



**Stride Bus Rapid Transit
South Renton Transit Center**

Additional Transportation Analysis Memorandum

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Prepared by the

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1. Introduction

This technical memorandum describes the additional traffic analysis prepared for the South Renton Transit Center (SRTC) and Roadway Improvements project, which would be used by the I-405 Bus Rapid Transit (BRT) service (Stride S1 Line) and other King County Metro Transit (Metro) bus routes.

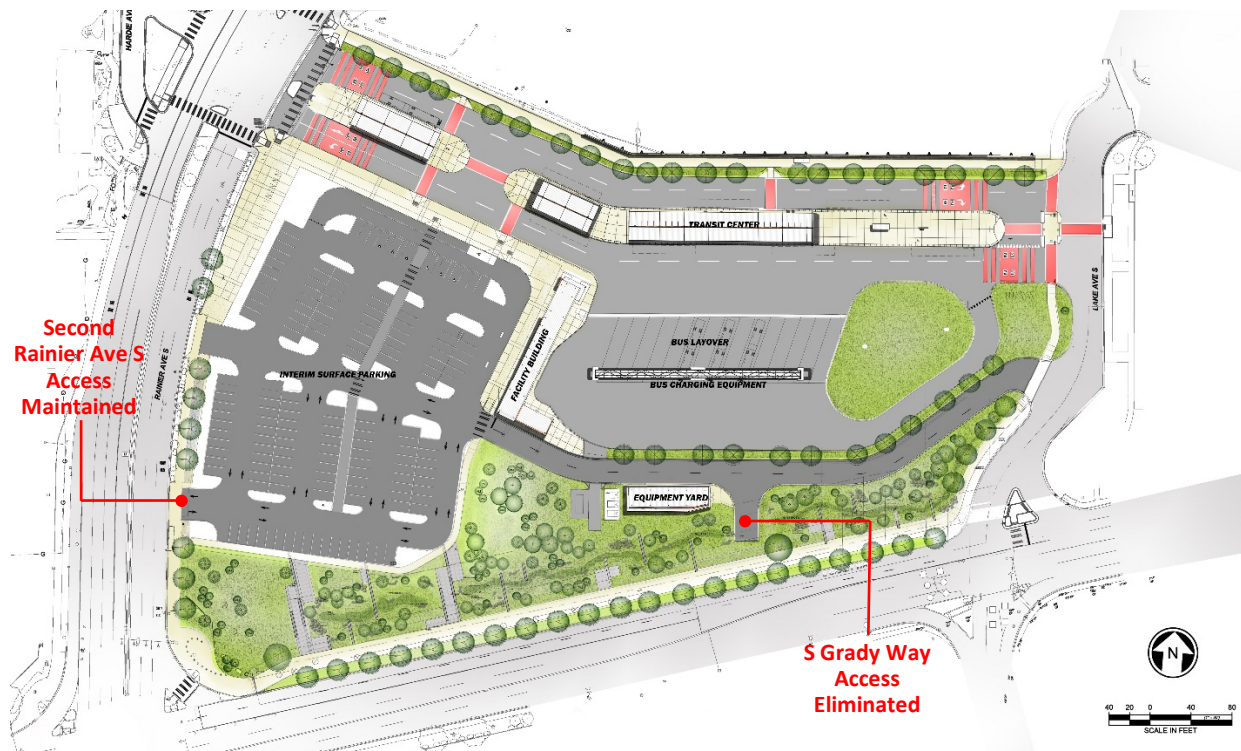
The transportation impacts of this project were evaluated in the *Bus Rapid Transit I-405 corridor Transportation Technical Report* (Sound Transit 2020a) and summarized in the State Environmental Policy Act (SEPA) documentation review for the project in September 2020 (Sound Transit 2020b). The project as described in the technical report and SEPA document included a new transit center facility, a new BRT station, a park-and-ride garage, and associated roadway improvements to provide access to the new SRTC and improve speed and reliability to the transit center for Stride S1 Line service. In addition to the SEPA analysis and documentation, an *Environmental Technical Memorandum for the South Renton Transit Center and Roadway Improvements Project* was prepared for review by the Federal Transit Administration under the National Environmental Policy Act (NEPA), completed in June 2022 (Sound Transit 2022a). The NEPA Environmental Technical Memorandum included Appendix A, *South Renton Transit Center Interim Parking Traffic and Analysis Summary* (Sound Transit 2022b), hereafter referred to as Interim Memorandum. The Interim Memorandum provided a traffic analysis to address the Sound Transit Board decision (Resolution (No. R2021-05) in August 2021 to delay the SRTC parking garage in response to budget shortfalls for the ST3 program.

