



Data and Lessons Learned from Elimination of the Ride Free Area and Start-up of RapidRide C and D Lines



Prepared by the Department of Transportation – Transit Division
in response to King County Ordinance 17476, Section 116, P5

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DATA AND LESSONS LEARNED – ELIMINATION OF RIDE FREE AREA AND START OF C AND D LINES

Executive Summary

In response to a King County Council budget ordinance proviso, this report presents data and lessons learned from Metro's elimination of the Ride Free Area and the start of the RapidRide C and D lines on September 29, 2012. We included additional information about service revisions made at the same time, as well as some systemwide data that provides useful context.

The fall 2012 service change was extraordinarily large, requiring Metro to do an unusual amount of planning, operational change and customer communications, and asking customers throughout the transit system to change their travel habits.

Key outcomes

- **The end of the Ride Free Area generally proceeded as expected, but some of the routing changes made to keep buses moving well through downtown Seattle resulted in unforeseen problems for which we took corrective actions soon after the service change.**

We had moved five routes to Fourth Avenue and Olive Way, but after traffic congestion resulted in delays, we shifted the routes to Pike Street and moved a Fourth Avenue bus stop one block north. We also shifted inbound Route 301 from Stewart Street to Union Street to improve its travel time.

We had made changes to several routes serving the I-90 corridor to speed service in the tunnel and reduce crowding on Route 218, but these resulted in overcrowding on Issaquah Highlands-bound routes. To correct this problem we revised Route 218 soon after the service change started. In May 2013 the County Council adopted our proposed reorganization of I-90-based routes to better match capacity with ridership; this additional adjustment will take effect in September 2013.

In response to a rider survey, 78 percent of riders said they were satisfied with the information Metro provided about the Ride Free Area closure; 67 percent said they were satisfied with how the transition was managed.

- **Changes in travel time, farebox recovery and ridership resulting from the end of the Ride Free Area are about the same as projected or better.**

Buses are moving more quickly than expected through downtown Seattle after the change to pay-on-entry. The median travel time increase is one minute or less, suggesting that median passenger wait times downtown have increased by 30 seconds or less.

Based on preliminary revenue data, Metro will gain an estimated \$2.2 million in new revenue in the first 12 months after the elimination of the Ride Free Area. We estimate that this may increase to \$3.6 million annually in the future, after Passport and U-PASS pricing has been adjusted.

Ridership loss in the former Ride Free Area is matching projections—an estimated 1.8 million fewer boardings annually, or 6,100 fewer average weekday boardings (96,200 actual average weekday boardings compared to an estimated 102,300 if the Ride Free Area had not ended).

The City of Seattle’s shuttle service is helping mitigate the loss of the free bus rides that people with low incomes used to access human services in downtown Seattle. Ridership on this free circulator has risen to an average of about 230 riders per day. An increase in the number of discounted bus tickets available to human service agencies is also helping.

- **The beginning of C and D line service was problematic and required a number of corrective actions immediately after the service change and in the months following. Despite these challenges, ridership on both lines has exceeded projections.**

Stations and technology features were not all completed and working correctly when service started. Interlining of the two lines contributed to reliability problems, especially during peak periods. Successful RapidRide service depends on experience operating each unique line, and during the startup period uneven bus headways and passenger overloads occurred. Overcrowding was particularly severe on the C Line during peak periods.

Metro quickly took corrective action after the launch and continued working for several months to resolve issues. To reduce overcrowding and improve reliability, we added service to the C and D lines and to alternative routes, deployed standby buses as needed, and adjusted running time and schedules. We worked to complete unfinished stations and get all real-time bus arrival signs, ORCA readers and transit signal priority systems working. We actively solicited and listened to customer complaints and suggestions, and informed customers about what we were doing in response. Many of the issues were resolved or improved by the end of the year, and we continue to monitor service, listen to customer feedback, and make adjustments.

Despite the challenges, in the January-March 2013 period C Line ridership had increased 44 percent above the routes it replaced, approaching the 5-year growth target of 50 percent. D Line ridership was 12 percent above the routes it replaced, on track to meet the 5-year target.

- **Based on a rider survey in spring 2013, overall rider satisfaction levels for the C and D lines and restructured routes are mixed, with both increases and decreases in satisfaction levels.**

A majority of riders were satisfied with the C Line (67 percent) and the D Line (73 percent); however, satisfaction ratings were lower than those given by riders on predecessor routes. Riders were less satisfied with being able to get a seat on the bus and had related safety concerns. They were also less satisfied with being able to sit while waiting and convenience of the bus stop to home.

Other new and revised routes received higher satisfaction levels. Route 21 riders were significantly more satisfied after (84 percent) than before (69 percent) the service change.

- **Systemwide ridership during the fall service period (9/29/12-2/15/12) was down slightly from the spring service period, due to the expected loss of ridership in the Ride Free Area. However, preliminary systemwide ridership in March and April of 2013 is up 2 to 3 percent above 2012. This apparent increase in ridership is larger than would be expected based on growth in employment, lower average gas prices and the closure of the Ride Free Area.**

Lessons learned

The challenges and successes of the fall 2012 service changes made it clear that it is important for Metro to do the following:

- **Analyze potential impacts of significant changes in service and take actions to mitigate expected problems, as we did with modifications to minimize travel-time increases expected in downtown Seattle following the start of pay-on-entry.**
- **Create a contingency service-hour reserve for major service changes to make it possible to quickly address unexpected schedule and overload problems.**
- **Closely monitor service and listen to customer feedback immediately after a major service change to identify problems and implement solutions.**
- **Launch future RapidRide lines only after supporting infrastructure is in place and after construction by others that would disrupt service has been completed (where possible).**
- **Continue pursuing strategies to speed boarding in downtown Seattle through off-board fare payment, including installation of off-board ORCA fare readers at RapidRide stops and installation of ticket vending machines downtown.**
- **Continue to employ new communication tools that enable targeted communication and engagement with Metro customers, supplementing traditional customer communication channels.**
- **Keep the size of service changes manageable for both Metro and riders, as the extensive September 2012 revisions was extremely challenging for Metro to plan and deliver and were difficult for many customers to understand and adapt to.**
- **Be mindful that while transit system productivity can be increased by reallocating existing service hours with no new investment, this approach also has negative consequences: some riders will find revised service to be less convenient or will lose service entirely.**
- **Continue to monitor and adjust service, as it typically takes months for riders to adjust to service changes and for Metro to have reliable data about customer satisfaction, ridership and other performance measures.**

Introduction

This report responds to King County’s 2013/2014 budget ordinance, Ordinance 17476, Section 116, P5:

By July 1, 2013 the executive should transmit a report that includes data and lessons learned from implementation and post-implementation transit operations after elimination of the ride free area and start-up of RapidRide lines C and D. The report shall include the following:

- A) The quantified projected and actual changes to ridership, cash and pass farebox collections, on-time performance and productivity;*
- B) The quantified projected and actual changes in passenger wait and travel times;*
- C) Specific corrective actions that the transit division has taken to mitigate the impacts of the changes; and*
- D) Identified lessons learned relative to transit speed, reliability and customer experience, and how the lessons learned are informing potential future service changes.*

Background

The service change that ended the Ride Free Area and started the C and D lines and restructured bus networks was an especially momentous one. It marked the culmination of a number of groundbreaking endeavors to make the Metro system more efficient, effective, and financially sustainable as the agency continued to experience both severe financial constraints and strong rider demand.

The groundwork for the September service revision was laid in July 2011, when the King County Council adopted Metro’s *Strategic Plan for Public Transportation 2011-2021*. As recommended by the Regional Transit Task Force, the strategic plan includes new guidelines for allocating transit service, replacing a formula that allotted service on the basis of geographic boundaries. The service guidelines define a transparent process using objective data that helps Metro make decisions about adding, reducing and changing transit service to deliver productive, high-quality service where it’s needed most.

Shortly after approving the strategic plan, the Council adopted Ordinance 17169, directing Metro to use the service guidelines to reinvest 100,000 annual service hours in 2012 to make the Metro system more efficient and productive.

By reallocating more than 65,000 service hours in conjunction with the launch of the C and D lines in September, on top of more than 30,000 hours reallocated in June, Metro accomplished the reinvestment required by the Council. Service hours were taken from lower productivity service (25.6 rides per hour on average) and reinvested in routes that were nearly 50 percent more productive (36.2 rides per hour).

Although the fall 2012 restructure was the first one based on the approved service guidelines, we had used an approach consistent with the guidelines to restructure Eastside routes in October 2011 along with the launch of the RapidRide B Line. Annual ridership has grown 19 percent in the Eastside restructure area as a result of the network revisions as well as B Line service, SR 520 tolling and overall ridership growth.

Taken together, the 2012 service revisions and Eastside restructure mean that substantial portions of the Metro system were revamped in little more than a year to become more efficient and more effective in meeting the county's public transportation needs.

Elimination of the Ride Free Area was another step to improve Metro's sustainability. King County's 2009 Performance Audit of Transit had recommended that Metro update the formula used to assess the City of Seattle's payment for the Ride Free Area. A preliminary analysis found that Metro could potentially gain \$2.2 million per year in additional revenue by eliminating the Ride Free Area, including the net gain of fare revenue, reduced fare evasion, and some offsetting of operational costs.

Completion of the C and D lines was yet another milestone in the transformation of the Metro system. The RapidRide bus rapid transit program was approved by voters in 2006 as part of Metro's Transit Now initiative. Funded by a 0.1-percent sales tax increase, the Transit Now program was intended to expand and enhance service to meet the region's growing public transportation needs. Although the County had to shelve most plans to expand service after 2009 because the recession had caused a steep drop in sales tax revenue, it decided to continue developing RapidRide. One reason was the program's success in attracting grant funding: \$40.8 million from federal and state grants as well as contributions from local agencies was used for C and D line buses, shelters, and other passenger amenities. RapidRide was also seen as a critical component of the next-generation transit system envisioned for the region.

Although the C and D lines followed two earlier lines, their launch represented a major step forward in the RapidRide program. Combined, the lines form an 18-mile backbone of fast, frequent service throughout the day between downtown Seattle and large neighborhood transit markets with much potential for growth. We expect that the C and D lines will be among the most highly used bus routes in the county.

About this report

This report provides the requested information about the elimination of the Ride Free Area and the start of the C and D lines. We have also included some key performance indicators for other service revisions made in September 2012 and for the Metro system as whole.

The evaluation of the service change and the information presented in this report was affected by several complicating factors:

- **Many service revisions occurred simultaneously, so in some cases it was difficult to sort out the causes of changes in ridership, travel time, etc.** For example, if

overall trip travel time changed on a restructured route that travels through downtown Seattle, the change might stem from the route revision, the change to pay-on-entry, or both. The report notes where such complicating factors come into play.

- **“Before and after” comparisons in some cases are comparing very different services, so the results may be difficult to interpret.** A service revision that illustrates this is the deletion of routes 56 local and 39, which operated between West Seattle and Rainier Beach, respectively, and downtown Seattle. The deleted routes were replaced by new Route 50, which operates between the two neighborhoods they formerly served via SODO, providing connections to downtown Seattle but not going there. Such major changes in service must be kept in mind when making before and after comparisons.
- **An extraordinarily large number of routes were affected.** We made major revisions to more than 50 routes and smaller changes to about 40 routes, and more than 60 percent of Metro’s routes operate through the former Ride Free Area and were affected by its elimination. Rather than attempt a comprehensive analysis and report on each route affected, we made aggregate comparisons or analyzed representative routes and reported significant outcomes. For example, we analyzed before and after travel times through downtown Seattle for the tunnel and along the key corridors for all routes. The analysis of customer satisfaction focuses on statistically significant “before and after” differences in corridors where we had made major changes.
- **Complete data are not yet available for all aspects of service, such as farebox revenue and route-level ridership.** For example, automatic passenger counters (APCs) are on 18 percent of Metro’s regular buses, and ridership counts are based on sampling. System-level ridership data for the fall service period ending February 15 are statistically reliable now, but route-level ridership estimates require a longer sampling period to be reliable. However, 50 percent of RapidRide coaches have APCs, and we have done more work to establish comparative baseline data for this new service, so “before and after” ridership data for the C and D line corridors are more reliable than that for other areas. Variations in the information presented for the Ride Free Area, C and D lines, and other routes may reflect the availability of data.

