BURKE-GILMAN TRAIL MISSING LINK PROJECT

Seattle Department of Transportation

Final Environmental Impact Statement

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Seattle
Department of
Transportation

BURKE-GILMAN TRAIL MISSING LINK PROJECT

Transportation Discipline Report

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Final Environmental Impact Statement
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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
Ballard Locks	Hiram M. Chittenden Locks
BINMIC	Ballard-Interbay-Northend Manufacturing and Industrial Center
BGT Missing Link	Burke-Gilman Trail Missing Link
BGT	Burke-Gilman Trail
BTR	Ballard Terminal Railroad Co.
City	City of Seattle
CSO	combined sewer overflow
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
GMA	Growth Management Act
LOS	level of service
mph	miles per hour
NACTO	National Association of City Transportation Officials
PSRC	Puget Sound Regional Council
RCW	Revised Code of Washington
SDOT	Seattle Department of Transportation
Ship Canal	Lake Washington Ship Canal
SMC	Seattle Municipal Code
Sound Transit	Central Puget Sound Regional Transit Authority
SPU	Seattle Public Utilities
USDOT	United States Department of Transportation
WSDOT	Washington State Department of Transportation

EXECUTIVE SUMMARY

This Transportation Discipline Report describes the existing conditions for all transportation modes and facilities within and near the footprint of the Burke-Gilman Trail Missing Link (BGT Missing Link) and analyzes the potential impacts of project construction and operation on these resources. Existing conditions, impacts, and mitigation for parking are evaluated in a separate Parking Discipline Report.

The Transportation Discipline Report was updated to reflect comments received on the Draft Environmental Impact Statement and to include analysis of the Preferred Alternative. Additional intersection and driveway data were collected to provide more information on potential transportation and freight impacts. Interviews were conducted with a sample of driveway owners to better understand driveway operations; vehicle types; driveway usage by time of day, week, and year; frequency of driveway users; number of driveways; and estimated vehicle volumes. Other edits were made to the Transportation Discipline Report to correct errors and improve clarity.

The study area selected for the BGT Missing Link transportation analysis is the area bounded by 32nd Ave NW to the west, NW 56th St/20th Ave NW/Leary Ave NW to the north, 11th Ave NW to the east, and Shilshole Ave NW/NW 45th St to the south.

The transportation modes that exist within the study area consist of general-purpose vehicles, freight, nonmotorized (pedestrian and bicycle), public transportation, and short line rail. The facilities within the study area that are associated with these modes are the street network, facilities for nonmotorized users, public transportation facilities, and rail facilities. Transportation safety was also analyzed as part of this report.

Activities during construction of any of the Build Alternatives could affect transportation in the study area by temporarily increasing congestion and altering local access. It is anticipated that increases in congestion and delay in the study area would be relatively minor because construction would occur in short segments, between three and four street blocks in length, and other local streets would remain open. For all of the Build Alternatives, any street closures along the alignments would likely occur during midday for several hours and would be temporary.

The construction duration of the entire project would be 12 to 18 months. During street closures, traffic would be routed around active construction areas. Pedestrian and bicycle access would be maintained during construction of any of the Build Alternatives. This would minimize impacts on nonmotorized users. The functionality of the overall street network within the study area would be maintained during construction. Public transportation facilities would also be maintained and impacts on public transit would be minimal.

No substantial impacts on rail facilities would occur during construction because rail service would continue. However, the Preferred Alternative and the Shilshole South Alternative would require track relocation, which would be coordinated with the rail provider to reduce disruption to track use. All construction activities near the rail line would be coordinated with the rail line operator and the Federal Railroad Administration and would adhere to federal requirements for construction near rail facilities. Various mitigation measures, including construction planning and public information and outreach, would minimize construction impacts on transportation resources.

All of the Build Alternatives would complete the Burke-Gilman Trail between 11th Ave NW/NW 45th St and the Hiram M. Chittenden (Ballard) Locks. The project would create a safely designed, direct, and defined multi-use trail for persons of all abilities, and improve predictability for all motorized and nonmotorized users along the project alignment. Under the Preferred, Shilshole South, Shilshole North, and Ballard Avenue Alternatives, intersection levels of service and delays for vehicle traffic would be similar or better at most intersections compared to the No Build Alternative. Under the Leary Alternative,

intersection level of service would be reduced to E or F, or delay would be increased by 5 seconds or more, when the intersection would also operate at LOS E or F at four intersections compared to the No Build Alternative. This is because Leary Ave NW, NW Leary Way, and NW Market St between the Ballard Locks and 24th Ave NW would be reduced by one lane to accommodate the multi-use trail. NW Market St would also be reduced by one lane under the Preferred and Shilshole North Alternatives, but this would not worsen intersection operations on NW Market St under those alternatives.

Under all of the Build Alternatives, some properties adjacent to the City of Seattle right-of-way could experience changes in driveway or loading dock access (impacts to loading zone parking spaces is summarized in the Parking Discipline Report). Changes could include reorientation of driveways or loading docks. Businesses that are currently using the public right-of-way for loading and unloading activities would have to modify their activities under any of the Build Alternatives.

Public transit would not be substantially affected under the Preferred, Shilshole South, Shilshole North, and Ballard Avenue Alternatives because there would be no additional delay on transit corridors; moreover, transit service would be able to operate similarly to the No Build Alternative. Under the Leary Alternative, increased congestion and delay on Leary Ave NW and NW Leary Way could affect public transportation. Under all of the Build Alternatives, the trail would provide a safer and clearly delineated facility for nonmotorized travel.

CHAPTER 1 INTRODUCTION AND PROJECT HISTORY

1.1 Introduction to the Project

The Burke-Gilman Trail (BGT) is a regional trail that runs east from Golden Gardens Park in Ballard and connects to the Sammamish River Trail in Bothell. Currently, the regional trail ends at the intersection of 11th Ave NW and NW 45th St on the east, and begins again at 30th Ave NW at the Hiram M. Chittenden (Ballard) Locks on the west. The City of Seattle Department of Transportation (SDOT) proposes to connect these two segments of the BGT with a marked, dedicated route for all users. The proposed project to connect the two existing portions of the BGT through the Ballard neighborhood, referred to as the Missing Link project, would complete the regional facility.

Completing this section of the BGT has been discussed since the late 1980s. Refer to the Final Environmental Impact Statement (EIS) for a comprehensive project history summary.

1.2 No Build Alternative

The No Build Alternative would result in no new multi-use trail connecting the existing two end points of the regional Burke-Gilman Trail. Trail users would continue to connect between the points using existing surface streets and sidewalks.

1.3 Build Alternatives

1.3.1 Preferred Alternative

Under the Preferred Alternative, the multi-use trail would be routed along NW 54th St, NW Market St, the southern side of Shilshole Ave NW, and NW 45th St (Figure 1-1). Beginning at the existing western trail end (at the Ballard Locks), the trail would continue east along the south side of NW 54th St until it turns into NW Market St. On NW 54th St, the westbound left-turn pocket provided at the Ballard Locks driveway that is adjacent to the Lockspot Café would be removed and replaced at 32nd Ave NW. The public angled parking lot along NW 54th St would be reoriented to provide eastbound one-way travel with angled parking. The trail would continue along the south side of NW Market St until the intersection with 24th Ave NW. Between the terminus of the existing trail and the intersection of NW Market St and 24th Ave NW, the Preferred Alternative follows the same route as both the Shilshole North and Leary Alternatives.

At the intersection of NW Market St and 24th Ave NW, the Preferred Alternative would head south on the west side of 24th Ave NW for approximately 125 feet before the intersection with the south side of Shilshole Ave NW.

The Preferred Alternative would then cross 24th Ave NW and proceed along the south side of Shilshole Ave NW, continuing onto the south side of NW 45th St to 11th Ave NW and the eastern terminus of the trail. This section of the Preferred Alternative route is identical to the Shilshole South Alternative.

A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW. The signal would facilitate nonmotorized user crossings of Shilshole Ave NW and allow for better traffic flow between Shilshole Ave NW and 17th Ave NW that would benefit traffic mobility and trail users.

SDOT selected the route components of the Preferred Alternative to balance benefits with potential impacts of constructing and operating the BGT Missing Link. Similar to the other alternatives, there would be changes to parking areas, travel and motor vehicle lanes, as well as intersection configurations on both sides of the streets along the Preferred Alternative. The trail would accommodate users on a newly paved surface for its entire length.

The trail width would vary throughout the corridor due to existing conditions and constraints, but would generally be between 10- and 12-feet wide. Based on the design concepts, the typical right-of-way on Shilshole Ave NW would include a barrier or buffer zone adjacent to the railroad tracks and vehicle travel lanes, a multi-use trail, two vehicle travel lanes, and preservation or addition of parking areas where feasible.

1.3.2 Shilshole South Alternative

Under the Shilshole South Alternative, the multi-use trail would be primarily routed along the south side of Shilshole Ave NW (Figure 1-1). There would be changes to parking, lanes, and intersection configurations on both sides of the street with this alternative. The trail would accommodate users on a newly paved surface for the majority of its length.

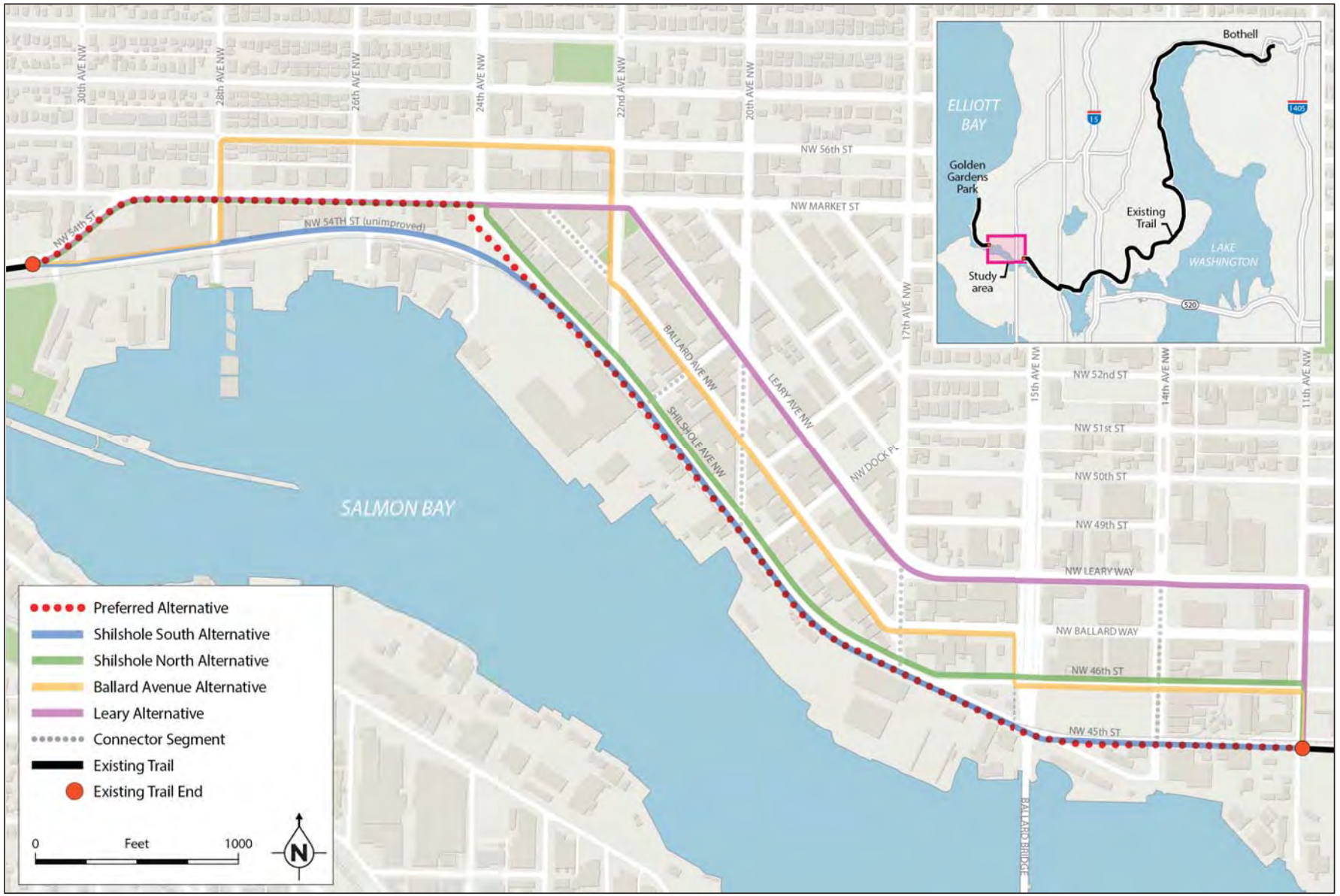
Beginning at the existing trail end at the Ballard Locks, the trail would continue along the north side of the NW 54th St right-of-way until the intersection with Shilshole Ave NW, just east of 24th Ave NW. The trail would then proceed along the southern side of Shilshole Ave NW, continuing onto the southern side of NW 45th St to the eastern project end at 11th Ave NW. From the existing trail end at the Ballard Locks, the trail would be north of the railroad tracks until just before 17th Ave NW, where the trail would jog to the south of the tracks. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW to improve safety for trail users crossing Shilshole Ave NW to access 17th Ave NW.

The trail width would vary throughout the corridor due to existing conditions and constraints. Based upon the design concepts, the typical right-of-way section would include a buffer zone adjacent to the railroad tracks and vehicle traffic lanes, a multi-use trail, two vehicle travel lanes, and preservation of parking areas where feasible.

1.3.3 Shilshole North Alternative

Under the Shilshole North Alternative, the multi-use trail would be primarily routed along the northern side of Shilshole Ave NW (Figure 1-1). Beginning at the existing trail end at the Ballard Locks, the trail would continue along the south side of NW 54th St until it turns into NW Market St. The trail would continue along the south side of NW Market St until it crosses 24th Ave NW and turns south on the eastern side of 24th Ave NW. The trail would then proceed along the northern side of Shilshole Ave NW to the intersection with NW 46th St. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW to improve safety for trail users crossing 17th Ave NW. It would continue along the northern side of NW 46th St underneath the Ballard Bridge to 11th Ave NW. At this point, the trail would turn south along the east side of 11th Ave NW until it connects to the eastern end of the trail at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the streets in this alternative. The Shilshole Ave NW right-of-way would include a buffer zone adjacent to the railroad tracks or vehicle travel lanes, multi-use trail, sidewalk, parallel parking area, and two vehicle travel lanes. The existing gravel shoulder on the south side of Shilshole Ave NW would be maintained. These elements would vary along the trail due to the existing road configuration and structures.



Burke-Gilman Trail Missing Link

Figure 1-1
Proposed Alternatives

April 2017

1.3.4 Ballard Avenue Alternative

Under the Ballard Avenue Alternative, the multi-use trail would be primarily routed along the southern side of Ballard Ave NW (Figure 1-1). Beginning at the existing trail end at the Ballard Locks, the trail would continue along the north side of NW 54th St until 28th Ave NW. At this point, the trail would turn north along the eastern side of 28th Ave NW until it reaches NW 56th St. The trail would then turn east along the south side of NW 56th St to the intersection with 22nd Ave NW. At 24th Ave NW and NW 56th St a new pedestrian-activated signal would be installed to facilitate the trail crossing of 24th Ave NW. The trail would turn south along the western side of 22nd Ave NW, cross NW Market St, and proceed south to Ballard Ave NW. At this point, the trail would turn southeasterly along the south side of Ballard Ave NW and then continue east on the south side of NW Ballard Way to the intersection with 15th Ave NW. The trail would then turn south onto the one-way road on the west side of 15th Ave NW, which could potentially be converted to trail only use (no motor vehicles). The trail would cross to the south side of NW 46th St at a newly signalized intersection and proceed east across 11th Ave NW. It would then turn south along the eastern side of 11th Ave NW to the eastern trail end located at NW 45th St.

There would be changes to parking and vehicle travel lane configurations on all streets traversed by this alternative. The right-of-way would include a buffer zone, pedestrian sidewalk, two vehicle travel lanes, and an adjacent parking area. In addition to the multi-use trail, sidewalks would be included on both sides of the street. These elements would vary along the trail due to the existing road configurations and structures.

1.3.5 Leary Alternative

Under the Leary Alternative, the multi-use trail would be primarily routed along the southern side of Leary Ave NW (Figure 1-1). Beginning at the existing trail end at the Ballard Locks, the trail would continue along the south side of NW 54th St until it turns into NW Market St. The trail would continue east along the south side of NW Market St, crossing 22nd Ave NW. At 22nd Ave NW, the trail would turn southeasterly on the south side of Leary Ave NW. The trail would continue along the south side of Leary Ave NW, which becomes NW Leary Way, to 11th Ave NW. At this point, the trail would turn south along the east side of 11th Ave NW to the current trail end at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the streets with this alternative. The typical Leary Ave NW right-of-way would include a buffer zone, multi-use trail, parking areas on both sides of the street, sidewalks on both sides of the street, two vehicle travel lanes, and one two-way center left-turn lane. The typical NW Market St right-of-way would include a sidewalk, the multi-use trail, a buffer zone, two vehicle travel lanes, center turn lane, and parking areas on both sides of the street. These elements would vary throughout the trail length due to the existing road configuration and structures.

1.3.6 Connector Segments

There were a number of possibilities to connect segments of the routes that were evaluated in the Draft EIS. The six segments listed below were identified as the most likely connectors (Figure 1-1).

- Ballard Ave NW Segment;
- NW Vernon Pl Segment;
- 20th Ave NW Segment;
- 17th Ave NW Segment;
- 15th Ave NW Segment; and
- 14th Ave NW Segment.

The Preferred Alternative does not use any of these connector segments.

1.4 Features Common to All Build Alternatives

Roadway designs would vary for each alternative based on factors such as intersection geometry, vehicle volumes, and types of vehicles. The features described below are common to all Build Alternatives, but the location and other specifications would vary according to the alternative considered.

1.4.1 Roadway Modifications

Adding a trail to the street system would require roadway modifications for vehicles to co-exist with nonmotorized users. These changes could include geometric changes to create perpendicular intersections, changes to roadway lane configurations, alterations of curb radii, and design details that provide sight lines between vehicles and nonmotorized users.

