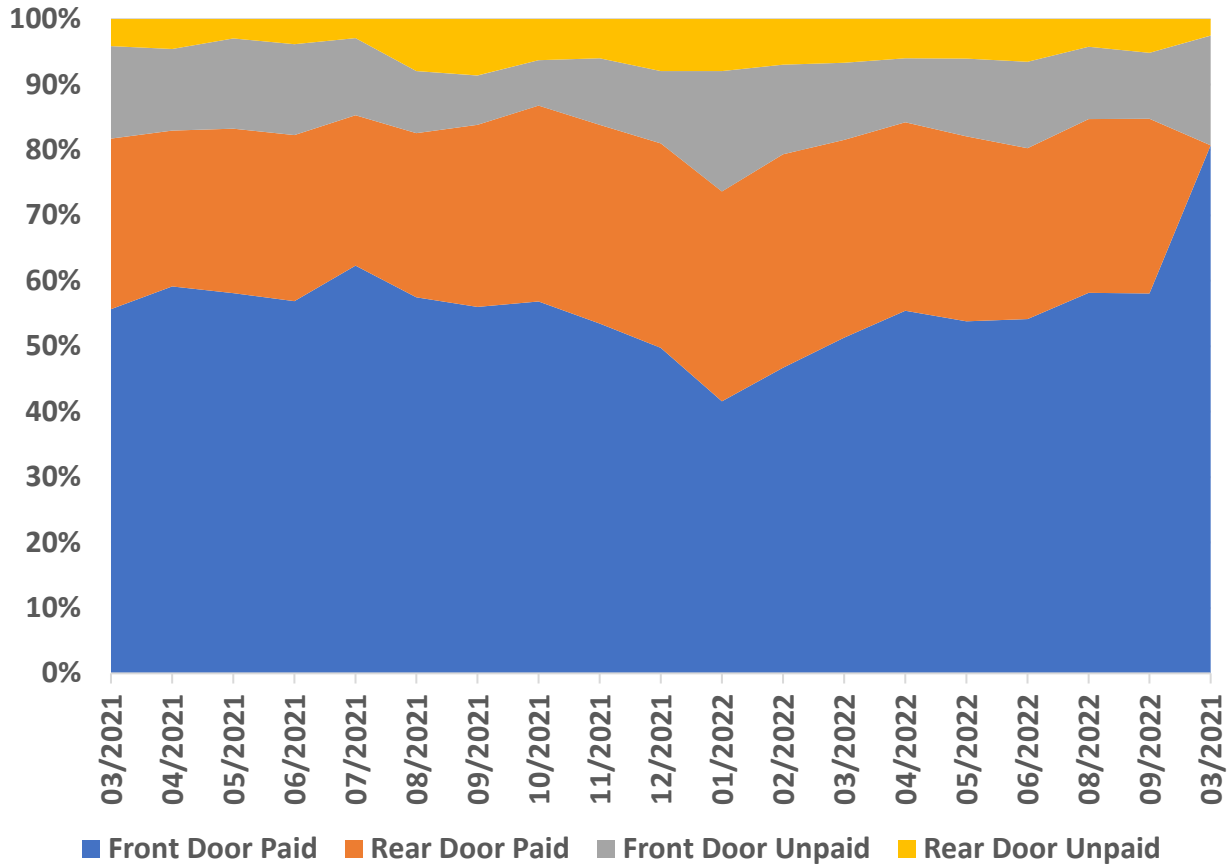
fare evasion between the two doors increases to about 17-20 percent versus the system-wide rate of 15-17 percent. This increase is due to more evasion at the rear door (2-7 percent), with fare evasion at the front door remaining the same as the system overall.

Exhibit 7 – Line 6 Fare Evasion



Next, staff reviewed the same data for Line 51B. The percentage of rear-door boarding is higher on Line 51B (25-30 percent) than on Line 6. Fare evasion is also similar to Line 6.

