

TRANSIT SPEED & RELIABILITY

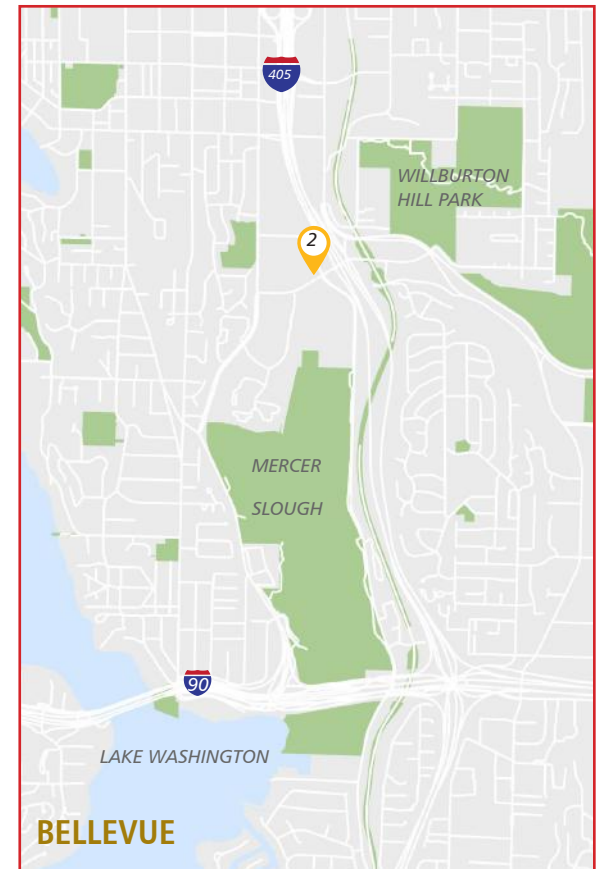
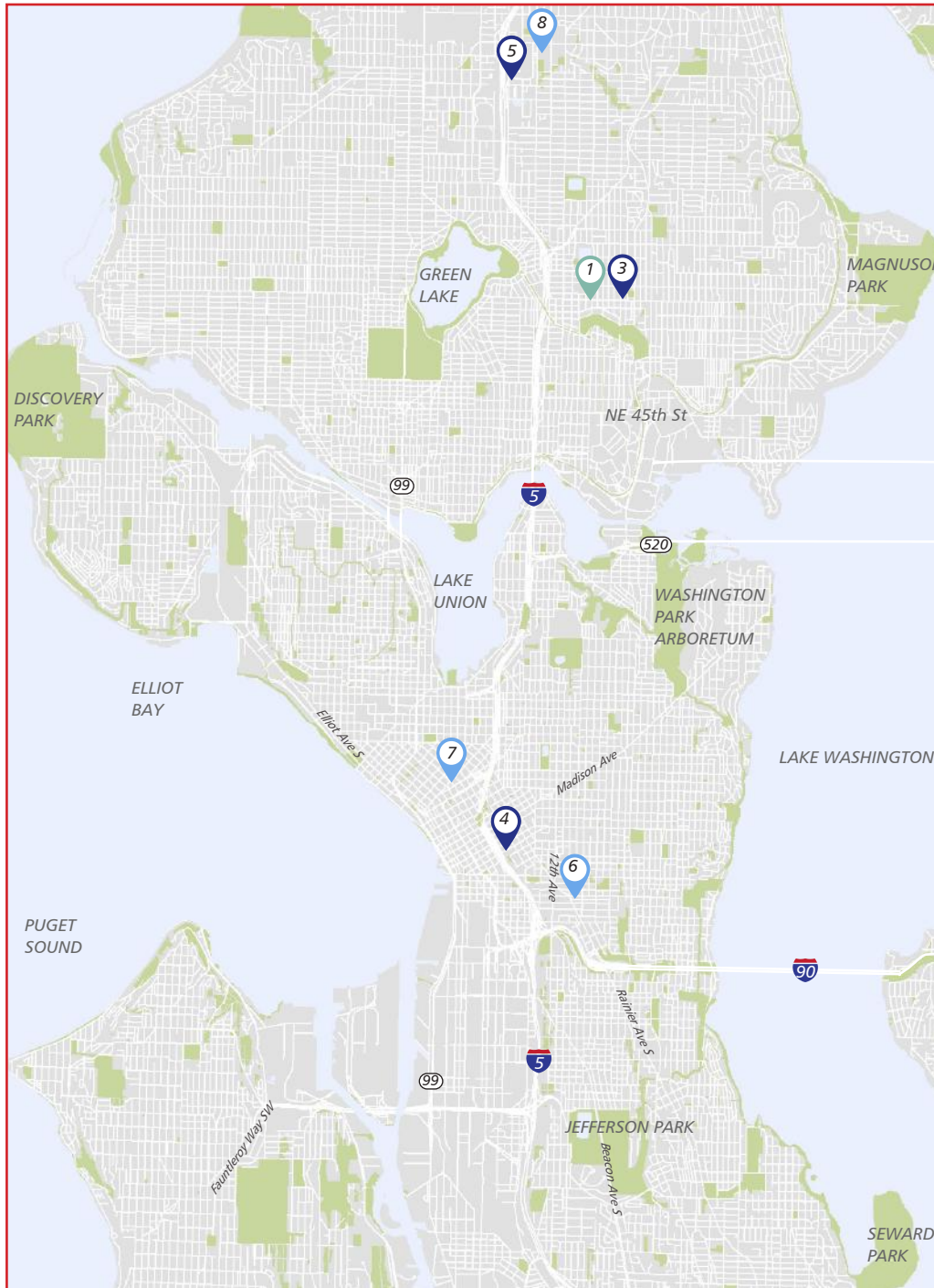
2022 ANNUAL SPOT IMPROVEMENTS END OF YEAR REPORT