It should also be noted that both Metro and our customers are still adjusting to the September 2012 service change. Starting June 8, we made further revisions to the C Line schedule and to several of the routes that were revised in September. We know from experience that it takes many months for riders to adjust to changes and begin using new travel options. As a result of the ongoing adaptations, we expect that outcomes presented in this report will change over time.

The results of the service change will continue to be fleshed out in future Metro reports, such as the 2013 Service Guidelines Report, the 2013 Rider/Non-Rider Survey and the one-year follow up surveys on the RapidRide C and D Lines.

Overview of the Changes Made

The September 2012 service change included several major and unusually complex elements, adding up to an extraordinary undertaking for Metro and our customers.

The elimination of the Ride Free Area and the start of “pay-on-entry” systemwide involved more than a year of preparation. Beginning in early 2011, we tested, planned and made operational changes to minimize delays downtown resulting from the switch to pay-on-entry. Changes included modifying zones in the tunnel and on streets, adding time to many route schedules, and changing the routing of buses through downtown. When the service change began, we stationed ORCA boarding assistants with portable fare readers in the Downtown Seattle Transit Tunnel and key street locations to enable riders with ORCA cards to board through the rear doors.

Preparations also included revising signs and customer information materials, training employees, coordinating with partner agencies, and helping develop plans to mitigate the impact on people in downtown Seattle who have low incomes and depend on transit.

Following the end of the Ride Free Area, we monitored operations and made adjustments as necessary.

The launch of the RapidRide C and D lines capped several years of work as we involved local communities in planning C and D line routing and stops; procured new buses; worked with the City of Seattle to modify streets and to install transit signal priority systems at 40 intersections; built a total of 68 stations, shelters, or stops; installed an intelligent transportation system to support real-time bus arrival signs, ORCA readers and other functions; trained operators and control center coordinators; and informed customers about the unique features of this new level of bus service.

When service began, not all RapidRide stations and technology were in place. Start-up issues including overcrowding and uneven headways occurred as we began operating the new lines—the first RapidRide lines to be interlined and to travel through downtown Seattle. We worked intensively to improve service immediately after September 29, and are continuing to make adjustments.

We restructured networks of more than 50 bus routes in Seattle and nearby communities, primarily to coordinate and integrate with the new C and D lines. We deleted 17 routes, created five new ones, and made extensive changes to others to reduce duplication and give riders connections to fast, frequent RapidRide service and key destinations.

The restructure involved deleting or reducing service from lower performing routes. We reinvested the service hours to relieve crowding and improve reliability on heavily used routes or to increase service on corridors that were below target service levels. More than 65,000 annual service hours were reallocated as part of this restructure.

In addition to this major restructure of bus routes, we made relatively minor administrative changes to the schedules or routing of other routes to improve their efficiency, speed or reliability.

Overall, major or small changes were made to 93 bus routes representing about one-third of Metro's total system hours, and the change to pay-on-entry affected transit users throughout King County. (See map showing affected routes in Appendix A.)

We carried out a massive public communication program to make sure everyone was informed about the changes and to promote use of ORCA cards to speed boarding.

We used a “Spot What’s New” communications theme to capture and unify all the changes. We developed a variety of materials, including flyers, exterior and interior bus posters, transit alerts posted at bus stops, banners on RapidRide shelters, and a rider alert brochure for bus information racks. Samples are shown on the following page. The same “spot” theme was prominently used on Metro Online, where detailed information was available about all the changes.

To ensure that information was available to people who do not speak English well, we translated basic information into 12 of the most commonly spoken languages in King County. We worked with community organizations that serve non-English-speaking populations to distribute translated materials.

We did direct mail outreach in neighborhoods served by the new RapidRide lines and restructured routes, to inform residents about new travel opportunities. We offered the In Motion program in both Ballard/Crown Hill and West Seattle, reaching more than 23,000 households and engaging more than 4,200 people in trying out ORCA and changing drive-alone trips to other modes. Using the “spot” motif, we conducted a “Tier 2” residential outreach campaign in Des Moines/SeaTac, Georgetown/SODO, White Center/South Park and Fremont/Seattle Pacific University. This campaign, which reached almost 29,000 households, highlighted new service connections. More than 2,600 people responded to the ORCA card offer, pledging to try ORCA and fill out a survey. We sent a “RapidRide is here” mailer to households along the C and D lines that were not part of the In Motion or Tier 2 catchment areas.

A media campaign was launched with a briefing in early September, followed by staff interviews throughout the month. A second awareness push began with a media briefing a few days before the service change started. Broadcast outlets, online news outlets, and print newspapers throughout the Seattle Metropolitan region carried news stories. More than 32 news stories were published or broadcast, often airing multiple times.

Shortly before the service change started, we emailed detailed information about individual routes to approximately 50,000 Transit Alert subscribers, deployed “street teams” of Metro employees to share information with riders, and played recorded announcements on Metro buses.

We expanded our use of social media. Tracked from September 19 to October 2, Metro tweets reached an audience of 6,700 followers dozens of times, and prompted retweets to more than 20,000 other followers. By actively tracking @kcmetrobus social media engagement, we were able to share timely information about the changes, respond to comments and questions, and reinforce key messages such as “pay on entry, exit through the rear door.”

Contingency planning was another important dimension of the fall service change. Because of the unusually large number of changes planned, we expected that some problems would occur. We established a reserve fund of 10,000 annual service hours so we could respond quickly. We also placed two “cover buses” along the C and D line corridors so we could fill gaps in service caused by delays, or respond to overcrowding. Once the change was underway, Metro staff members made field observations and listened to customer feedback to identify issues that had to be addressed.

Sample Public Communication Materials

Spot What's New at Metro

RapidRide
Ballard – Downtown Seattle
Serving Crown Hill, Interbay and Uptown
(continues to West Seattle as the C Line)

D Line

Hop on!

Wherever you go... Go with ORCA!

One card is all you need for buses, trains and ferries!

Purchase new adult cards or add value to all card types at the ORCA vending machines located in all downtown Transit Tunnel Stations. See back for locations.

ORCA makes it easy to transfer. Change to another bus, Sounder, Link Light Rail, Water Taxi or Seattle Streetcar within a two hour timeframe. (Transfers not valid on ferries).

ORCA speeds up bus loading and keeps our system moving.

ORCA Card Information:
Buy ORCA cards online: www.orcard.com
Metro Customer Service: 206-553-3000
Metro Online: www.kingcounty.gov/metro
Metro Customer Service:
• King Street Center, 201 S. Jackson St.
• Westlake Tunnel Station, 3rd Ave. and Pine St.

Ride Free Area Ends 9/29/12

How you ride buses in King County changes September 29.

For More Information:
www.kingcounty.gov/metro/howtoride
www.orcard.com
206-553-3000

Implementation and Corrective Actions

When the service change was implemented, most of the major changes to routes in downtown Seattle and the restructured areas went smoothly. However, a number of problems arose with the start of the RapidRide lines and with routing changes made to keep buses moving in downtown Seattle. We made concerted efforts to listen to customer concerns and improve service as quickly as possible, and continue monitoring and adjusting service.

Ride Free Area

Customers adjusted quickly to the end of the Ride Free Area. **In response to a survey, 78 percent of riders said they were satisfied with the information Metro provided about the Ride Free Area closure.**

Reflecting operational changes and route and stop adjustments we had made to keep buses moving, as well as the availability of ORCA boarding assistants in the tunnel and on streets, **67 percent of those surveyed said they were satisfied with how the change was managed.**

Ridership on the City of Seattle's Solid Ground Circulator, which provides a travel option for people who have low incomes and depended on free rides downtown, has grown to more than 230 average boardings per day. April 2013 had the highest ridership yet. Initial feedback from customers indicates fairly high satisfaction with the service, although many riders would like to see more stops, more hours of operation, and weekend service. The circulator is currently funded through the end of 2013.

The County increased the number of discounted bus tickets offered to human service agencies for their homeless and low-income clients. Metro has for many years sold tickets at an 80 percent discount to human service agencies in King County. The King County Code limits the amount of these discounts to \$1.875 million annually. In fall 2012, the County Council increased the limit on the total discount by \$250,000 to help ease the transition in 2012-2013 for homeless and low-income riders who had relied on the Ride Free Area. County residents also donated 174,216 bus tickets (\$296,167 value) through the Transit Incentives Program through April 2013.

Adjustments to improve service downtown

A few of the routing changes we had made to keep buses moving well through downtown Seattle resulted in unforeseen problems, and we took the following corrective actions during the first few weeks after the service change:

- **Shifted five routes from Olive Way to Pike Street.** We had revised five bus routes (301, 306, 308, 312 and ST Express 522) to travel northbound via Fourth Avenue and Olive Way. However, traffic in the area was congested. After a month of observations and rider feedback about lengthy travel times, we shifted the routes from Olive Way to Pike Street and moved a Fourth Avenue bus stop one block north. Rider Alerts were posted at the bus stop, emailed to route subscribers, and posted online. The revision improved travel time on Olive Way as well as for the routes moved. The bus

stop move affected seven Metro routes, 18 Community Transit routes, and nine Sound Transit Express routes.

- **Revised Route 301** inbound to serve Union Street instead of Stewart Street during the morning commute to improve travel time.
- **Made adjustments to ease crowding on Route 218.** To ease service in the tunnel and reduce overcrowding on Route 218 from downtown Seattle to the Eastgate and Issaquah Highlands park-and-ride lots, we had reduced the number of Route 218 trips and added trips to Eastgate-bound Route 212 and moved it out of the tunnel to Second Avenue near other Eastgate-bound service. However, many Eastgate-bound riders continued to use—and fill up—Route 218 and 216 buses in the tunnel.

To reduce overcrowding on buses to Issaquah Highlands, we revised Route 218 to no longer serve the Eastgate Freeway Station, and informed riders heading to Eastgate about alternative service on Second Avenue. In May 2013, the County Council adopted a reorganization of I-90-based routes to better match capacity with ridership levels; this change will be implemented in September 2013.

C and D lines

The major problems experienced by customers after the service change were related to the C and D lines. Immediately after the service change, rider demand was high for both new RapidRide lines. However, we received many complaints from C Line customers during the first months of operation, and many negative comments were posted on the West Seattle Blog. Metro had added RapidRide service hours to Route 54 a year in advance of the C Line start to mitigate Alaskan Way Viaduct construction impacts. As a result, the public did not perceive the increased service frequency as a benefit of RapidRide.

In the first few weeks following September 29, C Line buses were overcrowded during both the morning and evening peak periods. The real-time bus arrival signs were not operating correctly on both lines. Problems with Metro’s data feed and the University of Washington’s “One Bus Away” application also left Metro’s tech-savvy riders without access to next-bus arrival information. Transit signal priority systems were working at all but one C Line intersection, but were not operating at more than half of the D Line intersections, affecting speed and reliability on both of the interconnected lines. Two C Line and two D Line stations were not completed until late December and early January, and three additional D Line stations will not be completed until 2014 because of nearby construction work by others. As we found with the start-up of the first two RapidRide lines, headway management is a challenge during the first weeks of operation. Initially, bus spacing on the C and D Lines was uneven; however, this has improved as we have gained experience managing the unique operational issues with each of these lines.