1.4.2 Intersection Design

Intersections would be designed to more clearly identify crossings of the multi-use trail. These improvements could include the following:

- Curb extensions or curb bulbs;
- Pavement markings;
- Raised crosswalks;
- Conversion of the intersection to a driveway-style entrance;
- Signalized intersections;
- Rapid-flashing beacons at road crossings of the trail;
- Medians to improve the street crossing for pedestrians or to restrict left turns across the trail;
- In some locations, barriers, fences, or buffers to separate nonmotorized trail users from moving vehicular traffic or the railroad; and
- Alternative pavement treatments.

1.4.3 Driveway Design

Driveways that cross or intersect with the multi-use trail would also be evaluated for possible design changes. Design changes could include many of the intersection elements described above, including curb bulbs, pavement markings, and restricted parking. Driveways and loading docks would be reconfigured so that parked vehicles or trucks would not block the trail. Some driveways may be eliminated, relocated, or consolidated in the case of multiple driveways at a single property.

1.4.4 Parking Modifications

Parking in some private lots may be affected by changes to property access resulting from the multi-use trail. For example, striping in parking lots may need to be modified to prevent vehicles from blocking the trail when parked, which may result in a reduction of parking spaces in some lots.

1.5 Construction Methods

This section describes the construction methods that the City of Seattle (City) currently anticipates using for the Build Alternatives, including the Preferred Alternative. Because of the dynamic nature of construction, the sequencing, extent, and timing of construction activities would vary to some degree from those described here. However, this description represents a reasonable scenario that allows an understanding of the range of potential methods that could be used as the project is being built.

Overall construction of any of the Build Alternatives, including the Preferred Alternative, is anticipated to last 12 to 18 months. Duration would vary depending upon the extent of utility relocations required, storm drainage improvements, and existing roadway reconfigurations, including bus stop relocations. It is anticipated that construction would occur in segments, and that one segment would be completed before moving on to the next segment to minimize the construction duration at any given location.

1.5.1 Construction Activities

Construction of any of the Build Alternatives, including the Preferred Alternative, is expected to consist of the following general activities:

- Demolition, including removal of pavement, curbs, sidewalks, driveways, trees, signs, bus shelters, fencing, or other features located in the future trail area;
- Construction of new roadway elements including pavement, curbs and gutters, sidewalks, driveways, trees, bus shelters, fencing, signs, and buffer elements. Buffer elements include paving, landscaping, barriers, fencing, and signage, etc.
- Utility relocations ranging from moving fire hydrants, stormwater catch basins, and overhead utility and power poles to installing new drainage facilities.

1.5.2 Construction Staging

Construction staging and scheduling is typically determined by the contractor; however, the City will establish some restrictions to which the contractor must adhere. It is anticipated that the project would be constructed in multiple (roughly 3 to 5) smaller segments. It is likely that demolition would be limited to a certain length of the trail at any given time.

The project would generally use areas within or near the project footprint for construction staging and storing materials and equipment. These areas could include vacant lots, parking lots, and unused rights-of-way. Temporary construction offices, such as trailers, could also be located in these areas or in a rented office space. All staging areas would be restored to their pre-construction condition or better.

1.5.3 Construction Timing and Road Closures

Based on the alternative, including the Preferred Alternative, and specific design features selected, construction is estimated to occur over a 12- to 18-month duration. Construction work would occur primarily during typical daylight weekday work hours. However, night and/or weekend work could be scheduled for construction at high-volume intersections and driveways.

Throughout construction, the City would maintain access to private property, and would notify property owners in advance of activities that might temporarily limit access. If properties have multiple access points, one driveway could be closed while the other remains open. Pedestrian access would also be maintained where it exists currently, in which commercial businesses remain open and residential and industrial properties are accessible. Temporary pedestrian access would comply with the Americans with Disabilities Act (ADA); options may include temporary asphalt paths, steel plates, fabricated timber

walkway with handrails, or a cordoned section of the roadway. Specific methods would be determined by the contractor, subject to review and approval by SDOT.

Construction activities could result in temporary removal of on-street parking and restrictions in travel lanes such as full-lane closures or flagger-controlled travel through the construction zone. Clearly signed detour routes would be provided around construction areas.

1.5.4 Construction Sequencing

The sequence of construction activities is typically determined by the contractor, in consultation with, and with concurrence from, the City.

1.5.5 Worker Access and Parking

The contractor is expected to establish a job site office, which could be located in existing office space within the project vicinity or elsewhere along the Preferred Alternative route in a trailer. While a limited number of construction workers would park at the job site, other construction workers may be required to park away from the construction site in order to preserve parking for local businesses and customers to the greatest extent feasible.

1.5.6 Construction Traffic and Haul Routes

Construction would generate traffic to transport materials and equipment to the work site and to remove demolition debris and excess soil. The contractor would require access to the site for heavy vehicles such as dump trucks and concrete trucks, light vehicles such as pickup trucks, and heavy equipment such as excavators and compactors. Material transport for project construction would be by truck. The contractor would determine the best construction methods as permitted by the City and in conformance with the project construction plans and specifications. The exact number of truck trips per day during construction cannot yet be determined because project design is not complete. However, preliminary estimates indicate that the highest number would be approximately 20 round-trip truck trips per work day during a paving operation, spread uniformly throughout the day. City streets that could be used as haul routes include Shilshole Ave NW, NW 46th St, NW Leary Way/Leary Way NW, and 15th Ave NW.

CHAPTER 2 REGULATORY CONTEXT

Transportation facilities and functions are governed by federal, state, regional, and local laws, plans, and policies. These identify goals, infrastructure needs, and performance standards for various transportation modes and systems. This chapter provides a summary of laws, plans, and policies that apply to the BGT Missing Link transportation analysis.

2.1 Federal Laws and Regulations

The United States Department of Transportation (USDOT) signed the Policy Statement on Bicycle and Pedestrian Regulations and Recommendations in March 2010, which reflects the department's "support for the development of fully integrated active transportation networks" (FHWA, 2010). The Policy Statement requires that federal-aid projects include walking and bicycling components. The policy also encourages transportation agencies to go beyond the minimum requirements for inclusion of bicycle and pedestrian facilities to reduce the need to retrofit, and to proactively provide convenient, safe, and context-sensitive facilities that encourage increased nonmotorized use by users of all ages and abilities. The minimum requirements for inclusion of bicycle and pedestrian facilities vary by jurisdiction.

2.2 State Laws and Regulations

2.2.1 Washington State Growth Management Act

The Washington State Growth Management Act (GMA) sets goals, compliance deadlines, and direction for state and local governments to manage Washington's growth (Revised Code of Washington [RCW] 36.70A.070). The GMA includes a set of planning goals that local governments use to guide planning efforts, such as comprehensive plans and local development. The Seattle Comprehensive Plan, including its most recent draft of the Transportation Element (described below), was developed in compliance with the GMA. Development of alternatives for the BGT Missing Link was guided by the multimodal transportation policies included in the GMA and the Seattle Comprehensive Plan.

2.2.2 Washington State Transportation Plan

The Washington State Transportation Plan defines the vision for transportation in Washington State and identifies recommended actions for transportation investment over a 20-year period (WSDOT, 2015). The Washington State Transportation Plan is currently being updated, with the final phase to be completed by December 2017.

The vision of the Washington State Transportation Plan is:

> "By 2035, Washington's transportation system safely connects people and communities, fostering commerce, operating seamlessly across boundaries, and providing travel options to achieve an environmentally and financially sustainable system."

Transportation recommendations included in the plan aim to preserve the state's transportation system, improve safety, encourage economic vitality, improve mobility, and protect the environmental quality and health of transportation facilities. Several recommendations are intended to improve safety, nonmotorized access, public transit, and freight movement in Washington State.

2.2.3 Washington State Bicycle Facilities and Pedestrian Walkways Plan

The Washington State Bicycle Facilities and Pedestrian Walkways Plan establishes Washington's vision for statewide bicycle and pedestrian transportation needs (WSDOT, 2008). The vision included in the plan is to double walking and cycling while decreasing collisions by 5% in the next 20 years. SDOT has a plan called Vision Zero to end all collisions within the city of Seattle by 2030 (City of Seattle, SDOT, and the Seattle Police Department, 2015); see Section 2.4.10. The Bicycle Facilities and Pedestrian Walkways Plan also establishes objectives and performance measures for each of the state's transportation policy areas. The BGT Missing Link project is included in the plan as a locally identified need.

2.3 Regional Laws and Regulations

The Puget Sound Regional Council (PSRC) adopted Transportation 2040 in May 2010 with amendments adopted in May 2014. Transportation 2040 is an updated regional transportation plan that addresses critical issues such as congestion and mobility, the environment, and transportation finance in the central Puget Sound region (PSRC, 2010). The goals and policies in Transportation 2040 were used to guide the transportation system elements included in the BGT Missing Link project. This project is included in Transportation 2040 as a Tier 1 bicycling facility. Tier 1 facilities have been identified in the Transportation 2040 plan as the highest priority because they optimally connect regional destinations.

2.4 Local Laws and Regulations

2.4.1 Seattle Comprehensive Plan

The City of Seattle Comprehensive Plan describes the vision for future growth and fundamental policy decisions. The City adopted its updated Comprehensive Plan in 2016 (City of Seattle, 2016).

The Transportation Element of the Comprehensive Plan highlights the City's goal of promoting safe and convenient access and travel for all users, including pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers. The Transportation Element also prioritizes commercial and mixed-use industrial areas. Policies are specified in the plan to achieve increased travel choices through efficient use of public right-of-way and transportation demand management strategies. In working toward a multimodal transportation system, the City requires that economic development, the environment, regional connectivity, and efficient operation and maintenance must be considered.

2.4.2 Seattle Transportation Strategic Plan

The Seattle Transportation Strategic Plan (SDOT, 2005) is the implementation document for the transportation goals and policies described in the Comprehensive Plan. Specific programs and projects are included in the plan to bring SDOT closer to its goals. The BGT Extension is included in the Seattle Transportation Strategic Plan to achieve SDOT's transportation goals. The Seattle Transportation Strategic Plan was released in 2005. The plan is not being updated by SDOT, but the agency released Move Seattle in March 2015 as its 10-year transportation vision (described below). Even though the Seattle Transportation Strategic Plan is not being updated, it still provides direction for implementing the Seattle Comprehensive Plan goals and policies. Parking policies included in the Seattle Transportation Strategic Plan are discussed in the Parking Discipline Report.

2.4.3 Move Seattle

Move Seattle is SDOT's 10-year transportation vision that integrates SDOT's four modal plans: transit, walking, bicycling, and freight (SDOT, 2015f). Move Seattle is intended to help SDOT meet its current and future transportation needs and create a transportation system that contributes to a safe, interconnected, vibrant, affordable, and innovative city. Move Seattle identifies the BGT Missing Link project as a capital investment to be completed by 2024 that will help SDOT achieve its goals to be safe and interconnected. In November 2015, voters passed the 9-year Let's Move Seattle levy to fund projects and improvements included in the Move Seattle plan.

2.4.4 Move Ballard

Move Ballard is SDOT's 15-year transportation vision for the Ballard Hub Urban Village (SDOT, 2016a). The draft Move Ballard Plan identifies and prioritizes near-term multimodal transportation improvements for the Ballard Hub Urban Village in response to the area's rapid recent growth. The plan will also evaluate potential future high capacity (light rail, streetcar, bus rapid transit) transit station areas in anticipation of possible Metro and Sound Transit investments in the area. The draft plan includes a prioritized project list that includes nonmotorized improvements in the Ballard Hub Urban Village.

2.4.5 Seattle Freight Master Plan

The Seattle Freight Master Plan is the 20-year blueprint to guide freight mobility investments and improvements, increase safety, and address freight-related issues in Seattle (SDOT, 2016b). The plan highlights six main goals for Seattle's freight vision, which include Economy, Safety, Mobility, State of Good Repair, Equity, and Environment. The Freight Master Plan also summarizes existing and future freight conditions in the city, and proposes a number of strategies to achieve the plan's goals. The Ballard-Interbay-Northend Manufacturing and Industrial Center (BINMIC) is identified in the Seattle Freight Master Plan as a key component of the Seattle economy.

2.4.6 Seattle Industrial Areas Freight Access Project

The Seattle Industrial Areas Freight Access Project supports and promotes regional and international economic competitiveness and lays out the groundwork for the more comprehensive Seattle Freight Master Plan (SDOT, 2015h). The project identifies and initiates solutions to freight mobility, circulation, and access needs to major manufacturing and industrial centers and connecting corridors, including the BINMIC.

2.4.7 Seattle Transit Master Plan

The Seattle Transit Master Plan identifies the types of transit facilities, services, programs, and system features that will be required to meet Seattle's transit needs through 2030 (SDOT, 2012). The plan highlights six major initiatives for near-term priorities:

- Continue implementation of priority bus corridors;
- Develop center city transit to support downtown growth and vitality;
- Plan, fund, and build priority high-capacity demand transit projects;
- Enhance walk-bike-ride access where needs are greatest;
- Improve transit information and system usability; and
- Pursue funding to enhance transit service and facilities.

The Transit Master Plan includes NW Leary Way/Leary Ave NW, NW Market St, and 24th Ave NW as corridors for full modal evaluation for high-capacity transit service. Potential stations in the study area are at Leary Ave NW or Ballard Ave NW and NW Market St/15th Ave NW. NW Market St and 15th Ave NW have also been identified in the Transit Master Plan as priority bus corridors.

2.4.8 Seattle Bicycle Master Plan

The Seattle Bicycle Master Plan was adopted in April 2014 (SDOT, 2014a). The Bicycle Master Plan provides a framework for SDOT's future actions and investments to improve bicycling throughout the city. The overall vision of the plan is to ensure that "riding a bicycle is a comfortable and integral part of daily life in Seattle for people of all ages and abilities." There are five main goals that support the vision of the Bicycle Master Plan:

- Increase the amount and mode share of bicycle riding in Seattle for all trip purposes;
- Improve safety for bicycle riders;
- Create a bicycle network that connects to places that people want to go and provides for a time-efficient travel option;
- Provide equal cycling access for all through public engagement, program delivery, and capital investment; and
- Build vibrant and healthy communities by creating a welcoming environment for bicycle riding.

The plan aims to upgrade approximately 70 miles of existing bicycle facilities and add approximately 400 miles of new facilities over the next 20 years. In addition to upgrading and adding new facilities, the Bicycle Master Plan contains guidance regarding the provision of end-of-trip elements such as parking, shower facilities, and fix-it stations. The plan also recommends partnering with other agencies to help provide education, enforcement, and encouragement programs.

Several projects in the vicinity of the study area, including the BGT Missing Link, are recommended in the plan. In addition to the BGT Missing Link, recommended projects include bicycle lanes (minor separation) on 24th Ave NW, NW Market St/NW 54th St west of 24th Ave NW, and 20th Ave NW between Leary Ave NW and NW Market St. The Bicycle Master Plan also proposes neighborhood greenways on 20th Ave NW between Shilshole Ave NW and Leary Ave NW, and on 28th Ave NW beginning at NW Market St. Two neighborhood greenways included in the plan are near the study area; the neighborhood greenway on NW 58th St is completed, and the 17th Ave NW neighborhood greenway is currently under construction.

2.4.9 Seattle Pedestrian Master Plan

The Seattle Pedestrian Master Plan, adopted in 2009, provides a framework to allow Seattle to become the most walkable city in the country (SDOT, 2014b). The Master Plan describes four goals for the pedestrian environment: safety, equity, vibrancy, and health. The plan identifies the physical design elements of a walkable street and the types of destinations that create high pedestrian demand. Six objectives are included in the plan:

- Complete and maintain the pedestrian system identified in the Pedestrian Master Plan;
- Improve walkability on all streets;
- Increase pedestrian safety;
- Plan, design, and build complete streets to move more people and goods;
- Create vibrant public spaces that encourage walking; and

- Get more people walking for transportation, recreation, and health.

SDOT has developed a number of strategies to provide possible solutions for various pedestrian issues. The Pedestrian Master Plan does not identify projects for specific locations, but recommends areas of high priority for walking. High-priority areas for walking are locations in Seattle where people need to be able to walk the most. These areas are prioritized for projects and investment. The BGT study area is identified in the plan as a high-priority area.

2.4.10 **Seattle Municipal Code Title 11 Part 58**

Title 11 of the Seattle Municipal Code (SMC 11.58.230) provides traffic regulations for the city. Part 58 describes miscellaneous driving rules on Seattle streets, and includes regulations regarding vehicle operations at alleys, driveways, private properties, and buildings, as stated below:

> "Except as directed otherwise by official traffic-control devices, the driver of a vehicle emerging from any alley, driveway, private property, or building shall stop such vehicle immediately prior to driving onto a sidewalk or onto the sidewalk area extending across any alley or driveway, or onto a public path, and shall yield the right-of-way to any pedestrian or bicyclist as may be necessary to avoid collision, and upon entering the roadway of a street shall yield the right-of-way to all vehicles approaching on the roadway."

2.4.11 **Vision Zero Plan**

The Vision Zero Plan outlines how the City intends to end all traffic deaths and serious injuries by 2030. The Vision Zero Plan proposes a combination of street designs, policy, and regulations; education and public engagement; and enforcement to eliminate collisions by 2030. Near-term actions outlined in the plan include the implementation of safety improvements identified in the Pedestrian and Bicycle Master Plans.

CHAPTER 3 METHODOLOGY

3.1 Data Collection

Analysts consulted several sources to collect data regarding existing transportation conditions in the vicinity of the project footprint. The main data categories that were used to define the affected environment are as follows:

- Roadway Characteristics: Lane configuration, intersection control, and industrial and residential driveway information as collected during fieldwork; previous technical analyses in the study area; and data provided by SDOT.
- General-Purpose Traffic: Traffic counts and turning movement data as provided by SDOT and collected in the field.
- Freight Truck: Freight truck volumes, turning movement data, and truck routes as provided by SDOT and collected from field counts and previous technical analyses in the study area.
- Nonmotorized Users: Pedestrian and bicycle volumes and circulation as provided by SDOT and collected in the field within the study area, as well as BGT user volumes in other areas of the city.
- Public Transportation: Public transportation service operating in the study area (King County Metro Routes 15, 17, 18, 29, 40, 44, 994, and RapidRide D Line), and travel routes as provided by King County Metro.
- Freight Rail: Train volumes and routes that traverse the study area, as reported by the Federal Railroad Administration and the Ballard Terminal Railroad.
- Safety: Accident data and incident response data in the project vicinity as provided by SDOT and the Seattle Fire Department.