The present memorandum analyzes design changes proposed since the previous transportation analyses were completed. These include the elimination of the proposed SRTC access road/driveway to S Grady Way between Rainier Avenue S and Lake Avenue S (refer to Figure 2-1); the preservation of a second driveway accessing Rainier Avenue S between S Grady Way and Hardie Avenue SW (refer to Figure 2-1); the conversion of the proposed bus-only, bus-on-shoulder lane on northbound Rainier Avenue S to a bus-only lane with adjacent shoulder (refer to Figure 3-1); the inclusion of a surface parking lot for transit center users; and the extension of the proposed cycle track along Lake Avenue S (refer to Figure 4-1). This memorandum addresses potential transportation impacts that may occur due to project design changes.

2. Traffic Operations

Several changes to the transit center site have been proposed. These changes include the elimination of the proposed driveway accessing S Grady Way between Rainier Avenue S and Lake Avenue S and the preservation of a second driveway accessing Rainier Avenue S between S Grady Way and Hardie Avenue SW (refer to Figure 2-1). The impacts of these changes in traffic operations are assessed using the City of Renton's intersection Level of Service (LOS) standards. The standard is LOS D for arterials and collectors and LOS E Mitigated for "City Center" arterials, including Rainier Avenue and Grady Way. Following the methodology that Sound Transit developed with the City of Renton for the traffic analysis in 2020, Sound Transit would provide proportionate mitigation if the project results in an additional average 15 seconds per vehicle or more of delay to a given intersection or corridor that is projected to exceed the established standard under the No Build conditions. The impacts of the project changes on traffic operations are discussed below.

Figure 2-1. Proposed South Renton Transit Center Access Changes



2.1 Addition of S Rainier Avenue Driveway

No driveways along Rainier Avenue S were studied in the previous transportation analyses. Both the original and second proposed driveways are right-in-right-out. Any vehicles waiting to exit the transit center using these driveways are unlikely to experience delay, as the close proximity of the traffic signal will result in gaps in the northbound traffic flow. Furthermore, the addition of a second driveway will result in less delay as compared to a single driveway, because traffic volumes exiting the site will be divided between two driveways.

2.2 Removal of S Grady Way Driveway

The removal of the access road/driveway to S Grady Way would result in vehicles being re-routed to other access points. To analyze the effects of this change, the Synchro traffic models developed for the Interim Memorandum (Sound Transit 2022b) were obtained and updated to reflect the removal of the S Grady Way driveway. Traffic that was expected to use the eliminated driveway was assumed to access the site via Lake Avenue S or Rainier Avenue S. This means that re-routed traffic would utilize two of the previously studied intersections, Rainier Avenue S/S Grady Way and Lake Avenue S/S Grady Way. The Interim Parking Scenario 2 was evaluated, which represents the period when most project elements have been constructed but the delayed parking garage is not constructed. Interim Parking Scenario 2 was defined in the Interim Memorandum (Sound Transit 2022b) as the following:

- Stride S1 service begins with Metro Connects bus route restructuring, and the new SRTC facility is in place (including bus loop and layover).
- Additional onsite ST parking capacity in a surface parking lot for transit center users at the potential future transit-oriented development and ST parking garage sites on the west side of the transit center (up to 350 combined parking stalls) as well as the existing South Renton Park-and-Ride surface lots retained for a total of approximately 720 parking spaces.

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The proposed site configuration as presented in Interim Memorandum (Sound Transit 2022b) is shown in Figure 2-2.

