

ROUTE 40 TRANSIT-PLUS MULTIMODAL CORRIDOR TRANSPORTATION TECHNICAL REPORT

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EXECUTIVE SUMMARY

Introduction

This Executive Summary highlights the transportation effects associated with the Build Option for the Route 40 Transit-Plus Multimodal Corridor (TPMC) as compared to the No Build Option. The Route 40 corridor connects major destinations in north Seattle including Northgate, Ballard, and Fremont, with South Lake Union and downtown. The Route 40 TPMC project would improve transit travel time and reliability through a series of transit improvements including dedicated bus lanes and queue jumps, signal upgrades, channelization changes, turn restrictions, pavement spot improvements, and bus zone modifications.

Impact Summary

The following transportation elements are included in this *Transportation Technical Report*, and were analyzed to compare the Build and No Build Options:

- Transit
- Arterial and Local Streets
- Pedestrians and Bicyclists
- Parking
- Safety
- Freight

Transit

The Build Option would improve transit travel times and reliability along Route 40 through a series of transit improvements including dedicated bus lanes and queue jumps, signal upgrades, channelization changes, turn restrictions, and bus zone modifications. The proposed signal upgrades include Transit Signal Priority (TSP) capabilities at 14 study intersections as well as new signals at other intersections. Pavement improvements in Ballard and Fremont would support proposed bus lanes and rechannelization. With the improvement of transit travel times and reliability, the Route 40 corridor is expected to reduce travel times by approximately 9% during the peak periods.

The Build Option also includes a pilot project for a freight and bus (FAB) lane along the Westlake Ave N segment between the 4th Ave N and 9th Ave N intersection which would result in an overall improvement in transit performance along this segment compared to the No Build. The addition of a small number of freight vehicles over 26,000 pounds with the buses would have limited negative effects on bus travel time, not dissimilar to right-turning vehicles using a bus lane (as discussed **Section 3.6**). The Route 40 operates 10-minute headways, six buses during the peak hour, which leaves adequate excess capacity to allow limited freight vehicles to use the FAB lane. Given that this long segment has a limited number of cross streets, as well as minimal bus stop dwell times compared to other areas with higher volume stops, this segment is suitable for a FAB lane pilot, which addresses multiple mobility goals.

Arterial and Local Streets

Route 40 TPMC improvements would result in minimal changes to roadway operations for arterial and local streets. Most of the changes to traffic operations occur in the Fremont, Ballard Bridge, and Ballard/Market Segments. With the Build Option, most of the study intersections would retain the same Level of Service (LOS) in both AM and PM peak hours as with the No Build Option. All of the intersections that operate at LOS E or F overall under the Build Option also operate at LOS E or F overall in the No Build Option, except at two locations:

- 4th Ave N/Nickerson St/Dexter Ave N/Westlake Ave N operates at LOS E in the Build Option in the PM peak hour compared to LOS D in the No Build Option.
- Leary Ave NW/NW Dock Pl operates at LOS E in the Build Option in the AM peak hour compared to LOS C in the No Build Option. However, as presented in more detail in **Section 3.2.3**, this is a two-way stop-controlled intersection, so the LOS is reported based on worst minor approach delay. The increase in overall intersection delay is minimal.

Pedestrians and Bicyclists

The Build Option would further improve pedestrian access and conditions. New and upgraded bus zones would be designed to meet Americans with Disabilities Act (ADA), *Seattle Right-of-Way Improvements Manual (2017)*, and *King County Metro Transit Passenger Facilities Improvements Standard Details (2011)* standards. All existing pedestrian crossing movements and curb ramps would be maintained or improved.

The Build Option would also improve the bicycle conditions at two locations, as follows:

- Northbound protected bike lane on Fremont Ave N between N 34th St and N 36th St (Fremont Segment). At the time of writing, the decision on carrying this concept between N 34th St and N 35th St past 30% design is pending.
- Bicycle facility improvements in the southbound direction between Fremont Bridge and Nickerson St including bike box and bike dots in northbound lanes directing cyclists toward bike ramp approaching bridge.

Parking

The Build Option would result in the net loss of on-street parking spaces in the Fremont and Ballard/Market segments of the corridor. The total impacts include the net loss of approximately seven on-street parking spaces, including a net loss of nine paid spaces. The parking changes would occur in the Fremont segment with the loss of 6 on-street parking spaces including 3 paid spaces and the Ballard/Market segment with the loss of 6 paid on-street parking spaces. The Ballard Bridge segment would gain 5 on-street parking spaces, along Leary Way NW. Side streets were observed to have excess on-street parking capacity along the project corridor and adjacent businesses also provide off-street parking spaces. As short-term paid parking is removed on commercial corridors as part of final design, the Seattle Department of Transportation (SDOT) will look for opportunities to convert unpaid parking to paid parking where feasible to increase turnover and better support businesses.

While the design plans analyzed as part of this report do not show any impacts to load zones, if future design changes remove any load zones, SDOT will conduct outreach, both internally and externally, to identify potential new load zones nearby and work to add the load zones back at nearby locations wherever possible.

Safety

Under the Build Option, vehicular safety is likely to improve or remain similar along streets in the corridor through having additional dedicated roadway spaces for buses that would reduce conflicts and opportunities for collisions. In addition, adding road diet segments with a two-way left-turn lane (TWLTL) on N 36th St and Leary Ave NW would improve safety by reducing vehicle-to-vehicle conflicts, speeds, and speed differential. New crosswalks, ADA curb ramps, and the proposed pedestrian signals would improve pedestrian and cyclist safety. The Build Option would also provide cyclists with protected bike lanes in Fremont on Fremont Ave N.

Freight

SDOT has designated roads that are part of the Route 40 corridor as major or minor truck streets. The Build Option does not contain substantial roadway channelization or street modifications that would impact existing freight operations. Traffic conditions would mostly stay similar in the Build Option compared to the No Build Option. As presented in **Section 3.2.3**, there are several intersections where LOS degrades, and they are along the designated major truck routes. LOS degrades from D or better to E or F at two intersections: 4th Ave N/Nickerson St/Dexter Ave N/Westlake Ave N and Leary Ave NW/NW Dock Pl. The former is a result of the delay increase on the Westlake Ave N westbound approach, but the total intersection delay increases by approximately 6 seconds in the PM peak hour. The latter is caused by delay increase on side-street NW Dock Pl, which is not a designated truck route. Therefore, freight operations are not expected to be significantly affected by the Build Option. As noted above, there would be minimal impacts to freight access associated with load zone relocation. While the design plans analyzed as part of this report do not show any impacts to load zones, if future design changes remove any load zones, SDOT will work with the community to find acceptable areas for load zone relocation or if possible, maintain existing load zones as the design process is refined.

Per its Draft Freight Lane Policy, SDOT is exploring implementation of freight-only and shared transit/freight-only (freight and bus (FAB)) lanes in locations where these lanes can improve freight mobility without negatively impacting other transportation system users. SDOT is launching a pilot program to evaluate the FAB lanes before permanent installation. The following factors are considered to determine the locations for pilot FAB lanes:

- Transit volumes do not exceed 20 buses per hour during peak periods
- Transit reliability and rider experience
- Compatibility between transit buses and freight trucks

One segment of the Route 40 corridor is considered an appropriate pilot candidate to implement the FAB lanes – Westlake Ave N between the 4th Ave N and 9th Ave N intersections. This segment along Westlake Ave N is a designated major truck street that accommodates freight movement through the city, and to/from major freight traffic generators. Allowing

eligible freight trucks to use the FAB lanes in accordance with the freight lane policy is anticipated to improve freight regional mobility and local access. For the pilot, the FAB lane would operate 24/7 because most of the truck traffic avoids peak bus travel demand periods. Based off existing bus and freight traffic volumes, the FAB lane is expected to have a very limited impact on transit operations. The pilot will include an evaluation period to verify investments in this project provide and maintain the transit benefit.

Construction Impacts

The total construction duration of the Build Option would be approximately 200 working days, depending on staging and phasing. The project would result in short-term construction impacts along the corridor. Construction is planned to be primarily limited to the existing right-of-way but would require temporary construction easements. In general, one lane of traffic adjacent to the bus stop would be temporarily closed. To avoid and/or minimize impacts during construction, SDOT will develop a construction management plan that will require the contractor to follow industry best practices and specific construction mitigation measures.

Most of the Build Option construction activities would likely temporarily restrict parking along the street segment being constructed. Parking along the cross-streets or on parallel streets is less likely to be affected by construction. The loss of parking would only be temporary for the duration of construction on a particular segment. Various load zones would also be removed where on-street parking is removed during construction and temporarily relocated where feasible.

Potential Mitigation Measures

Potential mitigation strategies/measures for parking impacts and construction activities are provided in this section. SDOT will develop details of proposed mitigation as the design advances.

Operation (Parking)

Potential impacts of load zone losses on businesses and mitigation measures are described in **Section 3.4.2**. This report identifies no loss of load zones based on the 30% design plans. As design advances, if any load zone loss occurs, SDOT will work to relocate affected load zones to nearby locations or design the project to maintain loading. These locations will be identified during final design following coordination and outreach with adjacent businesses. As short-term paid parking is removed on commercial corridors as part of final design, SDOT will look for opportunities to convert unpaid parking to paid parking where feasible to increase turnover and better support businesses.

Construction

Temporary traffic and access mitigation are proposed for construction transportation impacts. Prior to construction of the Build Option, SDOT will finalize detailed construction plans during final design. All mitigation associated with construction will comply with SDOT-

approved/coordinated traffic control plans, a construction management plan, and a haul-route plan.

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1.0 INTRODUCTION

1.1 Background

This technical report presents a transportation study for the Route 40 Transit-Plus Multimodal Corridor (TPMC) being proposed by the Seattle Department of Transportation (SDOT) between the Northgate Transit Center and Pioneer Square via the King County Metro (KCM) Route 40. The Route 40 TPMC project would improve transit travel time and reliability through a series of transit improvements including dedicated bus lanes and queue jumps, signal upgrades, channelization changes, turn restrictions, pavement spot improvements, and bus zone modifications.

The Route 40 corridor connects major destinations in north Seattle including Northgate, Ballard, and Fremont, with South Lake Union and downtown. Running north to south, Route 40 is approximately 13.5 miles long and passes through the neighborhoods of Northgate, Crown Hill, Loyal Heights, Ballard, Fremont, Westlake, South Lake Union, Downtown Seattle, and Pioneer Square. From the Northgate Transit Center, Route 40 travels south on 1st Ave NE and east on N 92nd St over Interstate 5. It then heads north on College Way N/Meridian Ave N passing North Seattle College before heading west on N Northgate Way/N 105th St/Holman Rd N/NW to 15th Ave NW in Crown Hill. Route 40 then travels west on NW 85th St and south on 24th Ave NW through the Loyal Heights and Ballard neighborhoods down to NW Market St. The route then travels east on Leary Ave NW/NW Leary Way/Leary Way NW through the Fremont neighborhood and passes on the Fremont Bridge to Westlake Ave N. From Westlake Ave N, the route travels through South Lake Union to Downtown Seattle on the Lenora St/Virginia St couplet to 3rd Ave with a terminus in Pioneer Square. The Route 40 corridor is shown in **Figure 1**. For the Route 40 TPMC transportation study, improvements were limited to six study segments, defined as follows, with additional detailed included in **Section 2.2**:

- Westlake Segment
- Fremont Segment
- Ballard Bridge Segment
- Ballard/Market Segment
- Greenwood Segment
- Aurora Segment