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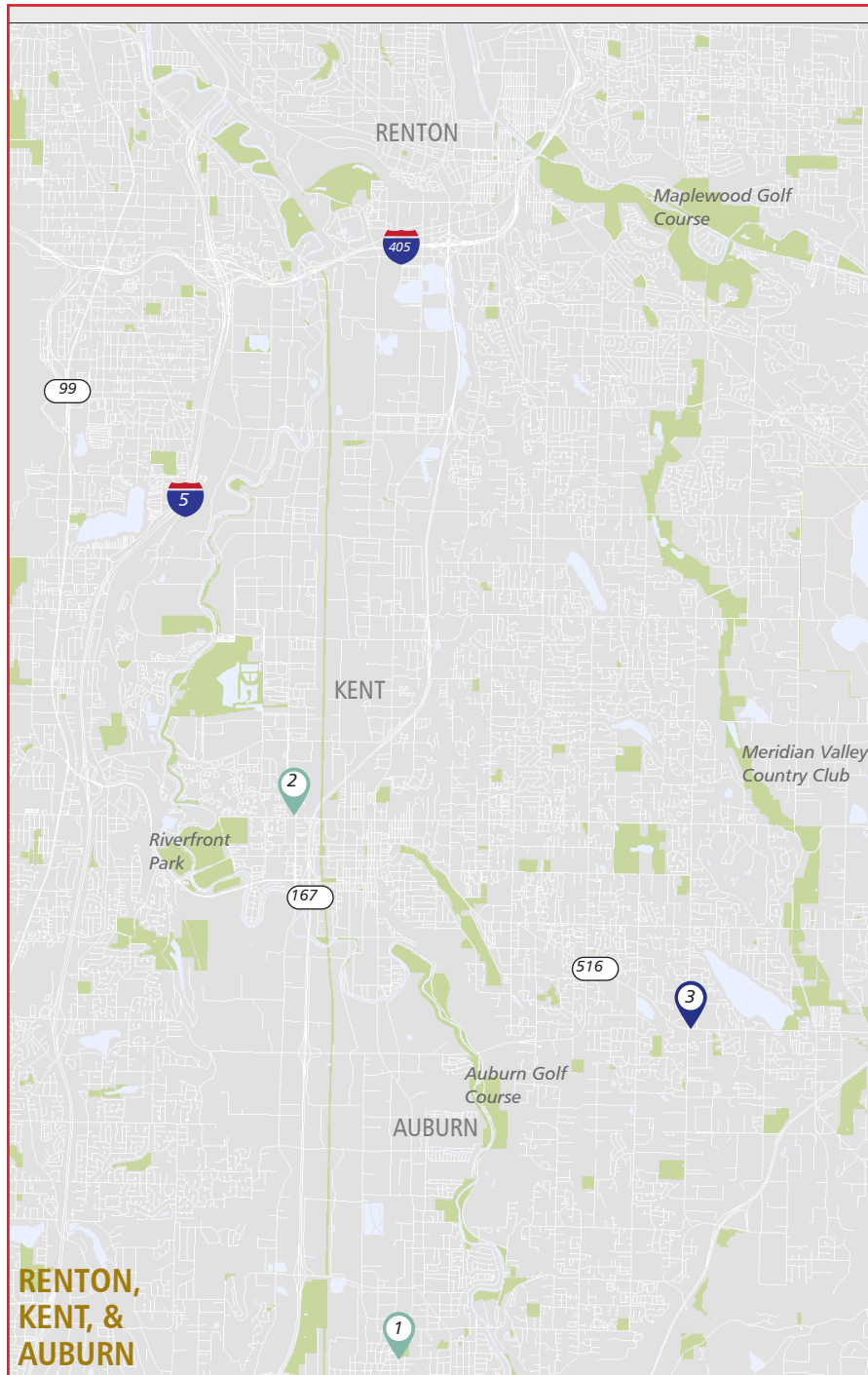
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- 8. NORTHGATE AREA SIGNAL RETIMING



- Street and Intersection Design Improvement
- Bus Stops and Routing Improvement
- Traffic Regulations Improvement
- Signals Improvement



1. 3RD STREET SW / S DIVISION STREET
2. W JAMES STREET / WASHINGTON AVENUE N
3. SE KENT-KANGLEY ROAD / 132ND AVENUE SE

- Street and Intersection Design Improvement
- Bus Stops and Routing Improvement
- Traffic Regulations Improvement
- Signals Improvement

**RENTON,
KENT, &
AUBURN**

INTRODUCTION

This annual report describes the spot improvements that were implemented in 2022 through partnerships with local traffic agencies. Spot improvements are low-cost capital investments aimed at improving bottleneck conditions and operational issues that affect bus travel times and reliability, which results in increased attraction to public transit as a travel mode of choice. Spot improvement projects are pursued to improve existing transit service or to support planned service restructures. The complexity of spot improvements can range from less complex projects, such as traffic signal timing adjustments, to more-complicated projects requiring design and public outreach, such as new bus-only lanes.

The Spot Improvement Program supports King County Metro Mobility Framework policy recommendations to implement investments that increase speed, reliability, and safety. Spot improvement projects utilize a set of transit supportive toolboxes identified in Metro's 2021 Transit Speed & Reliability Guidelines and Strategies. Examples of these transit supportive strategies are shown in the Speed and Reliability Toolbox Table (Page 2), and the improvements featured in this report are grouped by strategy type.

In 2022, Metro completed several projects related to the Renton, Kent, and Auburn Mobility Project (RKAAMP) that went into effect in Fall 2020 as well as North Link Connections restructure in Fall 2021; these were the higher-complexity projects that required additional time to complete. In 2022, we began planning for projects to support the upcoming East, Lynnwood, and Federal Way Link Connections restructures.