Additional intersection and driveway data were collected between the publication periods of the Draft EIS and Final EIS to provide more information on potential transportation and freight impacts. Interviews were conducted with a sample of driveway owners to better understand driveway operations; vehicle types; driveway usage by time of day, week, and year; frequency of driveway users; number of driveways; and estimated vehicle volumes.

The quantitative traffic analysis is based on traffic conditions during the PM peak hour—the hour during which traffic volumes are at their highest.

3.2 Selection of Study Area

Analysts defined the study area boundaries to encompass the areas where the function of transportation modes within the project footprint could be affected by project construction or operation. Analysts used estimated traffic volumes and construction phasing to identify potentially affected areas.

3.3 Future Travel Forecasts

This section summarizes how analysts derived future 2040 traffic and trail user volumes used in the transportation analysis. To be consistent with the data gathered for the affected environment and to reflect

the travel demand when traffic volumes are greatest, analysts forecasted the travel demand based on the PM peak hour.

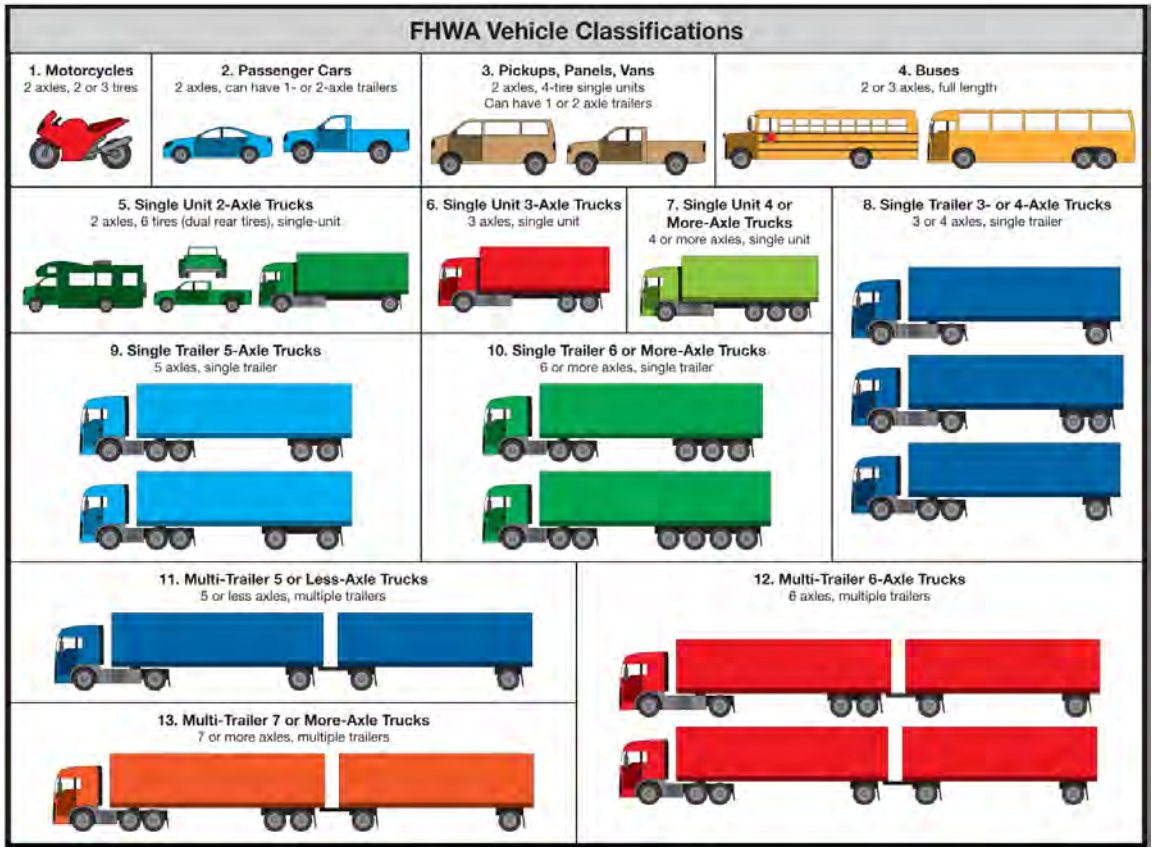
3.3.1 Passenger Vehicle Volumes

Future 2040 passenger vehicle volumes for the study intersections were derived by applying an annual background growth rate of 0.6% to existing traffic counts in the study area (IDAX, 2015; IDAX, 2017; SDOT, 2015a; SDOT, 2015b). The 0.6% growth rate is consistent with the two previous transportation studies completed in 2008 and 2011 for the BGT Missing Link (Parsons Brinckerhoff, 2008; 2011). This growth rate was also compared to the traffic growth rate included in PSRC's regional travel demand model for the BGT Missing Link study area. Because the growth rate for the BGT study area provided by PSRC was smaller than the 0.6% growth rate from the previous studies, analysts used the higher growth rate to ensure the most conservative analysis. The 0.6% growth rate captures additional passenger vehicle volumes that would be generated by planned land use development projects in the area.

3.3.2 Freight Truck Volumes

Freight truck volumes were calculated to the future year (2040) using a growth rate of 3.85%, which was used in the Seattle Industrial Freight Access Project (SDOT and Port of Seattle, 2015). Freight truck volumes are expected to grow at a faster rate compared to passenger vehicles because of changes in the regional and national economy, activity in Manufacturing Industrial Centers and the Ports, and transit expansion and tolling (SDOT and Port of Seattle, 2015). Medium (classes 5-7) and large (classes 4, 8-13) trucks were included in the freight truck volume information. Figure 3-1 shows examples of the types of vehicles that are classified as medium and large freight trucks, as well as small class vehicles (classes 1-3).

Figure 3-1. Vehicle Classifications



Source: SDOT and Port of Seattle, 2015

Although freight truck volumes typically peak during the midday (Figure 3-2), the volumes for other transportation modes in the study area, such as nonmotorized users and passenger vehicles, are higher during the PM peak hour. Evaluating the conditions during the PM peak hour results in the worst-case impacts for all modes.

3.3.3 Nonmotorized Volumes

Analysts first estimated trail user volumes that are expected when construction of the BGT Missing Link is complete, and then increased those volumes into projected future usage. BGT Missing Link trail user volumes were calculated by comparing volumes from nearby segments of the BGT (at 9th Ave NW and Seaview Ave NW); it was assumed that volumes on the BGT Missing Link would be similar to those documented in nearby segments. The total number of nonmotorized trail users in the BGT Missing Link study area is estimated to be the same across alternatives, but the exact number of nonmotorized users on the trail may vary slightly depending on the alignment. For example, with the Preferred, Shilshole South, and Shilshole North Alternatives, it is anticipated that there would be some diversion of nonmotorized users away from NW Leary Way/Leary Ave NW and NW Ballard Way/Ballard Ave NW to the BGT Missing Link. If the BGT Missing Link was provided along the Ballard Avenue or Leary Alternatives, it is anticipated that some bicyclists would continue to ride along Shilshole Ave NW rather than shift to the trail; however, to provide a conservative estimate of the impacts, it was assumed that all bicyclists would shift to wherever the BGT Missing Link would be provided. Because some nonmotorized users likely would have destinations along NW Leary Way and Ballard Ave NW, these users would be expected to use the trail through the study area for only a short distance, or not at all.

The number of nonmotorized users in the study area is anticipated to increase in the future with improved nonmotorized facilities and amenities within the study area. However, travel demand models do not forecast nonmotorized transportation modes with a high confidence level. Therefore, future nonmotorized volumes were developed by applying an annual linear background growth rate to the opening day volumes. This growth rate was 1% per year for pedestrians and 5% per year for bicyclists. These background growth rates were based on historical counts on the BGT, recent studies, expected land use changes and growth in the Ballard area, and input from SDOT.

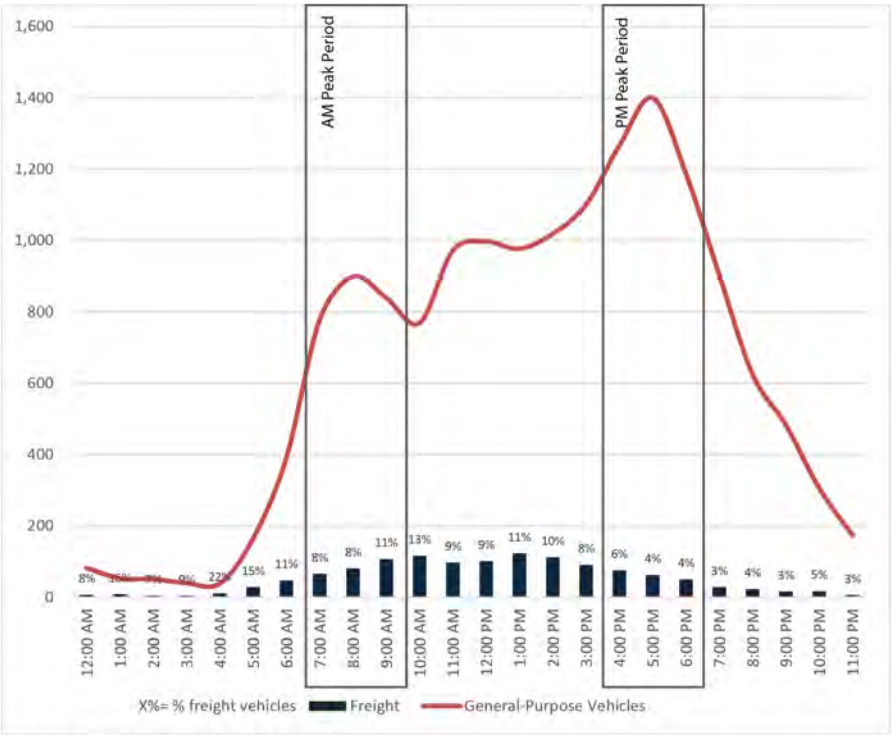
Analysts reviewed historical bicycle and pedestrian counts between 2013 and 2015 at the Fremont Bridge and the BGT north of NE 70th St to develop a historical growth rate for pedestrians and bicyclists (SDOT, 2015d; 2015e). These growth rates were compared to growth rates included in local studies and reports in the Seattle area (Sound Transit, 2010; Fehr & Peers and SvR Design Company, 2011).

PSRC also provided the nonmotorized growth rate included in the PSRC travel demand model for the BGT study area (PSRC, 2015). The growth rates developed from reviewing historical data were similar to those proposed in local Seattle studies, which were approximately 5% for bicyclists and 1% for pedestrians. The growth rate provided by PSRC was lower compared to the other sources; therefore, analysts used the higher growth rates to ensure the most conservative estimate of impacts.

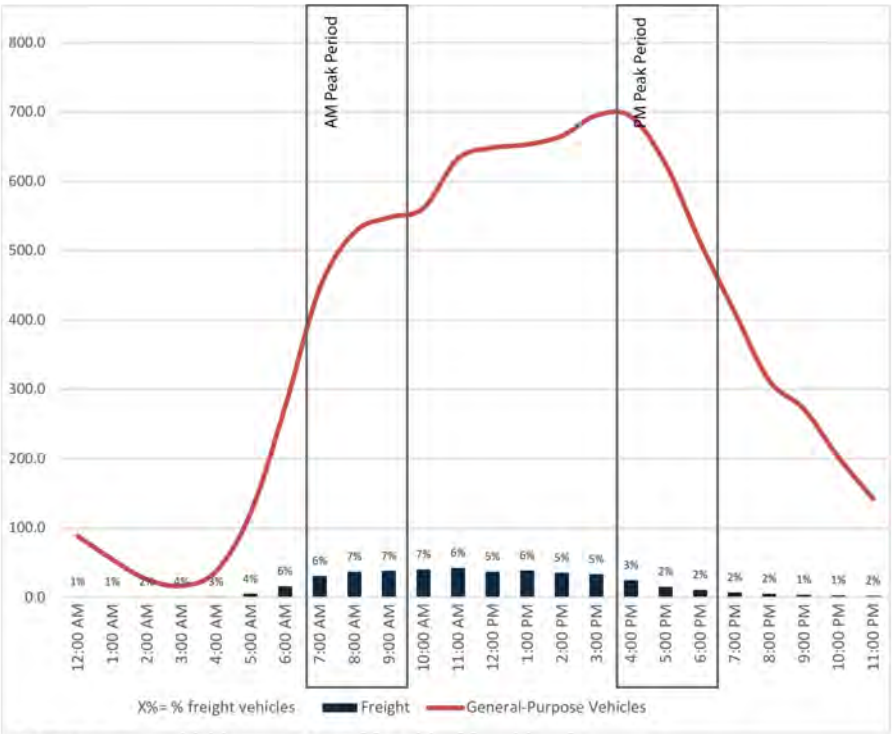
3.4 Analysis of Traffic Operations

Analysts used the level of service (LOS) metric to rate traffic operations in the study area. LOS is measured on a scale ranging from A to F, in which A represents freely flowing traffic and F represents severe congestion. LOS ratings are based on the control delay of the roadway or intersection being studied. Table 3-1 summarizes the criteria used to define LOS. The City does not have an adopted intersection LOS standard.

Figure 3-2. Daily Traffic Patterns for Freight and General-Purpose Traffic



NW Leary Way east of 14th Ave NW



Shilshole Ave NW northwest of NW 46th St

Table 3-1. Intersection Level of Service Criteria

	Control Delay (seconds/vehicle)	
Level of Service	**Signalized Intersection**	**Unsignalized Intersection**
A	<10	<10
B	>10 and <20	>10 and <15
C	>20 and <35	>15 and <25
D	>35 and <55	>25 and <35
E	>55 and <80	>35 and <50
F	>80	>50

Note: The LOS criteria are based on control delay, which includes initial deceleration delay, final deceleration delay, stopped delay, and queue move-up time.
Source: Transportation Research Board, 2000

Analysts used Synchro 9.1, a macroscopic simulation tool, to determine intersection LOS for isolated intersections, and to develop optimized intersection signal timing plans for the study area. This tool relied on a fixed set of input calculations to develop LOS ratings consistent with the methodology found in the Highway Capacity Manual (Transportation Research Board, 2000). This manual is the standard national traffic engineering guidance for quantifying the level of traffic congestion on streets and intersections.

Because Synchro 9.1 was used for the Final EIS, some of the intersection operations results have minor changes from the Draft EIS due to minor changes in how the software calculates delay.

3.5 Identification of Impacts

3.5.1 Identification of Construction Impacts

Construction impacts were assessed through a qualitative analysis of how construction of the Build Alternatives would affect traffic throughout the study area, as well as other travel modes and facilities including freight, pedestrians, bicyclists, public transportation, and rail. BGT Missing Link construction was anticipated to have an impact on transportation and traffic circulation if construction activities would do any of the following:

- Temporarily disrupt truck travel by prohibiting a facility that currently carries truck traffic from continuing to do so (including a roadway segment, intersection, or driveway);
- Temporarily disrupt nonmotorized access and routing;
- Temporarily disrupt public transportation service;
- Temporarily disrupt business access by blocking driveways, loading zones, or access to parking; or
- Temporarily disrupt rail service by obstructing the rail line or otherwise disrupting service.

3.5.2 Identification of Operational Impacts

3.5.2.1 *Impacts on Traffic*

Analysts used Synchro 9.1 to study traffic impacts at critical intersections and driveway locations where trail activity and/or future traffic volumes could affect PM peak hour vehicle movements. This traffic analysis software provided analysts with intersection LOS and delay information, which was used to measure the potential for the Build Alternatives to affect traffic at selected intersections.

Traffic impacts were determined at intersections by comparing intersection LOS for the No Build and Build Alternatives during the PM peak hour. Impacts would occur if a Build Alternative would increase traffic congestion and delays to a LOS E or F condition when the intersection operates at LOS D or better under the No Build Alternative. Impacts would also occur if a Build Alternative would increase the delay at intersections operating at LOS E or F under the No Build Alternative by 5 seconds or more. Significant impacts are not anticipated and mitigation may not be required because the City does not have an adopted intersection LOS standard.

Analysts evaluated driveways that have a range of traffic volumes and that also represent a range of uses, including industrial and commercial driveways, in order to provide a range of typical impacts that could be experienced at any and all driveways in the study area. It is standard practice to analyze a sample of representative driveways because the full range of impacts can be captured within the sample. Significant impacts could occur if delays would alter or displace existing uses.

There are limitations to how the Synchro software model calculates vehicular LOS and delay associated with intersections and driveways adjacent to trails. Therefore, the following two adjustments to the models were made to evaluate intersection and driveway impacts:

1. Bicyclists were assumed to ride in the traffic lane on Shilshole Ave NW under the No Build Alternative. Because existing bicycle data show that bicyclists primarily use Shilshole Ave NW to travel through the study area, bicycle volumes were added to vehicle volumes to arrive at the total volumes along Shilshole Ave NW. This user volume captures the impacts that would be associated with bicycle traffic in the study area without a trail.
2. Under the Build Alternatives, analysts evaluated delay at driveways as two separate intersections in the Synchro model. Vehicles approaching an unsignalized trail crossing would stop for trail users before proceeding through the crossing and then stop again at the intersection with the roadway. This provides an estimate of delay at the intersection with the trail and again at the intersection with the roadway. Analysts used the sum of the delay through both intersections to calculate the overall delay of the driveway. At the trail crossing intersection, bicycles were coded as "vehicle volumes" and pedestrian volumes were coded as "conflicting pedestrians" to capture impacts for the delay calculation. At the roadway intersection, the driveway volumes were only affected by the roadway vehicle volumes. Analysts assumed all bicycle traffic would shift to the applicable trail corridor for each Build Alternative. This assumption provides the most conservative estimate of impacts for each Build Alternative.

3.5.2.2 *Impacts on Freight*

Analysts evaluated impacts on freight vehicles by reviewing LOS at intersections and delay at driveways as described in the previous section. Although freight volumes are typically higher during the midday, the analysis was completed for the PM peak hour to reflect the worst-case scenario for all transportation modes. The PM peak hour is the hour of the day when the volumes for other transportation modes in the study area, such as nonmotorized users and general-purpose vehicles, are highest. Evaluating the

conditions during the PM peak hour results in worst-case impacts for each of the modes. An auto-turn analysis, a vehicle swept path software that analyzes the ability of large trucks to maneuver driveway and roadway configurations, was also completed to determine if the design of the Build Alternatives would affect freight access to businesses in the study area. The freight impacts analysis considered:

- The potential for trail design to impede freight movement to businesses in the study area; and
- The potential for freight travel delay related to roadway alterations in the study area.