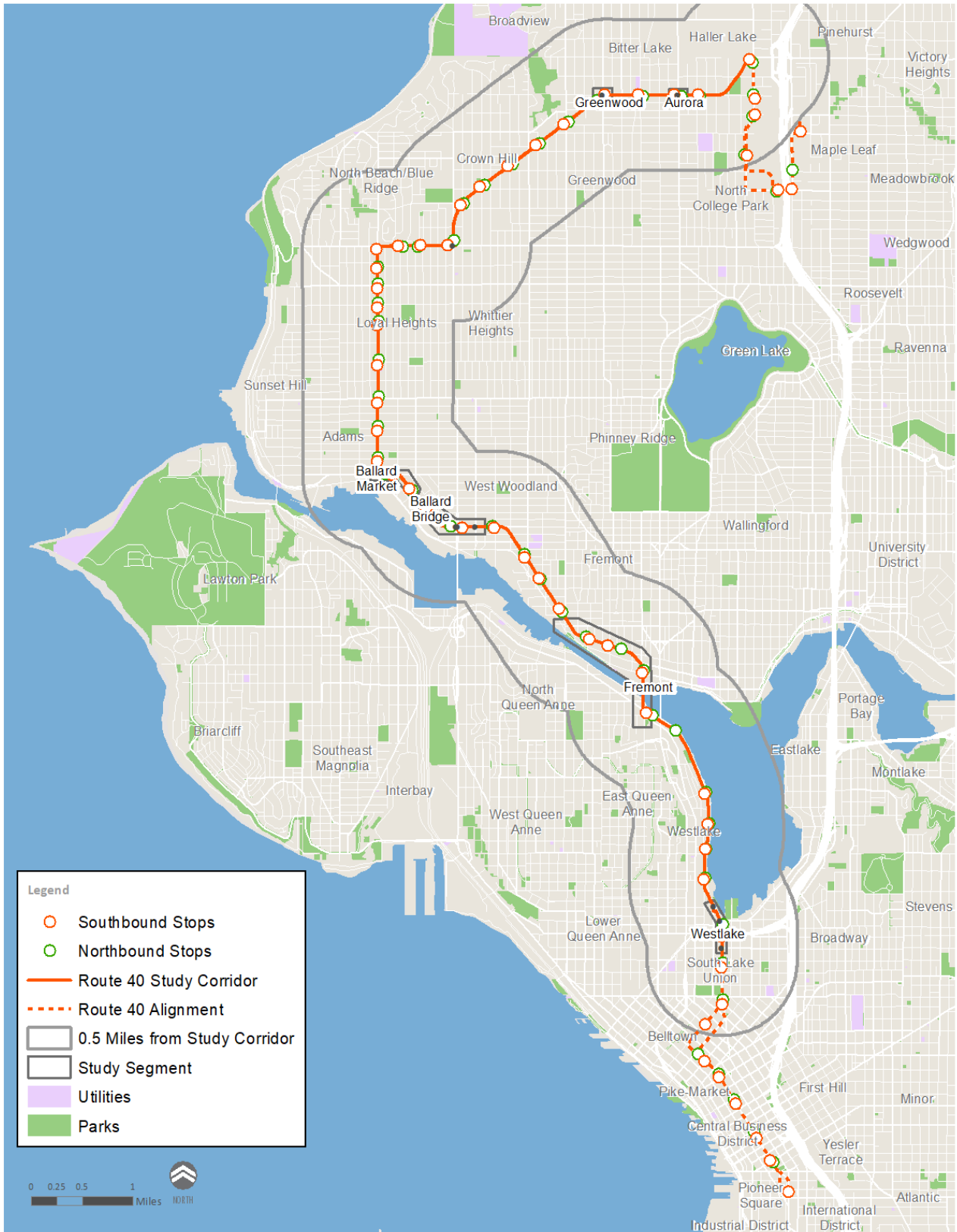


Figure 1: Route 40 Study Area

Downtown and Northgate, though critical sections of the corridor, were not identified as study segments because both are being evaluated under separate initiatives that focus on improvements in these specific areas. At the north terminus, Route 40 shares routing and bus stops used by multiple routes to access the Northgate Transit Center and facilitate connections to Link light rail. At the south terminus, routing through downtown also consists of transit stops shared by multiple routes, facilitating bus transfers and Link access. The Route 40 TPMC is proposed to include the design and implementation of bus improvements, primarily focused on transit speed and reliability, along the Route 40 corridor. Improvements under consideration include dedicated bus lanes, channelization and signal optimization for buses, queue jumps, Transit Signal Priority (TSP), and other geometric and operational changes. Intelligent Transportation Systems (ITS), limited stop consolidation, bus bulbs, and other improvements recommended in KCM's *Transit Speed and Reliability Guidelines and Strategies*¹ are also included along the Route 40 corridor.

In addition to improvements in transit speed and reliability, access to transit improvements such as pedestrian and bicycle facility upgrades were also included in the design. These are focused particularly on areas where speed and reliability improvements are also proposed. Potential bicycle and pedestrian improvements based on recommendations from the *Complete Streets Checklist*² include new pedestrian crossings, sidewalk rehabilitation or replacement, curb bulbs, extended bus bulbs, and pedestrian curb ramps for Americans with Disabilities Act (ADA) compliance.

This *Transportation Technical Report* evaluates the future transportation impacts associated with the Route 40 TPMC and identified potential mitigation measures to reduce impacts. A brief overview of the study methodology is presented in **Section 2.0**. **Section 3.0** discusses environmental conditions and impacts (future conditions) of operation of the Build Option. **Section 4.0** presents construction impacts. **Section 5.0** and **Section 6.0** discuss indirect and cumulative impacts, respectively.

1.2 Project Description

Two alternatives were evaluated in this report for the Route 40 TPMC: a No Build Option and a Build Option. These alternatives are summarized below.

1.2.1 No Build Option

The No Build Option assumes the Route 40 TPMC would not be constructed and KCM Route 40 would continue to operate under existing conditions.

1.2.2 Build Option

The Route 40 TPMC project consists of a series of transit improvements including dedicated bus lanes and queue jumps, signal upgrades, channelization changes, turn restrictions, and bus zone

¹ King County Metro. Transit Speed and Reliability Guidelines and Strategies. August 2021.
<https://kingcounty.gov/~media/depts/metro/about/planning/speed-reliability-toolbox.pdf>

² Seattle DOT. Complete Streets Checklist. May 2017.
https://www.seattle.gov/documents/Departments/SDOT/PlanningProgram/CompSt_Checklist.pdf

modifications. The Build Option described in this report includes the TPMC elements that are consistent with the current 30% design plans, except as follows:

- This report does not include rechannelization on NW Leary Way from west of 15th Ave NW through 14th Ave NW that would require the removal of 13 parking spaces and two load zones west of 15th Ave NW, four parking spaces and one load zone east of 15th Ave NW, and 15 parking spaces around 14th Ave NW on NW Leary Way in the Ballard Bridge Segment. This proposed change is shown in the 30% plans but will be removed from future design. Therefore, the impacts of this change are not considered as part of the Build Option.
- This report considers a protected bike lane on Fremont Ave N northbound between N 36th St and N 34th St based on the latest design configuration. On the section between N 34th St and N 35th St, this proposed change is not reflected in the 30% plans but is planned to be carried forward in future design. On the section between N 35th St and N 36th St, the 30% design plans do not show the latest configuration, which would keep the existing parking spaces and load zones on the east side but remove three parking spaces on the westside.
- This report considers a new pedestrian signal on Westlake Ave N at Halladay St. This proposed change is not reflected in the 30% plans but is planned to be carried forward in future design.

Figure 2 identifies the proposed improvements by type throughout the corridor. The following transit elements are proposed by study segment:

- South Lake Union:
 - Westlake Ave N between Dexter Ave N (Fremont Bridge) and 9th Ave N – pilot freight and bus (FAB) lanes and signal upgrades including a potential new pedestrian signal at Halladay St
 - Westlake Ave N/9th Ave N – southbound left turn bus lane and signal upgrades
 - Westlake Ave N/Mercer St – markings improvements
- Fremont:
 - 1st Ave NW/N 36th St – bus boarding bulb and stop amenities
 - Dayton Ave N/N 36th St – bus stop amenities
 - N 36th St between 2nd Ave NW and Fremont Ave N – southbound bus lane and signal upgrades
 - Fremont Ave N between N 35th St and N 34th St – bus lanes, bus stop modifications, new bus zone amenities, and signal upgrades
 - Fremont Ave N between N 36th St and N 34th St – potential new protected bike lane



Figure 2: Route 40 Proposed Improvements

- Ballard:
 - NW Market St between 22nd Ave NW and 24th Ave NW – bus lanes, bus bulb extensions, new bus zone amenities, and turn restrictions
 - Leary Ave NW between NW Market St and 20th Ave NW – northbound bus lane and turn restriction
 - Leary Ave NW/20th Ave NW – new signal and markings improvements and turn restriction
 - Leary Ave NW/NW Dock PI – relocate bus stop, bus boarding bulbs, and new bus zone amenities
 - NW Leary Way/15th Ave NW – minor signal upgrades and bus bulbs
- North Seattle:
 - Aurora Ave N/N 105th St – relocate eastbound bus stop and add new amenities
 - Holman Rd N between NW 103rd St and 3rd Ave NW – northbound bus lane
 - NW 85th St between 16th Ave NW and 15th Ave NW – markings improvements on eastbound approach.

In addition, signal upgrades to support Transit Signal Priority (TSP) are proposed at 14 intersections along the corridor. In some locations, the anticipated benefits of the Route 40 TPMC improvements would extend to other KCM buses that share the same alignment and/or stops.

The Route 40 TPMC project would require pavement improvements in Fremont and Ballard to support proposed bus lanes and rechannelization, including:

- Westlake Ave N near 4th Ave N – restoration of failing asphalt pavement in northbound curbside lane approaching the Fremont Bridge
- Fremont Ave N between N 34th St and N 35th St – full depth, curb-to-curb concrete paving between existing concrete joint line south of the N 34th St intersection and south curb line at N 35th St. Work would require sidewalk replacement to meet design standards for cross slope and curb height
- NW Leary Way near 17th Ave NW – concrete restoration to facilitate rechannelization and minimize further deterioration associated with the proposed lane line shift
- NW Market St between 22nd Ave NW and Ballard Ave NW – asphalt restoration as needed adjacent to extended bus bulbs

The Route 40 TPMC project would construct pedestrian improvements surrounding bus zones and at intersections. There would be ADA-compliant curb ramps, pedestrian push buttons, and countdown pedestrian signal heads to control pedestrian traffic at intersections near bus zone locations. There would also be intersection safety improvements for pedestrians accessing bus stops, including sidewalk repairs and crosswalk striping. Crossing enhancements to improve safety and access near transit stops would include:

- Install accessible pedestrian signals at four locations, including Fremont Ave N and N 35th St which was received as a community request.

- N 36th St at Phinney Ave N and Dayton Ave N – construct curb bulbs on several corners to shorten crossing distances
- Leary Ave NW north of 20th Ave NW – improve existing midblock crossing to replace overhead crosswalk beacon with flashing beacon and construct a median refuge island
- NW Leary Way at 15th Ave NW – repair sidewalk and upgrade curb ramps and improve the timing for the east-west pedestrian crossings

The Route 40 TPMC project also includes several improvements for bicyclists, including:

- 9th Ave N between Westlake Ave N and Roy St – extend buffer of the southbound bike lane north to the crosswalk
- 4th Ave N between Florentia St and Nickerson St – bike lane southbound and bike box
- Fremont Ave N between N 34th St and N 36th St – protected bike lane in northbound direction – at the time of writing, the decision on carrying this concept between N 34th St and N 35th St past 30% design is pending
- Leary Ave NW at 20th Ave NW/NW Vernon Pl – neighborhood greenway crossing including bicycle markings through intersection and bicycle detection on minor-leg approaches

These project elements would improve safety and access to transit for people walking, biking, and rolling along the Route 40 corridor.

Construction is planned to be primarily limited to existing right-of-way but would require temporary construction easements. Construction could impact on-street parking and require temporary closures of travel lanes. Temporary sidewalk closures with signage noting detour routes could be necessary when constructing around bus zones and installing utilities.

Construction staging would be within the existing roadway right-of-way where construction is occurring, and additional areas required for staging outside of existing right-of-way would be identified during final design.

2.0 METHODOLOGY AND ASSUMPTIONS

The study area of this analysis as part of the Route 40 TPMC is shown in **Figure 1**. The transportation analysis will assess changes to transportation operations resulting from project elements that could include changes to channelization, signal timing, curb space management, bus stop locations, pedestrian and bicycle facilities, implementation of TSP, and other roadway modifications in the study area. The transportation analysis will identify and evaluate the changes resulting from project elements on the following:

- Local traffic, including project corridor traffic
- Transit service, including transit travel times
- Street operations, including intersection level of service and vehicular travel times
- Property access and traffic circulation, including freight
- Bicycle and pedestrian circulation along the corridor
- On-street parking
- Construction activities
- Vehicular and nonmotorized safety

2.1 Evaluation Measures

Measures for assessing the transportation elements in the study area are both quantitative and qualitative. These measures are organized in this technical report by their respective transportation element, including transit, arterial and local streets, pedestrians and bicyclists, parking, safety, freight, construction (for all transportation elements), and indirect and cumulative impacts. The analysis will compare the No Build Option (existing conditions) to the Build Option. **Table 1** provides a summary of the evaluation measures included in this analysis, organized by transportation element.

Table 1: Transportation Measures

TRANSPORTATION ELEMENT	MEASURES
Transit	Transit stops Service levels Travel times Reliability
Arterial and Local Streets	Roadway system Traffic forecasts Intersection level of service General purpose traffic travel times Property access and circulation
Pedestrians and Bicyclists	Pedestrian system Sidewalk maintenance condition Intersection treatments Pedestrian volumes Bicycle facilities Bicycle volumes

TRANSPORTATION ELEMENT	MEASURES
Parking	Existing curb space inventory and occupancy Curb space inventory and load zone changes
Safety	Vehicular collisions Pedestrian and bicycle collisions
Freight	Freight operations Freight access
Construction (for all Transportation Elements)	Qualitative assessment of construction impacts
Indirect Impacts	Qualitative assessment of changes to mobility and access due to project-related land use changes
Cumulative Impacts	Qualitative assessment of the incremental impacts of corridor-wide effects

2.2 Study Area

As shown in **Figure 1** in **Section 1.0**, the study corridor follows the existing Route 40 between the Westlake Ave N/Harrison St intersection (southern end) and the N Northgate Way/Meridian Ave N intersection (northern end).