The success of each implementation was made possible with the support of cities and their willingness to make operational changes to roadway infrastructure and traffic signal systems to benefit transit riders. In addition, several projects completed this year were made possible through funding by a WSDOT Regional Mobility Grant. For additional information regarding this program, please contact Owen Kehoe at 206-477-5811/owen.kehoe@kingcounty.gov.

Spot Improvement program 2022 expenditures: \$154,313 in transit priority investments, and \$294,835 in service restructure improvements, totalling \$449,148 invested in 2022. This includes Metro staff time and reimbursed city costs to develop conceptual designs, develop final designs (when needed), construct these improvements, as well as administer the spot improvement program as a whole.

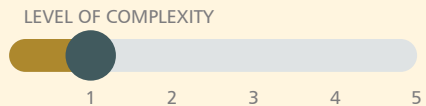
The **11** Spot improvement projects highlighted in this report benefited:

- » **52,000 Weekday Riders**
- » **39 Bus Routes**

Resulting in:

- » **\$325,184 in avoided additional operating cost annually; operating dollars that would otherwise need to be spent maintaining schedule reliability each year.**
- » **Improved bus operational safety at 4 locations throughout King County in 2022.**

Spot improvements can range in complexity depending on the level of jurisdictional coordination, public outreach, design work, and funding sources needed. The complexity of the projects presented in this report are rated on a 1-5 scale, a "1" being the least complex project, for example a signal timing adjustment, to "5" for the most complicated of the projects, such as new bus-only lanes.



RESTRUCTURE



GRANT FUNDED

SPEED AND RELIABILITY TOOLBOX TABLE

CHALLENGES														COST	COORDINATION
INTERSECTION	ROADWAY	FREWAY ON-RAMP	SIGNAL	RIGHT TURN	LEFT TURN	OTHER, TRAFFIC RELATED	INEFFICIENT ROUTE DESIGN	LEAVING BUS STOP	DWELL TIME	BUS ZONE CAPACITY	PEDESTRIANS	CYCLISTS	MOTORISTS		
CONGESTION			DELAY				OPERATIONS				SAFETY				

\$: UNDER \$50,000
 \$\$: \$50,000-\$100,000
 \$\$\$: \$100,000-\$250,000
 \$\$\$\$: OVER \$250,000

STRATEGY



A. Street and Intersection Design

Dedicated Bus Lane	♦♦♦	♦♦♦		♦♦♦	♦♦♦	♦♦♦		♦♦	♦♦	♦♦♦	♦♦		♦	♦♦	\$ - \$\$\$	High
Queue Bypass (Short Bus Lane)	♦♦♦	♦♦	♦♦		♦♦	♦♦	♦♦	♦♦	♦♦				♦	♦	\$ - \$\$\$	High
Roadway Channelization	♦			♦	♦♦	♦♦		♦	♦				♦	♦	\$	Low/Medium
Turn Radius Improvements		♦			♦♦	♦♦									\$\$\$	Medium
Speed Hump Modifications							♦♦								\$ - \$	Low



B. Bus Stops and Routing

Bus Stop Location	♦			♦				♦	♦♦	♦	♦	♦♦	♦♦		\$\$ - \$\$\$	Medium
Route Design	♦	♦		♦				♦♦♦	♦	♦	♦				\$\$	High
Bus Stop Lengthening									♦	♦♦	♦♦♦				\$\$	High
Bus Bulbs									♦	♦♦	♦♦				\$\$ - \$\$\$	High
Boarding Islands									♦	♦♦	♦♦		♦♦		\$\$ - \$\$\$	High



C. Traffic Regulations

Turn Restrictions/Exemptions	♦			♦	♦♦	♦♦	♦	♦	♦				♦	♦	♦	\$	Low
Parking Removal/ Alterations		♦♦							♦♦							\$	Low



D. Signals

Passive Traffic Signal Retiming	♦♦	♦		♦♦	♦	♦		♦♦					♦	♦	♦	\$ - \$	Low
Transit Signal Priority (Active)	♦♦♦			♦♦♦	♦♦♦	♦♦♦	♦♦♦	♦♦♦								\$ - \$	Low
Signal Phase Modification	♦♦	♦		♦	♦		♦♦						♦			\$ - \$\$\$	Low-Medium
New Signal Installation	♦♦	♦		♦	♦		♦♦						♦			\$ - \$\$\$	Low-Medium
Queue Jumps	♦♦♦	♦♦	♦♦		♦♦	♦♦		♦♦	♦♦				♦	♦		\$ - \$\$\$	Medium

Benefits: ♦ LOW ♦♦ MEDIUM ♦♦♦ HIGH

2022 SPOT IMPROVEMENTS



15TH AVENUE NE / NE 65TH STREET, SEATTLE



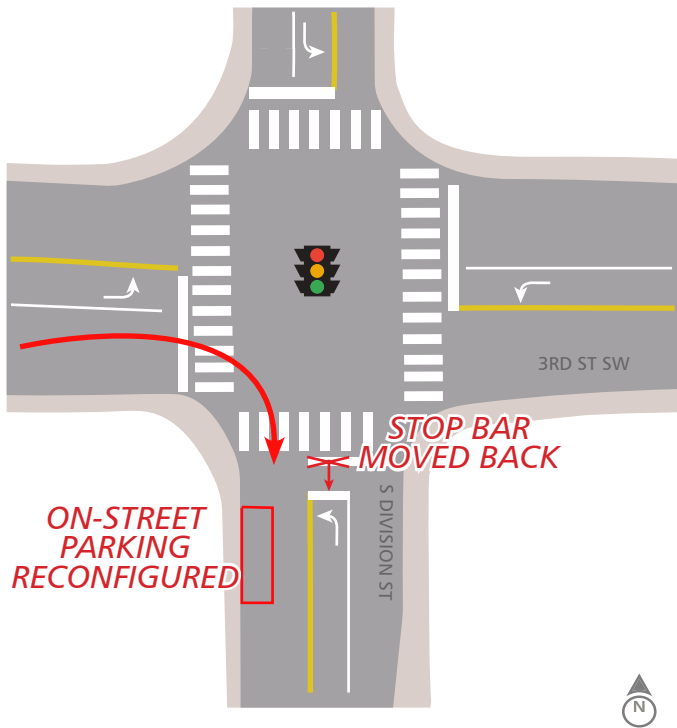
3RD STREET SW / S DIVISION STREET, AUBURN



RAINIER AVENUE S / S JACKSON STREET, SEATTLE



OLIVE WAY / 8TH AVENUE, SEATTLE



3RD STREET SW / S DIVISION STREET

ISSUE

The eastbound right turn at Division St and 3rd St SW was a tight turn and difficult for operators due to the narrow receiving lane and on-street parking located on Division St.