Figure 2-2. Interim Parking Scenario 2

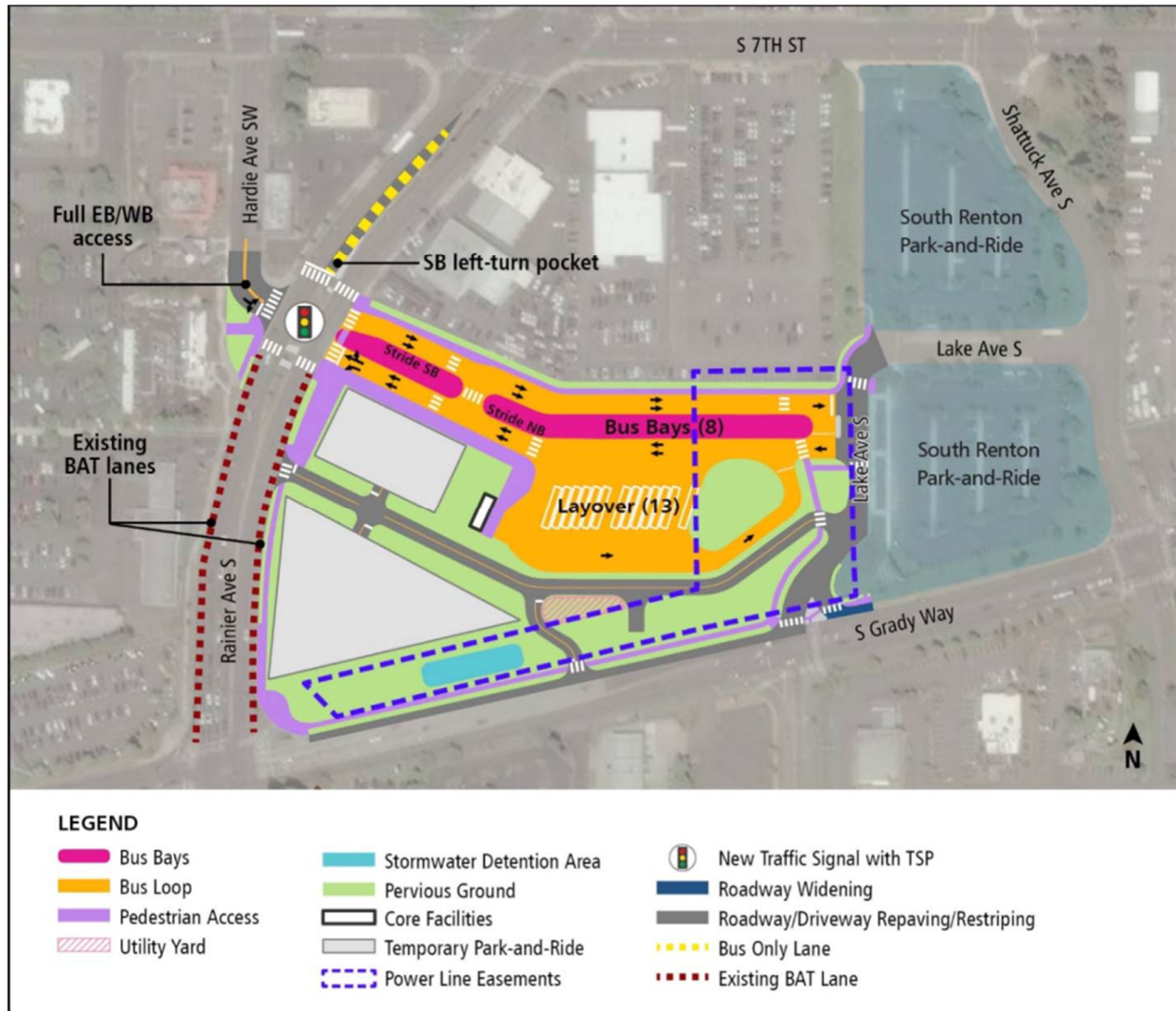


Table 2-1 below shows affected intersection delay and level of service impacts resulting from the removal of the S Grady Way driveway. As shown in the table, the Rainier Avenue S/S Grady Way intersection was projected to operate at LOS E in the AM peak hour and LOS F in the PM peak hour for Interim Parking Scenario 2. Lake Avenue S/S Grady Way is projected to operate at LOS C in both peak hours for Interim Parking Scenario 2.

After the elimination of the S Grady Avenue Driveway, the Rainier Avenue S/S Grady Way intersection would continue to operate at LOS E in the AM peak hour and LOS F in the PM peak hour with little to no increase in delay. Lake Avenue S/S Grady Way would also continue to operate at LOS C in both peak hours with a slight increase in delay.