Metro took concerted action to reduce overcrowding, complete unfinished service features, and communicate with riders during the weeks and months following the launch:

Service additions

One week after the launch, we drew upon planned service hour reserves to add two morning and two afternoon trips to the lines to make buses less crowded and more reliable. We continued deploying standby buses as needed to ease overcrowding, and assigned an ORCA boarding assistant to the Second and Columbia outbound stop downtown to speed boarding.

In West Seattle, we added two morning and two afternoon commute trips to Route 120 and to Route 55 (an alternative to the C Line between the Alaska Junction and downtown).

In early November, we responded to ongoing complaints and our observations of passenger crowding by adding four more afternoon commute trips on the C Line. At the same time, we added two morning and two afternoon trips apiece to Route 55 and to Route 120 (eight trips total) to further reduce peak-period passenger crowding.

Adjustments to running time and schedule

Throughout the service change, we made adjustments to improve underlying schedules of the C and D lines that inform operators, the online trip planner and real-time signs. C and D line travel times also improved in the months after the service change as riders established their new travel patterns and as more of the technology projects (transit signal priority installations in particular) became operational.

Communicating with C and D Line customers

We sent a series of messages to Transit Alert subscribers about what we were doing to correct the start-up issues, published a report to customers that was placed on coaches in October, had Metro representatives attend community meetings, and deployed teams of Metro employees to listen to customer comments and concerns at C Line stations during a morning peak period in November. We posted an online survey that was effective in gathering information from West Seattle customers; 400 people responded. We directed customers to the Metro Matters blog, where we responded to their questions and comments, and also posted responses to comments on the West Seattle Blog and others. We communicated actively through news media as well.

Many of the issues were improved or resolved by the end of the year, as stations were completed and most real-time signs, ORCA readers, and transit signal priority systems began operating well. Ridership has continued to be strong—far exceeding near-term projections in West Seattle.

We have continued to closely monitor performance and listen to our customers, and made the following adjustments in February and June to the RapidRide lines and other routes:

February

- **Adjustments to C and D line running time and schedule:** We continued to adjust scheduled running times to match actual experience. We also adjusted schedules to reduce the number of coaches waiting at the north-end terminal in Crown Hill to achieve operational savings and correct for faster-than-expected northbound travel

times. We had earlier added “cover bus” service to the D Line in the late-morning and early-evening peak periods to ease passenger crowding caused by student travel in Ballard, and built this additional service into the regular schedule in February.

- **Trip adjustments to routes 21, 22, and 24:** We made minor span and routing changes to routes 21 and 22 to increase access to the Shorewood and Arbor Heights neighborhoods, and added one evening round trip to Route 24 to lengthen the nighttime span by one hour.
- **Trip adjustments to routes 15, 17, and 18:** We adjusted trip times on these Ballard commuter routes to even out headways between them as they passed through Ballard in the morning or through downtown Seattle in the afternoon.

June

- **Adjustments to C and D line running time and schedule:** We made further adjustments to the C and D lines based on our ongoing monitoring of passenger loads and running times. Scheduled frequencies on the C Line in the morning were shifted to better match late-morning peak passenger overloads. A partial trip that was added to address D Line overloads in Ballard after school dismissal in the afternoon was extended to cover the entire D Line.
- **Trip adjustments to routes 15, 17, and 18:** We had earlier responded to concerns about the 15 Express trip times by temporarily adding an additional morning peak trip. In June, we adjusted trip times to better match ridership and to better match customer expectations, while continuing to provide a balance of these routes throughout the afternoon commute period.

Projected and Actual Results

Projected and actual changes to ridership, farebox collections, passenger wait and travel times, on-time performance and productivity are summarized below. The fall 2012 results are for the entire service change period—Sept. 29, 2012 through Feb. 15, 2013—reflecting both the initial period of adjustment as well as the later months when the new service and pay-on-entry systemwide had become more routine.

There are differences in what is presented for the Ride Free Area and for the C and D lines. Productivity, measured as average daily boardings per vehicle hour, is not presented for the former Ride Free Area because vehicle-hour data are not available for that geographic area. We do provide a comparison of systemwide productivity with productivity for routes that travel through downtown Seattle.

Fare revenue data are not available at the route level, so are not presented for C and D lines.

On-time performance (measured as headways) is critically important to successful RapidRide service and is presented for the C and D lines. Passenger wait and travel times are presented for the Ride Free Area because they are more meaningful metrics there.

Ride Free Area

Ridership

Metro's forecast was that elimination of the Ride Free Area would result in a loss of 1.8 million annual Metro boardings¹. A comparison of boardings in the Ride Free Area in spring 2012 (Feb. 18 through June 8, 2012) and in the fall post-service change period indicates that the annual ridership loss is about 1.8 million boardings, as originally estimated.

Non-Ride Free Area boardings increased by an estimated 0.5 percent between spring 2012 and fall 2012. That level of ridership growth within the former Ride Free Area would have resulted in 102,300 average daily boardings. Actual average weekday boardings were 96,200, which is 6,100 less. Applying Metro's standard annualization factor of 300 (to translate average weekday boardings into total annual boardings) results in the estimated 1.8 million lost boardings.

It should be noted that estimating ridership changes from the Ride Free Area closure and fall service changes is complicated by the difficulty of sorting out impacts of the many changes that occurred simultaneously. The service reconfiguration makes the changes in the Ride Free Area difficult to measure, and the changes in the Ride Free Area make the changes from the service reconfiguration difficult to measure. Metro was also upgrading the automatic passenger counter system during this time, resulting in slight changes in ridership that are very difficult to isolate at the zone level.

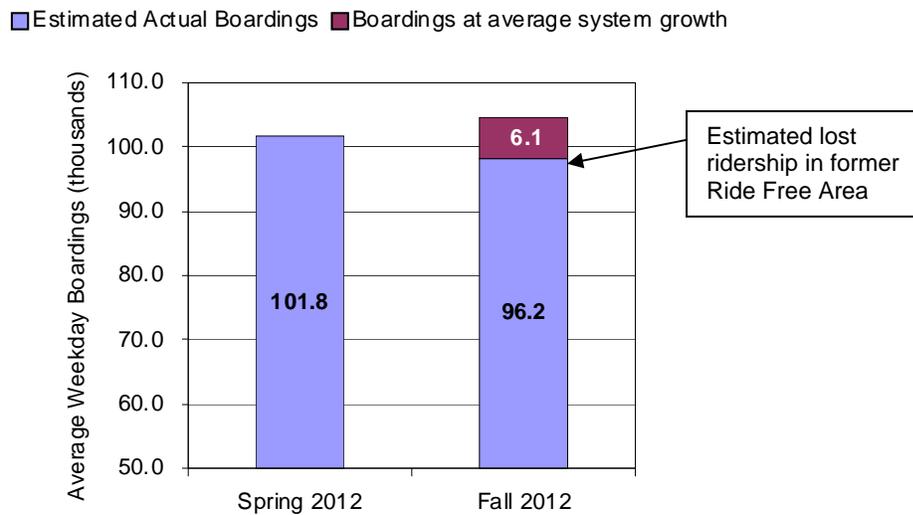
¹ The 2010 estimate of 1.7 million boardings lost was updated to 1.8 million based on total boardings systemwide in 2012.

Table 1
Ridership in Ride Free Area

	Actual (average daily boardings)	Estimated without RFA Closure (average daily boardings)
Spring 2012	101,800	101,800
Fall 2012	96,200	102,300

Source: Metro Transit automated passenger counts.

Fig. 1
Estimated Loss in Downtown Seattle Boardings from Ride Free Area Closure



Other transit agencies were affected by elimination of the Ride Free Area as well. An estimated 80,000 annual boardings were lost in downtown Seattle on Sound Transit Express bus service that Metro operates. Impacts on Community Transit and Sound Transit service operated by other agencies are not yet available.

Sound Transit estimates that average weekday Link light rail ridership in the downtown Seattle transit tunnel increased by 7.5 percent between the spring 2012 (February to June) and fall 2012 (September 29, 2012 to February 15, 2013) service periods. This compares with an overall increase in Link boardings of 10 percent.

Fare revenue

Final revenue data will not be available until the end of 2013; however, we have used preliminary data to estimate actual farebox collections in the former Ride Free Area.

Projected Ride Free Area revenue loss: A report that Metro developed in 2010² in response to the 2009 Performance Audit of Transit estimated that Metro lost \$2.6 to \$2.7 million in revenue in 2010 from the Ride Free Area, including loss from pay-on-exit fare evasion outside the Ride Free Area (but excluding the \$400,000 payment from the City of Seattle). When adjusted for Metro’s 2011 fare increase, the estimated annual revenue loss was \$2.9 to \$3.0 million.

Estimated actual revenue gain in former Ride Free Area: Based on data available now, we estimate that in the first 12 months after the Ride Free Area closure, Metro will receive about **\$2.2 million** additional revenue as a result of the closure. This is the result of customers now paying for rides in the former Ride Free Area with cash, tickets, and E-purse, as well as additional apportionment from the regional Puget Pass.

This estimate does not include increased revenue from employer Passport agreements or the U-PASS program. Pricing for Passport and U-PASS is renewed annually and is based on ridership in the previous 12 months. It will be several months before the pricing in these agreements will reflect ridership in downtown Seattle without the Ride Free Area. Incorporating ridership in the former Ride Free Area into Passport and U-PASS pricing will result in an estimated additional **\$1.4 million** per year.

We estimate that in future years, Metro will receive \$3.6 million in additional annual revenue because of Ride Free Area closure, if we see trends similar to those we saw for the other revenue sources discussed above.

Passenger wait and travel times

When Metro began planning for the elimination of the Ride Free Area, a major concern was the impact on travel time through downtown Seattle, both on surface streets and in the Downtown Seattle Transit Tunnel. With the switch to pay-on-entry, bus riders would no longer be able to use all-door boarding. Travel times were expected to increase, particularly during the afternoon and evening commute period.

To mitigate this impact, we made a number of adjustments:

- Reduced the number of turning buses at the Third Avenue and Pike Street intersection by shifting coaches to Fourth Avenue/Olive Way—later moving them to Fourth Avenue/Pike Street when extensive peak travel delays occurred.
- Shifted three routes (approximately 10 buses per direction in the peak hour) from the tunnel to surface streets.
- Placed temporary ORCA boarding assistants with portable card readers in the tunnel and at heavy-volume locations on surface streets (Third Avenue at Pike and Pine streets, and Columbia at Second Avenue).
- Improved four street-level bus stops on Third Avenue, including extension of stops and reconfiguration of street furniture to make more space for pedestrian flow.
- Lengthened rear-bay bus stops in the tunnel to optimize curb space.

² Report: 2010 Ride Free Area Ridership and Revenue Estimates, September 14, 2010.

As a result of these measures, buses typically are taking only slightly longer to move through downtown and the transit tunnel during the PM peak period. Many routes have gained some time savings from riders no longer having to pay as they exit outside of downtown Seattle, so the overall impact on service hasn't been significant. The following are median travel-time increases, based on January 2013 data compared to the October 2011 baseline.

Tunnel routes – PM peak: Simulations predicted travel time increases of 1 to 4 minutes northbound and southbound in the tunnel during the PM peak hours.

Actual increases:

- 1-minute median increase northbound
- Less than 1-minute median increase southbound

More detailed data on tunnel travel times is in Appendix B.

Surface Streets - PM peak: Simulations predicted travel time increases of 1 to 2 minutes on the major surface streets during the PM peak hours.

Actual increases:

- Median 50-second increase on Second Avenue southbound
- Median increase of nearly 1 minute on Third Avenue northbound
- Median increase of less than 30 seconds on Third Avenue southbound
- Only slight increase in travel time on Fourth Avenue northbound

Implications for passenger wait times: Passenger wait times would be roughly one-half of the increased travel time through downtown. Median travel time increases for bus service through downtown of one minute or less suggest that median passenger wait times have increased by 30 seconds or less.