IMPROVEMENTS MADE



As part of the recent Renton, Kent, and Auburn service restructure (RKAAMP), an improvement for this turn was identified. The stop bar for the northbound left turn lane was pulled back and the on-street parking on the west side of division street was moved southbound. These adjustments provide more space for coaches to safely complete the turn.

PROJECT i



AUBURN

METRO ROUTES IMPACTED: 181, 917, ST 578

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Cecile Malik, James Webb (Auburn)

BUS DELAY IMPROVEMENTS



2 SEC

DELAY REDUCED ON AVERAGE PER TRIP BETWEEN JUNE 2022 AND AUGUST 2022



The improvement also provides enhanced safety for buses making turns at the intersection, pedestrian crossing enhancements, and reliability benefits during congested periods.

SAFETY



This improvement allows buses to safely make right turns without fear of coach/vehicle collisions due to the new stop bar placement and adjusted parking.

ROUTE BENEFIT



6 BUSES/HR

TRANSIT BENEFITS

DAILY PASSENGER BENEFIT (= 1000 PERSONS)



2000 RIDERS

2 W JAMES STREET / WASHINGTON AVENUE N



ISSUE

Buses traveling westbound through this intersection have a far-side bus stop located in a pullout. The intersection also was configured to allow westbound right turns from either the curb lane or the center lane (dual right turn lanes); this lane configuration required buses to move over into the pullout within the intersection. Buses also were delayed by the heavy westbound right turning traffic that occurred during the AM peak, and delayed by heavy westbound through traffic other times of the day.

IMPROVEMENTS MADE

STREET AND INTERSECTION DESIGN

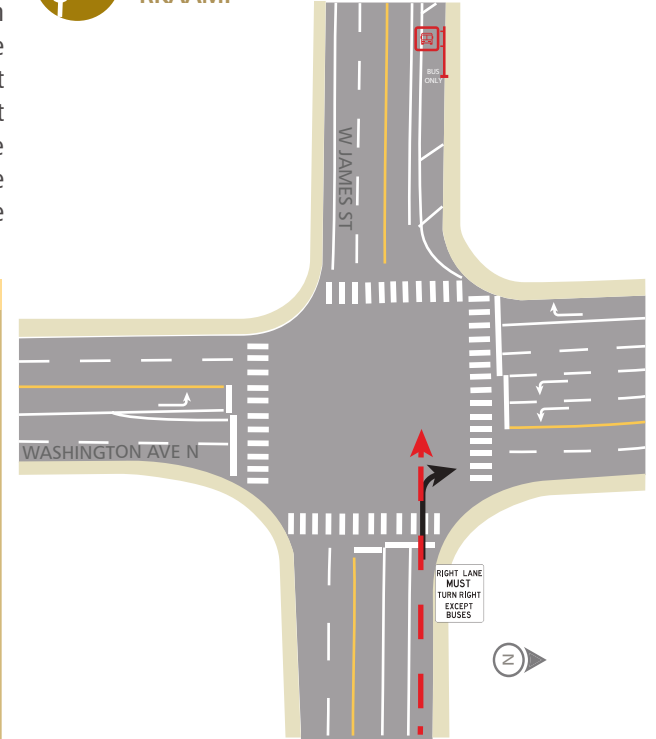
As part of the Renton, Kent, and Auburn (RKAAMP) service restructure, Metro partnered with the City of Kent to design and install a modification to the westbound approach to the intersection. The revised configuration provides a single right turn lane with buses allowed to make a through movement from that lane. The right turn lane allows buses to move directly into the pullout without weaving through the intersection. During periods of heavy traffic, buses can use the center lane to bypass right turn queues.



GRANT FUNDED
WSDOT REGIONAL MOBILITY GRANT



RESTRUCTURE
RKAAMP



PROJECT



METRO ROUTES IMPACTED: 150, 162, 183

PROJECT PARTNERS



ACKNOWLEDGEMENTS
Rob Brown (Kent), Kale Chang Yuen (Metro)



TRANSIT BENEFITS

BUS DELAY IMPROVEMENTS



6 SEC

DELAY REDUCED ON AVERAGE PER TRIP IN THE PM PEAK BETWEEN AUGUST 2022 AND OCTOBER 2022



The improvement also provides enhanced safety for buses making turns at the intersection, pedestrian crossing enhancements, and reliability benefits during congested periods.