This analysis focused on 20 study intersections within the six study segments that were identified as key areas to improve transit reliability. Each segment includes at least one study intersection. The study segments and intersections are as follows:

- Westlake Segment
 - Westlake Ave N/Republican St
 - Westlake Ave N/Mercer St
 - Westlake Ave N/Valley St
 - Westlake Ave N/9th Ave N
- Fremont Segment
 - 4th Ave N, Nickerson St, Dexter Ave N, Westlake Ave N
 - Fremont Ave N/N 34th St
 - Fremont Ave N/N 35th St
 - Fremont Pl N/N 36th St/Evanston Ave N
 - N 36th St/Dayton Ave N
 - N 36th St/Phinney Ave N
 - N 36th St/1st Ave NW
 - Leary Way NW/NW 39th St

- Ballard Bridge Segment
 - NW Leary Way/14th Ave NW
 - NW Leary Way/15th Ave NW
 - Leary Ave NW/NW Dock Pl
- Ballard/Market Segment
 - Leary Ave NW/NW Market St
 - NW Market St/24th Ave NW
 - Leary Ave NW/20th Ave NW/NW Vernon Pl
- Greenwood Segment
 - Holman Rd N/Greenwood Ave N/N 105th St Intersection
- Aurora Segment
 - Aurora Ave N/N 105th St Intersection

3.0 ENVIRONMENTAL CONDITIONS AND IMPACTS

This section of the *Transportation Technical Report* describes the current environmental conditions and potential impacts of the transportation elements for the Route 40 TMPC, including:

- Transit
- Arterial and Local Streets
- Pedestrians and Bicyclists
- Parking
- Safety
- Freight

3.1 Transit

3.1.1 Transit Stops

No changes are proposed under the No Build Option; the Build Option proposes changes to the locations of transit stops in the study area, as follows:

- Fremont Ave N between N 34th St and N 35th St: Extend and split the existing northbound bus zone
- NW Market St between Ballard Ave NW and 22nd Ave NW: Extend the bus zones and bus bulbs in both directions to accommodate three coaches with clear landings at door areas
- NW 85th St at 15th Ave NW: Relocate bus stop around corner to nearside stop north of NW 85th St and consolidate with D Line stop
- N 105th St at Aurora Ave N (SR 99): Relocate eastbound bus stop flag to driveway (approximately an additional 75 feet)
- Leary Ave NW between NW Lone Pl and NW Dock Pl: Relocate NW Lone Pl bus stops to far side stops at NW Dock Pl including construction of bus bulbs
- N 36th St at 1st Ave NW: Install bus bulbs at eastbound bus stop

Additionally, bus stops along the corridor are recommended to be updated with amenities including shelter, real-time arrival information, closed circuit TV cameras, lighting, seating, and waste receptacles.

3.1.2 Service Levels

KCM provides bus service along the Route 40 Corridor. KCM bus routes run from 5 AM until approximately 2 AM with headways ranging from 30 minutes at the beginning and end of service hours to 6 minutes during peak periods. There are 15 total transit routes, including Route

40, operated by KCM serving stops along the Route 40 corridor. No changes to bus frequencies or span of service are proposed as part of either the No Build or Build Option.

3.1.3 Ridership

Average daily boardings for Route 40 are shown in **Table 2**. The table highlights that ridership peaked in Fall 2019 before the start of the COVID-19 pandemic. Ridership was at its lowest point at the start of the pandemic and has been recovering year over year. Systemwide, average weekday ridership for June 2022 is up 8.9% from the same time period a year earlier. The Route 40 average weekday boardings for June 2022 show a 43% increase over June 2021. The Build Option is expected to increase transit ridership along the corridor through travel time savings, improved reliability, and upgraded amenities and pedestrian infrastructure.

Table 2: Route 40 Average Weekday Ridership

TIME PERIOD	BOARDINGS
Fall 2019	13,233
Fall 2020	3,594
Spring 2021	4,087
Fall 2021	5,664
Spring 2022	6,228

Source: KCM

3.1.4 Travel Times

Table 2 presents the expected transit travel time savings under the Build Option as compared to the No Build. The travel times are based on existing transit automated vehicle locator (AVL) data, which show that the average travel time during the AM and PM peak periods is 71 minutes in each direction under the No Build Option.

Table 3: Build Option Projected Travel Time Savings (AM and PM Peak Average)

		ZONE 4 (WESTLAKE)		ZONE 3 (FREMONT)		ZONE 2 (BALLARD)					ZONE 1 (NORTH SEATTLE)						
Segment	A	1	B	2	C	3 & 4	D	4	E	5	F	6	G	7	H	Corridor	
Start	4th Ave S & Jackson St (619)	Westlake Ave N & Harrison St (26715)	Westlake Ave N & Galer St (26770)	Westlake Ave N & Westlake Ave N (26840)	N/A	Leary Way NW & 8th Ave NW (28415)	N/A	N/A	24th Ave NW & NW 61st St (19530)	NW 85th St & 20th Ave NW (35580)	Holman Rd NW & 13th Ave NW (40052)	Holman Rd NW & 3rd Ave NW (40058)	N/A	N Northgate Way & Aurora Ave N (40068)	Meridian Ave N & N 105th St (16980)	N/A	
End	Westlake Ave N & 9th Ave N (26690)	Westlake Ave N & Highland Dr (26760)	Westlake Ave N & Crockett St (26800)	Leary Way NW & NW 43rd St (28410)	N/A	24th Ave NW & NW 57th St (19510)	N/A	N/A	NW 85th St & 22nd Ave NW (35570)	Holman Rd NW & Mary Ave NW (40050)	Holman Rd NW & 7th Ave NW (40056)	N 105th St & Fremont Ave N (40065)	N/A	Meridian Ave N & N Northgate Way (16960)	Northgate Transit Center Bay #2 (35324)	N/A	
BUILD OPTION																	
Single Direction Route Length (miles)	1.9	0.8	0.8	1.7	N/A	1.6	N/A	N/A	1.5	0.7	0.7	0.8	N/A	0.8	1.5	N/A	12.8
Current Average Speed (mph)	7.0	7.5	21.8	12.2	N/A	9.6	N/A	N/A	12.9	14.3	16.8	9.9	N/A	12.4	12.8	N/A	10.7
Current Travel Time	15.9	6.3	2.3	8.2	N/A	10.0	N/A	N/A	6.8	3.0	2.5	4.9	N/A	4.1	6.9	N/A	71.0
Time Savings (min)																	
Bus Pads	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Intersection Modification	-	0.1	-	(0.3)	-	0.2	-	-	-	-	-	-	-	-	-	-	(0.0)
Bicycle Facility	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Freight and Bus Lanes	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2
Bus-Only Lanes	-	-	-	1.3	-	0.7	-	-	-	-	-	0.5	-	-	-	-	2.5
Paving	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrian Bulb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bus Bulb	-	-	-	0.1	-	0.1	-	-	-	-	-	-	-	-	-	-	0.1
Bus Zone Modification	-	-	-	0.0	-	0.1	-	-	-	-	-	0.0	-	-	-	-	0.1
Sidewalk Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turn Restriction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corridor Markings	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0
Signal Modification	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bus Zone Relocation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TSP Upgrade	-	0.1	-	0.1	-	0.2	-	-	-	-	-	0.4	-	-	-	-	0.7
Crossing Improvement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Savings	-	2.3	-	1.2	-	1.2	-	-	-	-	-	1.0	-	-	-	-	5.7
Total Travel Time (Min)	15.9	4.0	2.3	7.1	N/A	8.8	N/A	N/A	6.8	3.0	2.5	3.9	N/A	4.1	6.9	N/A	65.3
Distance (Miles)	1.9	0.8	0.8	1.7	N/A	1.6	N/A	N/A	1.5	0.7	0.7	0.8	N/A	0.8	1.5	N/A	12.8
Average Speed (mph)	7.0	11.8	21.8	14.3	N/A	10.9	N/A	N/A	12.9	14.3	16.8	12.3	N/A	12.4	12.8	N/A	
% Improvement	0%	-58%	0%	-17%		-14%			0%	0%	0%	-25%		0%	0%	0%	-8.7%

Depending on the type of bus improvement, the No Build Option bus travel times were compared to the estimated travel times under the Build Option using Synchro, a comparison of travel times during the peak vs. off-peak using AVL data, or industry standard benchmarks. The Transit Cooperative Research Program (TCRP) was the primary source for the industry standard benchmarks, which has developed standard transit travel times savings for various transit treatments based on performance within comparable case studies, as shown in **Table 4**.

In some cases, treatments could be coded into Synchro to test the impact on transit travel times. To assess these changes, the No Build Synchro models were modified to reflect the signal timing, geometry, and/or volume changes at the study intersections that fall within the limits of a treatment. Each treatment was evaluated individually. Transit travel time saved was measured by comparing the reduction in delay for the lane group in which the Route 40 buses travel to the No Build Option. If a project concept involves multiple intersections, the delay differences were averaged and weighted by volumes for the AM peak hour and PM peak hour separately.

Table 4: Transit Travel Time Savings Standards

IMPROVEMENT OPTION	TIME SAVED/UNIT (SECONDS)	TIME SAVEDS PER MILE (MINUTES)	TIME SAVED PER MILE (SECONDS)
Queue bypass (add lane)	6	0.1	6
Curb extension	4	0.27	16.2
TSP	3	0.33	19.8

Source: TCRP 118 Exhibit S-2, S-3

The proposed pilot FAB lanes on the Westlake Ave N segment between the 4th Ave N and 9th Ave N intersections would result in an overall improvement in transit performance along this segment compared to the No Build. The addition of a small number of freight vehicles over 26,000 pounds with the buses would have limited negative effects on bus travel time, not dissimilar to right-turning vehicles using a bus lane. The impact would be minimal since this long segment has limited signalized cross streets. In addition, the number of Route 40 buses during the peak hour (roughly six buses per hour in one direction based on the current schedule) is well below the threshold for FAB lane consideration (20 buses per hour), and there is no other bus route on this segment of roadway.

3.1.5 Reliability

Peak period transit reliability is constrained throughout the corridor due to buses mixing with general purpose traffic during congested peak periods, lack of transit priority, and bus zone infrastructure. Based on KCM's April 2019 AVL data, the Westlake segment shows slow speeds for both peaks and directions, with the most unreliable travel times occurring northbound during the AM and PM peaks. The Fremont segment also shows unreliable travel times in the AM period, both northbound and southbound. Travel times are somewhat less reliable through the Ballard Bridge segment and the Ballard/Market segment, particularly along NW Leary Way/Leary Ave NW between 11th Ave NW and NW Lone Pl. The intersection of Leary Ave NW and NW Market St also appears to result in unreliable travel times. The Greenwood segment and Aurora segment experience some of the lowest reliability in the corridor. In the northbound direction during the PM peak, several stop-to-stop segments from 7th Ave NW to Aurora Ave N

all appear to be congested. Similar conditions occur in the southbound direction during this time.

Under the Build Option, improvements such as dedicated bus lanes, queue jump lanes, TSP, bus stop consolidation, and bus bulbs would improve transit speed and reliability along the Route 40 corridor.

3.2 Arterial and Local Streets

3.2.1 Roadway System

The Build Option would include approximately 30 improvements to right-of-way infrastructure that would impact general traffic flow. A summary of these proposed changes is shown in **Table 5**.

Table 5: Improvement Type and Location

IMPROVEMENT TYPE	WESTLAKE AVE N	FREMONT AVE N	N 36TH ST	LEARY WAY NW/NW LEARY WAY/LEARY AVE NW	NW MARKET ST	24TH AVE NW	NW 85TH ST	HOLMAN RD NW/N	N 105TH ST	N NORTHGATE WAY	MERIDIAN AVE N
Bus Lanes	●	●	●	●	●			●			
Bus Zone Modification		●			●				●		
Bus Zone Relocation				●			●				
Turn Restriction		●		●	●						
Intersection Modification	●	●		●							
Corridor Markings				●		●	●				
Signal Modification							●				
TSP Upgrade	●		●	●			●	●	●	●	●
Bicycle Facilities	●	●									
Crossing Improvement	●			●							

3.2.2 Traffic Forecasts

A traffic analysis was conducted for the horizon year (2040) No Build and Build traffic operations. The following sections describe this analysis.