Exhibit 8 – Line 6 Fare Evasion



Staff reviewed footage of a sample of trips to determine whether these findings matched reality and to see how the fare evasion was happening. The sample found a lower rate of evasion but the sample was small – only a single day. Staff also were able to watch and listen to operator interactions with customers who didn't pay the fare. AC Transit operators are instructed to quote the fare and not engage with riders about non-payment for their own safety and to reduce schedule delays. This was consistent with what was seen during the footage review.

To ensure these results matched the reality of fare payment conditions on the bus, staff pulled video from a sample of trips from lines 6 and 51B and reviewed footage of all boardings on those lines and then compared the observed fare payments to ridership data from the onboard APC units. Staff chose four buses in service on a single day (January 26, 2023) and reviewed hours of footage and counted each instance of a boarding and how (and whether) that rider paid their fare.

Overall, staff observed 32 instances of a rider boarding without paying a fare on Line 6 and 28 on line 51B. These amount to 11.3 percent of total boardings on Line 6 and 5.6 percent on Line 51B, with the vast majority of those events happening at the front door. Among these observed evasions, 51 (85 percent)

were “courtesy rides” when an operator would wave passengers on and five (15 percent) were riders getting on and not paying with no action taken by the operator.

RELIABILITY AND DWELL

Reliability is a core goal of the program because allowing multiple avenues for riders to board can speed the boarding process and allow the bus to spend more time moving and less time stopped. The primary means of determining reliability is on-time performance (OTP). Exhibits 9 and 10 illustrate Line 6 OTP by timepoint and direction. Looking at OTP in these charts, it is difficult to parse out any real impact on reliability from the Pilot, positive or negative as there have been several schedule changes and congestion has been increasing as the region slowly recovers from the depths of the pandemic. A key issue, illustrated in the southbound direction, is poor restroom access at the northern layover means many trips start late.

Exhibit 9 – Line 6 Northbound On-time Performance by Timepoint

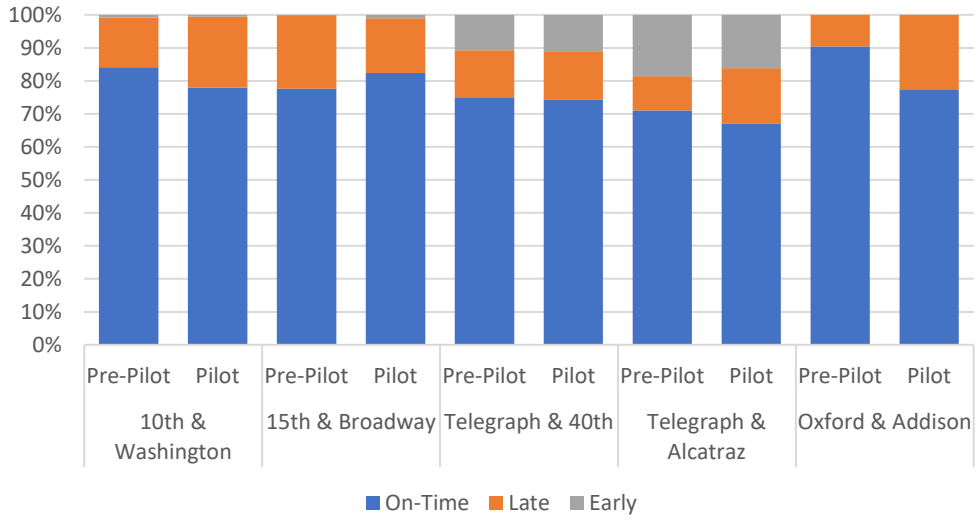
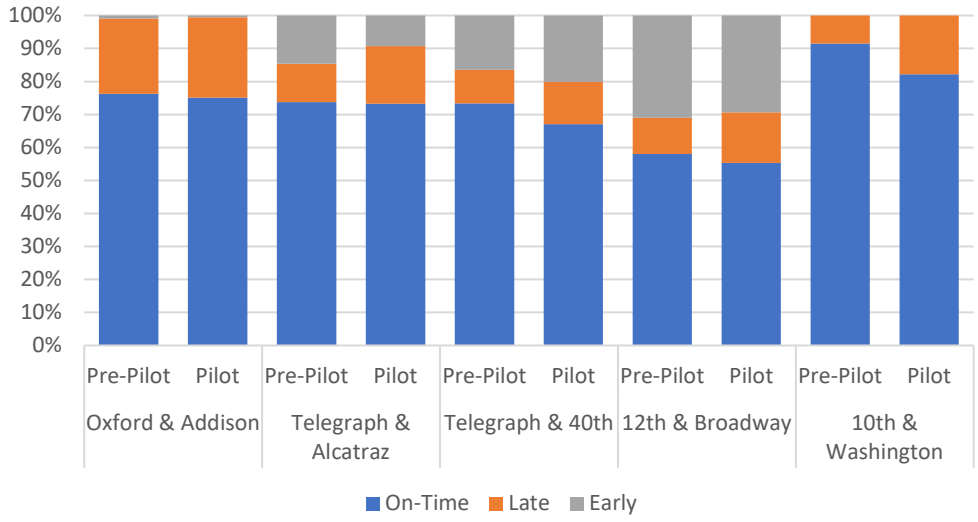