ROUTE BENEFIT



12 BUSES/HR

DAILY PASSENGER BENEFIT (1 person icon = 1000 PERSONS)



3350 RIDERS

RESTRUCTURE NORTH LINK CONNECTIONS

15TH AVENUE NE / NE 65TH STREET

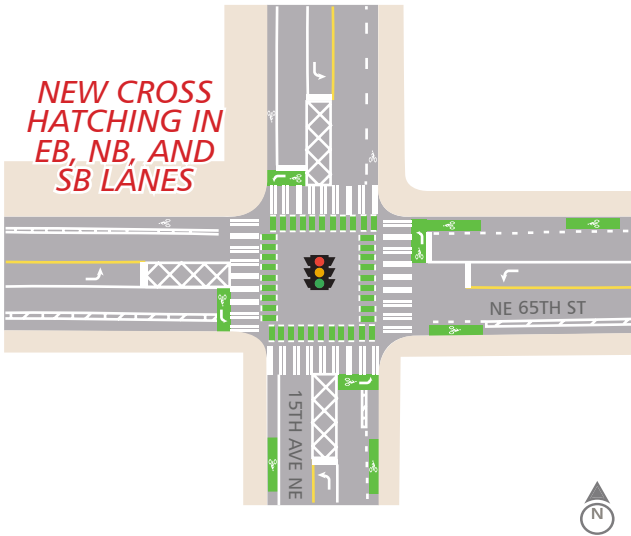
ISSUE

As part of the Northgate Link Connections service restructure, the Route 45 pathway was modified to travel on 15th Avenue NE north of University Way, and the new Route 79 was established. These new pathways required right turns at the intersection of NE 65th St and 15th Ave NE (Route 45 makes an EB right turn, Route 79 makes a SB right turn). These right turns were geometrically constrained and would become more so with new bike lanes SDOT was planning.

IMPROVEMENTS MADE

STREET AND INTERSECTION DESIGN

Metro partnered with SDOT to incorporate set-back stop bars on some of the left turn lanes to provide more space for coaches making right turns. Since the amount of required set-back was large, cross-hatching was added to improve motorist compliance. These improvements were implemented as part of SDOT's 15th Ave NE paving project, with a financial contribution from Metro to cover the additional cost.



PROJECT i

SEATTLE

METRO ROUTES IMPACTED: **45, 79**

PROJECT PARTNERS

ACKNOWLEDGEMENTS

Jonathan Dong (SDOT), Brian Glas (SDOT)

TRANSIT BENEFITS

<p>BUS DELAY IMPROVEMENTS</p> <p>7 SEC</p> <p>DELAY REDUCED ON AVERAGE PER TRIP IN THE PM PEAK BETWEEN JULY 2022 AND JANUARY 2023</p>	<p>SAFETY</p> <p>This improvement allows buses to safely make left turns without fear of coach/vehicle collisions due to the new stop bar placement and cross-hatching installed in the roadway.</p>	<p>ROUTE BENEFIT</p> <p>9 BUSES/HR</p>	<p>DAILY PASSENGER BENEFIT (1 person icon = 1000 PERSONS)</p> <p>5,800 RIDERS</p>
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ISSUE

Eastbound buses were delayed both entering and exiting the bus stop due to southbound general-purpose vehicles turning right to I-405 ramp. Also, sometimes while servicing this stop vehicles went around the coach making it challenging to go when the coach was done servicing the stop. In addition, the distance between the bus zones #70820 and #70822 fell below Metro's standard of 0.25 miles and caused an additional delay for the coaches.

IMPROVEMENTS MADE



BUS STOPS AND SPACING

The bus stop was removed according to Metro's procedures, with posting Rider Alert and gathering information from operations, Transit Route Facilities and others.

PROJECT



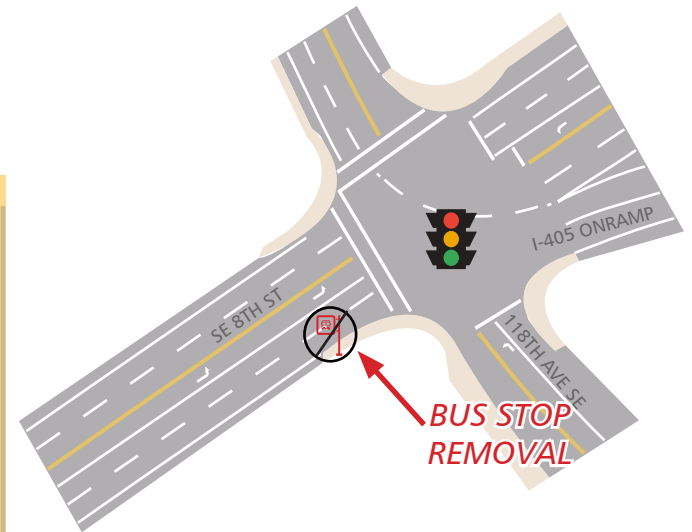
METRO ROUTES IMPACTED: **240, 246, 342**

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Liz Gotterer (King County Metro)



TRANSIT BENEFITS

BUS DELAY IMPROVEMENTS



13 SEC

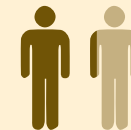
DELAY REDUCED ON AVERAGE PM PEAK TRIP BETWEEN DECEMBER 2021 AND FEBRUARY 2022

ROUTE BENEFIT



3 BUSES/HR

DAILY PASSENGER BENEFIT (1 person icon = 1000 PERSONS)



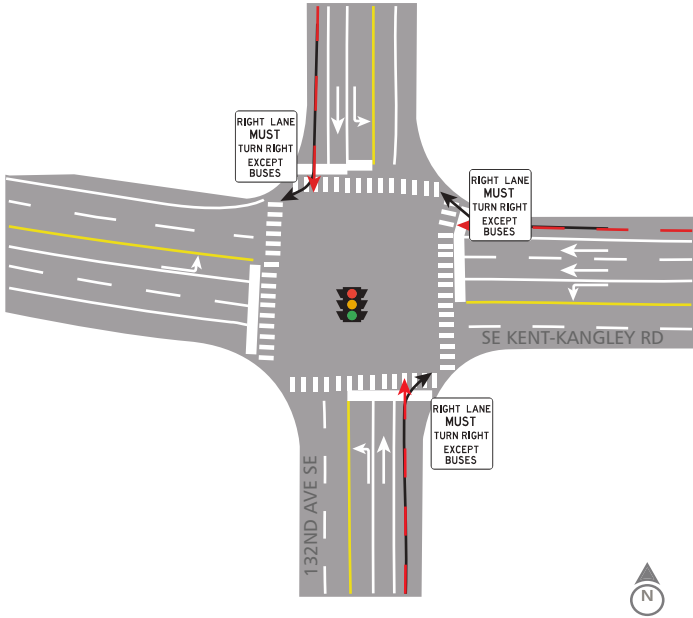
1,200 RIDERS



GRANT FUNDED
WSDOT REGIONAL MOBILITY GRANT



RESTRUCTURE
RKAAMP



ISSUE

Buses traveling WB, NB, and SB through this intersection have far-side bus stops located in pullouts. Although right turn lanes were provided at the intersection approaches and they aligned with the bus stop pullouts on the other side of the intersection, buses were not legally allowed to use the right turn lanes for a through movement. The through lanes were congested with general traffic, which delayed buses.