Similar to impacts on general purpose traffic, significant impacts to freight are not anticipated and mitigation may not be required because the City does not have an adopted intersection LOS standard.

3.5.2.3 *Impacts on Nonmotorized Users*

Analysts qualitatively evaluated the potential for the Build Alternatives to alter operations of nonmotorized circulation and facilities in the study area. Impacts on nonmotorized users considered:

- The potential to alter pedestrian circulation within the study area;
- The potential to alter bicycle circulation within the study area; and
- The type of intersection control provided for nonmotorized users at intersections.

3.5.2.4 *Impacts on Public Transportation*

Analysts qualitatively evaluated impacts on public transportation by reviewing transit service alignments, stop locations, and travel delay in the study area and the potential for the Build Alternatives to alter transit operations. The analysis of transit impacts included:

- The potential for the Build Alternatives to require removal or relocation of transit stops;
- The potential for transit travel delay related to roadway alterations in the study area;
- Removal or relocation of transit layover space in the study area; and
- The potential to preclude a planned future transit improvement.

3.5.2.5 *Impacts on Freight Rail*

Analysts qualitatively evaluated impacts on freight rail movement in the study area by reviewing the potential for the Build Alternatives to change freight rail operations in the study area. The freight rail impacts analysis considered the potential to remove or relocate freight rail facilities in the study area.

3.5.2.6 *Impacts on Safety*

Analysts qualitatively evaluated impacts on safety by reviewing collision and incident response history in the study area and the potential for the Build Alternatives to alter safety. The safety analysis considered:

- The potential for increasing or decreasing the risk of motor vehicle/trail user conflicts;
- The potential for increasing or decreasing the risk of motor vehicle/motor vehicle conflicts; and
- Impacts on sight distances at affected driveways and intersections.

3.6 Identification of Avoidance, Minimization, and Mitigation Measures

Where the potential for construction or operation impacts appears likely, potential measures were identified to avoid, minimize, or mitigate those impacts. Construction measures generally would be designed to improve traffic flow in active construction areas, maintain appropriate wayfinding, and maintain access for all modes of transportation. Operation measures would generally involve adjustments to roadway and trail design elements or intersection control to maintain satisfactory operation of the transportation environment.

3.7 Cumulative Impacts and Mitigation Measures Analysis

Analysts reviewed potential cumulative effects on transportation resources resulting from other past, present, or reasonably foreseeable future actions that could affect transportation, either directly or indirectly. These actions could include other transportation projects or other planned developments or land use changes occurring in the area.

CHAPTER 4 AFFECTED ENVIRONMENT

This chapter discusses the affected environment for the transportation analysis by defining the study area and describing the 2015 existing transportation conditions. In response to comments on the Draft EIS, additional data were collected in 2016 and 2017; however, 2015 still serves as the baseline year. The traffic data and transportation facilities are approximately the same in 2016 and 2017 as in 2015. The 2015 existing conditions serve as the basis against which conditions projected for 2040, the project analysis year, are compared.

4.1 Selected Study Area

The study area was defined as the area bounded by 32nd Ave NW to the west, NW 56th St/20th Ave NW/Leary Ave NW to the north, 11th Ave NW to the east, and Shilshole Ave NW/NW 45th St to the south (Figure 4-1).

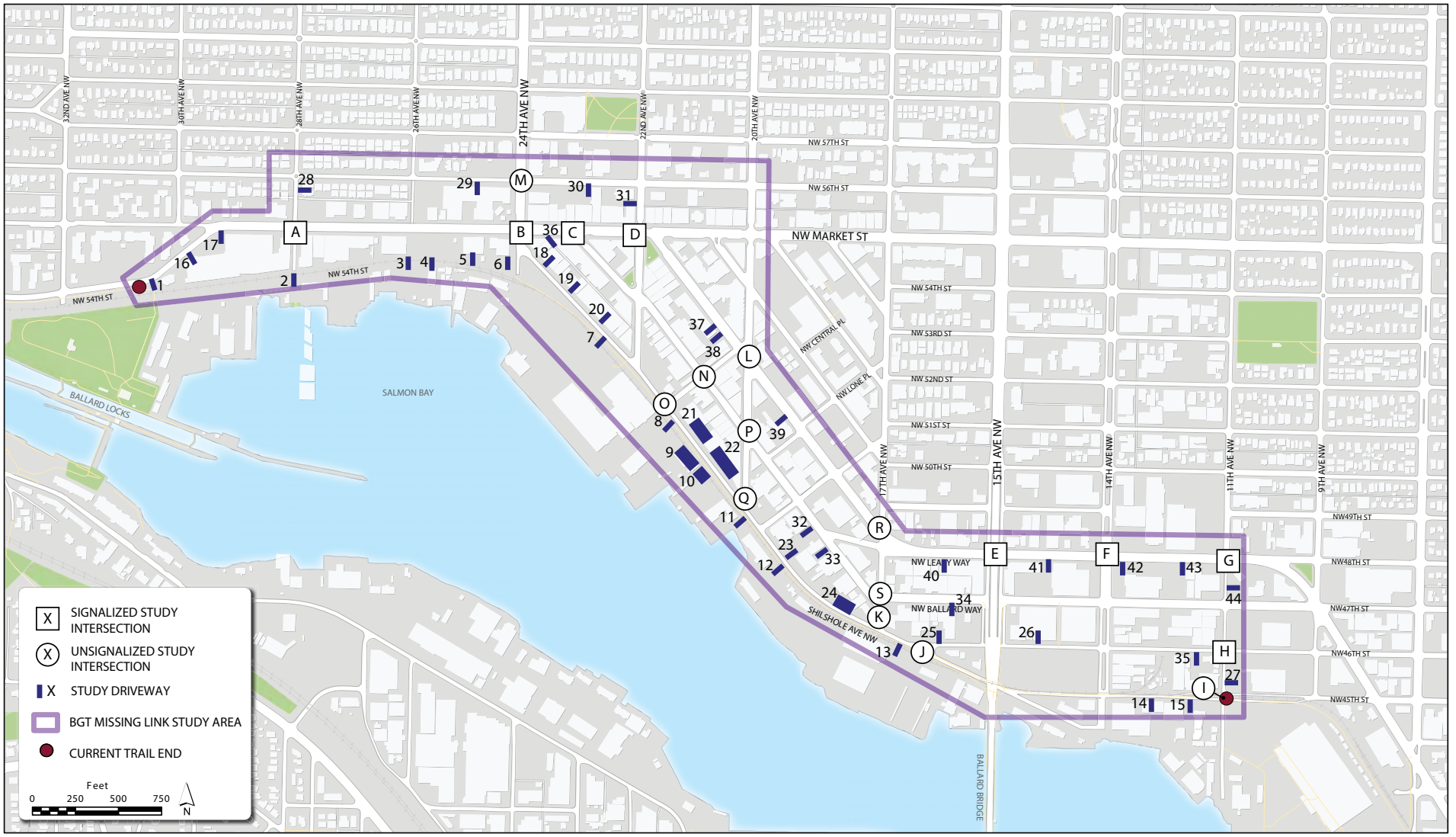
Figure 4-1 also shows the 19 intersections and 44 driveways evaluated as part of the affected environment analysis. Seven of the intersections (intersections A, B, and D through H) have full signals and are referred to as signalized intersections. Intersection C has a pedestrian-activated signal, which remains green for traffic on the major street until activated by a pedestrian. This intersection is described as having a pedestrian half signal. The remaining intersections (intersections I through S) are controlled by stop signs and are referred to as unsignalized intersections.

Driveways (identified in Figure 4-1 as numbers 1 through 44) provide access to businesses in the study area and are unsignalized. The driveways chosen for this analysis are a sampling of representative driveways in the study area. Appendix A includes a summary of special considerations for the 44 representative driveways selected for this analysis. Analysts evaluated driveways that have a range of traffic volumes and that also represent a range of uses, including industrial and commercial driveways, in order to provide a range of typical impacts that could be experienced at any and all driveways in the study area. It is standard practice to analyze a sample of representative driveways because the full range of impacts can be captured within the sample.

In addition, 16 driveway owners were interviewed to provide additional information on operations and driveway uses. Analysts asked driveways owners a set of questions to collect information on the following:

- General description of the types of vehicles that use a driveway;
- Driveway operations based on time of day, week, and year;
- Direction of travel on each driveway;
- Whether vehicles back in or out of each driveway;
- Frequency of driveway users (occasional customers, frequent customers, employees);
- Number of driveways serving the business and if there are shared driveways with other businesses; and
- An estimate of vehicle volumes using the driveway.

This provided analysts with information on how driveways in the study area are currently being used. Interview notes are included in Appendix B.



SOURCE:
City of Seattle 2015, Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-1
Transportation Discipline Study Area and Study Intersections and Driveways

April 2017

4.2 Existing Transportation Conditions

The transportation facilities, service types, and conditions that exist in the study area in 2015 are listed below and discussed in subsequent sections:

- Roadway Network: Roadway types and facilities.
- Traffic Volumes and Operations: Peak hour intersection volumes at all study area intersections and level of service for motor vehicles at intersections.
- Freight: Summary of freight routes and freight vehicle volumes.
- Nonmotorized Users: Bicycle and pedestrian facilities and volumes.
- Public Transportation: Summary of transit routes and stops.
- Freight Rail: Summary of rail facilities.
- Safety: Summary of collision and incident response data.

Additional traffic data were collected in 2016 and 2017; however, 2015 still serves as the baseline year. The traffic data and transportation facilities are approximately the same in 2016 and 2017 as in 2015.

4.2.1 Roadway Network

The roadway network within the study area consists of principal, minor, and collector arterial streets, as well as local access streets (Figure 4-2). Most roads in the study area are classified as local access streets.

Principal arterial roadways are the foundation of the city's transportation network, designated as the major thoroughfares for trucks, motor vehicles, and transit vehicles. In the study area, NW Leary Way, a portion of NW Market St, and 15th Ave NW are defined as principal arterials, meaning that they serve as primary routes for vehicle trips between urban centers and as connections to the regional transportation network.

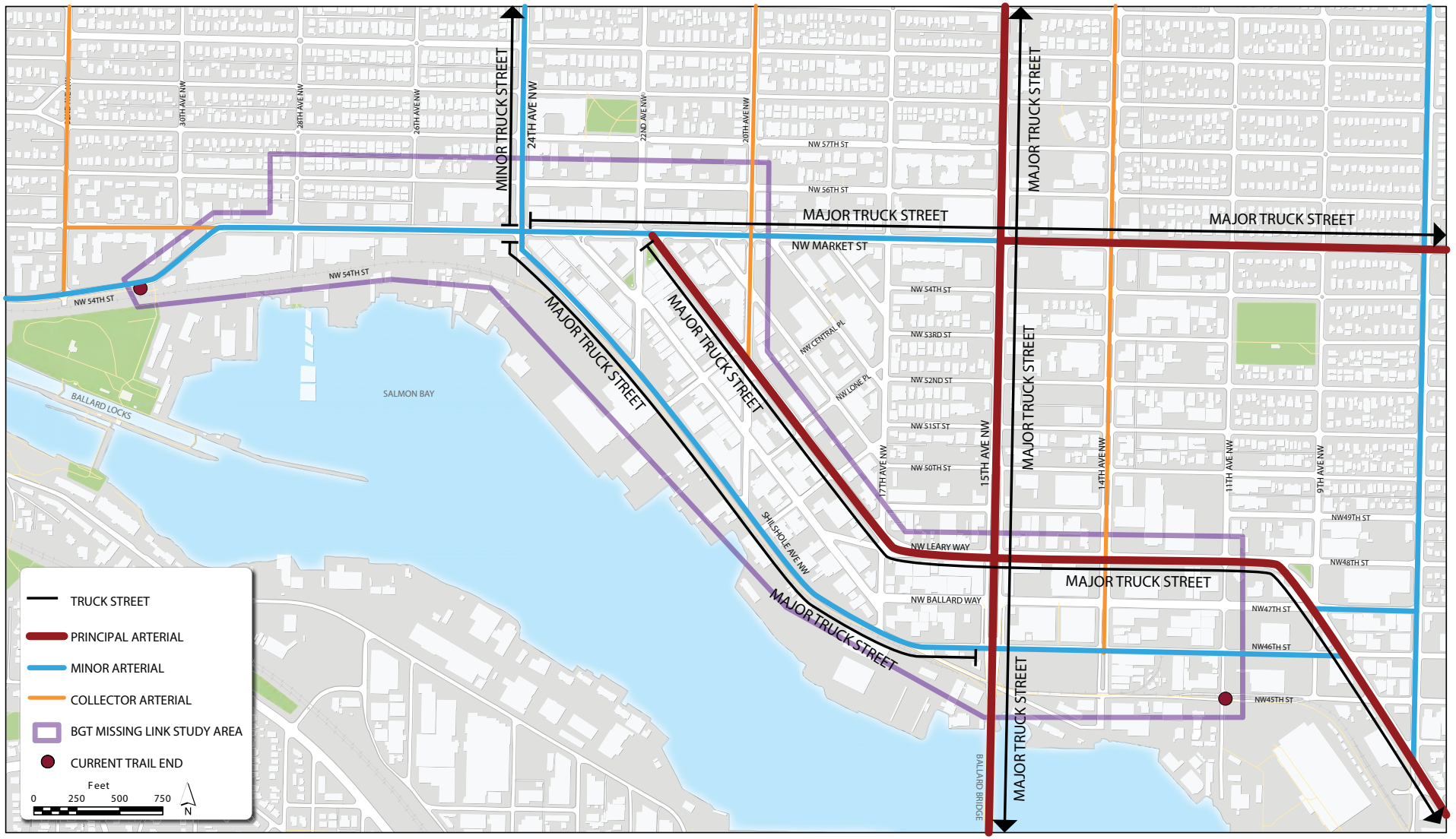
Minor arterials distribute traffic from the principal arterials to collector arterials and local access streets and provide connections to community destinations. In the study area, NW 46th St, Shilshole Ave NW, a portion of NW Market St, and 24th Ave NW are minor arterials.

Collector arterials collect and distribute traffic from principal and minor arterials to local access streets or directly to local destinations. Collector arterials are typically located within neighborhood boundaries and serve small groups of stores, schools, small apartment complexes, and residential land uses. In the study area, 14th Ave NW and 20th Ave NW are considered collector arterials.

All other streets are local residential or commercial access streets. SDOT does not consider local access streets as part of the arterial network. Local access streets provide direct access from the arterial network to local land uses.

There are also Major and Minor Truck Streets within the study area, also shown on Figure 4-2. Major Truck Streets are arterial streets that provide connections between and through industrial land uses, commercial districts, and urban centers (SDOT, 2016). Minor Truck Streets provide connections to and from urban villages and commercial districts, and secondary connections to Major Truck Streets (SDOT, 2016). Major Truck Streets in the study area include:

- Shilshole Ave NW;
- NW Leary Way;
- 15th Ave NW; and
- NW Market St between 24th Ave NW and the eastern boundary of the study area.



SOURCE:
City of Seattle 2015, Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-2
Transportation Discipline Study Area
Roadway Hierarchy

April 2017

Minor Truck Streets in the study area include 24th Ave NW between Shilshole Ave NW and the northern boundary of the study area.

4.2.2 Traffic Volumes and Operations

This section describes the PM peak hour weekday counts and turning movements at intersections, segment locations, and driveways; daily traffic volumes along roadways and driveways; and the traffic operations analysis for the 2015 existing conditions in the study area. The PM peak hour was analyzed because the evening commute volumes are higher than the morning commute volumes based on the adjacent land uses.

This section was reorganized for clarity; the section now includes separate sections for the PM peak hour traffic volumes information (Section 4.2.2.1), the daily traffic volume information (Section 4.2.2.2), and the intersections operations and driveway delay analysis (Section 4.2.2.3).

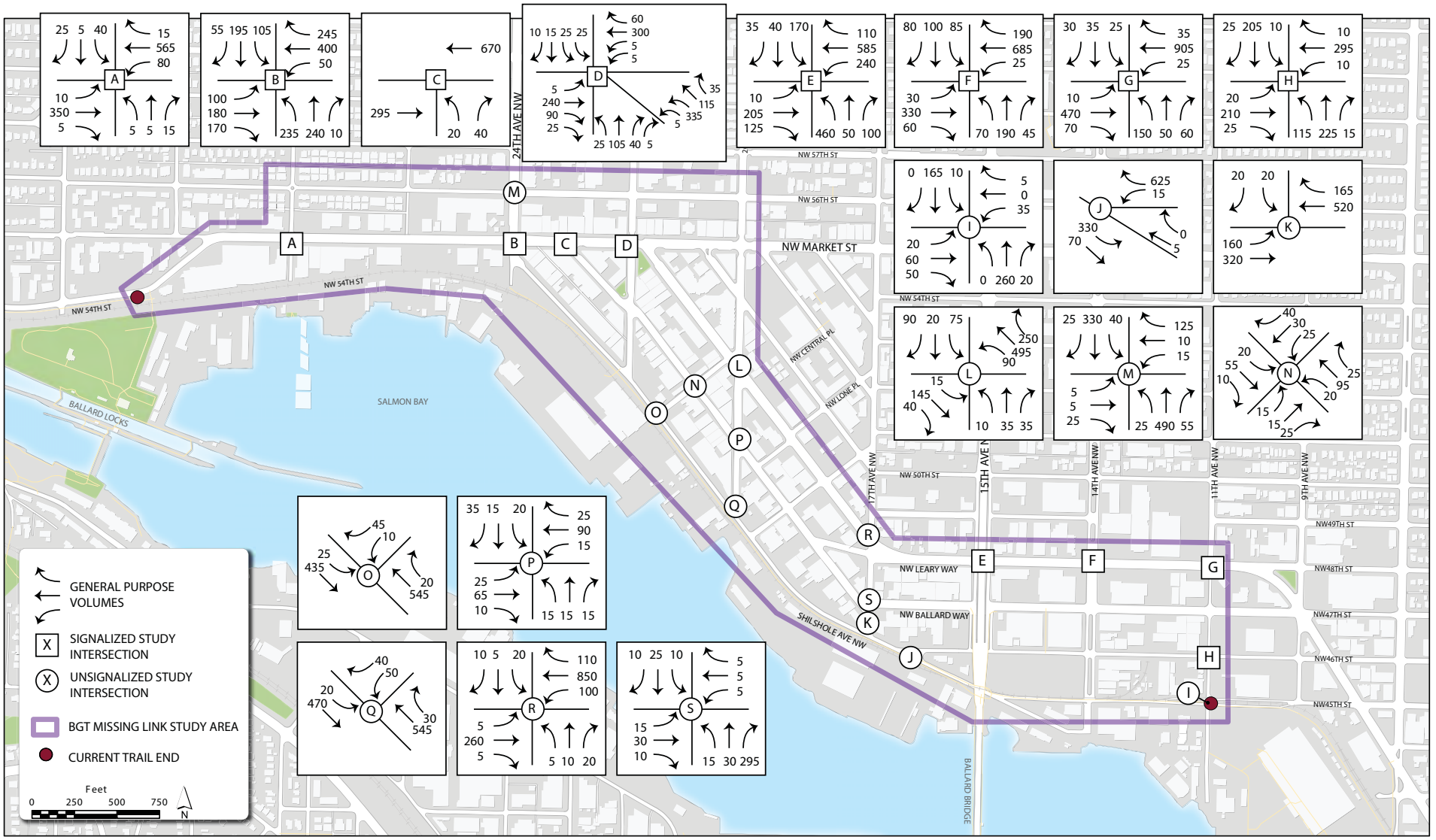
4.2.2.1 *PM Peak Hour Traffic Volumes*

In response to comments on the Draft EIS, analysts collected additional intersection and driveway PM peak hour traffic volume data. The traffic volume data included turning movements at driveways as well as turning movements at additional study area intersections. Additional information was also included in Table 4-2 to indicate which traffic counts were average weekday counts and which were average daily (weekday and weekend) counts.