Exhibit 10 – Line 6 Southbound On-time Performance by Timepoint



Line 51B has experienced many challenges over the pilot period. The return of UC Berkeley to in-person classes has significantly increased loads and congestion along the College & University corridors, which has made keeping on schedule difficult. In addition, the lack of restroom access at the 3rd/University layover has made leaving on-time more challenging as operators have to walk further to get to/from their designated restrooms during layover. Finally, both lines 6 and 51B have undergone numerous schedule changes during the pilot period, making it difficult to attribute changes in OTP to the pilot program negatively or positively.

Exhibit 11 – Line 51B Northbound On-time Performance by Timepoint

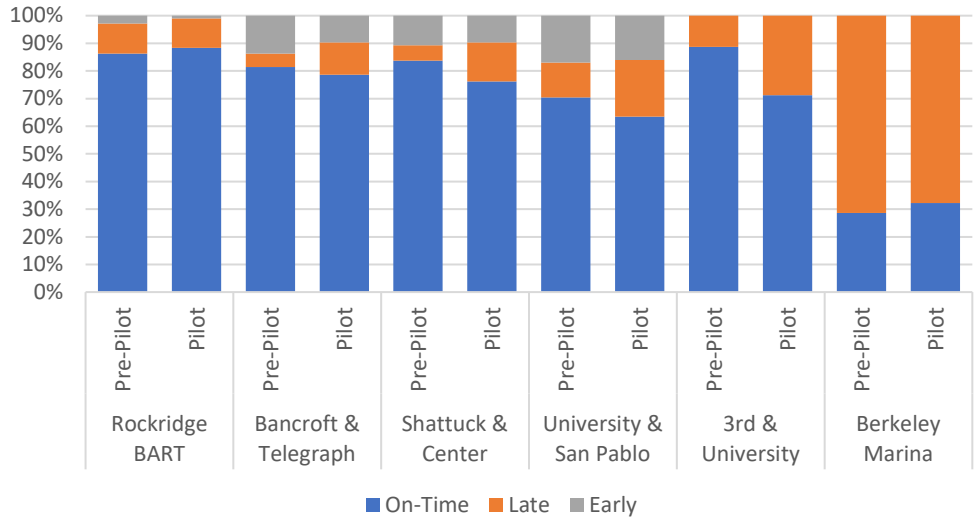
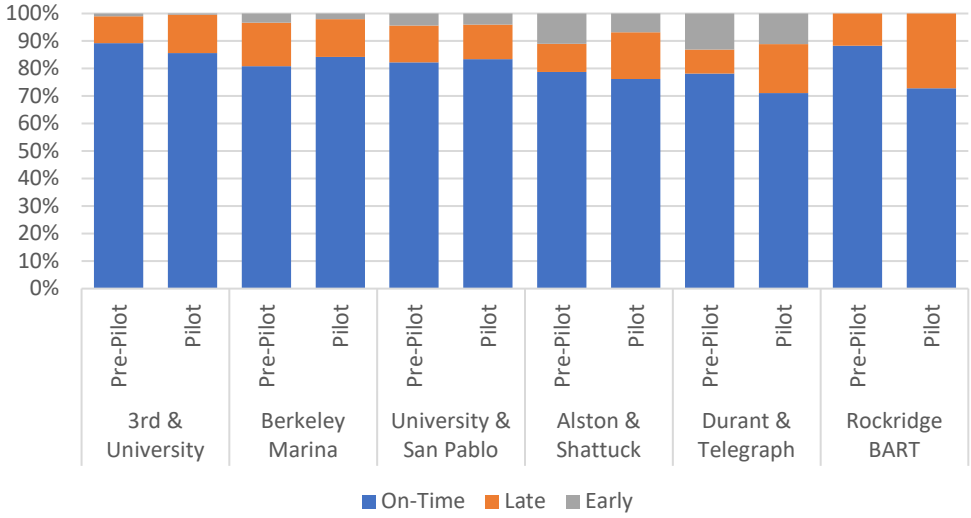