A new impact would occur if an intersection fell to an unacceptable LOS due to the design changes, or if those changes result in an additional 15 seconds or more of delay at an intersection that is projected to exceed the established standard under the No Build conditions. As shown in Table 2-1, the design changes are not projected to cause a new impact at any study area intersection.

Table 2-1. Affected Intersection Delay and Level of Service – Removal of S Grady Way Driveway

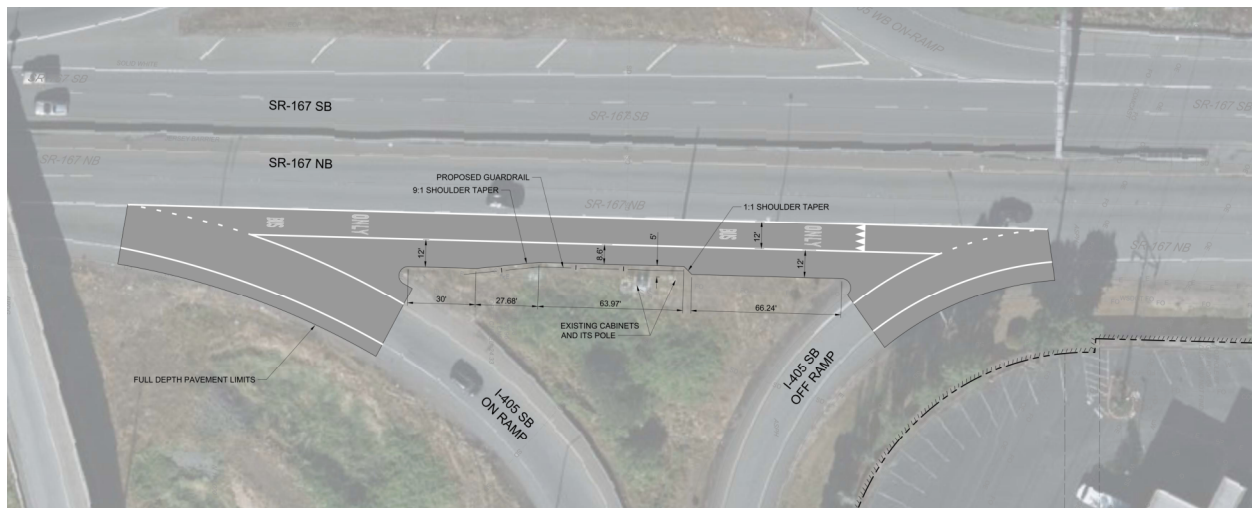
Intersection	Peak Hour	No Build (sec/veh) - LOS	Interim Parking Scenario 2 (sec/veh) - LOS	Interim Parking Scenario 2 - w/o Driveway (sec/veh) - LOS	Change from w/ Driveway to w/o Driveway (sec/veh)	Change from No Build to w/o Driveway (sec/veh)	New Impact?
Rainier Ave S/ S Grady Way	AM	66 - E	59 - E	60 - E	+1	-6	NO
	PM	138 - F	88 - F	88 - F	0	-50	NO
Lake Ave S/ S Grady Way	AM	14 - B	20 - C	23 - C	+3	+9	NO
	PM	21 - C	31 - C	34 - C	+4	+13	NO

sec/veh = seconds per vehicle

3. Transit Operations

To improve transit speed and reliability, a short section of a bus-only, bus-on-shoulder lane on northbound SR 167/Rainier Avenue S was proposed in the conceptual design (refer to Figure 3-1). This bus-only lane would be constructed starting at the existing southbound I-405 loop on-ramp and extending north approximately 200 feet north to connect with the existing business access and transit (BAT) lane approaching the intersection with S Grady Way. In the 2020 traffic analysis, the bus-only lane was considered as a bus-on-shoulder concept. The proposed design change is for a full bus-only lane with an adjacent shoulder. From a traffic operations standpoint, the two are identical during peak periods. However, a full evaluation of the bus-only lane was not included in previous analyses.