PM peak hour turning movement counts were collected at 19 study area intersections and 44 driveways in April 2014, September 2015, November 2016, December 2016, and February 2017 (depending on the intersection or driveway) between 4:00 and 6:00 PM, as summarized in Figure 4-3 and Table 4-1 (SDOT, 2015a; IDAX, 2015; IDAX, 2017). Updated traffic data were not collected for all intersections. Data collected in 2016 and 2017 at several study intersections showed that traffic volumes are approximately the same in 2016 and 2017 as in 2015.

The intersection and driveway counts included the total number of general-purpose vehicles, medium and large freight vehicles, pedestrians, and bicycles. The PM peak hour for study area intersections and driveways was the highest 1-hour volume between 4:00 and 6:00 PM at each individual intersection or driveway.

Figure 4-3 shows PM peak hour turning movements at the study intersections. All vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. For intersections that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-3
Existing Conditions PM Peak Hour Intersection Traffic Volumes

April 2017

Table 4-1. Weekday Turning Movement Count Locations and Dates

ID	*Count Location*	*Collection Date*[1]
Intersections		
A	NW Market St/28th Ave NW	09/22/2015
B	NM Market St/24th Ave NW	09/22/2015
C	NM Market St/Ballard Ave NW	09/22/2015
D	NW Market St/22nd Ave NW/Leary Ave NW	09/22/2015
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	09/22/2015
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	09/22/2015
F	NW Leary Way/14th Ave NW	04/15/2014
G	NW Leary Way/11th Ave NW	04/09/2014
H	11th Ave NW/NW 46th St	04/02/2014
I	11th Ave NW/NW 45th St	09/22/2015
J	NW 46th St/Shilshole Ave NW	09/22/2015
K	Shilshole Ave NW/NW 17th St	09/22/2015; 02/01/2017
L	Leary Ave NW/20th Ave NW	09/22/2015; 02/01/2017
M	NW 56th St/24th Ave NW	09/22/2015
N	NW Vernon Pl/Ballard Ave NW	02/01/2017
O	NW Vernon Pl/Shilshole Ave NW	02/01/2017
P	Ballard Ave NW/20th Ave NW	02/01/2017
Q	Shilshole Ave NW/20th Ave NW	02/01/2017
R	NW Leary Way/17th Ave NW	02/01/2017
S	NW Ballard Way/17th Ave NW	02/01/2017
Driveways		
1	NW 54th St/Ballard Locks (NW 54th St/30th Ave NW)	09/22/2015; 11/02/2016
2	NW 54th St/McGinnis Marine (5320 28th Ave NW)	12/21/2016
3	NW 54th St/Ballard Oil (5300 26th Ave NW)	12/21/2016
4	NW 54th St/Snow and Co (5302 26th Ave NW)	12/21/2016
5	NW 54th St/Ballard Transfer (2425 NW 54th St)	12/21/2016
6	NW 54th St/Lieb Marine Services (2406 NW 54th St)	12/21/2016
7	Shilshole Ave NW/Stimson Marina (5435 Shilshole Ave NW)	09/22/2015; 11/02/2016
8	Shilshole Ave NW/Salmon Bay Center (5281 Shilshole Ave NW)	09/22/2015; 11/02/2016
9	Ballard Ave NW/Salmon Bay Sand and Gravel South (5231 Shilshole Ave NW)	09/22/2015; 11/02/2016

ID	*Count Location*	*Collection Date*[1]
10	Shilshole Ave NW/Covich Williams (5219 Shilshole Ave NW)	09/22/2015; 11/02/2016
11	Shilshole Ave NW/Salmon Bay Café (5109 Shilshole Ave NW)	09/22/2015; 11/02/2016
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina (4733 Shilshole Ave NW)	09/22/2015; 11/02/2016
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina (4611 Shilshole Ave NW)	11/02/2016
14	NW 45th St/Ballard Insulation (1125 NW 45th St)	11/02/2016
15	NE 45th/Dovetail General Contractors (1143 NW 45th St)	11/02/2016
16	NW 54th St/Triad Ballard Development (2839 NW 54th St)	11/02/2016
17	NW 54th St/Trident Seafood Retail (2983 NW Market St)	11/02/2016
18	Shilshole Ave NW/Shilshole West Building (5470 Shilshole Ave NW)	11/02/2016
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive (5450 Shilshole Ave NW)	11/02/2016
20	Shilshole Ave NW/Magnum Self Storage (5422 Shilshole Ave NW)	11/02/2016
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North (5232-5228 Shilshole Ave NW)	11/02/2016
22	Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North (5232-5228 Shilshole Ave NW)	09/22/2015; 11/02/2016
23	Shilshole Ave NW/Ballard Hardware (4764 Shilshole Ave NW)	09/22/2015; 11/02/2016
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance (4700-4764 Shilshole Ave NW)	11/02/2016
25	NW 46th St/Ballard Marine (1530 NW 46th St)	11/02/2016
26	NW 46th St/Ballard Blocks Development (1438 NW 46th St)	11/02/2016
27	11th Ave NW/U.S. Post Office (4501 11th Ave NW)	11/02/2016
28	28th Ave NW/Townhomes (5518 28th Ave NW)	02/01/2017
29	NW 56th St/Mark24 (2443 NW 56th Ave)	02/01/2017
30	NW 56th St/Ballard Square Parking (2291 NW 56th St)	02/01/2017
31	22nd Ave NW/Chase Bank (5509 22nd Ave NW)	02/01/2017
32	Ballard Ave NW/Ballard Sheet Metal Works (4763 Ballard Ave NW)	02/01/2017
33	Ballard Ave NW/Ballard Hardware Loading Dock (4741 Ballard Ave NW)	02/01/2017
34	NW Ballard Way/Warden Fluid Dynamics (1515 NW Ballard Way)	02/01/2017
35	NW 46th St/Radtke Marine (1119 NW 46th St)	02/01/2017
36	NW Market St/Alley (2359 NW Market St)	02/01/2017
37	Leary Ave NW/Ballard Landmark (5433 Leary Ave NW)	02/01/2017

ID	*Count Location*	*Collection Date*[1]
38	Leary Ave NW/Public Parking/Caffé Fiore (5409 Leary Ave NW)	02/01/2017
39	Leary Ave NW/Carter Subaru Ballard (5221 Leary Ave NW)	02/01/2017
40	NW Leary Way/BOLT Modern Storage (1515 NW Leary Way)	02/01/2017
41	NW Leary Way/Quest Church (1451 NW Leary Way)	02/01/2017
42	NW Leary Way/Office Max (1139 NW Leary Way)	02/01/2017
43	NW Leary Way/U-Haul (1119 NW Leary Way)	02/01/2017
44	11th Ave NW/7-Eleven (4701 11th Ave NW)	02/01/2017

[1]Data from earlier years were not updated because traffic volumes and transportation facilities are approximately the same as 2017.

In addition to peak hour intersection and driveway turning movement counts, peak hour traffic volume segment counts were collected at 19 locations within the study area, as shown on Figure 4-4 (IDAX, 2015; SDOT, 2015b). Table 4-2 summarizes the segment count location, time of week (average weekday or average daily (weekday and weekend) traffic count, individual segment peak hours, and PM peak hour directional volumes. All vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. Based on the traffic counts, traffic volumes are highest during the PM peak hour on NW Leary Way/Leary Ave NW, NW Market St, NW 46th St, and Shilshole Ave NW.

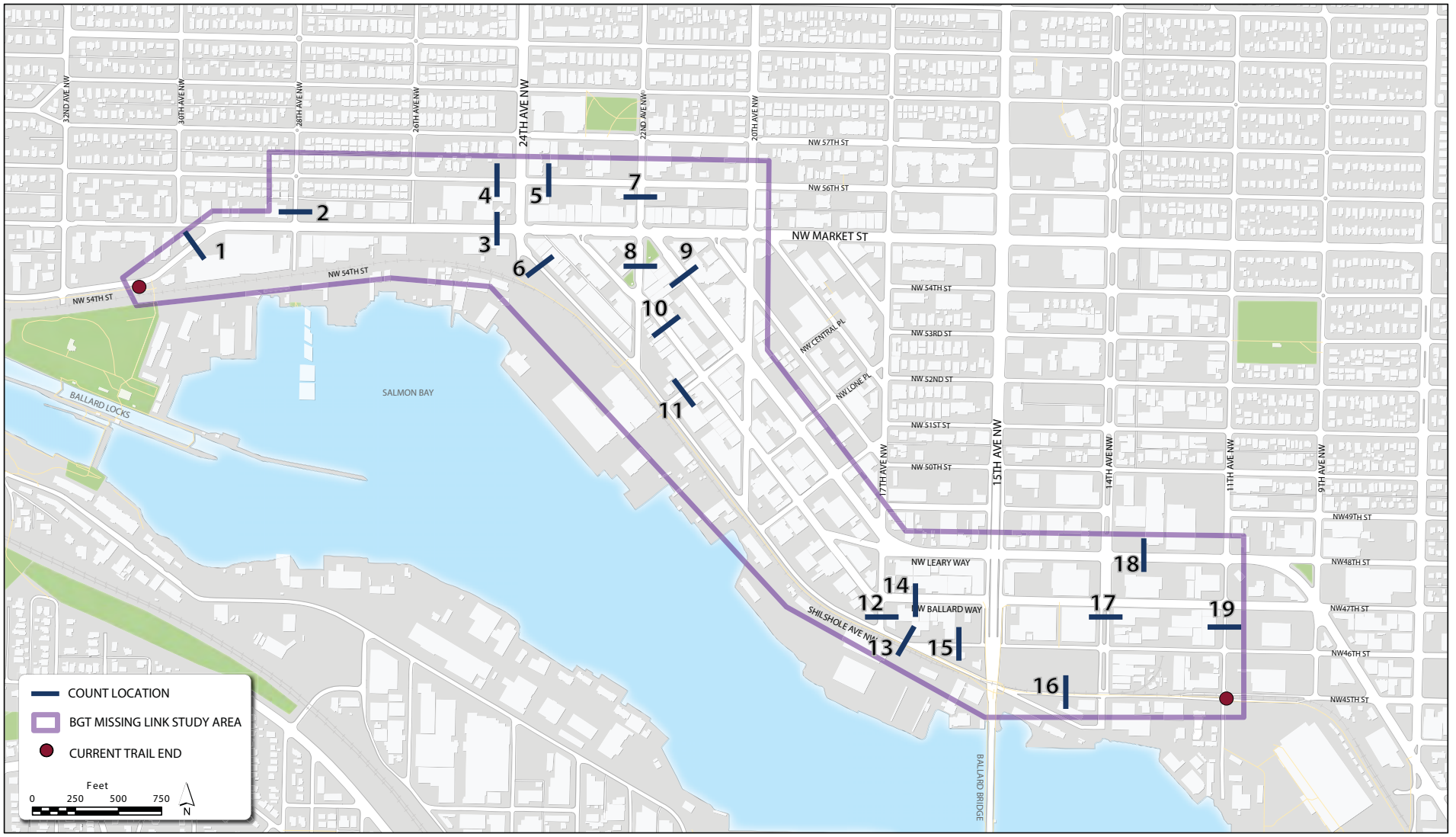
Figure 4-5 shows PM peak hour turning movements at the study driveways. All vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. For driveways that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.

Table 4-2. PM Peak Hour Traffic Volume Counts (January 2013 to September 2015)

ID	*Segment Location*	*Average Weekday or Daily (Weekday/ Weekend)*	*Individual PM Peak Hour*	*PM Peak Northbound/ Eastbound Volume*	*PM Peak Southbound/ Westbound Volume*	*Total Peak Volume*
1	NW 54th St west of NW Market St	Average Weekday	5:00-6:00 PM	335	265	600
2	28th Ave NW north of NW Market St	Average Daily	5:00-6:00 PM	60	35	95
3	NW Market St west of 24th Ave NW	Average Daily	5:00-6:00 PM	470	580	1,050
4	NW 56th St west of 24th Ave NW	Average Daily	4:00-5:00 PM	30	20	50
5	NW 56th St east of 24th Ave NW	Average Daily	5:00-6:00 PM	120	140	260
6	Shilshole Ave NW southeast of 24th Ave NW	Average Daily	5:00-6:00 PM	360	235	595
7	22nd Ave NW south of NW 56th St	Average Weekday	5:00-6:00 PM	280	100	380

ID	*Segment Location*	*Average Weekday or Daily (Weekday/ Weekend)*	*Individual PM Peak Hour*	*PM Peak Northbound/ Eastbound Volume*	*PM Peak Southbound/ Westbound Volume*	*Total Peak Volume*
8	22nd Ave NW south of NW Market St	Average Weekday	5:00-6:00 PM	165	65	230
9	Leary Ave NW south of NW Market St	Average Daily	5:00-6:00 PM	730	195	925
10	Ballard Ave NW southeast of 22nd Ave NW	Average Weekday	5:00-6:00 PM	175	80	255
11	NW Vernon Pl northwest of Shilshole Ave NW	Average Weekday	5:00-6:00 PM	45	40	85
12	17th Ave NW north of Shilshole Ave NW	Average Daily	4:00-5:00 PM	210	30	240
13	Shilshole Ave NW west of NW 46th St	Average Daily	4:00-5:00 PM	355	365	720
14	NW Ballard Way east of 17th Ave NW	Average Weekday	5:00-6:00 PM	330	25	355
15	NW 46th St west of 15th Ave NW	Average Daily	4:00-5:00 PM	265	440	705
16	NW 45th St west of 14th Ave NW	Average Daily	4:00-5:00 PM	110	90	200
17	14th Ave NW south of NW Ballard Way	Average Weekday	4:00-5:00 PM	145	220	365
18	NW Leary Way east of 14th Ave NW	Average Weekday	5:00-6:00 PM	540	920	1,460
19	11th Ave NW north of NW 46th Ave NW	Average Weekday	5:00-6:00 PM	240	105	345

Note: Counts were rounded to the nearest five vehicles to account for daily fluctuations in volumes. For counts that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.



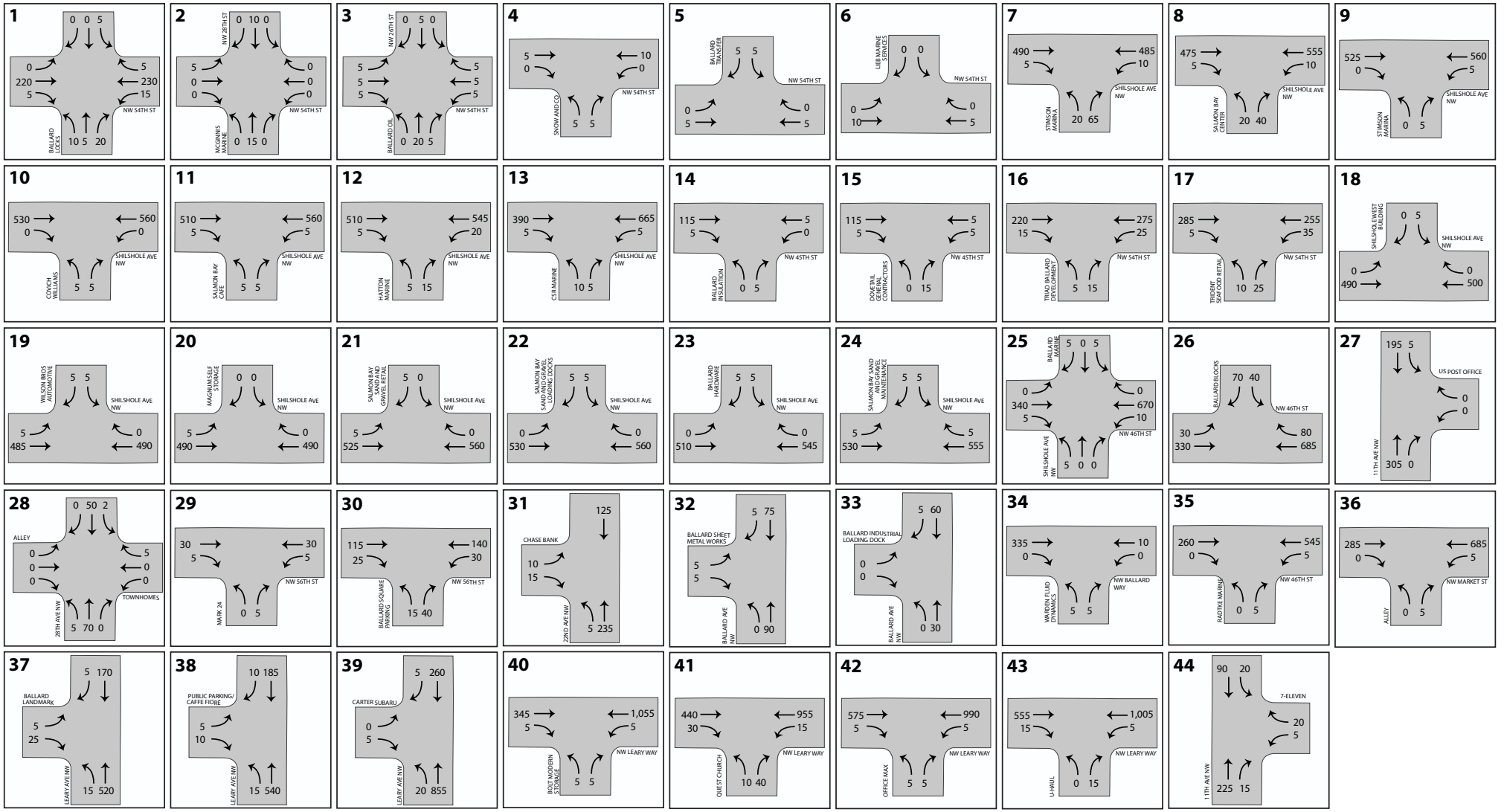
SOURCE:
City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-4

Existing Conditions Roadway Segment Traffic Count Locations

April 2017



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-5
Existing Conditions PM Peak Hour Driveway Traffic Volumes

April 2017

4.2.2.2 *Daily Traffic Volumes*

In response to comments on the Draft EIS, analysts collected additional daily traffic volume data at 44 driveways, including vehicle classification information.