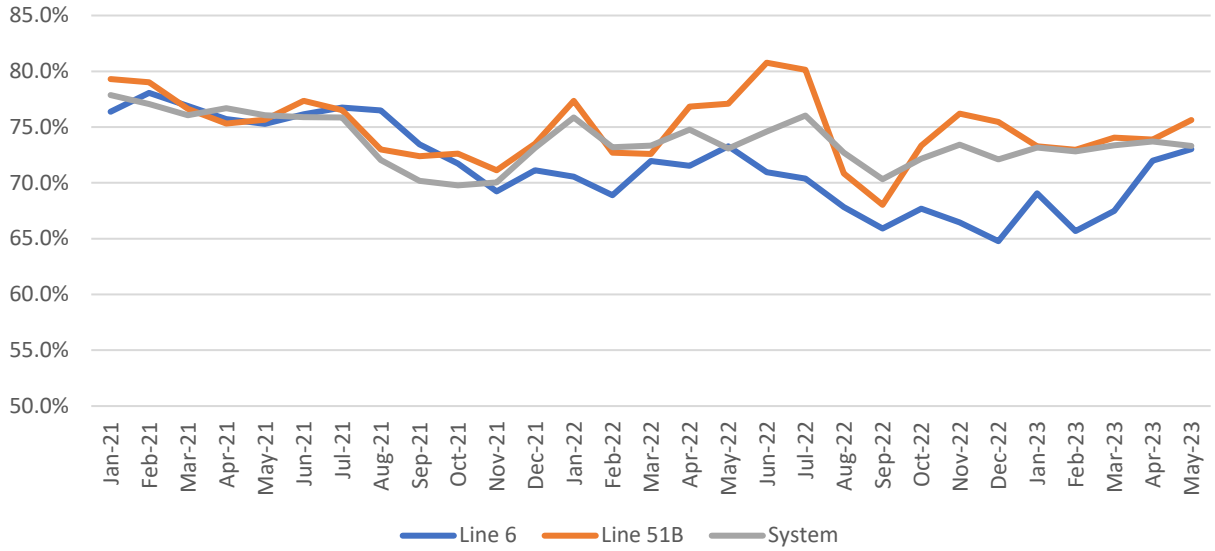
Exhibit 12 – Line 51B Southbound On-time Performance by Timepoint



Staff then looked at OTP over time to gauge whether there has been an impact on reliability relative to the rest of the system. System-wide OTP was around 78 percent in January 2021 and has been declining steadily with some improvements since then as illustrated in Exhibit 13.

The Pilot was launched in March 2021 and didn't have an immediate impact. In fact, OTP on the pilot lines was worse than the system until June 2021 when the Pilot lines performed better than the system. This marks the beginning of a period when the Pilot lines began outperforming the system. OTP on Line 6 dropped below the system in November 2021 and has continued to decline due to significant construction activity along the Telegraph corridor while Line 51B has generally been beating the system as a whole. Staff attributes the period of improvement to the fact the all-door boarding procedure allows these lines to board riders more quickly and move faster through the corridor. While other lines get slower as more boardings occur, opening all the doors mitigates dwell-time issues so it's conceivable their OTP would be even worse without the Pilot. In addition, with increased congestion, getting the buses moving faster means that the overall congestion issues affecting the whole system are not able to affect the Pilot lines to the same extent. However, these lines have seen riders return at a faster rate than the system as a whole and that has led to more delay overall.