Traffic Volume Development

Traffic counts (provided by SDOT) along arterials in or near the corridor were reviewed to identify traffic annual growth rates within the study corridor. Individual annual growth rates were developed for each segment, which ranged between 0.0% and 0.5%. The same growth rate was used for AM and PM peak hours for each segment and applied to grow the existing year (2019) volumes into the future horizon year volumes.

A set of balanced horizon year AM and PM peak hour traffic volumes was developed for the study segments, including the 20 study intersections.

Synchro Analysis

The Synchro traffic analysis models were developed for the AM and PM peak hours for the 20 study intersections in the horizon year No Build Option. In general, existing geometric layouts were maintained. The existing layout was updated in one location along N 34th St to reflect a SDOT bike lane project, installed in 2021. Volumes in the existing Synchro models were updated to reflect the balanced horizon year AM and PM peak hour volumes. Signal cycle length was kept unchanged while the splits and offsets for the signalized intersections were re-optimized in the Synchro models.

The Synchro models were updated to reflect proposed improvements in the 30% design for the horizon year Build conditions. Signal splits and coordination offsets were optimized using Synchro's optimization function. Cycle lengths were optimized wherever necessary. The Synchro outputs included delay and LOS by overall intersection as well as by approach and queue length by movement for the study intersections.

3.2.3 Intersection Level of Service

Intersection LOS was estimated for study intersections in the study segments for the 2040 No Build and Build Options in the AM and PM peak hours, as shown in **Table 6** and **Table 7**. Most of the changes to traffic operations occur in the Fremont, Ballard Bridge, and Ballard/Market Segments. LOS for most of the intersections remain the same in both AM and PM peak hours. All of the intersections that operate at LOS E or F overall in the Build Option also operate at LOS E or F overall in the No Build Option, except for two locations:

- At 4th Ave N/Nickerson St/Dexter Ave N/Westlake Ave N which operates at LOS E in the Build Option in the PM peak hour compared to LOS D in the No Build Option. This is attributable to the reduction of westbound right-turn general purpose lanes from two to one lane (replaced by a transit-only lane). However, the overall delay increases by approximately 6 seconds only and the delay under the No Build Option is already very close to the threshold between LOS D and E.

The proposed FAB lane on Westlake Ave N between the 4th Ave N and 9th Ave N intersections that allows freight trucks to share the bus lane could also shift some traffic from the general-purpose lane on the westbound approach of this intersection to the FAB lane and help alleviate general purpose lane congestion. Except for potentially improving the LOS for the 4th Ave N/Nickerson St/Dexter Ave N/Westlake Ave N intersection, the FAB lane on Westlake Ave N would not change the LOS for the Build Alternative, as shown in **Table 6** and **Table 7**.

- At Leary Ave NW/NW Dock PI, which operates at LOS E in the Build Option in the AM peak hour compared to LOS C in the No Build Option. This is because side street delay is reported for this two-way stop intersection. As the Leary Ave NW EB/WB approaches become one through lane in each direction in the Build Option, it is harder for stop-controlled NW Dock PI northbound/southbound vehicles to find a gap to proceed. However, when the Leary Ave NW approaches are also considered, the average delay for

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the entire intersection remains minimal (a change from 4 to 6 seconds in the AM peak hour, and 4 to 5 seconds in the PM peak hour).

Table 6: AM Peak Hour Intersection LOS Change between No Build and Build Options (2040)

REF #	INTERSECTION	TRAFFIC CONTROL	DELAY (sec/veh)		LEVEL OF SERVICE					
			NO BUILD	BUILD	A	B	C	D	E	F
1	Westlake Ave N/Republican St	Signal	17	17		●				
2	Westlake Ave N/Mercer St	Signal	287	287						●
3	Westlake Ave N/Valley St	Signal	36	36				●		
4	Westlake Ave N/9th Ave N	Signal	11	12		●				
5	4th Ave N/Nickerson St/Dexter Ave N/Westlake Ave N	Signal	50	50				●		
6	Fremont Ave N/N 34th St	Signal	28	30			●			
7	Fremont Ave N/N 35th St	Signal	20	22			●			
8	Fremont Pl N/N 36th St/Evanston Ave N	Signal	15	43		→				
9	N 36th St/Dayton Ave N	Signal	2	5	●					
10	N 36th St/Phinney Ave N	Signal	7	8	●					
11	NW 36th St/1st Ave NW	Signal	5	11	→					
12	Leary Way NW/NW 39th St	Signal	16	19		●				
13	NW Leary Way/14th Ave NW	Signal	13	13*		●				
14-1	NW Leary Way/15th Ave NW NB	Signal	15	15*		●				
14-2	NW Leary Way/15th Ave NW SB	Signal	10	10*		●				
15	Leary Ave NW/NW Dock Pl	TWSC	23	40		→				
15.5	Leary Ave NW/20th Ave NW	AWSC (No Build); Signal (Build)	10	11		●				
16	Leary Ave NW/NW Market St/22nd Ave NW	Signal	33	32			●			
17	NW Market St/24th Ave NW	Signal	34	34			●			
18	NW 85th St/15th Ave NW	Signal	54	52				●		
19	Holman Rd/Greenwood Ave N/N 105th St	Signal	70	70					●	
20	Aurora Ave N/N 105th St	Signal	50	50				●		

Notes: ● indicates no change in intersection LOS between No Build and Build.

→ indicates a change in intersection LOS between No Build and Build.

sec/veh = seconds per vehicle

AWSC = all-way stop-controlled; TWSC = two-way stop-controlled (worst side street delay reported)

*Delay in Build reported the same as in No Build. Post 30% design will not include channelization on NW Leary Way between 14th Ave NW and 15th Ave NW shown on the 30% design plans.

Table 7: PM Peak Hour Intersection LOS Change between No Build and Build Options (2040)

REF #	INTERSECTION	TRAFFIC CONTROL	DELAY (SEC/VEH)		LEVEL OF SERVICE					
			NO BUILD	BUILD	A	B	C	D	E	F
1	Westlake Ave N/Republican St	Signal	14	14		●				
2	Westlake Ave N/Mercer St	Signal	102	102						●
3	Westlake Ave N/Valley St	Signal	39	39				●		
4	Westlake Ave N/9th Ave N	Signal	16	14		●				
5	4th Ave N/Nickerson St/Dexter Ave N/Westlake Ave N	Signal	52	58				→		
6	Fremont Ave N/N 34th St	Signal	78	73					●	
7	Fremont Ave N/N 35th St	Signal	30	38			●			
8	Fremont Pl N/N 36th St/Evanston Ave N	Signal	22	24			●			
9	N 36th St/Dayton Ave N	Signal	3	4	●					
10	N 36th St/Phinney Ave N	Signal	10	29			→			
11	NW 36th St/1st Ave NW	Signal	9	15	→					
12	Leary Way NW/NW 39th St	Signal	41	41				●		
13	NW Leary Way/14th Ave NW	Signal	10	10*		●				
14-1	NW Leary Way/15th Ave NW NB	Signal	28	28*			●			
14-2	NW Leary Way/15th Ave NW SB	Signal	14	14*		●				
15	Leary Ave NW/NW Dock Pl	TWSC	41	55						→
15.5	Leary Ave NW/20th Ave NW	AWSC (No Build); Signal (Build)	24	12		←				
16	Leary Ave NW/NW Market St/22nd Ave NW	Signal	38	38				●		
17	NW Market St/24th Ave NW	Signal	41	41				●		
18	NW 85th St/15th Ave NW	Signal	74	70					●	
19	Holman Rd/Greenwood Ave N/N 105th St	Signal	271	271						●
20	Aurora Ave N/N 105th St	Signal	58	58					●	

Notes: ● indicates no change in intersection LOS between No Build and Build.

→ indicates a change in intersection LOS between No Build and Build.

sec/veh = seconds per vehicle

AWSC = all-way stop-controlled; TWSC = two-way stop-controlled (worse side street delay reported)

*Delay in Build reported the same as in No Build. Post 30% design will not include channelization on NW Leary Way between 14th Ave NW and 15th Ave NW shown on the 30% design plans.

3.2.4 General Purpose Travel Times

Because the Build Option does not propose substantial roadway modifications (see **Section 3.2.1**) and would have similar roadway operations (see **Section 3.2.3**), the general purpose travel time in the study segments is expected to be similar between the No Build and Build Options.

3.2.5 Property Access and Circulation

The improvement concepts would not close any driveways or noticeably change roadway operations (see **Section 3.2.1** and **Section 3.2.3**) in the study area. No load zones would be removed (see **Section 3.4**). There are no anticipated impacts to circulation and property access within the study area.

3.3 Pedestrians and Bicyclists

3.3.1 Pedestrian System

According to SDOT's sidewalk inventory, sidewalks connect pedestrians and transit users to nearby streets, businesses, and residences along the Route 40 study corridor. Where traditional sidewalks may be missing, trail systems are provided such as the Cheshiahud Lake Union Loop. The presence of signalized crossings and crosswalks provides insight into the ability for pedestrians to safely cross the street in a timely manner. **Figure 3** depicts the presence of signalized crossings and crosswalks. Intersections that do not have pedestrian signals or marked crosswalks exist along the study corridor; however, these are not present within the study segments. The Ballard/Market segment is the only study segment that contains intersections with a crosswalk but no pedestrian signal. The lack of signals may indicate pedestrians are waiting a long time to cross the street. The remaining study intersections in the study segments contain both signals and crosswalks.

The Pedestrian Master Plan (PMP), adopted in June 2017, establishes policies, programs, and a Priority Investment Network (PIN) to coordinate resources and support Seattle's Vision Zero mission to eliminate traffic-related deaths and serious injuries on city streets by 2030. The PIN is focused on schools and transit service routes, such as Route 40. The entire study corridor is identified as part of the PIN, and several projects would result in improvements to the pedestrian system as part of the No Build Option. The first step identified in the PMP is to improve pedestrian facilities including creating safer crossing conditions. Crossing-the-roadways improvements include shortening crossing distances, providing controlled crossing spaces with pedestrian signals, and providing ramps where they are missing. It is anticipated that the Route 40 TPMC would be designed and built within the timeframe of the PMP 2020-2024 Implementation timeline. Route 40 intersection improvements would support the implementation of the PMP.

Walksheds to Frequent Transit Network Stops

South of NW 85th St, the sidewalk grid is complete and robust within walking distance of transit. North of NW 85th St, however, a significant number of streets including the intersections of N 105th St with Greenwood Ave N and Aurora Ave N lack sidewalks, which impacts safe transit accessibility for all users.



Figure 3: Presence of Signals and Crosswalks throughout the Route 40 Study Corridor
 Source: SDOT

Curb Ramp and Accessibility Improvements

As part of the Build Option, improvements to curb ramps and accessibility would be performed within the areas directly impacted by project work to meet requirements outlined by the Right-of-Way Opening and Restoration Rules 2017 (ROWORR) for sidewalk and ramp restoration. Improvements recommended by internal or external stakeholders, such as SDOT's ADA Accessibility or PMP groups, would require additional project coordination.

3.3.2 Sidewalk Maintenance Condition

The Build Option would either maintain or improve the maintenance condition of sidewalks in the study area. Some short sections of sidewalk would be repaired including along Fremont Ave N between N 34th St and N 35th St as well as in Ballard at NW Leary Way and 15th Ave NW. No other work is proposed that would substantially affect the sidewalk maintenance condition.

3.3.3 Intersection Treatments

All existing pedestrian crossing movements would be maintained with the Build Option; no crosswalks or pedestrian signal phases would be removed. A new pedestrian signal and crosswalk would be added on Westlake Ave N at Halladay St. New curb ramps would be installed at Fremont Ave N between N 34th St and N 35th St as well as in Ballard at NW Leary Way and 15th Ave NW. Pedestrian bulbs would be added in Fremont at N 36th St and Phinney Ave N, Fremont Pl N and N 35th St, and N 36th St and Dayton Ave N. No ramps would be eliminated or replaced with non-compliant ramps without Maximum Extent Feasible documentation.

3.3.4 Pedestrian Volumes

Areas of high pedestrian activity were calculated based on traffic counts at study intersections within the study segments.³ Each segment has a varied number of intersections within it that were reviewed. Generally, the southern segments closer to downtown Seattle have higher pedestrian counts, including Westlake Ave N and Mercer St and Westlake Ave N and Republican St, while northern segments have lower pedestrian counts. Pedestrian counts are higher in the PM peak period (4 pm to 6 pm) than the AM peak period (7 am to 9 am) as shown in **Figure 4** and **Figure 5**.

³ Pedestrian counts calculated as the sum of all pedestrian movements across all crosswalks in a given intersection. Data was collected between 2017 to 2019, generally in November.