Daily traffic volume counts were collected at 19 locations within the study area between January 2013 and September 2015. Table 4-3 summarizes the count location, time of week (average weekday or average daily traffic count), daily directional volumes, and total daily volumes. All vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. Figure 4-4 summarizes the 19 roadway segment counts (IDAX, 2015; SDOT, 2015b). Based on the traffic counts, daily traffic volumes are highest on NW Leary Way/Leary Ave NW, NW Market St, NW 46th St, and Shilshole Ave NW.

Table 4-3. Daily Traffic Volume Counts (January 2013 to September 2015)

ID	*Roadway Segment*	*Average Weekday or Daily (Weekday/ Weekend)*	*Daily Northbound/Eastbound Volume*	*Daily Southbound/Westbound Volume*	*Total Volume*
1	NW 54th St west of NW Market St	Average Weekday	4,205	3,595	7,800
2	28th Ave NW north of NW Market St	Average Daily	590	610	1,200
3	NW Market St west of 24th Ave NW	Average Daily	6,490	5,920	12,410
4	NW 56th St west of 24th Ave NW	Average Daily	385	345	730
5	NW 56th St east of 24th Ave NW	Average Daily	1,655	1,370	3,025
6	Shilshole Ave NW southeast of 24th Ave NW	Average Daily	4,600	3,385	7,985
7	22nd Ave NW south of NW 56th St	Average Weekday	2,130	1,830	3,960
8	22nd Ave NW south of NW Market St	Average Weekday	1,050	1,100	2,150
9	Leary Ave NW south of NW Market St	Average Daily	7,590	3,240	10,830
10	Ballard Ave NW southeast of 22nd Ave NW	Average Weekday	1,720	1,225	2,945
11	NW Vernon Pl northwest of Shilshole Ave NW	Average Weekday	585	620	1,205
12	17th Ave NW north of Shilshole Ave NW	Average Daily	3,045	500	3,545
13	Shilshole Ave NW west of NW 46th St	Average Daily	4,200	5,395	9,595
14	NW Ballard Way east of 17th Ave NW	Average Weekday	4,535	300	4,835
15	NW 46th St west of 15th Ave	Average Daily	3,655	5,200	8,855

ID	*Roadway Segment*	*Average Weekday or Daily (Weekday/ Weekend)*	*Daily Northbound/Eastbound Volume*	*Daily Southbound/Westbound Volume*	*Total Volume*
	NW				
16	NW 45th St west of 14th Ave NW	Average Daily	1,640	1,110	2,750
17	14th Ave NW south of NW Ballard Way	Average Weekday	1,550	3,355	4,905
18	NW Leary Way east of 14th Ave NW	Average Weekday	6,920	9,880	16,800
19	11th Ave NW north of NW 46th Ave NW	Average Weekday	2,705	1,370	4,075

Daily driveway counts with vehicle classification information (small, medium, and large vehicles) were collected in 2016 and 2017 and are summarized in Table 4-4 (IDAX, 2017). The driveway counts indicated that the driveways located at Ballard Blocks (Driveway 26), Stimson Marina (Driveway 7), Ballard Square (Driveway 30), Salmon Bay Center (Driveway 8), Quest Church (Driveway 41), 7-Eleven (Driveway 44), Ballard Landmark (Driveway 37), and Ballard Locks (Driveway 1) have the highest daily traffic volumes (Kidder Mathews, 2015).

The driveways with the largest number of daily medium and large trucks are the Salmon Bay Sand and Gravel driveways located on the south side of Shilshole Ave NW (Driveway 9), the maintenance facility on the north side of Shilshole Ave NW (Driveway 24), 7-11 (Driveway 44), Ballard Oil (Driveway 3), U-Haul (Driveway 43), Ballard Hardware Loading Dock (Driveway 33), and the Stimson Marina (Driveway 7). More detailed information on vehicle turning movements by classification at driveways is included in Appendix C.

Table 4-4. Study Area Daily Driveway Traffic Volumes (November 2016, December 2016, February 2017)

ID	*Driveway Location*	*Total Number of Vehicles*			*Vehicle Classification*					
					Small			*Medium and Large*		
		In	*Out*	*Total*	*In*	*Out*	*Total*	*In*	*Out*	*Total*
1	NW 54th St/Ballard Locks	300	210	510	285	195	480	15	15	30
2	NW 54th St/McGinnis Marine	165	165	330	160	160	320	5	5	10
3	NW 54th St/Ballard Oil	230	230	460	210	205	415	20	25	45
4	NW 54th St/Snow and Co	50	50	100	40	40	80	10	10	20
5	NW 54th St/Ballard Transfer	30	30	60	25	20	45	5	10	15
6	NW 54th St/Lieb Marine Services	5	5	10	5	5	10	0	0	0
7	Shilshole Ave NW/Stimson Marina	475	505	980	455	485	940	20	20	40
8	Shilshole Ave NW/Salmon Bay Center	435	405	840	425	395	820	10	10	20

ID	*Driveway Location*	*Total Number of Vehicles*			*Vehicle Classification*					
					Small			*Medium and Large*		
		In	*Out*	*Total*	*In*	*Out*	*Total*	*In*	*Out*	*Total*
9	Ballard Ave NW/Salmon Bay Sand and Gravel South	125	135	260	50	55	105	75	80	155
10	Shilshole Ave NW/Covich Williams	40	30	70	20	20	40	20	10	30
11	Shilshole Ave NW/Salmon Bay Café	150	130	280	135	125	260	15	5	20
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina	185	200	385	175	190	365	10	10	20
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina	155	165	320	140	145	285	15	20	35
14	NW 45th St/Ballard Insulation	65	30	95	55	20	75	10	10	20
15	NE 45th/Dovetail General Contractors	110	140	250	100	120	220	10	20	30
16	NW 54th St/Triad Ballard Development	170	105	275	160	105	265	10	0	10
17	NW 54th St/Trident Seafood Retail	195	230	425	185	225	410	10	5	15
18	Shilshole Ave NW/Shilshole West Building	20	20	40	20	20	40	0	0	0
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	25	25	50	25	25	50	0	0	0
20	Shilshole Ave NW/Magnum Self Storage	10	5	15	10	5	15	0	0	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	55	70	125	50	60	110	5	10	15
22	Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North	20	20	40	15	15	30	5	5	10
23	Shilshole Ave NW/Ballard Hardware	30	160	190	20	150	175	10	10	20
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	40	35	75	15	10	25	25	25	50
25	NW 46th St/Ballard Marine	10	10	20	10	10	20	0	0	0
26	NW 46th St/Ballard Blocks Development	895	960	1,855	895	960	1,855	0	0	0
27	11th Ave NW/U.S. Post Office	45	60	105	30	40	70	15	20	35

ID	Driveway Location	Total Number of Vehicles			Vehicle Classification					
					Small			Medium and Large		
		In	Out	Total	In	Out	Total	In	Out	Total
28	28th Ave NW/Townhomes	10	10	20	10	10	20	0	0	0
29	NW 56th St/Mark24	35	40	75	35	40	75	0	0	0
30	NW 56th St/Ballard Square Parking	490	490	980	485	480	965	5	10	15
31	22nd Ave NW/Chase Bank	10	355	365	10	355	365	0	0	0
32	Ballard Ave NW/Ballard Sheet Metal Works	60	70	130	50	60	110	10	10	20
33	Ballard Ave NW/Ballard Hardware Loading Dock	30	30	60	10	10	20	20	20	40
34	NW Ballard Way/Warden Fluid Dynamics	25	30	50	20	25	45	5	5	10
35	NW 46th St/Radtke Marine	30	25	55	20	20	40	10	5	15
36	NW Market St/Alley	20	30	50	15	20	35	5	10	15
37	Leary Ave NW/Ballard Landmark	260	255	515	255	255	510	5	0	5
38	Leary Ave NW/Public Parking/Caffé Fiore	235	210	445	230	205	435	5	5	10
39	Leary Ave NW/Carter Subaru Ballard	245	45	290	240	40	280	5	5	10
40	NW Leary Way/BOLT Modern Storage	75	55	130	65	50	115	10	5	15
41	NW Leary Way/Quest Church	480	355	835	470	350	820	10	5	15
42	NW Leary Way/Office Max	200	150	350	190	145	335	10	5	15
43	NW Leary Way/U-Haul	75	75	150	55	55	110	20	20	40
44	11th Ave NW/7-Eleven	440	320	760	415	300	715	25	20	45

Source: IDAX, 2017
Note: Counts were rounded to the nearest five vehicles to account for daily fluctuations. For driveways that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate.

4.2.2.3 *Intersection Operations and Driveway Delay*

Intersection operations were measured using the LOS scale ranging from A to F, depending on the delay conditions at the intersection. LOS A represents the best conditions with minimal delay and LOS F represents the worst conditions with severe congestion. LOS ratings are based on the control delay of the intersection or roadway. Table 3-1 in Section 3.4 lists the intersection LOS delay thresholds for signalized and stop-controlled intersections. There are variations in the ranges of delay associated with the LOS ratings for signalized and unsignalized (stop-controlled) intersections.

At signalized intersections, LOS is calculated based on the average delay of all vehicles entering the intersection. At two-way stop-controlled intersections, LOS is calculated based on the worst stopped approach. The delay thresholds are also lower for stop-controlled intersections because driver behavior considerations make delays at stop-controlled intersections more onerous. For example, at a signalized intersection, drivers may relax during the red light interval while waiting for the green light interval, but drivers on the stopped approach of a stop-controlled intersection must remain attentive to the task of identifying acceptable gaps in oncoming traffic.

For this analysis, intersections that operate at LOS E or F were evaluated in more detail to determine the reasons for the higher level of congestion.

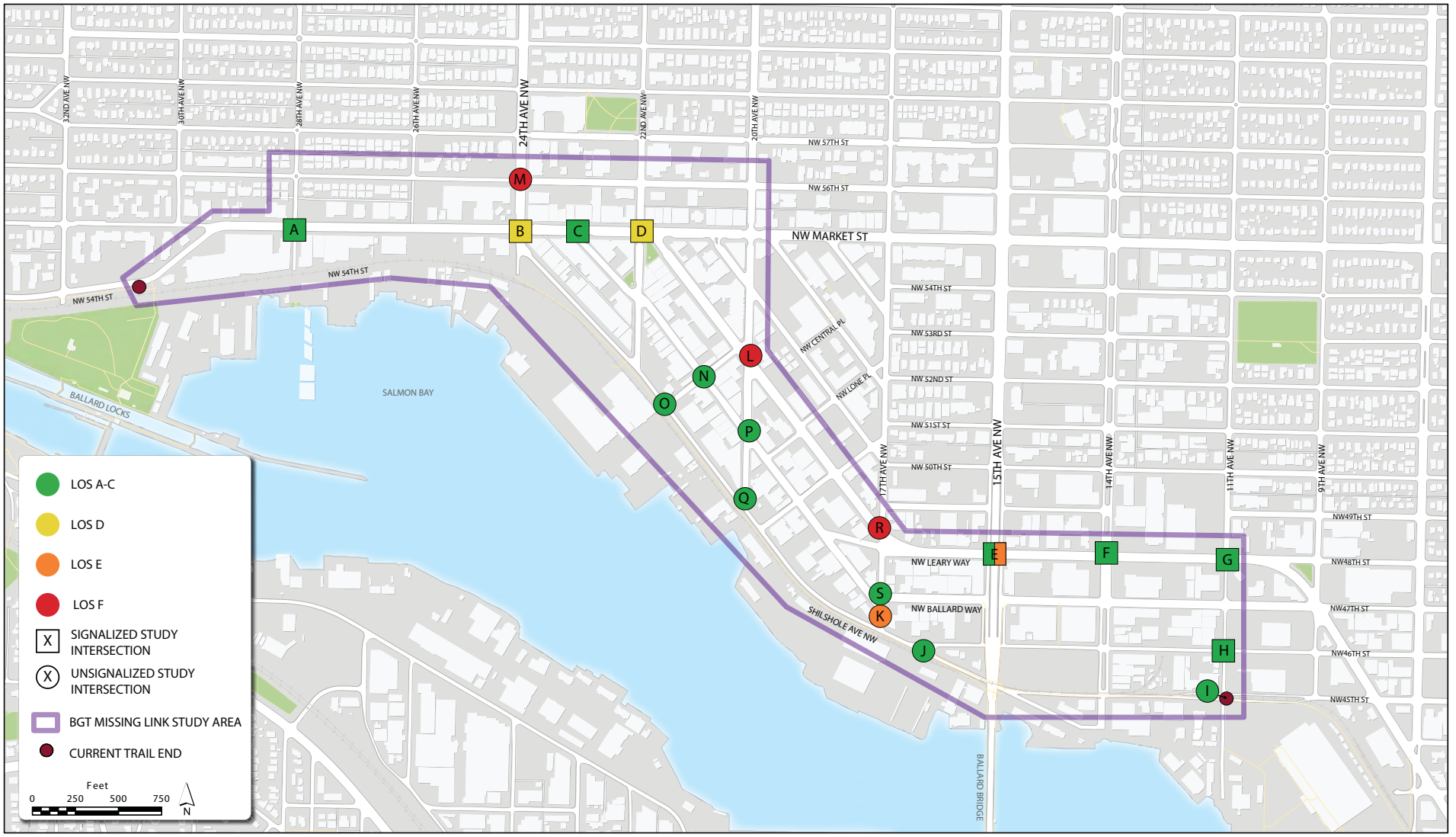
Analysts conducted the LOS analysis for the 19 study area intersections and the delay analysis for the 44 driveways using Synchro 9.1 software. Figure 4-6 and Table 4-5 show the 2015 PM peak hour LOS and delay for each of the study intersections. The average delay for all vehicles is reported for signalized intersections. The delay of the worst stop-controlled approach is reported for unsignalized intersections and driveways.

As shown in Figure 4-6 and Table 4-5, the following five intersections operate at LOS E or F during the PM peak hour:

- Intersection E2: 15th Ave NW/NW Leary Way Northbound Off-Ramp;
- Intersection K: Shilshole Ave NW/NW 17th St (southbound approach from NW 17th St);
- Intersection L: Leary Ave NW/20th Ave NW (southbound approach on 20th Ave NW);
- Intersection M: NW 56th St/24th Ave NW (westbound approach on NW 56th St); and
- Intersection R: NW Leary Way/17th Ave NW (southbound approach on 17th Ave NW).

All other intersections in the study area currently operate at LOS D or better.

The average delay in seconds at driveways during the PM peak hour is shown in Table 4-6. Existing delay at driveways in the study area ranges between approximately 0 and 38 seconds during the PM peak hour. Driveways that had no exiting volume during the PM peak hour had no delay as shown in Table 4-6.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-6
Existing Conditions PM Peak Hour Study Intersection Level of Service

April 2017

Table 4-5. 2015 PM Peak Hour Study Intersection Level of Service

ID	*Intersection*	*Traffic Control*	*2015 Existing Conditions PM Peak Hour*[1]	
			LOS	*Delay (sec)*
A	NW Market St/28th Ave NW	Signal	A	6
B	NM Market St/24th Ave NW	Signal	D	42
C	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8
D	NW Market St/22nd Ave NW/Leary Ave NW	Signal	D	54
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	B	15
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	61
F	NW Leary Way/14th Ave NW	Signal	A	8
G	NW Leary Way/11th Ave NW	Signal	B	14
H	11th Ave NW/NW 46th St	Signal	B	18
I	11th Ave NW/NW 45th St	Unsignalized	A	10
J	NW 46th St/Shilshole Ave NW	Unsignalized	A	8
K	Shilshole Ave NW/NW 17th St	Unsignalized	E	46
L	Leary Ave NW/20th Ave NW	Unsignalized	F	260
M	NW 56th St/24th Ave NW	Unsignalized	F	54
N	NW Vernon Pl/Ballard Ave NW	Unsignalized	C	18
O	NW Vernon Pl/Shilshole Ave NW	Unsignalized	C	19
P	Ballard Ave NW/20th Ave NW	Unsignalized	B	14
Q	Shilshole Ave NW/20th Ave NW	Unsignalized	C	18
R	NW Leary Way/17th Ave NW	Unsignalized	F	50
S	NW Ballard Way/17th Ave NW	Unsignalized	A	9

[1] Existing conditions PM Peak Hour operations are based on volume data collected in 2015, 2016, and 2017; however, 2015 still serves as the baseline year.