Table 2
Change in PM Peak Median Travel Time* (minutes)

Corridor	Projected	Actual
<i>Tunnel</i>		
Northbound	1 – 4	1
Southbound	1 – 4	< 1
<i>Surface Streets</i>		
Second Ave Southbound	1 – 2	0.8
Third Ave Northbound	1 – 2	0.9
Third Ave Southbound	1 – 2	0.4
Fourth Ave Northbound	1 – 2	0.1

*Projected travel times were based on simulations done in 2010 and 2011. Actual travel times based on January 2013 data. Median travel time for all buses in the PM Peak period. Tunnel routes between International District and Convention Place Station. Second Avenue Southbound between Pike Street and Jackson Street. Third Avenue between Stewart Street and Yesler Way, or Second and Columbia; Fourth Avenue between Stewart and Jackson Street.

Overall travel time changes (downtown to end-of-the-line): The following is a summary of changes in median PM peak travel times from downtown Seattle to the end of the line for indicator routes on major corridors and for routes that had significant changes in downtown Seattle. (Since 60 percent of Metro routes travel through downtown Seattle, it was impractical to assess every route.) The routes analyzed are shown in Table 3. Figures showing travel times for each of these routes are in Appendix C.

- Metro routes with no routing changes generally had either no change in travel times, or travel time improvements through the end of the route; most increases in travel time through downtown were made up by faster travel time outside of downtown.
- Routes that moved from the tunnel to surface streets saw travel-time increases. The greatest travel time increases were experienced by Route 212 from 4 to 6 p.m.
- Routes that moved from Third Avenue to Fourth Avenue generally had slight travel-time improvements.
- Sound Transit routes generally had some improvement or no change.

Table 3
Change in Median PM Peak Travel Times after Fall 2012 Service Change
 Outbound from downtown through end of the line

Route	Sep-12	Jan-13	Changes to routing	Time (in minutes)			
				3 PM	4 PM	5 PM	6 PM
7	surface	surface	No change	-2.7	-3	-7.1	0.7
41	tunnel	tunnel	No change	-3.9	-5.1	-2.8	-0.5
101	tunnel	tunnel	No change	0.3	0.6	-3.8	-2.6
120	surface	surface	No change in CBD	-0.2	0.5	1.7	-0.2
212	tunnel	surface	Moved from tunnel to 2nd/4th	2.6	4.5	4.2	1.8
218	tunnel	tunnel	No change in CBD	-0.8	-1.8	-3	-2.5
255	tunnel	tunnel	No change	-1.2	-0.3	-1.7	0.4
301	tunnel	surface	Moved from Stewart/Olive to Union/Pike	1.4	1	2.7	3.2
306	surface	surface	Moved from 3rd to 4th outbound	0	0	-2.6	0
308	surface	surface	Moved from 3rd to 4th outbound	0	0	-2.9	0
312	surface	surface	Moved from 3rd to 4th outbound	0	0	0	4
358	surface	surface	No change	2.1	4.9	3.1	0
522	surface	surface	Moved from Olive to Pike outbound	-3.0	-1.9	-0.2	-3.1
545	surface	surface	No change	-2.7	-0.7	-0.8	-1.7
550	tunnel	tunnel	No change	0.9	-0.4	-1.4	0.3
554	surface	surface	No change	-1.6	-0.3	-0.9	-1.8

 CBD routing changed in the outbound (PM peak) direction
 No change or decrease in travel time

C and D Lines

Ridership

Metro’s original 5-year ridership target/projection for the C and D lines was 50 percent above the 2009 baseline ridership. The baselines were later revised to reflect ridership growth after 2009. Spring 2012 is the updated baseline for the D Line. The updated baseline for the C Line is spring 2011, before service was increased to RapidRide levels on the corridor (then served by Route 54).

Ridership data from January through March 2013 indicate that just a few months after the start of operations, **C Line ridership had grown 44 percent above its 2011 baseline**, already coming close to the updated 5-year ridership projection.

For the same January through March period, **D line ridership was 12 percent above the updated baseline**, on track to achieve the 5-year ridership projection.

Table 4
Projected and Actual C & D Line Ridership – Average Weekday

Line	Original 2009 Baseline	Original 5-Year Projection	Updated Baseline C – 2011 D – 2012	Updated 5-Year Projection	Jan to March 2013	% Increase from Baseline
C	3,570	5,350	4,650	6,975	6,684	44%
D	6,950	10,430	7,630	11,445	8,527	12%

To get a broader picture of ridership changes resulting from the September 2012 service change, we compared average weekday boarding counts from spring (Feb. 18 through June 8, 2012) and fall (Sept. 29, 2012 through Feb. 15, 2013) for 75 routes involved in the service change.³ Given the size of the available data samples and the corresponding margins of error, this comparison could find no measurable increase in boardings on these routes.

Preliminary data for spring 2013 indicate that systemwide ridership is up between 2 and 3 percent above 2012. This is a larger ridership increase than would be expected based on employment growth, lower gas prices and closure of the Ride Free Area since last spring, suggesting that the service change may be resulting in a ridership increase. As more data become available, further analysis should provide more definitive results. We expect, however, that it will take some time for ridership on these routes to build as riders become more familiar with these changes and the new connections that can be made.

Productivity

Metro measures productivity as average weekday boardings per vehicle hour. Both the C and D lines were well above the average system productivity (32 boardings per hour

³ Routes included: 1, 2, 5, 10, 11, 12, 13, 14, 15, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 45, 46, 47, 50, 51, 53, 54, 55, 56, 57, 60, 61, 62, 65, 66, 67, 68, 75, 81, 85, 116, 120, 123, 122, 123, 124, 125, 128, 131, 132, 133, 156, 166, 169, 212, 216, 217, 218, 301, 306, 308, 312, 330, 673, 674

in January 2013). We expect their productivity to increase as ridership rises towards the 5-year projection. Productivity tends to drop immediately following a big service increase, because service hours are invested but ridership can take time to grow and respond to the investment.

Table 5
C & D Line Weekday Boardings per Vehicle Hour

Route	Projected (based on 5-year ridership projection)	Actual (Jan-March 2013)
C Line	41.2	39.5
D Line	73.1	54.5

On-time performance/headway adherence

Metro’s systemwide weekday on-time performance target is 80 percent. This target was met in January through March of 2013, after an adjustment period following the September service change.⁴

On-time performance for RapidRide routes is measured as headway adherence. (Headway is the number of minutes between buses.) Data are collected at the stop level for each trip. A trip is considered to be adhering to the headway at a particular stop if it arrives within 3 minutes and 29 seconds of the scheduled headway.

During January 2013, overall headway adherence for the C and D lines was 80 percent and above. Headway adherence on both lines approached 90 percent for trips inbound to downtown, while the headway adherence for outbound trips was below 80 percent, as shown in Table 6.

Table 6
Estimated Weekday C & D Line Headway Adherence by Hour and Direction
 Data collected Jan. 2-25, 2013

	Inbound to Downtown	Outbound from Downtown	Overall
C Line	89%	76%	81%
D Line	88%	74%	80%

Travel times

Median peak hour travel times on the C and D lines represent an improvement over travel times on the Routes 54 local and 15 local that they replaced. The greatest travel time reductions are seen for the northbound C Line during the AM peak and for the north-

⁴ Data measuring on-time performance are collected at the stop level for each trip. A trip is considered to be on time at a particular stop if it leaves that stop no more than 1 minute early or no more than 5 minutes late.

bound D Line during the PM peak. The least travel time improvement is seen on the southbound C Line during the PM peak.

Table 7
**Changes in Bus Travel Times,
 September 2012 to January 2013***
 (Routes 15L and 54L compared to C and D Lines respectively)

Route (time period)	Reduction in Travel Time	
NB C Line (AM peak)	10% - 17%	3-6 minutes
SB D Line (AM peak)	3% - 13%	1-4 minutes
SB C Line (PM peak)	2% - 9%	1-4 minutes
NB D Line (PM peak)	6% - 18%	2-6 minutes

* Travel times on the C Line (54 local) are measured between Third Avenue at Pike Street and both SW Alaska Street at California Avenue SW and Fauntleroy Avenue SW at SW Barton Street. Travel times on the D Line (15 local) are measured between Third Avenue at Pike Street and both 15th Avenue NW at NW Market Street and 15th Avenue NW at NW 85th Street.

Systemwide context

The table and text below summarizes data about Metro’s overall system and about routes serving downtown Seattle that can be useful as context for assessing the outcomes of the Ride Free Area elimination and the service changes.

Table 8
Changes in Ridership, Productivity and On-Time Performance – Spring 2012 to Fall 2012

			Spring 2012	Fall 2012	% change	Change
Average weekday boardings	Systemwide		385,000	380,600	-1.1%	(4,400)
	Routes to/from downtown		254,100	243,900	-4.0%	(10,200)
Weekday vehicle hours	Systemwide		11,240.5	11,310.9	0.6%	70
	Routes to/from downtown		6459.6	6339.7	-1.9%	(120)
Productivity (boardings/vehicle hour)	Systemwide		34.3	33.6	-1.8%	
	Routes to/from downtown		39.3	38.5	-2.2%	
On-time performance	Systemwide		77%	78%		
	Routes to/from downtown		76%	76%		
		Inbound	81%	82%		
		Outbound	70%	72%		

Ridership

Average weekday boardings systemwide declined by about 4,400 (-1.1 percent) between the spring and fall 2012 service periods, while average weekday boardings on routes to and from downtown Seattle declined by about 10,200 (-4 percent).

As noted in Table 1 (p.18), the number of average weekday boardings in the former Ride Free Area declined by about 5,600 over this timeframe, accounting for more than the total decline in boardings systemwide, and more than half of the decline in boardings on routes to and from downtown Seattle.

The fall service change reconfigured service to and from downtown Seattle, resulting in a reduction of both vehicle hours and boardings on routes serving downtown. Some service to downtown Seattle was truncated. For instance, the portion of Routes 131 and 132 from Burien south became the Route 166, resulting in a loss of both vehicle hours and boardings to/from downtown Seattle. Service on other routes to downtown was reduced (Routes 55, 56) or eliminated (Route 17) and replaced by service that does not come to downtown Seattle (Routes 50 and 61).

Vehicle hours

While there was an increase of 70 average weekday vehicle hours (0.6 percent) systemwide between the spring and fall of 2012, service to and from downtown Seattle saw an decrease of 120 average weekday vehicle hours (-1.9 percent), due to the service reconfiguration implemented with the fall service change as described above.

Productivity

Systemwide productivity fell by 1.8 percent between spring and fall 2012, largely due to the decrease in boardings in the former Ride Free Area, but also in part to the increase in vehicle hours.

As noted above, routes serving downtown Seattle saw both decreases in boardings and vehicle hours, resulting in a decline in productivity from spring to fall 2012 that was quite close to that of the system as a whole (-2.2 percent).

On-time performance

Systemwide on-time performance (OTP) increased slightly from spring to fall 2012, to 78 percent, remaining just short of Metro's 80 percent target (as noted earlier, systemwide OTP met the 80 percent target for the months of January through March of 2012). This is consistent with the typical seasonal pattern that sees OTP increase in the fall compared with spring.

The on-time performance of routes to and from downtown Seattle also increased slightly from spring to fall, remaining somewhat below that of the system as a whole. The on-time performance of inbound routes remained stable, above the 80 percent target level. Outbound routes had lower on-time performance, but saw the largest improvement spring to fall due to additional time being added to schedules with the service change.