Figure 4: Pedestrian Counts by Intersection, AM Peak Period (7-9 AM)
 Source: SDOT, 2018-2019

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Figure 5: Pedestrian Counts by Intersection, PM Peak Period (4-6 PM)

Source: SDOT, 2018-2019

Segments with the highest pedestrian counts include:

- Westlake
- Fremont
- Ballard/Market

Intersections with the highest pedestrian counts include:

- Westlake Ave N/Republican St intersection (Westlake segment)
- Westlake Ave N/Mercer St intersection (Westlake segment)
- Leary Ave NW/NW Market St intersection (Ballard/Market segment)

When study segment pedestrian counts are averaged based on the number of intersections, similar results occur but are not identical: the Westlake segment has the highest pedestrian counts, followed by Ballard/Market and Fremont segments. Pedestrian volumes are expected to grow because of planned job and housing densities consistent with the *City of Seattle Comprehensive Plan* (2019) and with the Build Option due to the improved pedestrian facilities.

3.3.5 Bicycle Facilities

According to Seattle's 2018 Bicycle Facilities inventory, which includes all on the ground infrastructure varying from dedicated off-street trails to shared roadways markings (sharrows), most bicycle facilities exist on streets adjacent to the Route 40 study corridor.

The following summarizes the existing neighborhood greenway⁴ connections along the corridor:

- 17th Ave NW/NW Dock Pl – Existing signalized crossing of Route 40 Corridor.
- NW 58th St/24th Ave NW – Existing Rectangular Rapid Flashing Beacon (RRFB) crossing with existing Route 40 transit stops within one block providing a multimodal node.
- 17th Ave NW/NW 85th St – Existing RRFB crossing with existing Route 40 transit stops approximately two-to-three blocks away.
- NW 92nd St/13th Ave NW/Holman Rd NW – Existing ground-level signalized and overhead crossing with existing Route 40 transit stops within one block providing a multimodal node. This crossing was significantly upgraded in 2019.
- Interurban Trail (Fremont Ave N)/N 105th St – Existing signalized crossing of Route 40 Corridor with existing Route 40 transit stops within one block providing a multimodal node.
- N 100th St/College Way N – Existing unsignalized crossing with existing Route 40 transit stops within one block providing a multimodal node. The intersection has been upgraded as part of Northgate Pedestrian and Bicycle Bridge Project. The accessible bridge opened in October 2021 as the John Lewis Memorial Bridge. This multi-use bridge connects North Seattle College on the west side with the recently opened Northgate Station, serving Link light rail, on the east side.

⁴ Seattle Neighborhood Greenways are residential streets generally one off main arterials with low volumes of cars going slowly enough so that people who walk or ride bicycles feel safe and comfortable.

Within the project limits of the Westlake, Fremont, Ballard Bridge, and Ballard/Market Segments, the Burke-Gilman Trail, Ship Canal Trail, Westlake Ave Cycle Track, and Dexter Ave N multiuse facilities or bike lanes provide high-quality routes for people biking parallel to the Route 40 corridor. The Westlake Cycle Track was built in 2016 connecting Northwest Seattle and Downtown Seattle. Ongoing investments in the Burke-Gilman Trail in the Ballard vicinity, also known as the Missing Link, are currently under construction or planned. It is not anticipated that the Route 40 TPMC would have impacts on existing multiuse infrastructure.

As part of the No Build Option, the Bicycle Master Plan (BMP), updated in 2019, provides an overall vision for the future of bicycling in Seattle, including a proposed citywide bicycle network to be designed and built over time. There are portions of the Route 40 study corridor that are part of the SDOT's planned bicycle network, and the Build Option does not preclude these future bike projects. Along most of the Route 40 study corridor, bicycle facilities are planned as separate projects on adjacent streets or off-street facilities rather than along Route 40. Because fewer cyclists ride along the corridor itself, intersections along the Route 40 corridor are the most likely points of conflict between buses and bikes. Intersections with proposed bike facility improvements, as outlined in the BMP and within study segments where bikes would interface with Route 40 include:

- Westlake Ave N/Republican St intersection (Westlake segment)
- 4th Ave N/Florentia St (Fremont segment)
- N 36th St/Phinney Ave N (Fremont segment)
- NW 36th St/1st Ave NW (Fremont segment)
- Leary Way NW/NW 39th St (Fremont segment)
- NW Leary Way/14th Ave NW (Ballard Bridge segment)
- Leary Ave NW/20th Ave NW (north leg)/NW Vernon Pl (south leg) (Ballard/Market segment)

In addition to the above improvements, the Build Option would provide for the following bicycle improvements:

- Northbound protected bike lane on Fremont Ave N between N 34th St and N 36th St (Fremont Segment). At the time of writing, the decision on carrying this concept between N 34th St and N 35th St past 30% design is pending.
- Bicycle facility improvements in the southbound direction between the Fremont Bridge and Nickerson St including bike box and bike dots in northbound lanes directing cyclists toward the bike ramp when approaching the Fremont Bridge.

3.3.6 Bicycle Volumes

Higher bicycle volumes may indicate intersections and approaches where bicycle improvements may benefit the safety and reliability of the SDOT's bicycle network.

Study intersection approaches with high bicycle volumes (more than 100 bicycles per hour) in the AM peak hour include:

- Southbound approach at the Westlake Ave N/9th Ave N intersection

- Southbound approach at the Westlake Ave N/Dexter Ave N/Nickerson St/4th Ave N intersection
- Eastbound approach at the Fremont Ave N/N 34th St intersection

The intersection approaches with relatively high (50 to 100 bicycles per hour) in the AM include:

- Westbound approach at the Fremont Ave N/N 34th St intersection
- Southbound approach at the Fremont Ave N/N 34th St intersection
- Southbound approach at the Fremont Ave N/N 35th St intersection

At the total intersection level, heavy bicycle traffic travels through the Westlake Ave N/9th Ave N intersection and in the Fremont Bridge area. Westlake Ave N/9th Ave N is where the Westlake Cycle Track connects with bicycle lanes on 9th Ave N into downtown Seattle. The Fremont Bridge area is a vital bicycle connection across the Lake Washington Ship Canal.

The intersection approaches with high bicycle volumes (more than 100 bicycles per hour) in the PM peak hour include:

- Northbound approach at the Westlake Ave N/9th Ave N intersection
- Northbound approach at the Westlake Ave N/Dexter Ave N/Nickerson St/4th Ave N, Fremont Ave N/N 34th St intersection
- Northbound approach at the Fremont Ave N/N 35th St intersection
- Westbound approach at the Fremont Ave N/N 34th St intersection

At the intersection level, as in the AM peak hour, heavy bicycle volumes occur through the Westlake Ave N/9th Ave N intersection and in the Fremont Bridge area.

This pattern change conforms to the expectation that in the AM peak hour, the dominant bicycle traffic heads toward the downtown area, while in the PM peak hour bicycle traffic leaves the downtown area.

3.4 Parking

This section describes the existing curb space conditions, as well as changes to the curb space conditions due to the proposed improvements for the Route 40 TPMC.

3.4.1 Existing Curb Space Inventory and Occupancy

Field data for parking was collected in mid-December 2019 and early June 2022. Other data sources include recent (October and November 2021) parking inventory and occupancy data from SDOT and other recent studies, such as the Burke-Gilman Trail Missing Link Environmental Impact Statement (EIS). Existing parking inventory data and the paid parking inventory data from SDOT were used to identify existing parking categories along each blockface in the study segments. **Figure 6** and **Figure 7** depict existing parking categories along each blockface as well as identify the addition or loss of parking spaces anticipated from the implementation of the proposed improvements. Impacts to parking spaces are described further in **Table 11** in **Section 3.4.2**.

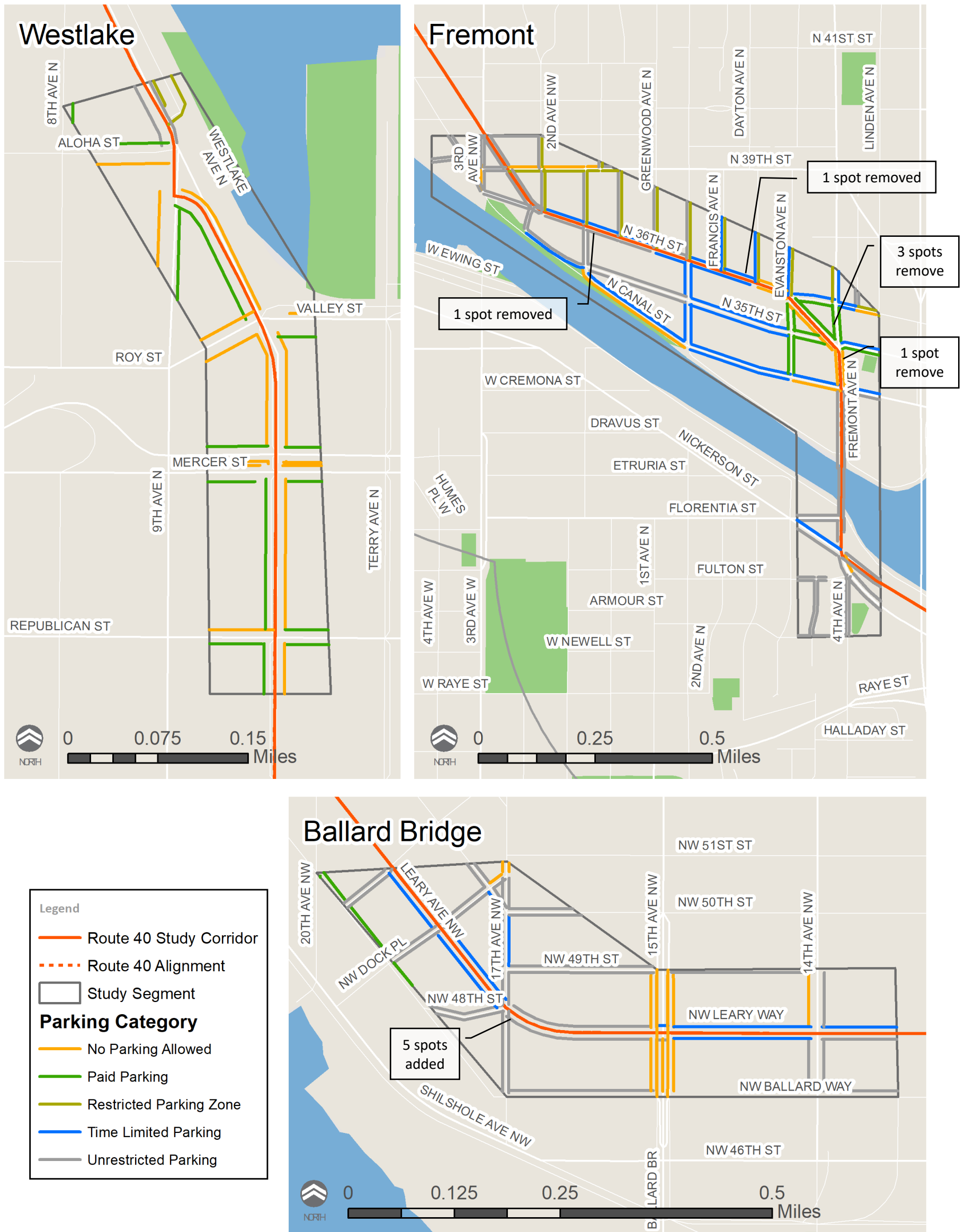


Figure 6: Parking Categories of Westlake, Fremont, and Ballard Bridge Segments
 Source: SDOT, GIS, CDM Smith