Table 4-6. 2015 PM Peak Hour Study Driveway Delay

ID	*Driveway*	*2015 Existing Conditions PM Peak Hour Delay (sec)*[1]
1	NW 54th St/Ballard Locks	14
2	NW 54th St/McGinnis Marine	0
3	NW 54th St/Ballard Oil	9
4	NW 54th St/Snow and Co	9
5	NW 54th St/Ballard Transfer	9
6	NW 54th St/Lieb Marine Services	0
7	Shilshole Ave NW/Stimson Marina	19
8	Shilshole Ave NW/Salmon Bay Center	20
9	Ballard Ave NW/Salmon Bay Sand and Gravel South	15
10	Shilshole Ave NW/Covich Williams	31
11	Shilshole Ave NW/Salmon Bay Café	17
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina	13
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina	19
14	NW 45th St/Ballard Insulation	10
15	NE 45th/Dovetail General Contractors	9
16	NW 54th St/Triad Ballard Development	14
17	NW 54th St/Trident Seafood Retail	14
18	Shilshole Ave NW/Shilshole West Building	21
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	15
20	Shilshole Ave NW/Magnum Self Storage	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	13
22	Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North	21
23	Shilshole Ave NW/Ballard Hardware	21
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	22
25	NW 46th St/Ballard Marine	19
26	NW 46th St/Ballard Blocks Development	38
27	11th Ave NW/U.S. Post Office	0
28	28th Ave NW/Townhomes	9
29	NW 56th St/Mark24	9
30	NW 56th St/Ballard Square Parking	12
31	22nd Ave NW/Chase Bank	14
32	Ballard Ave NW/Ballard Sheet Metal Works	10
33	Ballard Ave NW/Ballard Hardware Loading Dock	0
34	NW Ballard Way/Warden Fluid Dynamics	11
35	NW 46th St/Radtke Marine	10

ID	*Driveway*	*2015 Existing Conditions PM Peak Hour Delay (sec)*[1]
36	NW Market St/Alley	12
37	Leary Ave NW/Ballard Landmark	11
38	Leary Ave NW/Public Parking/Caffè Fiore	12
39	Leary Ave NW/Carter Subaru Ballard	9
40	NW Leary Way/BOLT Modern Storage	18
41	NW Leary Way/Quest Church	14
42	NW Leary Way/Office Max	10
43	NW Leary Way/U-Haul	19
44	11th Ave NW/7-Eleven	10

[11] Existing conditions delay is based on driveway volume data collected in 2015, 2016, and 2017; however, 2015 still serves as the baseline year.

4.2.3 **Freight**

As documented in the Freight Master Plan, SDOT has designated several streets in the study area as Major and Minor Truck Streets. Major Truck Streets are arterial streets that provide connections between and through industrial land uses (Manufacturing Industrial Centers and intermodal terminals), commercial districts, and urban centers (SDOT, 2016). Minor Truck Streets provide connections to and from urban villages and commercial districts, and secondary connections to Major Truck Streets (SDOT, 2016). Major Truck Streets in the study area include:

- Shilshole Ave NW;
- NW Leary Way;
- 15th Ave NW; and
- NW Market St between 24th Ave NW and the eastern boundary of the study area.

Minor Truck Streets in the study area include 24th Ave NW between Shilshole Ave NW and the northern boundary of the study area.

The Industrial Areas Freight Access Project (SDOT and Port of Seattle, 2015) describes all arterial streets in the city as freight routes, although arterials are not subject to the same criteria for street design, traffic management, and pavement design and repair as Major Truck Streets. As described in Section 4.2.1, Roadway Network, in addition to Shilshole Ave NW, NW Market St, 24th Ave NW, NW Leary Way, and 15th Ave NW, the following streets are considered arterial streets and are expected to accommodate some freight traffic:

- NW 46th St;
- 14th Ave NW; and
- 20th Ave NW.

Daily freight truck volumes (medium and large trucks) are highest on NW Leary Way/Leary Ave NW, NW Market St, NW 54th St, Ballard Ave NW, NW 46th St, and Shilshole Ave NW based on the daily volume counts. During the PM peak hour, freight truck volumes in the study area are highest on NW Leary Way/Leary Ave NW, NW 46th St, NW Market St, and Ballard Ave near 22nd Ave NW.

Table 4-7 summarizes medium and large vehicle (classes 4-13) counts collected in the study area between January 2013 and September 2015 at locations shown on Figure 4-7 (IDAX, 2015; SDOT, 2015b). Table 4-7 was revised from the Draft EIS to include class 4 vehicles, which were inadvertently not included. All freight vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. Although freight truck volumes are typically highest during the midday, the volumes for other transportation modes in the study area, such as nonmotorized users and general-purpose vehicles, are higher during the PM peak hour. The analysis evaluates the conditions for all modes during the PM peak hour to show the worst-case impacts.

Table 4-7. 2015 Daily and PM Peak Freight Volumes (January 2013 to September 2015)

ID	*Location*	*PM Peak Northbound/Eastbound Volume*	*PM Peak Southbound/Westbound Volume*	*Daily Volume*
1	NW 54th St west of NW Market St	15	20	560
2	28th Ave NW north of NW Market St	5	5	50
3	NW Market St west of 24th Ave NW	25	20	790
4	NW 56th St west of 24th Ave NW	0	0	25
5	NW 56th St east of 24th Ave NW	5	5	120
6	Shilshole Ave NW southeast of 24th Ave NW	15	5	380
7	22nd Ave NW south of NW 56th St	5	5	145
8	22nd Ave NW south of NW Market St	5	0	90
9	Leary Ave NW south of NW Market St	55	10	820
10	Ballard Ave NW southeast of 22nd Ave NW	5	40	495
11	NW Vernon Pl northwest of Shilshole Ave NW	5	5	70
12	17th Ave NW north of Shilshole Ave NW	30	5	465
13	Shilshole Ave NW west of NW 46th St	10	20	515
14	NW Ballard Way east of 17th Ave NW	20	5	550
15	NW 46th St west of 15th Ave NW	20	35	520
16	NW 45th St west of 14th Ave NW	5	5	125
17	14th Ave NW south of NW Ballard Way	10	10	360
18	NW Leary Way east of 14th Ave NW	20	40	1,290
19	11th Ave NW north of NW 46th Ave NW	5	5	215

Note: Counts were rounded to the nearest five vehicles to account for daily fluctuations. For counts that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.

The City recently updated the Freight Master Plan, which was adopted by the City Council on October 3, 2016. The Freight Master Plan identified locations where safety issues and bottlenecks exist for freight transportation. In the study area, 15th Ave NW has been identified as a high bottleneck location, meaning that freight truck volumes and congestion are expected to be high. The City also identified the intersections of 15th Ave NW/NW Market St and 15th Ave NW/NW Leary Way as locations with safety concerns (SDOT, 2015g). The intersection of 15th Ave NW and NW Market St would not be crossed by the BGT Missing Link. Please see Section 4.2.2 for analysis of the intersection of 15th Ave NW and NW Leary Way.

Interviews with driveway owners provided additional information on the types of vehicles at driveways. There are a range of vehicle types at driveways, including small class vehicles (motorcycles, passenger cars, and light trucks) as well as medium and large class trucks. Some driveways also had vehicles with tractor-trailers and other special vehicle types, such as boat transporters, lowboys, or tankers. There is also forklift activity at some driveways.

Busy times for vehicle activity at driveways vary by the time of the day, week, and year. Many driveway owners reported that vehicle activity was busiest throughout normal business hours (8:00 AM to 5:00 PM) rather than during evenings. Similarly, many of the driveway owners reported that vehicle activity is higher during the weekday compared to the weekend. As described in Section 4.2.4.2 below, nonmotorized volumes on the trail are also high during these times of the day and weekdays because many BGT users are commuters. As reported by driveway owners, busy times of the year for driveways vary; many of the driveways are busy throughout the year.

Many of the driveways allow two-way travel; however, several driveway owners reported that their driveway only provides one-way access. In some cases, this was because there is insufficient driveway width to allow two vehicles to pass each other in the driveway. These driveways were primarily located on NW 54th St.

Driveway owners also provided information on typical vehicle maneuvers and activities at driveways, as summarized in Table 4-8. Driveway owners identified where vehicles were backing into or out of driveways and where additional information on freight operations could be provided. There are a number of driveways where vehicles back into or out of the driveway, which could be a hazardous maneuver because vehicles could conflict with nonmotorized users. Vehicles backing into or out of driveways, particularly large vehicles, could have difficulty seeing other users in the area, including nonmotorized users crossing the driveway. These maneuvers currently occur at driveways on the unimproved portion of NW 54th St, Shilshole Ave NW, and Ballard Ave NW.

Driveway owners also reported on the frequency of drivers using the driveway, i.e., whether drivers were familiar with the driveway compared to drivers who are unfamiliar with the driveway. Many of the driveway owners reported that drivers accessing their driveways are frequent customers or employees. These types of driveway users would be familiar with the characteristics of the driveway and nearby roadway system. There are also occasional driveway users as well as delivery service drivers at many of the driveways. These driveway users would be expected to be less familiar with the driveway characteristics.

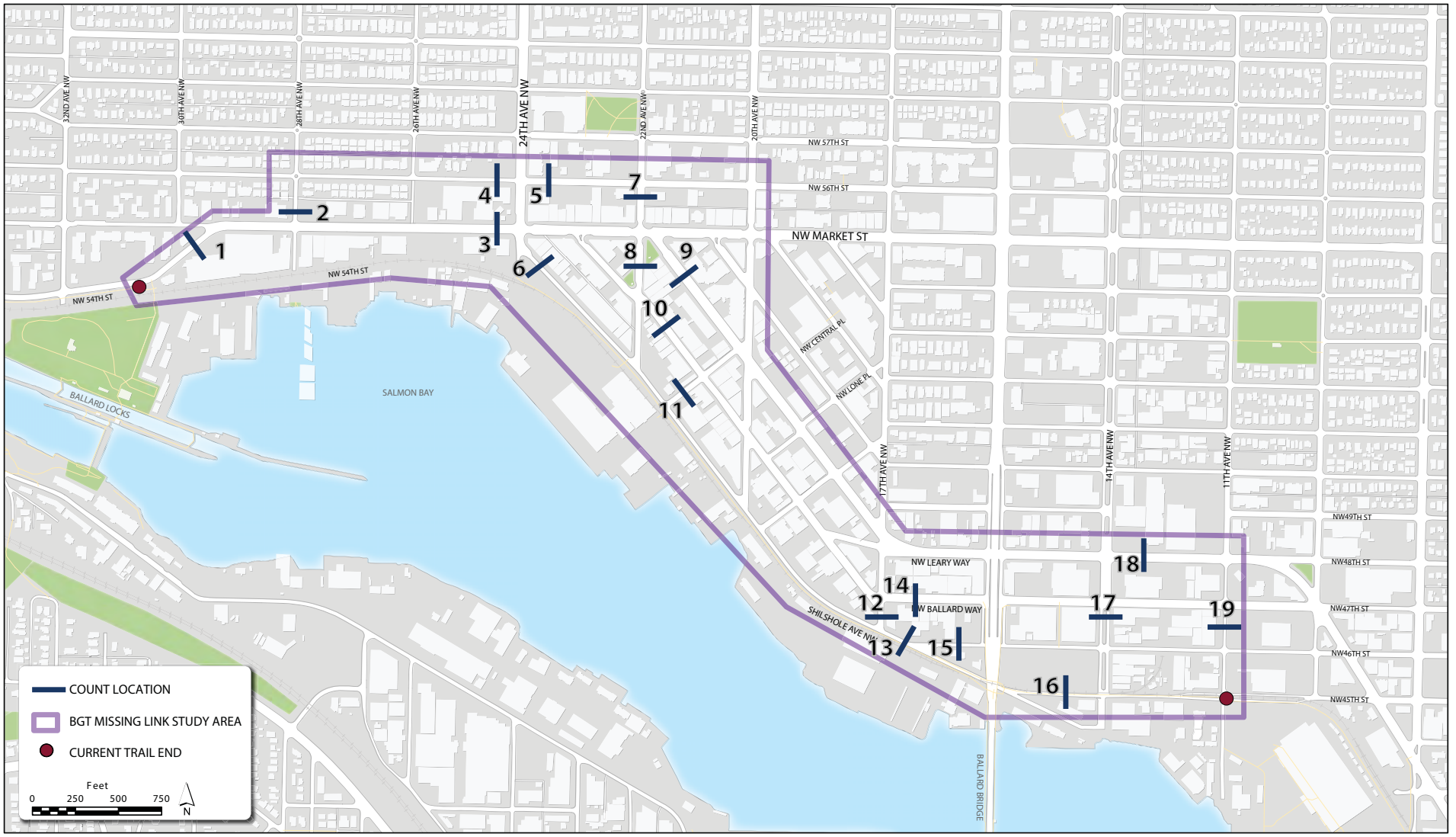
Driveway owners also provided information on the uses of specific driveways providing access to their business. This information was used to determine the needed driveway widths along the trail alignment.

Table 4-8. 2015 Representative Driveway Movements and Operations[1]

Driveway	Vehicles Back In	Vehicles Back Out	Busiest Time of Year	Busiest Time of Week	Busiest Time of Day
Ballard Oil	Yes	No	All Year	Varies	Varies
Snow and Co	Yes	No	All Year, Near Fishing Seasons	Monday-Friday	Varies
Ballard Transfer	Yes	No	All Year	Monday-Friday	Mornings, Evenings
Lieb Marine	Yes	No	Summer	Monday-Friday	Varies

Driveway	Vehicles Back In	Vehicles Back Out	Busiest Time of Year	Busiest Time of Week	Busiest Time of Day
Shilshole West Building	No	No	All Year	Monday-Friday	All Day
Wilson Bros Automotive	No	Yes	All Year	Monday-Friday	Commute Periods
Magnum Self Storage	No	No	All Year	Saturday-Sunday	Varies
Stimson Marina	No	No	All Year	Monday-Friday	Commute Periods
Trident Seafoods	No	No	January-February, June-July	Monday-Saturday	Commute Periods
Salmon Bay Sand and Gravel	Yes	No	Summer, Winter	Monday-Friday	Business Hours
Covich Williams	Yes, Occasionally	No	Summer, Winter	Monday-Saturday	Commute Periods
Sagstad Marina	No	No	Spring, Summer, Fall	All Week	All Day
Ballard Hardware	Yes, at Loading Dock	No	Fall, Winter, Spring	Monday-Friday	Loading dock—Mid-AM/PM
Ballard Marine	Yes	No	Summer	Monday-Friday	Business Hours
Ballard Mill Marina	No	No	Nearing Fishing Seasons	All Week	Business Hours
Ballard Insulation	No	No	October-June	Monday-Friday	Business Hours

[1] Data shown in the table were collected from interviews with property owners.



SOURCE:
City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-7
Existing Conditions Daily Freight Volume Count Locations

April 17

4.2.4 Nonmotorized Users

4.2.4.1 *Study Area Facilities*

The existing BGT ends just east and west of the study area. The eastern end of the BGT is at the intersection of 11th Ave NW and NW 45th St. The western end is 300 feet east of the intersection of 32nd Ave NW and NW 54th St.

The BGT is a multi-use trail that provides local and regional access connecting Seattle, Lake Forest Park, and Kenmore. Near the study area, the BGT provides connections to destinations such as Golden Gardens Park and the Ballard Locks to the west, and Gas Works Park and the University of Washington to the east. Near the study area, the trail has a width of between 12 and 15 feet. Currently, the BGT is used by a variety of nonmotorized users, including walkers, runners, cyclists, skaters, and commuters.

In addition to the BGT, other bicycle facilities within and near the study area include the following (Figure 4-8):

- Bicycle lanes on 20th Ave NW between NW Market St and the northern border of the study area;
- Bicycle lanes on 24th Ave NW beginning at the northern border of the study area and traveling north;
- A cycle track on Shilshole Ave NW/NW 45th St between NW 46th St and 11th Ave NW;
- Neighborhood greenway on NW 58th St;
- Bicycle lanes on 8th Ave NW;
- Bicycle lanes on 32nd Ave NW; and
- Path over the Ballard Locks.

A neighborhood greenway was recently constructed on 17th Ave NW between 90th St NW and Ballard Ave NW. A neighborhood greenway is a shared street environment with low speeds and volumes of motorists that is safer and more pleasant for people riding bicycles and walking.

Most streets in the study area have paved sidewalks on both sides of the street with widths varying between 6 and 20 feet (Figure 4-9). For example, 20-foot sidewalks are provided on NW Market St; 12-foot sidewalks are provided on Ballard Ave NW; and 6-foot sidewalks are provided on NW 56th St. Crosswalks are provided at most major intersections. Currently, no sidewalks are provided on NW 45th St between 15th Ave NW and 11th Ave NW, or on the west side of 11th Ave NW. On NW 46th St, no sidewalks are provided between 14th Ave NW and 11th Ave NW. On 14th Ave NW, no sidewalks are provided on the west side of the street between NW 48th St and NW 45th St. There are no sidewalks on 26th Ave NW between NW 56th St and NW 54th St, and on 28th Ave NW between just north of NW Market St and NW 54th St. No sidewalks are provided on NW 54th St between the Ballard Locks and 24th Ave NW or on the south side of Shilshole Ave NW. Although a sidewalk is provided on the north side of Shilshole Ave NW, there are areas where the sidewalk is partially obstructed by parked vehicles or trash dumpsters. Also, parallel to the Ballard Bridge, there are no sidewalks directly adjacent to the bridge on 15th Ave NW. However, sidewalks are provided on the far east and far west sides of the street. NW Market St and Ballard Ave NW are major pedestrian corridors because of the density of retail and commercial uses.

4.2.4.2 *Pedestrian and Bicycle Volumes*

SDOT provided nonmotorized counts on the BGT at two locations near the study area. Counts were taken on the BGT at 9th Ave NW and on the BGT at Seaview Ave NW in July 2015. the fall when counts were taken were cloudy with temperatures in the mid-60s. Weather conditions in the summer when counts were taken were cloudy to sunny with temperatures in the mid-70s to mid-90s.

Table 4-9 summarizes the daily nonmotorized volumes recorded at these locations. All nonmotorized counts were rounded to the nearest five users to account for daily fluctuations. For counts that were between one and four users, the volume was rounded up to provide a conservative estimate of impacts. Because the counters did not record pedestrian volumes separately, analysts collected pedestrian and bicycle counts at the 9th Ave NW location in September 2015 to develop a ratio of pedestrians to cyclists on the trail. This ratio was applied to the July 2015 bicycle counts to estimate the number of pedestrians during that same period. Analysts used the July counts because overall volumes are higher during the summer compared to the fall. Weather conditions in the fall when counts were taken were cloudy with temperatures in the mid-60s. Weather conditions in the summer when counts were taken were cloudy to sunny with temperatures in the mid-70s to mid-90s.