Rider Satisfaction

Although the proviso did not specifically request data about rider satisfaction, recent customer survey results add to our understanding of the customer experience and are presented here. This section summarizes results of rider satisfaction ratings from surveys conducted before the September 2012 service change (March 2012) with those from surveys conducted after the service change (March/April 2013) on representative all-day routes in northwest Seattle and southwest Seattle and King County. All differences noted are statistically significant.⁵

Results of the survey were mixed, with riders indicating both increases and decreases in satisfaction levels. These results underscore the remaining challenges with service on the C and D lines.

Table 9
**Summary Results of Pre- and Post-
 September 2012 Service Change
 Rider Surveys**

	Overall Satisfaction	
	Spring 2012	Spring 2013
C Line		67%
Route 54 L	82%	
Route 55	81%	
D Line		73%
Route 15 L	84%	
Route 18 L	81%	
Route 40 (85th to downtown Seattle)		78%
Route 17 L	83%	
Route 18 L	81%	
Route 40 (84th to Northgate)		75%
Route 75	77%	
Route 21 L	69%	84%
Route 120	76%	77%
Route 131		67%
Route 132		69%
Route 166		77%

C and D lines – While a large majority of riders on the C Line (67%) and the D Line (73%) surveyed in spring 2013 were satisfied overall with their route, overall satisfaction ratings were from nine to 15 percentage points lower than those given by riders on their predecessor routes.

⁵ March 2012 “pre study” surveys were conducted on routes 15 local, 17 local, 18 local, 54 local, 55, 75, 120 and 21. March/April 2013 “post study” surveys were conducted on RapidRide D Line (RR D), RapidRide C Line (RR C), 40(2 segments), 120, 21 local, 131, 132, 166, 5, 31/32, 28X/28, 29, 15X, 50, 125, 128, 22, 55, 60, 116/118/119, 156, 123 and 124.) More detailed survey results are in Appendix C.

C and D line riders were generally more satisfied than riders on their predecessor routes with cleanliness and lighting at the RapidRide stops, bus interiors being clean and free of graffiti, wide doors and aisles, information on routes and connections, and smoothness of the ride. Both C and D line riders were generally less satisfied with being able to get a seat on the bus and personal safety while riding, being able to sit while waiting, convenience of the bus stop to home, and helpfulness of drivers in ensuring transfer connections. C Line riders were also less satisfied with the behavior of others and personal safety while waiting for the bus than riders on the previous routes 54 local and 55.

Route 40 (85th to downtown) – Riders’ overall satisfaction ratings (78%) were somewhat lower than riders’ ratings on the Route 17 local (83%), but not significantly different than riders’ ratings on the Route 18 local.

Route 40 riders were more satisfied than route 17 and 18 local riders with personal safety while waiting, the behavior of others at waiting areas, bus cleanliness and lack of graffiti, and service frequency during peak hours.

Route 40 riders were generally less satisfied with the number of transfers, being able to sit while waiting, and the availability of service in the mornings or evenings. Compared to Route 17 riders, Route 40 riders were also less satisfied with how long the bus trip takes, personal safety, the behavior of others on the bus, bus stop cleanliness, convenience to home, and the bus leaving the stop early. Route 40 riders were less satisfied with being able to get a seat and transfer information at the waiting area than were Route 18 riders.

Route 40 (85th to Northgate) – Riders’ overall satisfaction ratings (75%) were not significantly different than riders’ ratings on the Route 75 (77%).

Route 40 riders were more satisfied with information about routes and connections, and less satisfied with the time the bus trip takes, personal safety issues, cleanliness, visibility at waiting areas, being able to get a seat, and midday service frequency.

Route 21 local – Riders on Route 21 local after the service change were significantly more satisfied after (84%) than before (69%) the service change.

Route 21 local riders were more satisfied with 12 service elements after the service change, including those having to do with bus speed, service reliability, frequency and transfer connections.

Route 21 local riders were less satisfied with personal safety issues, convenience of the bus stop to home, being able to get a seat, and bike rack capacity after the service change.

Route 120 – There was no significant difference in the overall satisfaction ratings given by riders on Route 120 before or after the service change. There were only a small number of differences in satisfaction ratings for specific service elements.

Routes 131, 132 and 166 – No pre-service change surveys were conducted for these routes. The large majority of riders on these routes are satisfied overall, ranging from 67% on Route 131 to 77% on Route 166.

Lessons Learned

Metro learned from both the changes that went smoothly and from problems that occurred in the September 2012 service change that it is important to do the following:

Analyze potential impacts of significant changes in service and take actions to mitigate expected problems. Simulations that Metro conducted before the service change had predicted that pay-on-entry would result in travel time delays of one to four minutes through downtown Seattle. The planning and actions we took to ease bottlenecks have reduced these increases to one minute or less on average.

Create a contingency service hour reserve for major service changes to make it possible to quickly address unexpected schedule and overload problems. The availability of reserve hours enabled us to add needed service to respond to crowding and schedule reliability issues as early as one week after the service change started, and to increase service further as we observed ongoing needs.

Closely monitor service and listen to customer comments immediately after a major service change to identify problems and implement solutions. As detailed in this report, Metro's close monitoring of service and customer comments in the days and weeks following the service change allowed transit staff to quickly identify bottlenecks and take immediate action to deal with them while planning for longer-term solutions.

Launch future RapidRide lines only after supporting infrastructure is in place and after construction by others that would disrupt service has been completed (where possible). We also learned that promotional messages about the benefits of RapidRide should be tempered to better match what will be available to riders as the service is rolled out. In addition, our experience with the C Line showed that starting RapidRide-level service a year before launch on the predecessor route blurred the distinction between RapidRide and regular service, weakening the public's perception of RapidRide's benefits.

Continue to pursue strategies to speed boarding in downtown Seattle through off-board fare payment. Steps will include:

- Installing off-board ORCA fare transaction processors at RapidRide stops downtown, currently targeted to be operational by early 2014.
- Moving forward with a federally funded project to procure and install ticket vending machines downtown.

Continue using new communication tools that enable targeted communication and engagement with our customers, as these are effective in informing customers and responding to their questions, comments and concerns. Transit Alerts tailored to route subscribers, online surveys, blogs, Twitter, and recorded announcements on buses effectively augmented our traditional communication channels—Metro Online, signs, posters, alerts posted at bus stops, advertisements, earned media, and street teams. We also found that informing customers about destinations and frequency of changed bus routes was more helpful than simply telling them what routes changed.

Keep the size of service changes manageable for both Metro and riders. The huge number and extent of route changes in fall 2012 was extremely challenging for Metro to plan and deliver, and was difficult for many customers to understand and adapt to.

Be mindful that while transit system productivity can be increased by reallocating existing service hours with no new investment, this approach also has negative consequences: even though the revised system is expected to serve more riders overall, some riders will find revised service to be less convenient or will lose service entirely. These issues are reflected in lower rider satisfaction levels on some routes surveyed before and after the September changes.

Continue to monitor and adjust service, as it typically takes months for riders to adjust to service changes and for Metro to have reliable data about customer satisfaction, ridership and other performance measures. We need to continue gathering performance information and improving areas where riders are less satisfied than they were with predecessor routes.

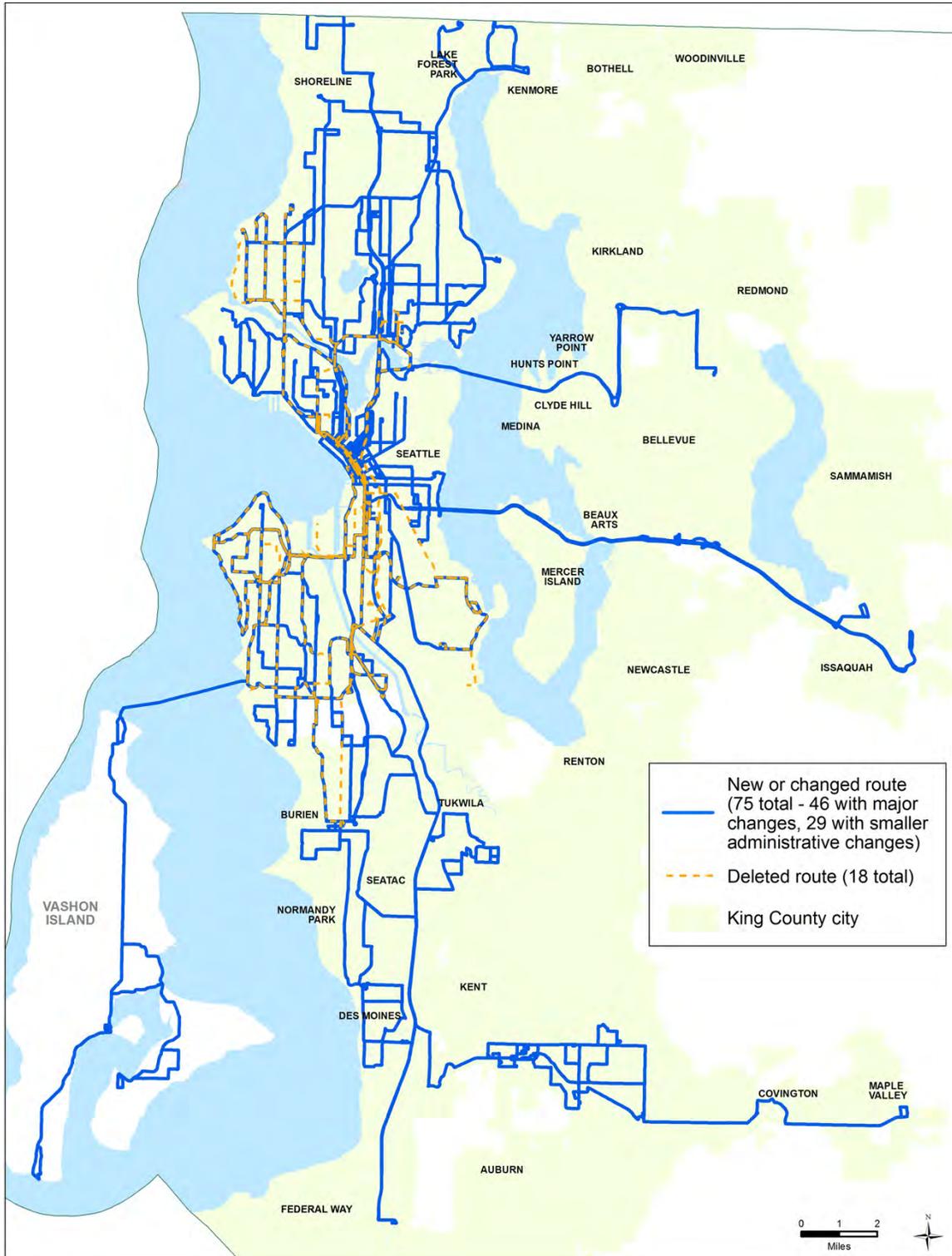
By continuing to monitor and improve service, and by applying the lessons learned to future service changes, Metro can become a stronger system serving more people as a result of the major revisions made in fall 2012.

Appendices

- A. Map of Routes Changed, September 2012**
- B. Detailed Data on Travel Times in the Downtown Seattle Transit Tunnel**
- C. Comparison of Median Travel Times Before and After Closure of the Ride Free Area**
- D. Rider Survey Results**

A. Map of Routes Changed, September 2012

This map shows routes that were deleted or changed at the same time the Ride Free Area was eliminated and the RapidRide C and D lines started service.