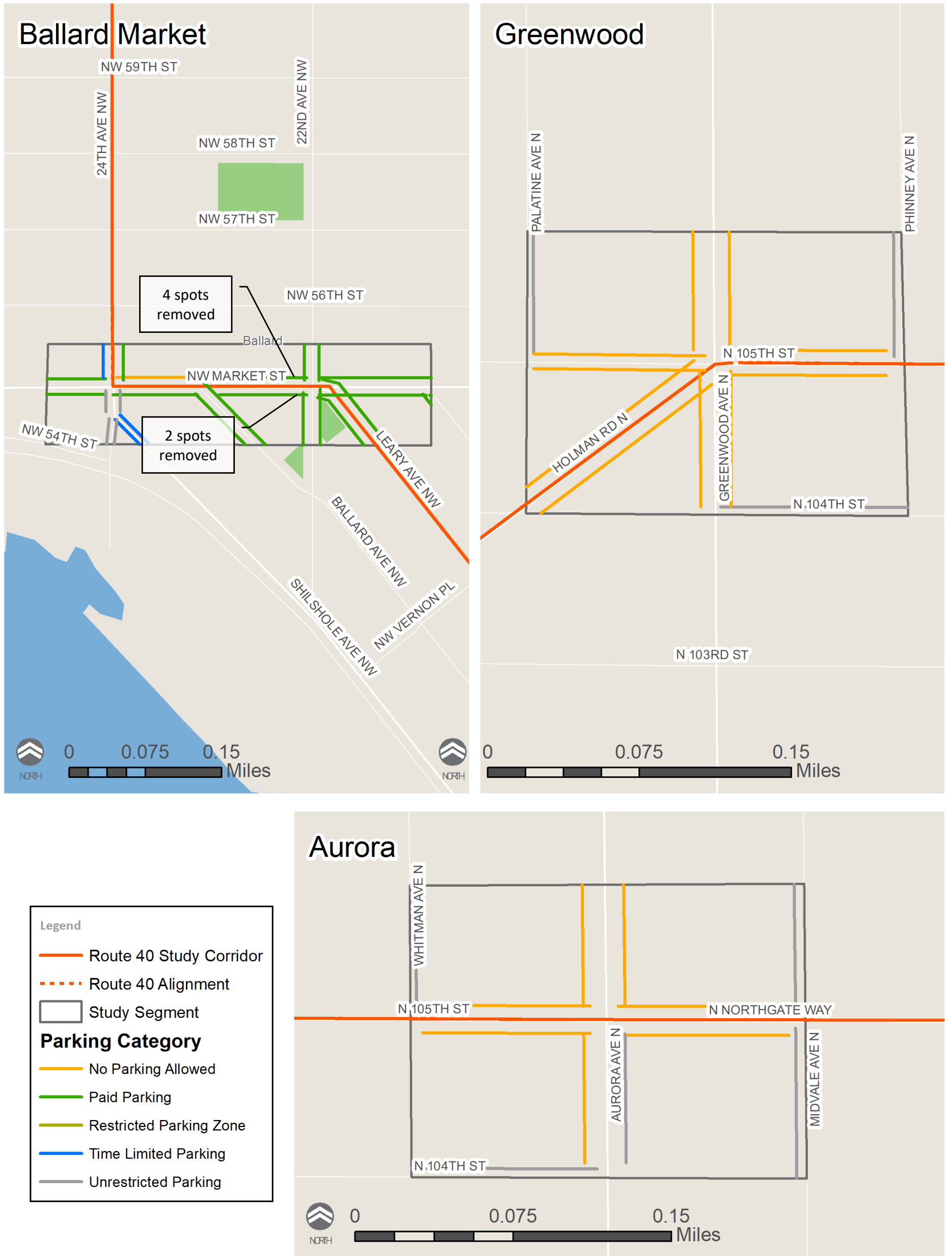


Figure 7: Parking Categories for Ballard/Market, Greenwood, and Aurora Segments
 Source: SDOT, GIS, CDM Smith

Westlake, Greenwood, and Aurora Segments

The Westlake, Greenwood, and Aurora segments have limited on-street arterial parking. Within the Westlake segment along Westlake Ave N, there is only limited on-street parking along the arterial portion of public right-of-way permitted between 9th Ave N and Valley St and just north of Harrison St on the west side of the street. Off-street parking is provided in public lots within right-of-way adjacent to Westlake Ave N and the South Lake Union Park. The Greenwood and Aurora segments contain intersections with little to no parking. The roadway is largely used for travel lanes.

Fremont, Ballard Bridge, and Ballard/Market Segments

Parking demand for these segments was estimated using a combination of available parking counts collected by SDOT in October and November 2021 (for the Fremont and Ballard/Market segments) and field data collection in December 2019 (for the Ballard Bridge segment). Parking was also assessed along side streets in the Fremont and Ballard/Market segments due to the higher demand. In Fremont, the side streets north of the corridor have implemented a restricted parking zone on the east side of the residential street. As shown in **Table 8**, overall parking utilization on Fremont Pl N in Downtown Fremont ranges from 50% to 113% during the day. During 12 to 2 PM, the parking demand is over the theoretical capacity (assumed to be 20 feet per space, excluding driveways and no parking zones) meaning vehicles are parking very close together. There is higher demand in Fremont during midday and afternoon. When the side streets are included, the utilization is similar during 9 to 11 AM and 3 to 5 PM but a bit lower during 12 to 2 PM. For the entire area, demand ranges from 58% to 87% with the highest occupancies during the midday and afternoon.

For the Ballard Bridge segment, the parking reflects the largely commercially focused uses. Parking is restricted in some cases to two hours and there are some segments that restrict overnight parking. Recent data for this segment is not available, so the information is based on the data collected in December 2019. As shown in **Table 9**, parking occupancy along the Route 40 corridor ranges from 39% in the morning to 79% in the midday consistent with commercial areas. Side streets were observed to have excess on-street parking capacity.

For the Ballard/Market Segment, there is a high demand for parking in the afternoons and evenings. **Table 10** summarizes parking utilization along the Route 40 corridor and the side streets. The data for this segment was collected by SDOT in November 2021. The highest parking demand along the route through Ballard was observed during the midday when available on street spots are 80% utilized. The demand continues through the afternoon and early evening (with 71% to 73% utilization rates). Parking on side streets has a similar pattern to that along the corridor - utilization rates range from 68% to 75% midday to early evening. Overall, for the study area, parking is utilized between 58% in the morning and 75% during the midday.

Additional parking information is available from the Burke-Gilman Trail Missing Link EIS, 2017. This study conducted a parking study for the two Ballard segments and included off-street parking. The Burke-Gilman Trail study is consistent with the occupancy data collected for the two segments, indicating higher use in the afternoons and evenings. The study suggests lower use of parking spaces on the weekend compared to weekdays but notes that events like the weekly farmer's market in Ballard (on Sundays) creates additional demand for parking.

Table 8: Fremont Segment Parking Summary

Parking along Route 40				9-11 AM			12-2 PM			3-5 PM			Notes
Street	Side	From (W/N)	To (E/S)	Capacity	Veh	Use	Capacity	Veh	Use	Capacity	Veh	Use	
Fremont Pl N	NE	N 36th St	Fremont Ave N	8	4	50%	8	9	113%	8	7	88%	Incl. load zone(s)
Route Summary				8	4	50%	8	9	113%	8	7	88%	
Parking on Side Streets													
Evanston Ave N	W	N 35th St	N 34th St	8	6	75%	8	6	75%	8	6	75%	Incl. load zone(s)
	E	N 35th St	N 34th St	7	5	71%	7	6	86%	7	5	71%	Incl. load zone(s)
Evanston Ave N	W	N 36th St	N 35th St	4	3	75%	4	4	100%	4	5	125%	Incl. load zone(s)
	E	N 36th St	N 35th St	5	1	20%	5	4	80%	5	5	100%	
Fremont Ave N	W	N 36th St	Fremont Pl N	8	2	25%	8	7	88%	8	6	75%	Incl. load zone(s)
	E	N 36th St	Fremont Pl N	6	3	50%	6	6	100%	6	5	83%	Incl. load zone(s)
N 35th St	N	Evanston Ave N	Fremont Ave N	13	4	31%	13	8	62%	13	11	85%	
	S	Evanston Ave N	Fremont Ave N	7	3	43%	7	5	71%	7	4	57%	Incl. load zone(s)
N 35th St	S	Fremont Ave N	Troll Ave N	22	18	82%	22	21	95%	22	21	95%	Incl. load zone(s)
	S	Fremont Pl N	Fremont Ave N	10	8	80%	10	9	90%	10	9	90%	Incl. load zone(s)
Side Streets Summary				90	53	59%	90	76	84%	90	77	86%	
Fremont Segment Subarea				98	57	58%	98	85	87%	98	84	86%	

Source: Capacity from study team's assessment based on Google Maps Streetview imagery and field observations. Occupancy from SDOT Curbside Occupancy Data, October 2021

Notes: Red Number reflects over capacity conditions

Table 9: Ballard Bridge Segment Parking Summary

Parking Along Route 40					8-10 AM				11-1PM				4-6PM				7-9PM			
Street	Side	From (West/North)	To (East/South)	Restrictions	Capacity	Notes	Veh	Use	Capacity	Notes	Veh	Use	Capacity	Notes	Veh	Use	Capacity	Notes	Veh	Use
Leary Way	South	14th Ave	11th Ave	NP 2AM to 5AM	18		7	39%	18		14	78%	18		11	61%	18		4	22%
Leary Way	South	15th Ave	14th Ave	Load zone 2 Hr 7-6PM	13		6	46%	13		11	85%	13		8	62%	13		5	38%
Leary Way	South	17th Ave	15th Ave	No restrictions	21		15	71%	21		20	95%	21		19	90%	21		17	81%
Leary Way	South	Dock Pl	17th Ave	4 hr 7AM-6PM	16		9	56%	16		14	88%	16		13	81%	16		16	100%
Leary Way	South	Ione Pl	Dock Place	2 hr 7AM-6PM	8		0	0%	8		6	75%	8		7	88%	8		8	100%
Leary Way	North	Ione Pl	Dock Place	2 hr 7AM-6PM	6		3	50%	6	1 delivery	6	100%	6		4	67%	6		5	83%
Leary Way	North	Dock Pl	17th Ave	2 hr 7AM-6PM	11		2	18%	11		8	73%	11		10	91%	11		11	100%
Leary Way	North	17th Ave	15th Ave	4hr prk	13	CLZ	1	8%	13	CLZ	5	38%	13	CLZ	9	69%	13	CLZ	12	92%
Leary Way	North	15th Ave	14th Ave	2 hr 7-6PM	6		1	17%	6	Landscape	4	67%	6	Landscape	2	33%	6		4	67%
Leary Way	North	14th Ave	11th Ave		15		0	0%	15		0	0%	15		1	7%	15		0	0%
Route Summary					112		44		112		88		112		83		112		82	
Source: Counts taken December 2019							39%				79%				74%				73%	

Source: SDOT and Counts Dec. 2019

Notes: Red Number reflects over capacity conditions; CV is commercial vehicle and cycle is motorcycle; Pod was storage pod; CLZ is commercial load zone

Table 10: Ballard/Market Segment Parking Summary

Parking along Route 40				9-11 AM			12-2 PM			3-5 PM			6-7 PM			Notes
Street	Side	From (W/N)	To (E/S)	Capacity	Veh	Use	Capacity	Veh	Use	Capacity	Veh	Use	Capacity	Veh	Use	
Leary Ave NW	SW	NW Market St	NW Vernon Pl	15	9	60%	15	13	87%	15	13	87%	15	9	60%	Incl. load zone(s)
	NE	NW Market St	NW Vernon Pl	21	9	43%	21	13	62%	21	13	62%	21	14	67%	Incl. load zone(s)
NW Market St	N	Ballard Ave NW	Leary Ave NW	7	4	57%	7	6	86%	7	6	86%	7	5	71%	Incl. load zone(s)
	S	Ballard Ave NW	Leary Ave NW	3	1	33%	3	3	100%	3	3	100%	3	3	100%	Incl. load zone(s)
NW Market St	S	24th Ave NW	Ballard Ave NW	9	2	22%	9	9	100%	9	4	44%	9	9	100%	Incl. load zone(s)
Route Summary				55	25	45%	55	44	80%	55	39	71%	55	40	73%	
Parking on Side Streets																
20th Ave NW	W	NW 56th St	NW Market St	4	4	100%	4	3	75%	4	3	75%	4	3	75%	
	E	NW 56th St	NW Market St	7	2	29%	7	5	71%	7	4	57%	7	4	57%	Incl. load zone(s)
20th Ave NW	W	NW Market St	Russell Ave NW	7	3	43%	7	4	57%	7	4	57%	7	4	57%	Incl. load zone(s)
	E	NW Market St	Russell Ave NW	8	5	63%	8	5	63%	8	4	50%	8	5	63%	Incl. load zone(s)
22nd Ave NW	W	NW Market St	Ballard Ave NW	10	6	60%	10	8	80%	10	7	70%	10	10	100%	Incl. load zone(s)
	E	NW Market St	Ballard Ave NW	9	6	67%	9	6	67%	9	4	44%	9	7	78%	Incl. load zone(s)
22nd Ave NW	W	NW 57th St	NW 56th St	8	5	63%	8	6	75%	8	5	63%	8	6	75%	Incl. load zone(s)
	E	NW 57th St	NW 56th St	6	2	33%	6	4	67%	6	6	100%	6	3	50%	Incl. load zone(s)
22nd Ave NW	W	NW 56th St	NW Market St	7	4	57%	7	6	86%	7	4	57%	7	4	57%	Incl. load zone(s)
	E	NW 56th St	NW Market St	6	3	50%	6	3	50%	6	5	83%	6	4	67%	
22nd Ave NW	W	Ballard Ave NW	Shilshole Ave NW	8	7	88%	8	10	125%	8	7	88%	8	7	88%	Incl. load zone(s)
	E	Ballard Ave NW	Shilshole Ave NW	11	8	73%	11	9	82%	11	10	91%	11	11	100%	Incl. load zone(s)
24th Ave NW	E	NW 57th St	NW 56th St	8	6	75%	8	7	88%	8	5	63%	8	5	63%	Incl. load zone(s)
	E	NW 56th St	NW Market St	5	2	40%	5	6	120%	5	5	100%	5	4	80%	
Ballard Ave NW	SW	NW Vernon Pl	20th Ave NW	6	5	83%	6	4	67%	6	4	67%	6	4	67%	
	NE	NW Vernon Pl	20th Ave NW	4	1	25%	4	2	50%	4	3	75%	4	4	100%	Incl. load zone(s)
Ballard Ave NW	SW	NW Market St	22nd Ave NW	31	19	61%	31	31	100%	31	30	97%	31	32	103%	Incl. load zone(s)
	NE	NW Market St	22nd Ave NW	13	8	62%	13	10	77%	13	8	62%	13	14	108%	Incl. load zone(s)
Ballard Ave NW	SW	NW lone Pl	NW Dock Pl	7	1	14%	7	5	71%	7	5	71%	7	7	100%	Incl. load zone(s)
	NE	NW lone Pl	NW Dock Pl	7	3	43%	7	6	86%	7	4	57%	7	7	100%	Incl. load zone(s)
Ballard Ave NW	SW	20th Ave NW	NW lone Pl	4	3	75%	4	3	75%	4	3	75%	4	4	100%	Incl. load zone(s)
	NE	20th Ave NW	NW lone Pl	5	3	60%	5	5	100%	5	4	80%	5	4	80%	Incl. load zone(s)
Ballard Ave NW	SW	22nd Ave NW	NW Vernon Pl	8	4	50%	8	8	100%	8	7	88%	8	6	75%	
	NE	22nd Ave NW	NW Vernon Pl	20	14	70%	20	17	85%	20	17	85%	20	20	100%	Incl. load zone(s)
Barnes Ave NW	SW	NW Market St	17th Ave NW	19	6	32%	19	13	68%	19	11	58%	19	6	32%	Incl. load zone(s)
	NE	NW Market St	17th Ave NW	16	12	75%	16	12	75%	16	12	75%	16	6	38%	
NW 56th St	N	22nd Ave NW	20th Ave NW	14	5	36%	14	7	50%	14	8	57%	14	11	79%	Incl. load zone(s)
	S	22nd Ave NW	20th Ave NW	18	11	61%	18	12	67%	18	14	78%	18	13	72%	
NW 56th St	N	24th Ave NW	22nd Ave NW	15	8	53%	15	9	60%	15	8	53%	15	6	40%	Incl. load zone(s)
	S	24th Ave NW	22nd Ave NW	19	12	63%	19	14	74%	19	10	53%	19	10	53%	Incl. load zone(s)
NW 57th St	S	24th Ave NW	22nd Ave NW	21	7	33%	21	6	29%	21	10	48%	21	8	38%	Incl. load zone(s)
NW Market St	S	17th Ave NW	15th Ave NW	12	6	50%	12	6	50%	12	9	75%	12	7	58%	Incl. load zone(s)