Exhibit 13 – On-time Performance by Line



One of the clearest positive signs of success for the program is the amount of time the bus spends dwelling at the bus stop for every passenger that boards the bus – dwell per passenger. This metric is measured in seconds and staff looked at lines 1/1T, 6, 51B, and the rest of the system across four key time periods:

1) The period in the months leading up to the pandemic.
2) The no-fare rear-door-only boarding period from March to October 2020 (or November for the 1/1T),
3) The period between October 2020 and March 2021 when fares were back in effect, and
4) The period from March 1 to May 2023, covered by this report when the all-door boarding pilot was in effect on lines 6 and 51B.

Dwell per passenger experienced wildly different changes per line with the pandemic. For Line 1 – which had a significant share of essential workers and converted to 1T BRT with all-door boarding in August 2020 – boarding times diminished significantly and even continued to drop once fare collection resumed.

All other lines saw dwell per passenger increase substantially once fare collection resumed. It has since dropped about one second per passenger for the rest of the system. The key question this pilot seeks to answer is whether the pilot had a more significant effect than what occurred naturally on the rest of the system. In this case, Line 6 saw a decrease of 2.4 seconds per passenger and Line 51B had each rider board 2.8 seconds faster than before the pilot was initiated. This means that if ten passengers boarded at a given stop, the time spent at the stop would be 24 and 28 seconds shorter, respectively.

Staff believe these results are extremely positive and will improve as the project team continues to identify and work through issues.

Exhibit 14 – Dwell per Boarding by Line by Time Period (seconds)

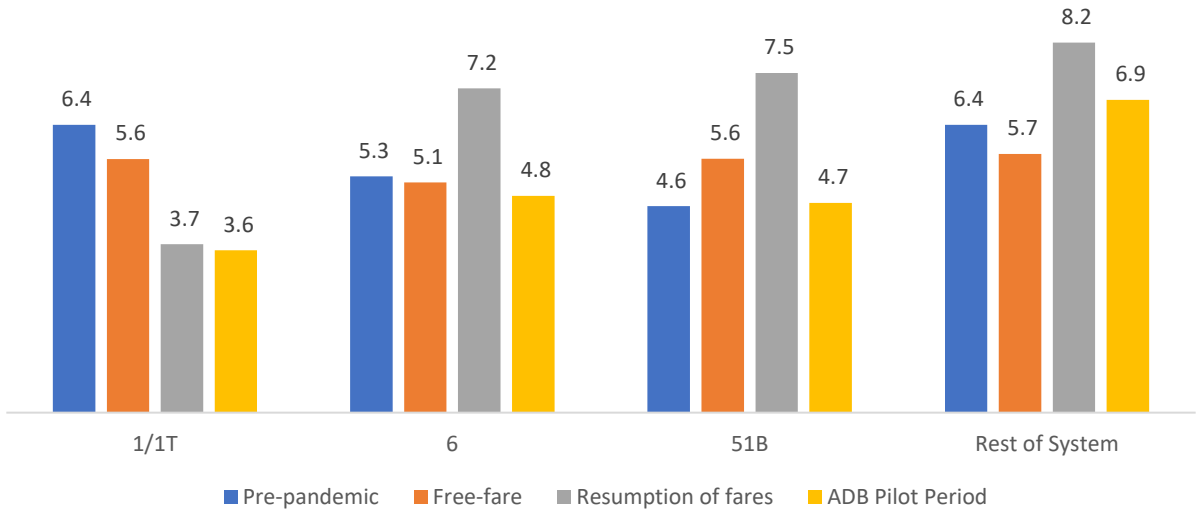


Exhibit 15 – Dwell per Boarding by Line Over Time (seconds)