Appendix B. Detailed Data on Travel Times in the Downtown Seattle Transit Tunnel

This appendix provides summary data on PM peak travel times through the Downtown Seattle Transit Tunnel, and shows the distribution of travel times in each direction

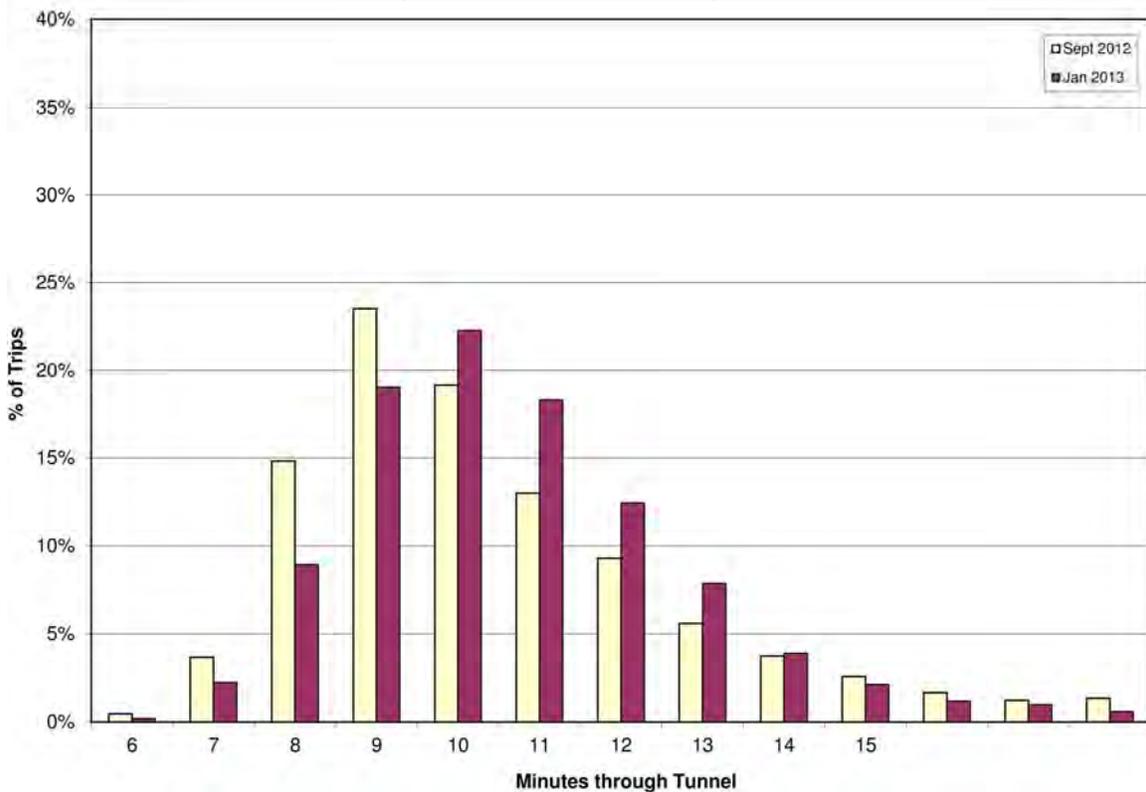
Tunnel Travel Times, September 2012 vs January 2013

Travel times greater than 18 minutes removed

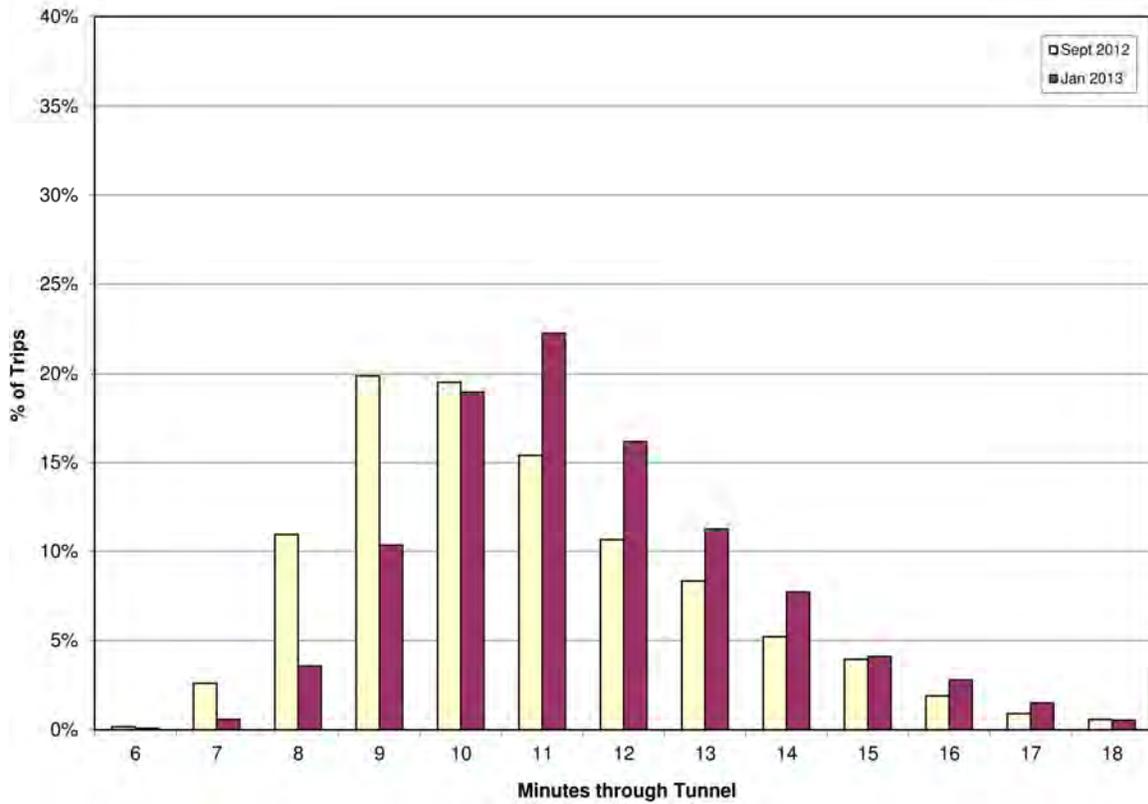
	September 2012			January 2013		
	Median Time	25th Percentile	75th Percentile	Median Time	25th Percentile	75th Percentile
PM Northbound	10	9	12	11	10	13
PM Southbound	10	9	12	10	9	12

Source: AVL/OBS

Distribution of PM Southbound Peak Tunnel Bus Travel Times September 2012 vs. January 2013



**Distribution of PM Northbound Peak Tunnel Bus Travel Times
September 2012 vs. January 2013**

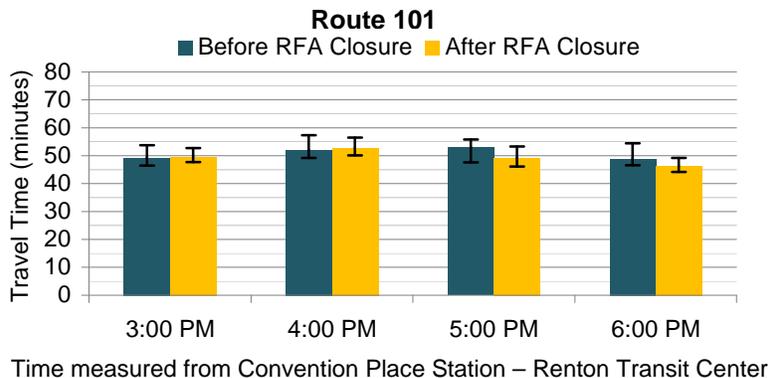
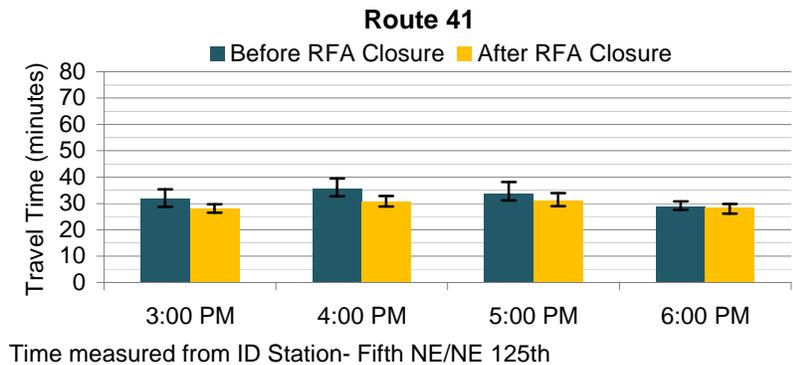
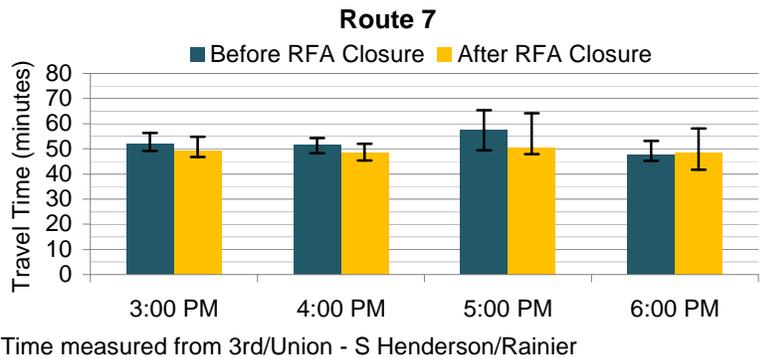


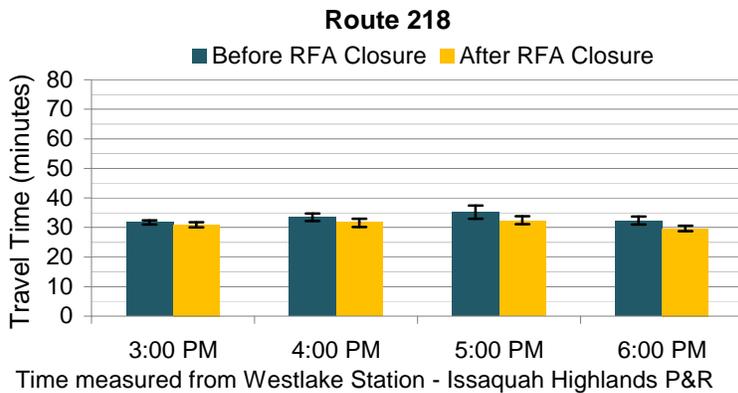
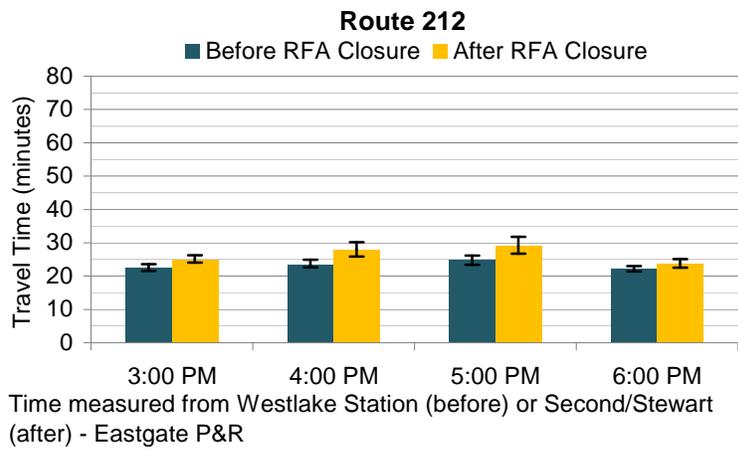
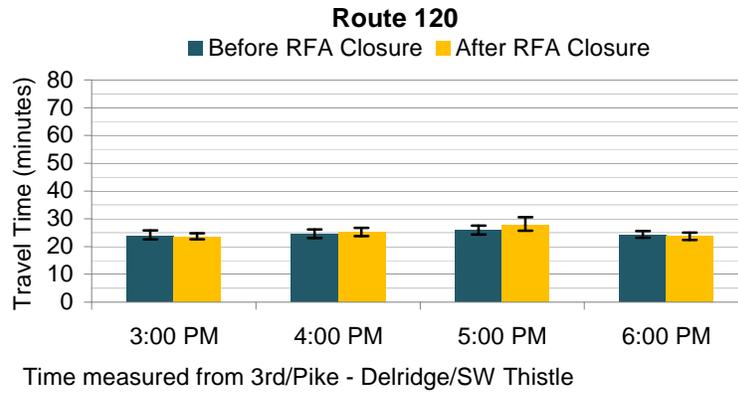
Appendix C. Comparison of Median Travel Times Before and After Closure of the Ride Free Area