3. ENVIRONMENTAL CONDITIONS AND IMPACTS

Parking along Route 40				9-11 AM			12-2 PM			3-5 PM			6-7 PM			Notes
Street	Side	From (W/N)	To (E/S)	Capacity	Veh	Use	Capacity	Veh	Use	Capacity	Veh	Use	Capacity	Veh	Use	
NW Market St	N	Barnes Ave NW	17th Ave NW	10	4	40%	10	6	60%	10	9	90%	10	6	60%	Incl. load zone(s)
	S	Barnes Ave NW	17th Ave NW	11	5	45%	11	6	55%	11	7	64%	11	6	55%	Incl. load zone(s)
NW Market St	N	Russell Ave NW	20th Ave NW	5	4	80%	5	2	40%	5	5	100%	5	4	80%	Incl. load zone(s)
	S	Russell Ave NW	20th Ave NW	4	1	25%	4	0	0%	4	3	75%	4	1	25%	Incl. load zone(s)
NW Market St	N	26th Ave NW	24th Ave NW	17	10	59%	17	10	59%	17	4	24%	17	9	53%	Incl. load zone(s)
	S	26th Ave NW	24th Ave NW	21	17	81%	21	15	71%	21	10	48%	21	3	14%	Incl. load zone(s)
NW Market St	N	Tallman Ave NW	Barnes Ave NW	13	2	15%	13	6	46%	13	7	54%	13	6	46%	Incl. load zone(s)
	S	Tallman Ave NW	Barnes Ave NW	4	3	75%	4	3	75%	4	3	75%	4	0	0%	
NW Market St	N	Leary Ave NW	Russell Ave NW	11	7	64%	11	9	82%	11	6	55%	11	10	91%	Incl. load zone(s)
	S	Leary Ave NW	Russell Ave NW	9	1	11%	9	7	78%	9	8	89%	9	8	89%	Incl. load zone(s)
NW Market St	N	20th Ave NW	Tallman Ave NW	4	1	25%	4	5	125%	4	3	75%	4	4	100%	Incl. load zone(s)
NW Vernon Pl	NW	Shilshole Ave NW	Ballard Ave NW	8	7	88%	8	7	88%	8	7	88%	8	8	100%	
	SE	Shilshole Ave NW	Ballard Ave NW	7	6	86%	7	6	86%	7	4	57%	7	4	57%	Incl. load zone(s)
NW Vernon Pl	NW	Ballard Ave NW	Leary Ave NW	8	7	88%	8	9	113%	8	8	100%	8	8	100%	
	SE	Ballard Ave NW	Leary Ave NW	8	6	75%	8	6	75%	8	7	88%	8	6	75%	Incl. load zone(s)
Russell Ave NW	SW	NW Market St	20th Ave NW	10	6	60%	10	7	70%	10	8	80%	10	9	90%	
	NE	NW Market St	20th Ave NW	15	9	60%	15	13	87%	15	13	87%	15	10	67%	Incl. load zone(s)
Tallman Ave NW	SW	NW Market St	NW Central Pl	19	14	74%	19	18	95%	19	16	84%	19	14	74%	Incl. load zone(s)
	NE	NW Market St	NW Central Pl	21	19	90%	21	18	86%	21	20	95%	21	12	57%	Incl. load zone(s)
Tallman Ave NW	SW	NW Central Pl	NW lone Pl	10	7	70%	10	9	90%	10	9	90%	10	5	50%	Incl. load zone(s)
	NE	NW Central Pl	NW lone Pl	7	5	71%	7	7	100%	7	7	100%	7	6	86%	
Side Streets Summary				565	332	59%	565	421	75%	565	404	72%	565	385	68%	
Fremont Segment Subarea				620	357	58%	620	465	75%	620	443	71%	620	425	69%	

Source: Capacity from study team's assessment based on Google Maps Streetview imagery and field observations. Occupancy from SDOT Curbside Occupancy Data, November 2021

Notes: Red Number reflects over capacity conditions

3.4.2 Curb Space Inventory and Load Zone Changes

The improvement concepts for the Route 40 TPMC that impact on-street parking are located in three study segments: Fremont, Ballard Bridge, and Ballard/Market. One improvement concept in the Ballard Bridge segment adds parking spaces, while others require the removal of parking spaces. The assessment of parking space and load zone changes is based on the latest 30% design plans (August 2021). However, the assessment does not include rechannelization on NW Leary Way from 14th Ave NW through west of 15th Ave NW in Ballard Bridge Segment. This proposed change is shown in the 30% plans but will be removed from future design. Therefore, the impacts of this change are not considered as part of the Build Option. In addition, a new configuration for the protected bike lane on Fremont Ave N northbound between N 35th St and N 36th St in the Fremont Segment has been developed and will be carried forward to post 30% design. This assessment considers the latest design configuration. A summary of parking spaces for each street segment (on impacted side(s) only), including the number of spaces added and removed, as well as total before and after numbers is shown in **Table 11**.

Table 11: On-Street Parking Inventory Changes

CONCEPT	STREET 1	STREET 2	PARKING			
			BEFORE	AFTER	CHANGE TOTAL	CHANGE PAID
Fremont Segment					-6	-3
Protected bike lane from N 35th St to N 36th St	Fremont Ave N	N 35th St	9	6	-3	-3
Add bus bulb to existing far-side stop on N 36th St EB at 1st Ave NW	N 36th St	1st Ave NW	6	5	-1	0
Add bus bulb to existing far-side stop on N 36th St WB at Dayton Ave N	N 36th St	Dayton Ave N	3	2	-1	0
Improve and expand stops at N 34th St and potential protected bike lane from N 34th St to N 35th St	Fremont Ave N	N 34th St	1	0	-1	0
Ballard Bridge					+5	0
Restriping at NW Leary Way/17th Ave NW/NW 48th St intersection	NW Leary Way	NW 48th St	0	5	+5	0
Ballard/Market					-6	-6
Extend bus zones/bus bulbs on NW Market St	NW Market St	Between Ballard Ave NW and 22nd Ave NW	6	0	-6	-6
Total					-7	-9

Note: Positive numbers show net gain of parking spaces or load zones, while negative numbers show net loss of parking spaces or load zones impact by the proposed improvements.

The numbers shown in the table are based on the 30% plans and may be refined based on continued design. As part of this process, additional outreach to identify and devise a comprehensive curb space management plan will be needed during the final design phase with input from local businesses, community members, and other stakeholders. While the design plans analyzed as part of this report do not show any impacts to load zones, if future design changes remove any load zones, this outreach should identify key spaces for ADA parking, freight loading, and access to adjacent land uses. If needed, this strategic process would involve SDOT's Curbside Management team and work with adjacent businesses to identify feasible alternate locations or project redesigns for load zones nearby wherever there is a load zone loss. In addition, if short-term paid parking is removed on commercial corridors as part of final design, SDOT will look for opportunities to convert unpaid parking to paid parking where feasible to increase turnover and better support businesses. The parking space and load zone impacts in each segment are described as follows:

Fremont Segment

In the Fremont Segment, several concepts would result in parking/loading impacts. The concept to improve and expand stops and potential new protected bike lane on Fremont Ave N northbound between N 34th St and N 35th St must take the entire blockface on the east side. However, most of this blockface is already designed as bus/no parking zones so the impact would be one space near N 35th St, which is already parking restricted during daytime hours. The protected bike lane on Fremont Ave N northbound between N 35th St and N 36th St would result in removing approximately three parking spaces on the west side of this section. The installation of the bus bulb to the existing far-side stop on N 36th St eastbound at 1st Ave NW would result in a loss of one parking space. The installation of the bus bulb to the existing far-side stop on N 36th St westbound at Dayton Ave N would result in a loss of one parking space. The net impact for the segment is a loss of approximately six parking spaces, including three paid spaces, and no loss of load zones. Overall, the loss of these six spaces represent a small fraction of the street parking available in the Fremont Segment subarea. Therefore, this is a level of change that is expected to be able to be absorbed within the street parking available within the business district, although there may be times when occupancy remains over 100%. At which point, SDOT may make paid parking rate or other parking regulatory adjustments to ensure appropriate customer parking access.

Ballard Bridge Segment

In the Ballard Bridge Segment, one concept would result in parking/loading impacts. The restriping of the channelization on the short section of NW 48th St at NW Leary Way would create an additional five parking spaces on the left side of this one-way leg. Adding bus bulbs on Leary Ave NW at NW Dock Pl (both far-side) would take away several parking spaces. However, these new bus stops would be relocated from those at NW Lone Pl. Therefore, roughly the same number of parking spaces would be gained at NW Lone Pl. The net impact for the segment is a gain of approximately five parking spaces and no loss of load zones.

Ballard/Market Segment

In the Ballard/Market Segment, there is one concept that would result in parking/loading impacts. On NW Market St, extending bus zones/bus bulbs in both directions between Ballard Ave NW and 22nd Ave NW would take away four parking spaces on the north side and two

parking spaces on the south side. The net impact for this segment is a loss of approximately six paid parking spaces and no loss of load zones. As design advances, SDOT will revisit the needs of bus standing for extending bus zones/bus bulbs on both sides. Potentially, two spaces on the north side and two spaces on the south side could be saved. Overall, the loss of these six spaces represent less than one percent of street parking available in the Ballard/Market Segment subarea. Therefore, these potential paid parking space changes along NW Market St are a level of change that is expected to be able to be absorbed within the street parking available broadly within the business district, although there may be times when occupancy exceeds 85%. At which point, SDOT may make paid parking rate or other parking regulatory adjustments, such as adding paid parking to other commercial blocks, to ensure appropriate customer parking access.

Corridor-wide Total

The proposed improvements would result in a net loss of approximately seven parking spaces, including a net loss of nine paid spaces, but no loss of load zones. Overall, there is significant street parking in the vicinity, both in terms of total number of spaces and the percentage of spaces available throughout the day. The proposed removed spaces represent a small percentage of the total spaces available in the vicinity of the project. Therefore, the changes are not expected to have a major effect on access to business and residential properties in these areas. For the two areas with paid street parking – downtown Ballard and Fremont – the SDOT Curbside Management team has an ongoing program to regularly analyze paid parking occupancy and make changes to the parking rates such that one to two parking spaces are open and available throughout the day. In that manner, changes to paid spaces – losses or additions – can be managed with changes to the parking rates to ensure that City access and other transportation goals are met.