IMPROVEMENTS MADE



Signage in the WB, NB, and SB directions was modified to add RIGHT LANE MUST TURN RIGHT EXCEPT BUSES signs. Buses can now legally use the right turn lanes to access the far-side bus stop pullouts, which allows them to bypass traffic queues and align better to the curb at the bus stop. In the EB direction, there is a near-side bus stop and a future queue jump signal is planned.



PROJECT i

METRO ROUTES IMPACTED: 162, 165, 168

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Rob Brown (City of Kent), Kale Chang Yuen (Metro)

BUS DELAY IMPROVEMENTS



14 SEC

DELAY REDUCED FOR WB AM TRIPS BETWEEN APRIL 2022 AND JULY 2022

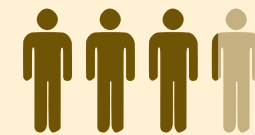
ROUTE BENEFIT



9 BUSES/HR

TRANSIT BENEFITS

DAILY PASSENGER BENEFIT (1 person icon = 1000 PERSONS)



3,130 RIDERS

6 25TH AVENUE NE / NE 65TH STREET

ISSUE

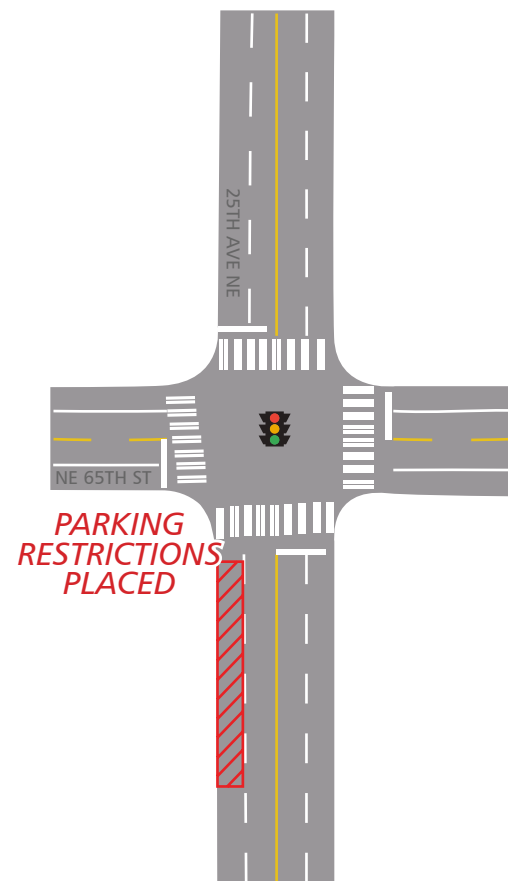
The intersection of 25th Ave NE and NE 65th St had been identified as a location with high bus delay due to a bottleneck at the intersection. In 2021, parking restrictions were added in the southbound direction of 25th Ave NE, north of NE 65th St. Although these parking restrictions successfully reduced delay for southbound buses, operators reported difficulty merging into the left lane south of NE 65th St where parking was still allowed during off-peak periods.

IMPROVEMENTS MADE



TRAFFIC REGULATIONS

Metro and SDOT worked together to install additional 24/7 parking restrictions on the southbound side of 25th Ave NE, south of NE 65th St. Outreach and negotiation with the adjacent property owners was required before determining the exact placement of the new parking signage. The additional parking restrictions provide an area for buses to merge from the curb lane to the left lane after passing through the intersection.



PROJECT



METRO ROUTES IMPACTED: 372

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Jonathan Dong, Fred Perez(SDOT)



SEATTLE SEATTLE

TRANSIT BENEFITS

BUS DELAY IMPROVEMENTS



10 SEC

DELAY REDUCED ON AVERAGE PER TRIP IN THE AM AND PM PEAK BETWEEN MARCH 2022 AND JULY 2022

The improvement also provides reliability benefits during congested periods.

ROUTE BENEFIT



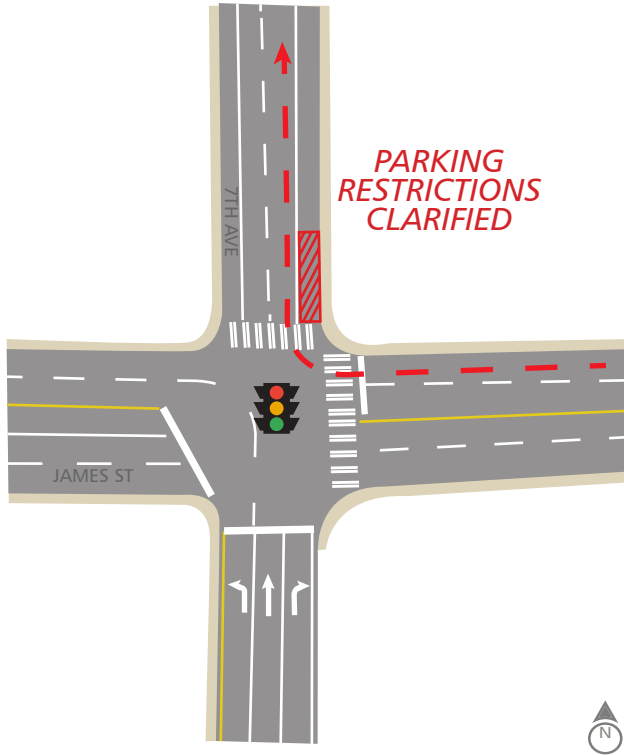
6 BUSES/HR

DAILY PASSENGER BENEFIT (1 person icon = 1000 PERSONS)