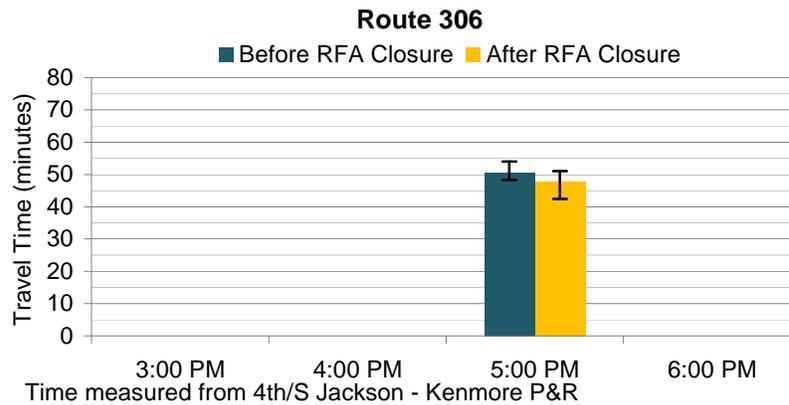
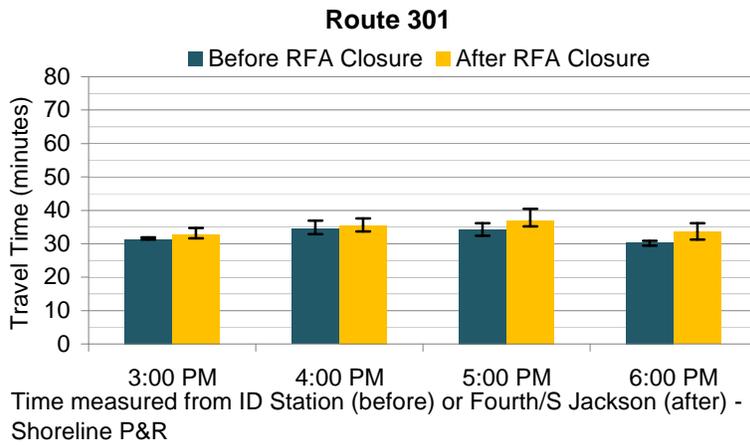
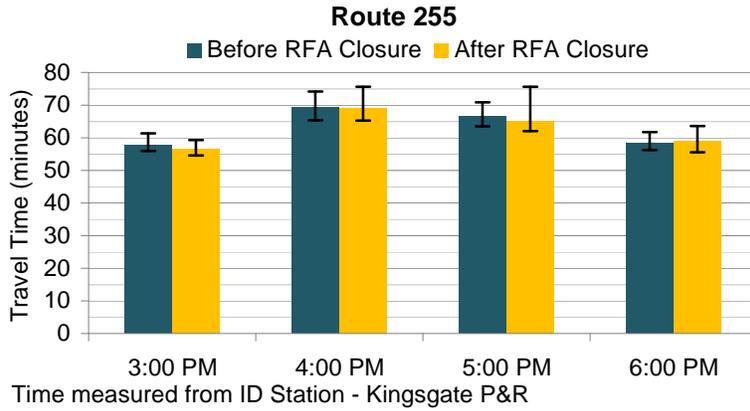
Data source: AVL/OBS

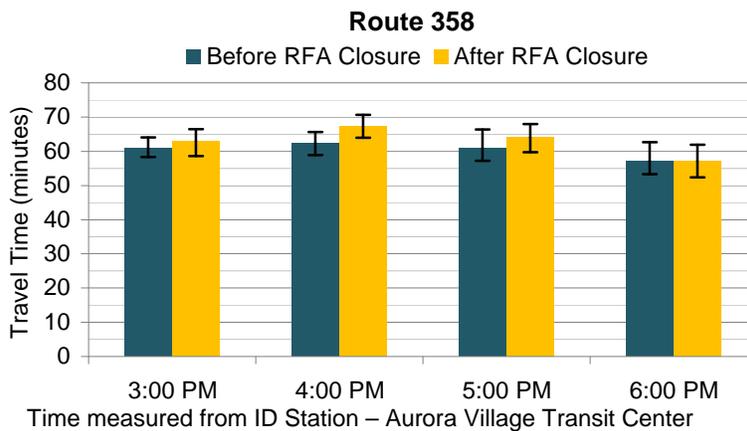
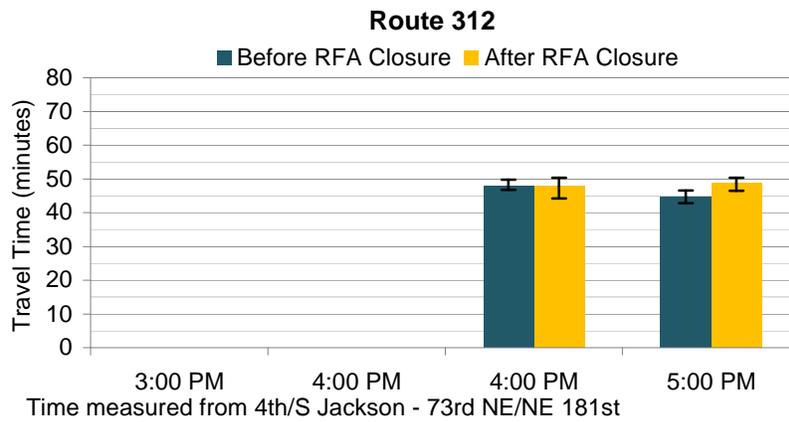
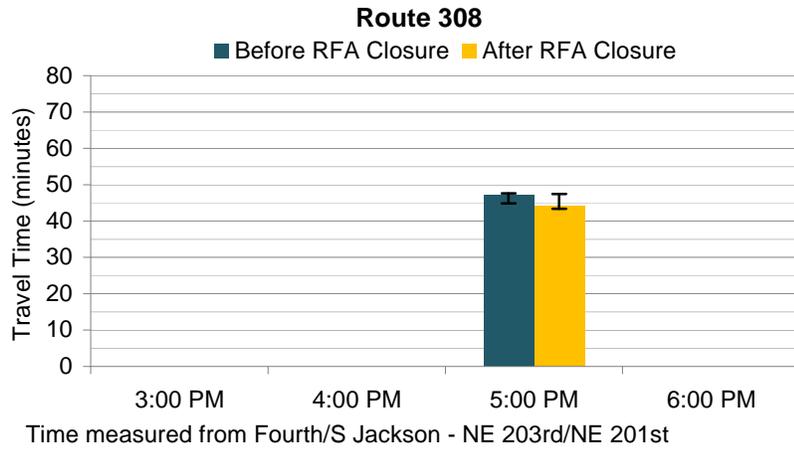
This appendix provides graphs detailing travel-time changes by hour from downtown Seattle to the end of the line for indicator routes on major corridors and for routes that had significant changes in downtown Seattle.

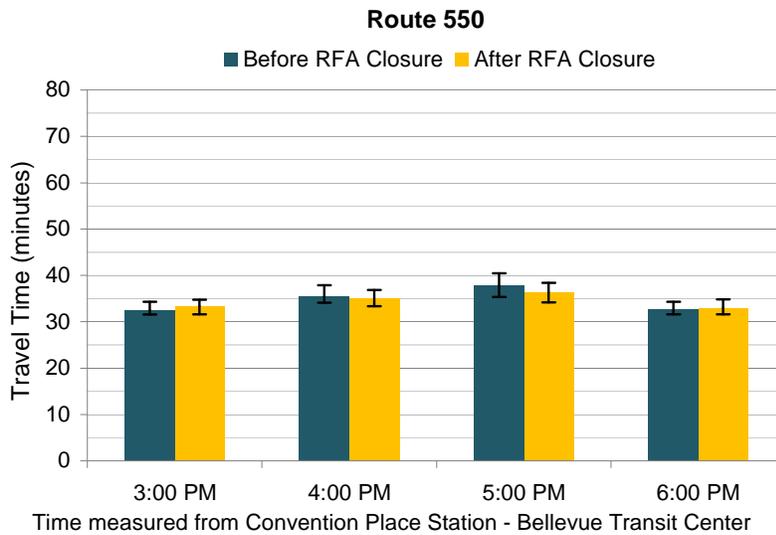
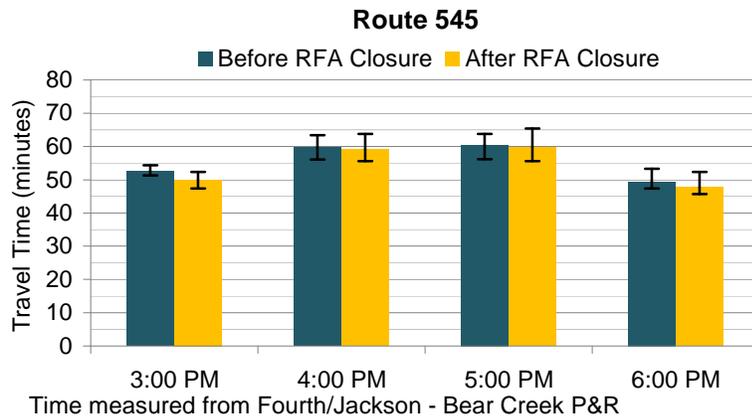
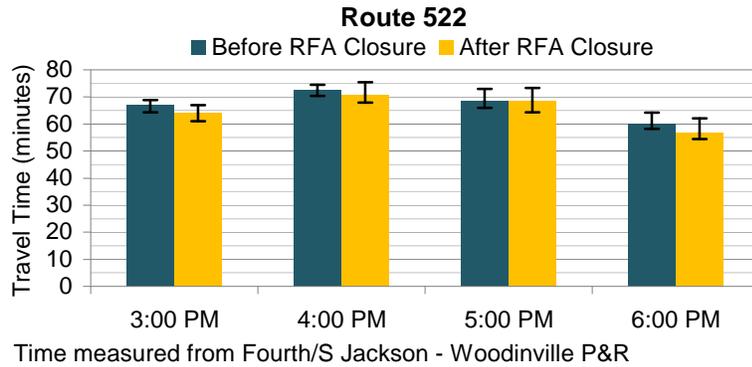
Key: I indicates 25th percentile to 75th percentile range

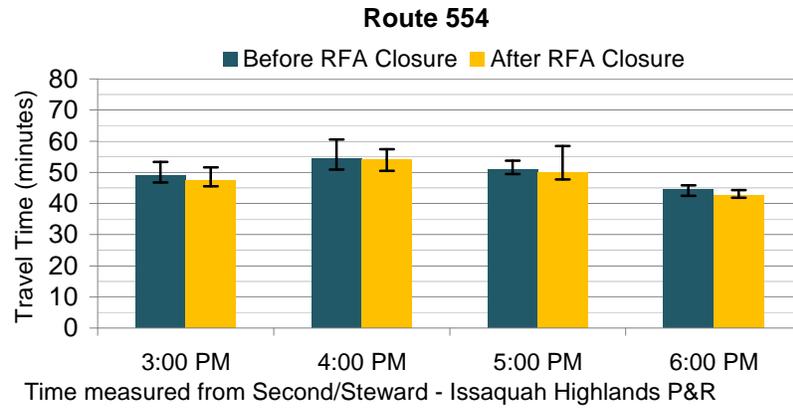












Appendix D: Rider Survey Results

This appendix compares rider satisfaction ratings from surveys Metro conducted before the September 2012 service change (March 2012) with those from surveys conducted after the service change (March/April 2013) on routes that had significant changes.