3.5 Safety

3.5.1 Vehicular Collisions

Under the No Build Option, no changes are anticipated that would affect safety or reduce the prevalence and severity of vehicle conflict points and vehicle speeds. Under the Build Option, vehicular safety is likely to improve or remain similar along streets in the corridor through having additional dedicated roadway spaces for buses that would reduce conflicts and opportunities for collisions. The rechannelization due to road diet with a two-way left turn lane on N 36th St and Leary Ave NW sections would improve safety through reduced vehicle-to-vehicle conflict points, speeds, and speed differential. Additional roadway changes (e.g. paving and restriping) are not expected to substantially affect the frequency or severity of vehicular collisions in the study area.

3.5.2 Pedestrian and Bicycle Collisions

As part of the No Build Option, projects implemented as part of the Bicycle Master Plan (BMP), would provide for treatments that are expected to improve non-motorized safety compared to existing conditions, including on streets located along the Route 40 corridor as well as adjacent streets or off-street facilities. Because fewer cyclists ride along the corridor itself, intersections along the Route 40 corridor are the most likely points of conflict between buses and bikes. In

addition to the above improvements, the Build Option would provide for the following bicycle improvements which are anticipated to have a positive impact on safety:

- Northbound protected bike lane on Fremont Ave N between N 34th St and N 36th St (Fremont Segment). At the time of writing, the decision on carrying this concept between N 34th St and N 35th St past 30% design is pending.
- Bicycle facility improvements in the southbound direction between Fremont Bridge and Nickerson St including bike box and bike dots in northbound lanes directing cyclists toward bike ramp approaching bridge.

Under the Build Option, new pedestrian bulbs along the corridor would improve pedestrian and cyclist safety, including N 36th St at Phinney Ave N, Fremont Pl N at N 35th St, and N 36th St at Dayton Ave N. New ADA curb ramps would also be added at intersections along Fremont Ave N and NW Leary Way. Additional pedestrian safety features include a median pedestrian refuge island on Leary Ave NW between 20th Ave NW and NW Market St as well as a new pedestrian signal and crosswalk at on Westlake Ave N at Halladay St.

3.6 Freight

3.6.1 Freight Operations

SDOT has designated a network of “Truck Streets” with different freight classes. Streets may be “Major” or “Minor” in class. Major truck streets are arterial streets serving connections to the regional network, between and through industrial land uses, commercial districts, and urban centers. They accommodate significant freight movement through the city, and to and from major freight traffic generators. Minor truck streets make connections for goods delivery to urban villages and neighborhood commercial districts and provide secondary connections for regional through trips in case of disruption to the major truck street network.

Most of the Route 40 corridor contains major and minor truck streets, as follows:

- Westlake Ave N north of Mercer St (major)
- Fremont Ave N/N 36th St/Leary Way NW/NW Leary Way/Leary Ave NW from Fremont Bridge to NW Market St (major)
- NW Market St between Leary Ave NW and 24th Ave NW (major)
- 15th Ave NW/Holman Rd NW/N 105th St/N Northgate Way between NW 85th St and Meridian Ave N (major)
- 24th Ave NW between NW Market St and NW 85th St (minor)
- NW 85th St between 24th Ave NW and 15th Ave NW (minor)

The Build Option does not contain substantial roadway channelization or street modifications that would impact freight operations. Traffic conditions would mostly stay similar in the Build Option compared to the No Build Option according to the intersection delay and Level of Service (LOS) analysis performed (**Section 3.2.3**). There are two intersections where LOS from D or better degrades to E or F. These are 4th Ave N/Nickerson St/Dexter Ave N/Westlake Ave N and Leary Ave NW/NW Dock Pl. They are both on designated major truck routes. The former is

caused by the delay increase on the Westlake Ave N westbound approach, but the total intersection delay increases by approximately 6 seconds (in the PM peak hour). The latter is caused by the delay increase on side-street NW Dock Pl, which is not a designated truck route. Therefore, freight operations are not expected to be significantly affected by the Build Option.

In an effort to improve freight mobility, SDOT is developing a Freight Lane Policy that builds upon a Freight Master Plan strategy to integrate and balance freight improvements with other transportation modes. The Freight Lane Policy includes action items to explore freight-only and shared transit/freight-only lanes. These types of lanes will be considered in locations where they can improve freight mobility and avoid negative impacts to other transportation system users.

Therefore, SDOT is launching a pilot program to evaluate the freight-only lane and freight and bus (FAB) lane before permanent installation. The following factors are considered to determine locations for the pilot FAB lanes:

- Transit volumes do not exceed 20 buses per hour during peak periods
- Transit reliability and rider experience
- Compatibility between transit buses and freight trucks

One segment of the Route 40 corridor has been identified to implement a FAB lane pilot project – Westlake Ave N between the 4th Ave N and 9th Ave N intersections. This segment along Westlake Ave N is a designated major truck street that accommodates freight movement through the city, and to/from major freight traffic generators. Allowing freight trucks over 26,000 pounds to use the FAB lanes is anticipated to improve freight regional mobility and local access while maintaining uncongested travel for buses.

The Route 40 currently runs at 10-minute headways during peak periods, or six buses per hour per direction. Traffic counts estimate that between approximately 20 and 50 heavy vehicles (including buses) per hour per direction use Westlake Ave N during peak periods. Hence, including both buses and freight, the Westlake Ave N FAB lane would be anticipated to serve no more than 50 vehicles per hour per direction. At this volume, very limited impact to transit operations is expected. Due to the unique markets served by each major freight route in Seattle, any induced freight demand onto Westlake Ave N from other corridors due to the FAB lane is expected to be minimal.

For the pilot, the FAB lane would operate 24/7 because most of the truck traffic avoids peak bus travel demand, and uniform hours allows for easier messaging to the public and clearer signing of the corridor.

The FAB pilot will include an evaluation period. Changes can be made to the FAB lane based on the evaluation.

Below outlines the proposed evaluation schedule:

- 0-3 months: gather data for bus only use;
- 3-6 months: gather data for FAB, and perform preliminary evaluation
- 6-9 months: continue to gather data for FAB, and survey transit and businesses
- 9-12 months: make final recommendations and implement identified changes

This evaluation of the pilot will be conducted to ensure investments in this project provide and maintain the transit benefit. Data collected for the pilot will at minimum include volumes by mode (transit, freight, general purpose), violation rates, and travel times by mode, along with feedback from KCM and businesses that use the FAB lane. Based on this data collection and analysis effort, adjustments to the pilot project could be made, such as modifying hours or types of trucks that can use the FAB lane, along with other operational adjustments, including changes to signing, changes to signal timing and phasing, and modifications to transit signal priority.

3.6.2 Freight Access

As described in **Section 3.4**, the Build Option is not expected to remove any load zones throughout the corridor. Therefore, the impacts to freight access in the Build Option are expected to be minimal.

The pilot FAB lane on Westlake Ave N between the 4th Ave N and 9th Ave N intersections would improve local freight access. Freight trucks accessing businesses on both sides of Westlake Ave N would benefit most from using the FAB lane.

4.0 CONSTRUCTION

This section discusses the potential impacts that would be caused by the construction of the proposed Route 40 corridor improvements.

4.1 Construction Scope and Activities

Construction of the Route 40 corridor improvements would involve the following activities:

- Installation of temporary traffic control measures
- Removal and replacement of existing pavement
- Construction of new pavement, curbs, sidewalks, and curb ramps
- Relocation, modification, or protection of utilities in conflict with or affected by corridor improvements
- Installation of drainage systems such as collection locations and detention facilities
- Construction, relocation, and modifications of bus zones
- Installation of traffic signal improvements
- Signage and pavement markings

4.2 Construction Duration and Phasing

Construction of the Route 40 TPMC would require approximately 200 working days to complete, but new construction impacts would be much shorter in duration.

4.3 Construction Impacts

Construction is planned to be primarily limited to the existing right-of-way but may require temporary construction easements. In general, one lane of traffic adjacent to the bus zone would be temporarily closed. For some work elements, such as traffic signal work, paving, and utility work, portions of streets may need to be closed for short periods; including potentially a full closure of Fremont Ave N between N 34th St and N 35th St where curb to curb pavement restoration is proposed.

To avoid and/or minimize impacts during construction, SDOT will develop a construction management plan that will require the contractor to follow industry best practices and specific construction mitigation measures as outlined herein for each resource. The construction management plan related to transportation will include the following:

- A transit and traffic control plan
- A public information plan
- Emergency route plan

SDOT will minimize the duration of construction impacts through:

- Curbspace loading plan and implantation prior to construction start
- Construction phasing and scheduling that provides the most efficient schedule opportunities for a given segment
- Coordination with other projects in the area

Signal improvements would also require temporary signal deactivation or configurations. During construction, work zone traffic control measures would help to ensure vehicles are able to navigate safely through or around construction areas. To the extent feasible, access to adjacent properties would be maintained along the corridor.

Lane closures in Fremont, Ballard, and along Westlake Ave N would affect transit service, including temporary stop closures and delays to buses from congestion. It is expected that the transit routes would continue along their routes and not require detours. At existing stops that would be built, bus zone construction would require temporary relocation of the stop.

Bus zone construction would generally require the closure of the surrounding sidewalk near that zone. At intersections where construction work would take place, one or more crossing movements could be temporarily closed. In these conditions, pedestrians would need to use an adjacent crossing or cross the street using the other intersection crossings.

Bicycles would be required to detour from bicycle lanes to general purpose travel lanes where those facilities overlap with civil and signal construction work, such as along Fremont Ave N and N 36th St. Cyclists continuing to ride on the corridor may need to ride over disturbed asphalt or steel plates, and in lanes with general purpose traffic. Alternatively, they would have the option of using parallel facilities along the corridor.

Most of the Build Option construction activities would likely temporarily restrict parking along the street segment being constructed. Parking along the cross-streets or on parallel streets is less likely to be affected by construction. The loss of parking would only be temporary for the duration of the construction in that area. Various load zones would also be relocated prior to start of construction in the areas where on-street parking is removed during construction where feasible. Outreach will occur prior to construction with adjacent property owners.

5.0 INDIRECT IMPACTS

Indirect effects result from one project, but unlike direct effects, they typically involve a chain of cause-and-effect relationships that can take time to develop and can occur at a distance from the Route 40 corridor improvements. Induced growth or growth-inducing effects are terms used to mean indirect effects related to changes in land use, population density, or growth rate.

The Route 40 corridor improvements are spread out along the entire corridor. Unlike fixed guideway projects, the proposed Route 40 improvements are limited to transit, bike and pedestrian improvements. These improvements are unlikely to change land use patterns or induce population growth.

6.0 CUMULATIVE IMPACTS

This section discusses potential consequences of constructing the Build Option combined with other future transportation system changes. The analysis of the No Build Option and Build Option is inherently cumulative because it is based on regional forecasts that assume future funded projects and future population and employment growth that is consistent with adopted land use plans. However, other planned, but not funded, regional and local transportation and development projects could have some effects on transit ridership and travel patterns within the study area.

6.1 Parking

As noted in **Section 3.4**, the Build Option would remove on-street parking spaces in the Fremont, Ballard Bridge, and Ballard/Market study segments. These impacts include removing approximately seven parking spaces. In addition to parking impacts caused by the Route 40 TPMC, subsequent changes to curb space management policies and measures may also impact the parking supply and utilization in the Fremont and Ballard areas in the future.

6.2 General Population and Employment Growth

The future transportation impacts discussed in **Section 3.0** were based on the results of modeling that incorporates funded and approved future actions as well as projected growth that would include development in the region. Unforeseen changes to the pace and pattern of development projects could affect transit ridership and travel patterns within the study area, including traffic operations and parking near bus zones. These changes could affect how people access the bus. An increase in development intensity would likely be accompanied by an increase in people walking or biking to a bus stop as nearby development occurs and planned nonmotorized facilities are implemented. If development slows, the reverse will likely occur.

6.3 Construction

Section 4.0, Construction, covers the impacts of the Build Option. Additional consideration should be given to the construction schedule in conjunction with other activities in the corridor. For example, construction will likely overlap with Seattle Public Utilities' Wallingford Conveyance Project. This will close portions of N 34th St, N 35th St, and Stone Way N, which could all be on the detour route for any closures of this block. Continued coordination with other area SDOT projects and other projects in SDOT's right-of-way will be required to minimize overlapping of projects to avoid multiple sequential construction impacts to the same street segments. Therefore, there is not an expectation of cumulative effects caused by construction activities from multiple projects in the area combined with the Build Option construction period.