Figure 3-1. Proposed Northbound SR 167/Rainier Ave S Bus-only Lane



To evaluate the effects of adding the bus-only lane, the VISSIM models prepared for the *Environmental Technical Memorandum for the South Renton Transit Center and Roadway Improvements Project* (Sound Transit 2022a) were obtained. The models were updated for the AM and PM peak hours to represent conditions with and without the northbound bus-only lane. No other changes to the modeling parameters or network were made. Both travel time and queue length were evaluated for northbound BRT vehicles.

Table 3-1 shows the transit travel time from the I-405 off-ramp to S Grady Way, both with and without the bus-only lane. As shown in the table, the travel time for northbound BRT vehicles between the northbound I-405 off-ramp and the Rainier Avenue S/S Grady Way intersection is projected to be 4 minutes 38 seconds without a bus-only lane during the AM peak hour. With the addition of the bus-only lane, travel time would improve to 3 minutes 46 seconds over this segment. Travel time during the PM peak hour is

projected to be 3 minutes 25 seconds without a bus-only lane and would improve to 2 minutes 47 seconds with the addition of the bus-only lane.

With the addition of the bus-only lane, there is the potential for queueing at the point where BRT vehicles must yield to general traffic entering Rainier Avenue S from the southbound I-405 off-ramp (merge point). VISSIM results show that the maximum queue would be approximately 65 feet (about the length of one BRT vehicle) during both peak hours. The VISSIM analysis showed that no BRT vehicle would experience stopped delay at the merge point with the southbound I-405 off-ramp traffic for more than 1 minute during either peak hour.

Table 3-1. Transit Operations – Travel Time from I-405 NB Off-ramp to S Grady Way, With and Without Bus-only Lane

Measure of Effectiveness	Peak Hour	Without Bus-Only Lane	With Bus-Only Lane	Change
BRT Vehicle Travel Time	AM	4 min 38 sec	3 min 46 sec	-52 sec
	PM	3 min 25 sec	2 min 47 sec	-38 sec
BRT Vehicle Queuing ^a	AM		65 ft ^b	
	PM		65 ft ^c	

^a BRT vehicle queueing within the bus-only lane could only be estimated in scenarios with a bus-only lane.

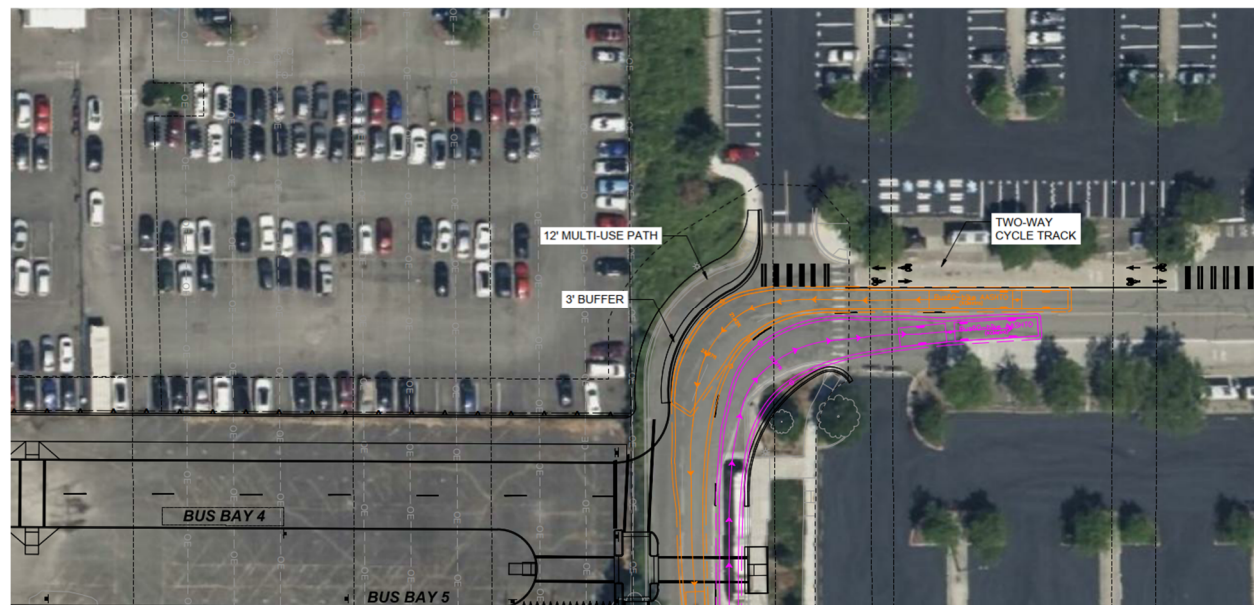
^b Simulation results project that the BRT would not queue at all during 53 out of the 60 minutes during the AM peak hour.