3,700 RIDERS

7TH AVENUE / JAMES STREET



ISSUE

The right turn from westbound James St to northbound 7th Ave is a frequently used deadhead route for buses to get to northbound I-5. Despite the presence of a fire hydrant, vehicles were frequently parking close to the corner, constraining the turn and requiring operators to split lanes as they approached the turn. Although parking was not allowed near the corner due to the adjacent fire hydrant and crosswalk, it was not clearly marked as a restricted parking zone.

IMPROVEMENTS MADE

TRAFFIC REGULATIONS

SDOT installed a new NO STOPS sign and red curb paint to clearly mark the restricted parking zone.

PROJECT



 SEATTLE

METRO ROUTES IMPACTED: **DEADHEAD ROUTING**

PROJECT PARTNERS



ACKNOWLEDGEMENTS
Fred Perez (SDOT)

TRANSIT BENEFITS

SAFETY



Vehicles will no longer be parked in a location that impedes operators' ability to make the right turn onto 7th Ave. This reduces the potential for coaches to collide with parked vehicles

ROUTE BENEFIT



DEADHEAD ROUTING ONLY

8 NORTHGATE LAYOVER FACILITY

LEVEL OF COMPLEXITY



RESTRUCTURE
NORTH LINK CONNECTIONS

ISSUE

Service Quality supervisors observed that there were frequent violators of the bus-only layover facility, including private vehicles using the roadway for pick-up/drop-off for the adjacent transit center. Violator vehicles would often drive in the wrong direction due to the unusual left-side configuration of the roadway. The bus-only signage near the south entrance on N 100th St was unclear and obstructed.

IMPROVEMENTS MADE



The City of Seattle evaluated the existing signage and determined that modifications were required. New signage indicating that the roadway is bus-only was installed and the existing signs were rotated for better visibility.

PROJECT



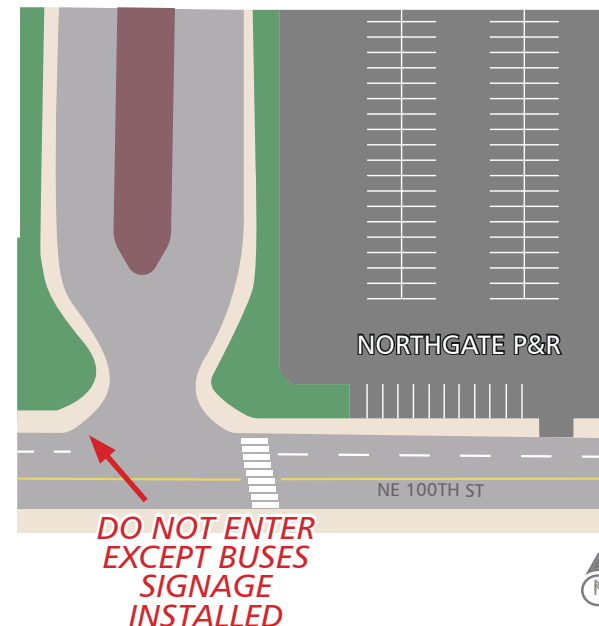
METRO ROUTES IMPACTED: **DEADHEAD ROUTES AND LAYOVERS**

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Jonathan Dong (SDOT)



TRANSIT BENEFITS

SAFETY



New signage gives general purpose traffic information that the Northgate Layover Facility (formerly Northgate Transit Center) is not a location for private automobiles. This will ensure that only transit vehicles enter the layover facility, and reduces the potential for coach/vehicle collisions.

ROUTE BENEFIT



DEADHEAD ROUTING ONLY

RAINIER AVENUE S / S JACKSON STREET

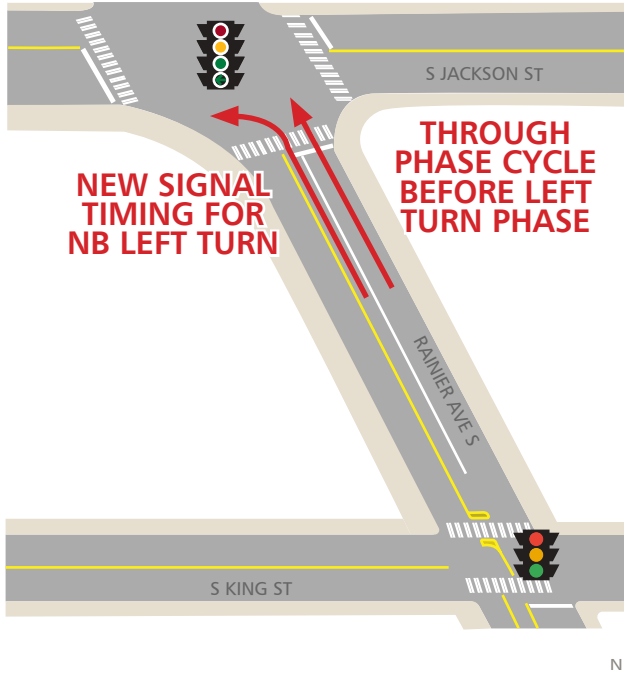
ISSUE

A new traffic signal and center concrete median were recently installed at Rainier Ave S & S King Street by SDOT. This median unfortunately restricted the ability for northbound buses to enter the left turn pocket to turn left onto S Jackson St. Due to the signal timing sequence in use, buses often were unable to enter the turn pocket during the left turn phase due to queued traffic, and would have to wait through an additional signal cycle to get through the intersection.