March 2012 “before” surveys were conducted on routes 15 local, 17 local, 18 local, 54 local, 55, 75, 120 and 21. March/April 2013 “after” surveys were conducted on RapidRide D Line (RR D), RapidRide C Line (RR C), 40 (two segments), 120, 21 local, 131, 132, 166, 5, 31/32, 28X/28, 29, 15X, 50, 125, 128, 22, 55, 60, 116/118/119, 156, 123 and 124.

The surveys typically ask riders to rate their level of satisfaction on 37 different aspects of service, plus their overall satisfaction. Surveys of RapidRide customers included a few additional questions related to the unique features of this service. Rather than include the results of all 38 or more questions for all routes surveyed, this summary includes only those satisfaction ratings for which the differences before and after the service change were statistically significant.

RapidRide D Line (RR D – after) vs. routes 15 local and 18 local (before)

Riders ratings of overall satisfaction on the D Line (73%) were significantly lower than riders’ ratings on the Route 15 local (84%) and the Route 18 local (81%).

D Line riders gave significantly higher satisfaction ratings than Route 15 local and Route 18 local riders for the following service elements:

- Cleanliness of waiting area (61% RR D vs. 54% Route 15)
- Amount of lighting (65% RR D vs. 54% Route 15)
- Having information available about routes /connections (60% RR D vs. 49% Route15 and 52% Route18)
- Cleanliness of bus interior (83% RR D vs. 76% Route 15 and 71% Route 18)
- Bus is free of graffiti (84 % RR D vs. 76% Route15 and 75% Route 18)
- Smoothness of the ride (70% RR D vs. 62 % Route15 and 61% Route18)
- Wide enough doors and aisles for loading/unloading (86% RR D vs. 80% Route 15 and 80% Route 18)

Route 15 local riders gave significantly higher satisfaction ratings than D Line riders for the following service elements:

- Personal safety on the bus (88% Route15 vs. 83% RR D)
- Being able to sit down while waiting (59% Route 15 vs. 47% RR D)
- Convenience of bus stops to home/start of trip (87% Route15 vs. 76% RR D)
- Being able to get a seat (73% Route 15 vs. 59% RR D)
- Helpfulness of drivers in ensuring transfer connections (67% Route 15 vs. 56% RR D)

Route 18 local riders gave significantly higher satisfaction ratings than D Line riders for the following service elements:

- Being able to sit down while waiting (55% Route 18 vs. 47% RR D)
- Convenience of bus stop to home/start of trip (84% Route 18 vs. 76% RRD)
- Being able to get a seat (78% Route 18 vs. 73 % RR D)

RapidRide C Line (RR C – after) vs. Routes 54 local (before) and Route 55 (before)

Riders ratings of overall satisfaction on the C Line (67%) were significantly lower than riders' ratings on the Route 54 local (82%) and the Route 55 (81%).

C Line riders gave significantly higher satisfaction ratings than Route 54 local and Route 55 riders for the following service elements:

- Cleanliness of the waiting area (62% RR C vs. 54% Route55)
- Amount of lighting (66% RR C vs. 52% Route 54 vs. 50% Route 55)
- Having information available about routes and connections (62% RR C vs. 50 % Route 55)
- Cleanliness of bus interior (78% RR C vs. 71% Route 54)
- Bus is free of graffiti (78% RR C vs. Route 73% Route 54)
- Smoothness of the ride (66% RR C vs. 60% Route 54)
- The bus getting me where I am going on time (71% RR C vs. 65% Route 55)
- How often the bus runs during midday hours (58% RR C vs. 50% Route 55)

Route 54 local riders gave significantly higher satisfaction ratings than C Line riders for the following service elements:

- Personal safety while on the bus (90% Route 54 vs. 81% RR C)
- Personal safety while waiting for the bus during the day (85% Route 54 vs. 79% RR C)
- Behavior of other people at the waiting area (59% Route 54 vs. 50% RR C)
- Convenience of bus stop to home/start of trip (82% Route 54 vs. 67% RR C)
- Being able to get a seat (77% Route 54 vs. 46% RR C)
- Enough bars/straps to hang onto while standing (80% Route 54 vs. 71% RR C)
- How early the bus runs in the morning (71% Route 54 vs. 64% RR C)
- Helpfulness of drivers in ensuring transfer connections (68% Route 54 vs. 53% RR C)
- How often the bus runs in the evening/night (59% Route 54 vs. 45% RR C)
- Transfer information at the waiting area (59% Route 54 vs. 45% RR C)

Route 55 riders gave significantly higher satisfaction ratings than C Line riders for the following service elements:

- Personal safety while on the bus (89% Route 55 vs. 81% RR C)
- Behavior of other passengers on the bus (80% Route 55 vs. 68% RR C)
- Personal safety while waiting for the bus during the day (85% Route 55 vs. 79% RR C)
- Behavior of other people at the waiting area (60% Route 55 vs. 50% RR C)
- Convenience of bus stop to home/start of trip (81% Route 55 vs. 67% RR C)
- Being able to get a seat (73% Route 55 vs. 46% RR C)
- Helpfulness of drivers in ensuring transfer connections (64% Route 55 vs. 53% RR C)

Route 40 – 85th to downtown (after) vs. Route 17 local (before) and Route 18 local (before)

Riders' ratings of overall satisfaction on the Route 40 (78%) were significantly lower than riders' ratings on the Route 17 local (83%), but not significantly different than riders' ratings on the Route 18 local.

Route 40 riders gave significantly higher satisfaction ratings than Route 17 local and Route 18 local riders for the following service elements:

- Personal safety while waiting for the bus during the day (89% Route 40 vs. 83% Route 18)
- Behavior of other people at the waiting area (69% Route 40 vs. 57% Route 18)
- Cleanliness of bus interior (84% Route 40 vs. 71% Route 18)
- Bus if free of graffiti (83% Route 40 vs. 75% Route 18)
- How often the bus run during peak hours (68% Route 40 vs. 60% Route 17)

Route 17 local riders gave significantly higher satisfaction ratings than Route 40 riders for the following service elements:

- How long the bus trip takes (76% Route 17 vs. 65% Route 40)
- Personal safety while on the bus (93% Route 17 vs. 86% Route 40)
- Behavior of other passengers on the bus (85% Route 17 vs. 74% Route 40)
- Being able to sit down while waiting (49% Route 17 vs. 40% Route 40)
- Cleanliness of waiting area (66% Route 17 vs. 60% Route 40)
- Convenience of bus stop to home/start of trip (85% Route 17 vs. 80% Route 40)
- Enough bike rack capacity (58% Route 17 vs. 44% Route 40)
- The bus not leaving the stop early (70% Route 17 vs. 65% Route 40)
- How early the bus runs in the morning (67% Route 17 vs. 60% Route 40)
- The number of transfers I make (74% Route 17 vs. 60% Route 40)

Route 18 local riders gave significantly higher satisfaction ratings than Route 40 riders for the following service elements:

- Being able to sit down while waiting (55% Route 18 vs. 40% Route 40)
- Being able to get a seat (78% vs. 64%)
- Enough bike rack capacity (60% vs. 44%)
- How early the bus runs on weekends (66% vs. 60%)
- The number of transfers I make (71% vs. 60%)
- How often the bus runs in the evening/night (53% vs. 40%)
- Transfer information at the waiting area (53% vs. 40%)

Route 40 (after) – 85th to Northgate vs. Route 75 (before)

Riders' ratings of overall satisfaction on the Route 40 (75%) were not significantly different than riders' ratings on the Route 75 (77%).

Route 40 (85th to Northgate) riders gave significantly higher satisfaction ratings than Route 75 riders for the following service element:

- Having information about routes/connections (56% vs. 50%)

Route 75 riders gave significantly higher satisfaction ratings than Route 40 riders for the following service elements:

- How long my bus trip takes (76% Route 75 vs. 69% Route 40)
- Personal safety while on the bus (89% vs. 83%)
- Behavior of other passengers on the bus (77% vs. 68%)
- Personal safety while waiting for the bus during the day (87% vs. 82%)
- Personal safety while waiting for the bus at night (62% vs. 55%)
- Behavior of other people at the waiting area (71% vs. 62%)
- Cleanliness of waiting area (62% vs. 51%)
- Being able to see an oncoming bus (83% vs. 78%)
- Being able to get a seat (78% vs. 72%)
- Enough bike rack capacity (67% vs. 49%)
- How often the bus runs during midday (74% vs. 63%)

Route 21 local (before) vs. Route 21 local (after)

Riders on Route 21 local after the service change were significantly more satisfied after (84%) than before (69%) the service change.

Riders on Route 21 local after the service change gave significantly higher satisfaction ratings than Route 21 local riders before the service change for the following service elements:

- How long the bus trip takes (78% vs. 57%)
- Number of stops my bus makes (68% vs. 60%)
- Protection from the weather (52% vs. 44%)

- The bus not leaving the stop early (69% vs. 62%)
- The bus not leaving the stop late (61% vs. 48%)
- The bus getting me where I'm going on time (73% vs. 57%)
- How often the bus runs during peak hours (74% vs. 61%)
- How often the bus runs during midday hours (64% vs. 55%)
- How often the bus runs in the evening/night (53% vs. 42%)
- The way buses scheduled to make transfer connections (58% vs. 45%)
- Waiting time between transfers (54% vs. 39%)
- The bus coming on time when transferring (56% vs. 45%)

Riders on Route 21 before the service change riders gave significantly higher satisfaction ratings than Route 21 riders after the service change for the following service elements:

- Personal safety while on the bus (86% Route 21 pre vs. 79% Route 21 post)
- Behavior of other passengers on the bus (73% vs. 64%)
- Personal safety while waiting for the bus at night (52% vs. 45%)
- Convenience of bus stop to home/start of trip (83% vs. 78%)
- Being able to get a seat (86% vs. 80%)
- Enough bike rack capacity (61% vs. 46%)

Route 120 (before) vs. Route 120 (after)

There was no significant difference in the overall satisfaction ratings given by riders on Route 120 before or after the service change.

Riders on Route 120 after the service change were significantly more satisfied with:

- Amount of lighting (58% Route 120 post vs. 52% Route 120 pre)
- Cleanliness of bus interior (67% vs. 61%)

Riders on Route 120 after the service change were significantly less satisfied with:

- Enough bike rack capacity (63% Route 120 pre vs. 51% Route 120 post)
- Transfer information at the waiting area (59% vs. 42%)

Routes 131, 132 and 166

The results for Routes 131, 132 and 166 provided below include ratings on overall satisfaction as well as the service elements with the three highest and three lowest satisfaction ratings.

Route 131:

- Overall satisfaction with route: 79%
- Having three doors for loading/unloading: 89%
- Amount of lighting inside the bus: 88%

- Personal safety on the bus: 86%
- How often the bus runs in the evening/night: 44%
- How often the bus runs in the evening/night when transferring: 44%
- How often the bus runs on weekends: 45%

Route 132:

- Overall satisfaction with route: 75%
- Amount of lighting inside the bus: 84%
- Personal safety while waiting for the bus during the day: 79%
- Wide enough doors and aisles for loading/unloading: 79%
- How often the bus runs in the evening/night when transferring: 41%
- How often the bus runs on weekends: 42%
- How often the bus runs in the evening/night: 42%

Route 166:

- Overall satisfaction with route: 73%
- Amount of lighting inside the bus: 83%
- Enough bars/straps to hang onto while standing: 79%
- Being able to see an oncoming bus: 78%
- How often the bus runs on weekends: 43%
- Protection from the weather: 44%
- How often the bus runs in the evening/night: 47%