^c Simulation results project that the BRT would not queue at all during 59 out of the 60 minutes during the PM peak hour.

4. Non-Motorized Transportation

To improve connections between the proposed transit center and existing and planned bicycle networks, a two-way cycle track has been added to the project design along Lake Avenue S; see Figure 4-1 (up is north). At its western end, the cycle track will connect to a multi-use path that leads to the proposed transit center. At its eastern end, the track will connect to the existing two-way cycle track along Shattuck Avenue South (not shown on Figure 4-1). The cycle track has been designed to accommodate all vehicles that are projected to use Lake Avenue S and will not affect traffic operations.

Figure 4-1 Proposed Lake Avenue South Cycle Track



5. Parking

The previous transportation analysis included the construction of a 752-space parking garage at the southeast corner of the intersection of Rainier Avenue S and Hardie Avenue NE in 2024. The realignment of the overall Sound Transit ST3 project schedule has now delayed its construction pursuant to R2021-05. In the period between the start of Stride operations and delivery of additional parking, the improved speed and reliability of the bus service through this segment may attract some new vehicle trips, but the total will likely be less than that projected with completion of the garage.

The existing South Renton Park-and-Ride provides 385 parking spaces. It was observed to be 100 percent full at the peak hour of use on selected weekdays in 2017 (Metro 2017) but peak occupancy had fallen to 41 percent of capacity by mid-2022. Metro has forecasted that with the full-build out of the SRTC, peak weekday utilization at this park-and-ride will range between 410 and 707 spaces in 2039 (Fehr & Peers 2022). This forecast accounts for factors such as the capacity and utilization of park-and-ride locations, post-pandemic transit use adjustment factors, and transit and drive alone commuter mode share. With the 158 additional spaces proposed in the surface parking lot for transit center users per the most recent design refinements, 543 total spaces are proposed to be provided. This total is at approximately the mid-point of Metro's forecast.

Metro's demand forecast assumed an available parking supply of 1,085 parking spaces serving the South Renton Transit Center (existing park-and-ride plus originally proposed parking garage), including some demand induced by the widely available and underutilized supply. However, with a parking supply limited to 543 spaces in 2039, as proposed, parking demand is not anticipated to exceed the available supply and can be expected to fall within the bottom half of range of demand forecasted by Metro in 2022. Therefore, the proposed 543 total parking spaces provide adequate parking and no adverse effects to parking are anticipated as a result of the refinements.

As the forecast variables are only estimates, it is possible that parking demand could approach or exceed projected available parking at some point in the future. However, no significant impact to access for nearby properties and land uses is anticipated, since the nearest available on-street parking spaces for spillover parking are already signed as time-limited, reducing their practicality for supporting transit access and thereby mitigating any parking-related impact on adjacent property. The closest unrestricted on-street spaces are located a minimum of 1,500 feet away from the nearest bus bay at the SRTC, which is beyond the distance most transit passengers are willing to walk to reach bus stations.

Sound Transit and local agencies will continue to monitor parking availability as new bus services and additional parking spaces are introduced.

6. Conclusions

The additional transportation analysis has shown that the proposed design changes will not result in any new impacts. The addition of a second driveway along Rainier Avenue S will reduce delay for vehicles entering and exiting the proposed project; the removal of the driveway along S Grady Way will result in little to no increase in delay and no new impacts; the proposed bus-only lane will improve BRT travel times and cause only minimal queueing; and the proposed cycle track along Lake Avenue South will improve bicycle connections and maintain traffic flow. The surface parking lot is projected to provide adequate parking. No adverse effects to parking are anticipated as a result of the refinements. Because these design changes will not result in any new impacts, no additional mitigation is necessary.

7. References

Fehr & Peers. 2022. *Park & Ride Model Methodology and Forecasting Scenario Results*

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