IMPROVEMENTS MADE

TRAFFIC SIGNALS

Metro worked with SDOT to develop different timing sequences to improve the chances of northbound buses to get through the intersection in one cycle. SDOT implemented new timings during an area-wide signal optimization project. Under the new sequence, the northbound left turn phase starts at the end of the northbound through phase. This provides an opportunity for buses to move into the turn pocket just before the left turn phase is serviced.



PROJECT i



SEATTLE

METRO ROUTES IMPACTED: 7, 9, 106

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Laura Wojcicki (SDOT)



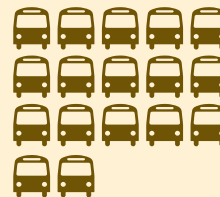
BUS DELAY IMPROVEMENTS



17 SEC

DELAY REDUCED AVERAGE PER TRIP IN THE AM PEAK PERIOD BETWEEN JANUARY 2022 AND FEBRUARY 2022

ROUTE BENEFIT



17 BUSES/HR

TRANSIT BENEFITS

DAILY PASSENGER BENEFIT (= 1000 PERSONS)



8,800 RIDERS

10 OLIVE WAY / 8TH AVENUE



ISSUE

Operators reported the queue jump at Olive Way and 8th Ave was not working in the morning. It was determined that the queue jump had been disabled during the AM peak since Route 545 continues to Capitol Hill during those hours and would not normally need to use the queue jump to merge left. However, the ongoing Convention Center expansion project had closed the curb lane on the far side of 8th Ave for construction staging. Under that condition, the queue jump would be useful at all hours.

IMPROVEMENTS MADE

TRAFFIC SIGNALS

Since the Convention Center expansion project is a long-term project, SDOT adjusted the queue jump configuration so that it is in operation all day. The queue jump now helps all coaches get around the long-term curb lane closure. The queue jump operation may be re-evaluated once the Convention Center expansion project is complete.

PROJECT



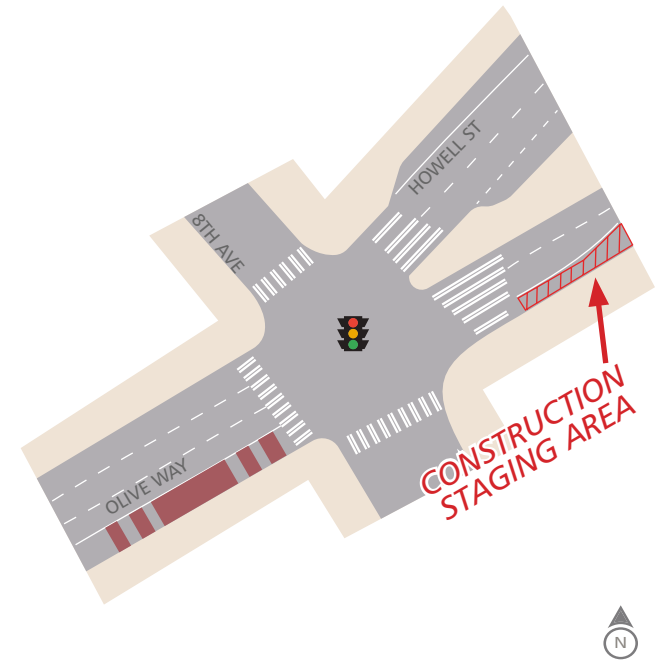
METRO ROUTES IMPACTED: **ST 545**

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Laura Wojcicki (SDOT)



TRANSIT BENEFITS

BUS DELAY IMPROVEMENTS



32 SEC

DELAY REDUCED ON AVERAGE PER TRIP IN THE AM PEAK BETWEEN MAY 2022 AND JUNE 2022

ROUTE BENEFIT



10 BUSES/HR

DAILY PASSENGER BENEFIT (1 person icon = 1000 PERSONS)



3119 RIDERS

NORTHGATE AREA SIGNAL RETIMING

RESTRUCTURE NORTHGATE



ISSUE

As part of the Northgate Link Connections service restructure, bus route in the Northgate area were significantly modified and the total number of buses operating through the area was greatly increased. Traffic signals are a significant source of delay to buses travelling through the Northgate area, and it had been many years since the signals had been retimed.

IMPROVEMENTS MADE

TRAFFIC SIGNALS

To support the Northgate Link Connections restructure, Metro provided funding to SDOT to optimize and re-time nine signals in the Northgate area, including 1st Ave NE, 5th Ave NE, NE 100th St, NE 103rd St, and Northgate Way. The new signal timings help reduce signal delay for 19 different bus routes operated by King County Metro, Sound Transit, and Community Transit.

PROJECT *i*



SEATTLE

METRO, COMMUNITY TRANSIT, AND SOUND TRANSIT ROUTES IMPACTED: **20, 40, 67, 75, 301, 302, 303, 304, 320, 345, 346, 347, 348, ST 511, ST 512, ST 513, CT 810, CT 821, CT 860**

PROJECT PARTNERS



ACKNOWLEDGEMENTS

Laura Wojcicki, Andrew Natzel, Jonathan Dong (SDOT)

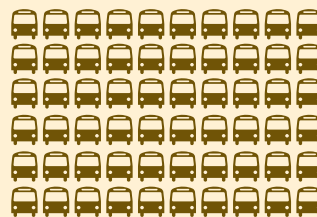
BUS DELAY IMPROVEMENTS



15 SEC

DELAY REDUCED ON AVERAGE PER TRIP IN THE PM PEAK BETWEEN NOV 2020 AND NOV 2021

ROUTE BENEFIT



60 BUSES/HR

TRANSIT BENEFITS

DAILY PASSENGER BENEFIT (1 person icon = 1000 PERSONS)



20,000 RIDERS