Table 4-9. 2015 Daily Bicycle Counts and Estimated Pedestrian Volumes on the BGT

Date	*Total Bicycles*	*Westbound Bicycles*	*Eastbound Bicycles*	*Estimated Total Pedestrians*[1]	*Estimated Westbound Pedestrians*[1]	*Estimated Eastbound Pedestrians*[1]
BGT at 9th Ave NW						
Fri 7-17-15	1,080	670	410	360	230	130
Sat 7-18-15	1,530	760	770	505	260	245
Sun 7-19-15	1,420	715	705	470	245	225
Mon 7-20-15	1,665	845	820	545	285	260
Tues 7-21-15	1,640	815	825	540	275	265
Wed 7-22-15	1,720	850	870	565	290	275
BGT at Seaview Ave NW						
Fri 7-17-15	400	180	220	135	60	75
Sat 7-18-15	635	325	310	210	105	105
Sun 7-19-15	200	80	120	65	25	40
Mon 7-20-15	55	45	10	20	15	5
Tues 7-21-15	75	65	10	25	20	5
Wed 7-22-15	130	75	55	45	25	20
Thurs 7-23-15	95	70	25	30	20	10

[1] Pedestrian volumes estimated based on the bicycle-to-pedestrian ratio developed using counts taken in September 2015.

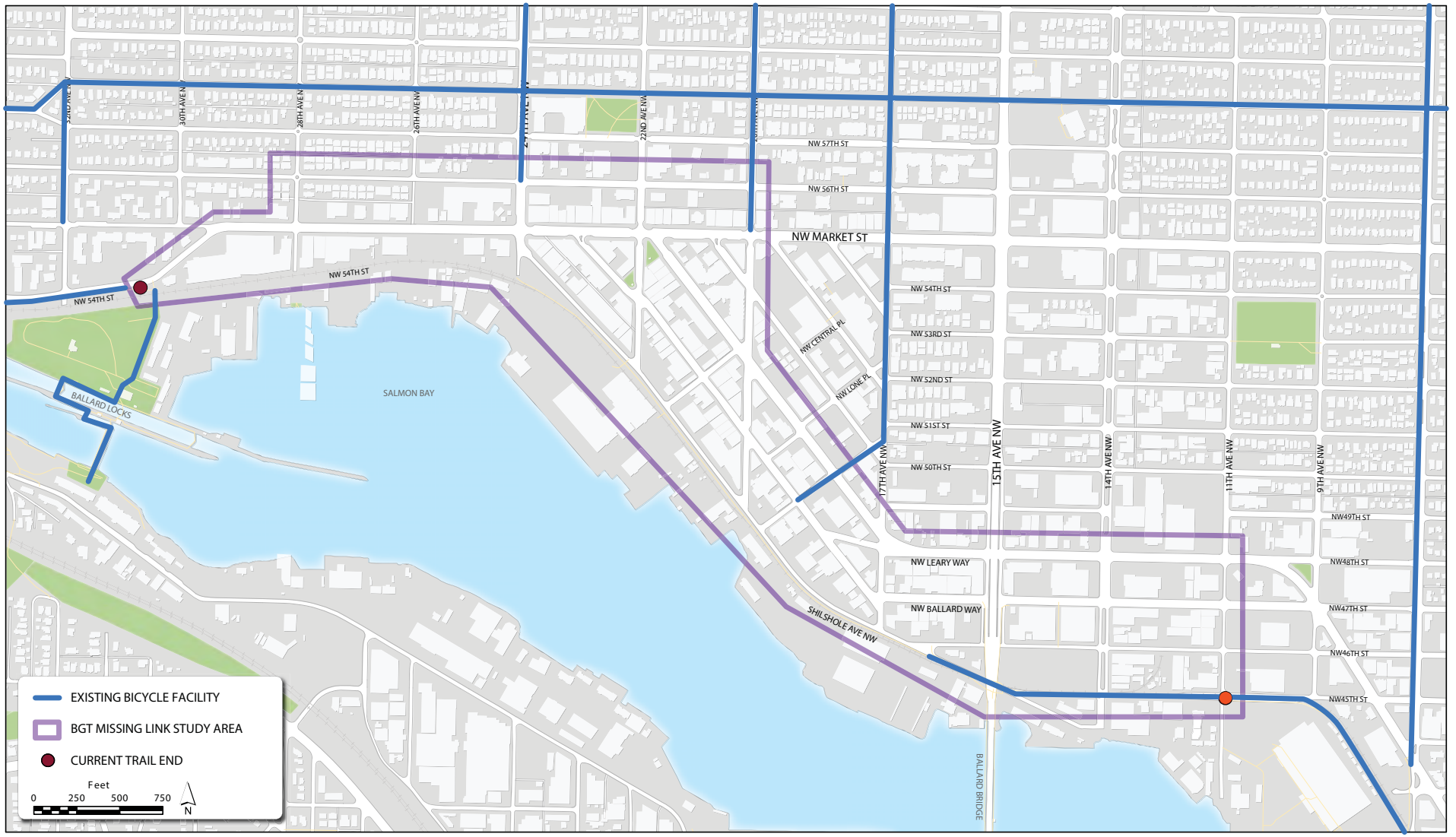
Note: Counts were rounded to the nearest five users to account for daily fluctuations. For counts that were between one and four users, the number was rounded up to provide a conservative estimate of impacts.

Nonmotorized volumes during the PM peak hour on the BGT at 9th Ave NW are summarized in Table 4-10. These counts were collected in September 2015. Nonmotorized volumes on the BGT during the PM peak hour are approximately 10% of the daily nonmotorized volume.

Table 4-10. 2015 PM Peak Hour Nonmotorized Counts on the BGT at 9th Ave NW

PM Peak Hour	Total Bicycles	Westbound Bicycles	Eastbound Bicycles	Total Pedestrians	Westbound Pedestrians	Eastbound Pedestrians
5:00-6:00 PM	190	145	45	50	35	15

Note: Counts were rounded to the nearest five users to account for daily fluctuations. For counts that were between one and four users, the number was rounded up to provide a conservative estimate of impacts.

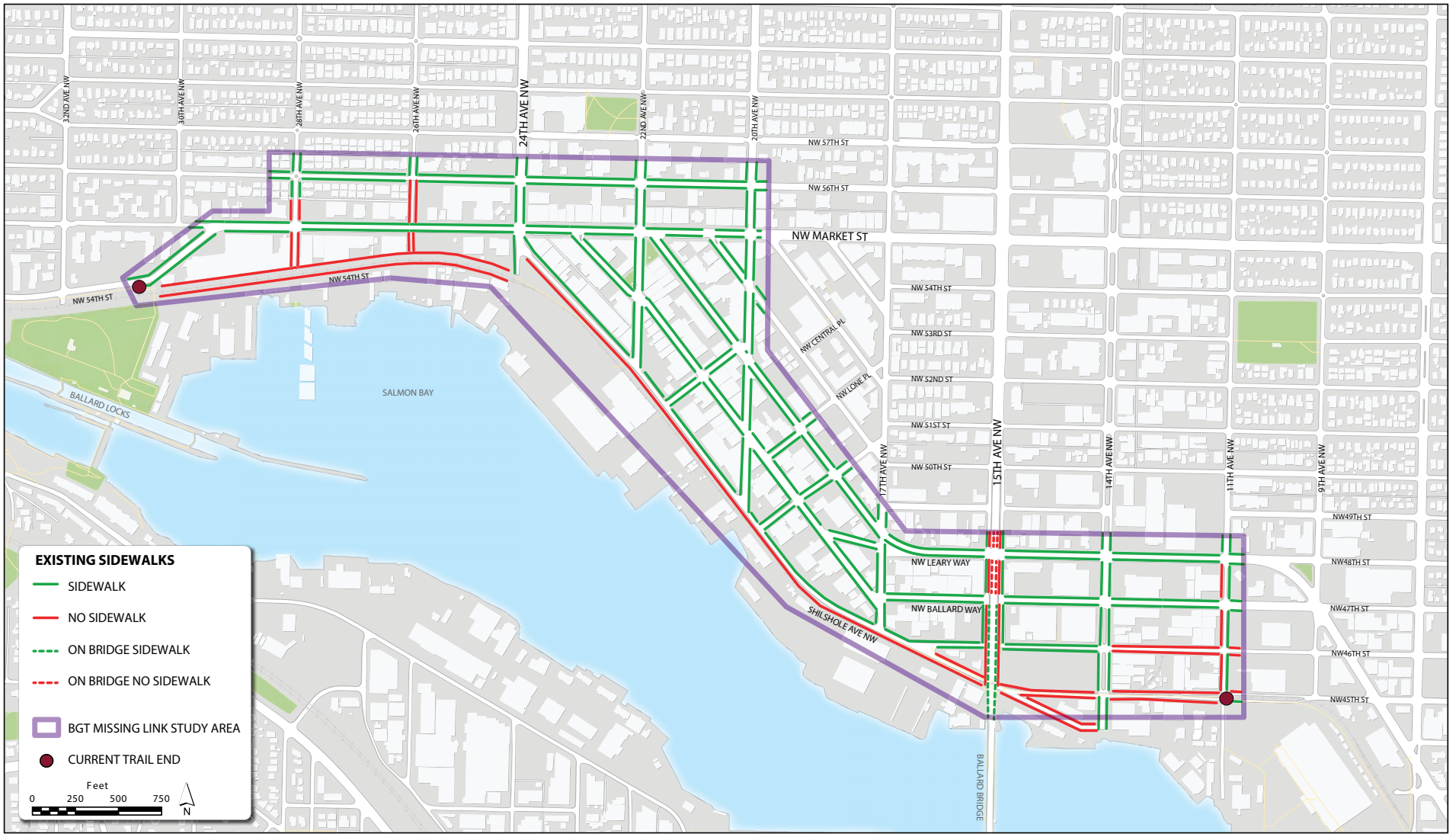


SOURCE:
City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-8
Existing Study Area Bicycle Facilities

April 2017



SOURCE:
City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-9
Existing Conditions Study Area Sidewalks

April 2017

Bicycle volumes are higher than pedestrian volumes on the BGT. The counts recorded on September 26, 2015 indicated that pedestrian volumes are approximately 30% bicycle volumes on the trail. The counts at 9th Ave NW, the closest location to the study area, also indicate that bicycle volumes are typically higher on weekdays than on weekends (see Table 4-9). This is likely because of the high number of commuters who use the BGT compared to recreational users. Nonmotorized volumes on the BGT are substantially higher on the east side of the study area compared to the west side. It is likely that a large number of users are starting and ending their trips in the higher density residential areas north of the study area.

Turning movement counts collected in April 2014, September 2015, and February 2017 at study area intersections also recorded pedestrian and bicycle movements during the PM peak hour (Figure 4-10). During the PM peak hour, bicycle volumes are highest at:

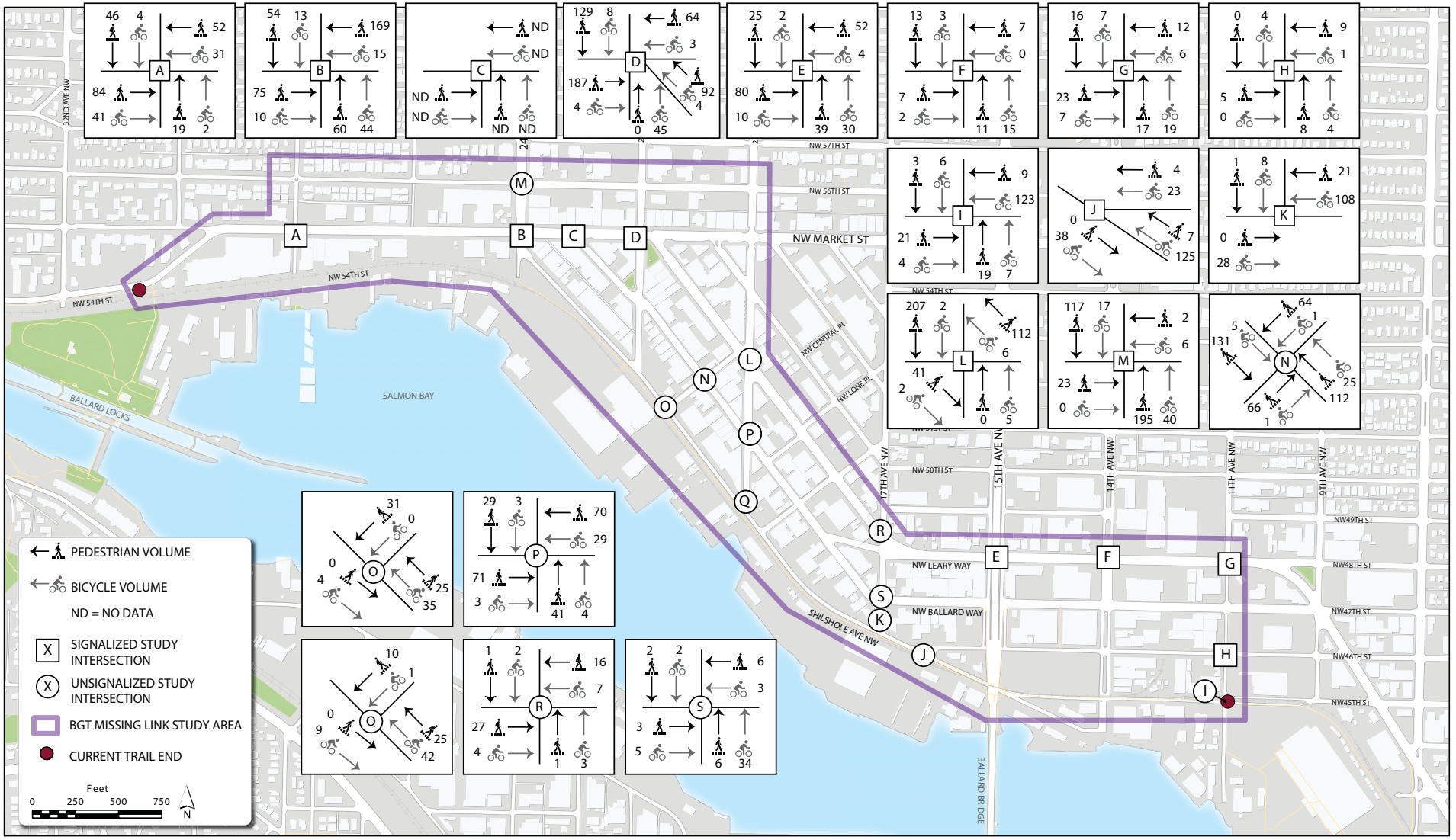
- NW 45th St near the eastern end of the BGT;
- Shilshole Ave NW and NW 46th St;
- Shilshole Ave NW and 17th Ave NW;
- NW Market St, Leary Ave NW, and 22nd Ave NW;
- NW Market St and NW 24th St;
- NW Market St and NW 28th St; and
- NW 24th St and 56th Ave NW.

The bicycle counts indicate that during the PM peak hour, cyclists are traveling westbound from the eastern end of the BGT along Shilshole Ave NW. Cyclists likely use various northbound streets, such as 20th Ave NW, 22nd Ave NW, and 24th Ave NW, to connect to residential areas.

During the PM peak hour, pedestrian volumes are highest at:

- NW Market St;
- Ballard Ave NW;
- Leary Ave NW near 20th Ave NW; and
- NW 56th St near 24th Ave NW.

Pedestrian volumes in these locations are likely highest due to the adjacent land uses and proximity of transit stops. Section 4.2.5, Public Transportation, summarizes existing public transportation facilities in the study area.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-10
Existing Conditions PM Peak Hour Intersection Nonmotorized Volumes
April 2017

4.2.5 Public Transportation

The following six King County Metro transit routes operate in the study area:

- Route 17, connecting Loyal Heights, Ballard, Queen Anne, and downtown Seattle, with stops on 15th Ave NW and NW Market St in the study area.
- Route 18, connecting North Beach, Ballard, Queen Anne, and downtown Seattle, with stops on 15th Ave NW and NW Market St in the study area.
- Route 29, connecting Ballard, Queen Anne, downtown Seattle, and Pioneer Square, with stops on 15th Ave NW, NW Leary Way, NW Market St, and NW 54th St in the study area.
- Route 40, connecting Northgate, Loyal Heights, Ballard, Fremont, Queen Anne, and downtown Seattle. In the study area, stops are located on NW Leary Way, NW Market St, and 24th Ave NW.
- Route 44, connecting Ballard, Wallingford, and the University of Washington, with stops on NW Market St in the study area.
- RapidRide D Line, connecting Crown Hill, Ballard, Interbay, Uptown, and downtown Seattle. In the study area, stops are located on 15th Ave NW.

Routes 15 and 994 do not serve stops on roadways that would be affected by the BGT Missing Link.

Major transit corridors include NW Market St, NW Leary Way, 24th Ave NW, and 15th Ave NW. Figure 4-11 shows the transit stop locations and transit corridors in the study area. Transit service in the study area is provided 7 days per week. During the weekdays, most transit service is provided between 5:00 and 2:00 AM with additional service during peak commute periods (6:00 to 9:00 AM and 3:00 to 7:00 PM). Routes 17, 18, and 28 only operate during the commute periods on weekdays (no weekend service). The RapidRide D Line provides service 24 hours per day with 15-minute or less headways between 5:00 AM and 11:30 PM during the week.

On weekends, the RapidRide D Line provides service 24 hours per day with 15-minute headways between 5:00 AM and 11:30 PM. Weekend service is also provided on Routes 40 and 44 between 5:00 AM and 2:00 AM. Between 8:00 AM and 6:00 PM on Saturday and Sunday, headways on Routes 40 and 44 are between 15 and 30 minutes.

4.2.6 Freight Rail

The Ballard Terminal Railroad Co. (BTR) rail line is a short line railroad that provides freight goods movement in the study area, primarily to the Salmon Bay Sand and Gravel Company. In the study area, the BTR rail line is located on the south side of NW 54th St and Shilshole Ave NW and continues onto the north side of NW 45th St. There is also a rail spur line that travels north from NW 45th St to NW 46th St directly east of 14th Ave NW. There are nine public at-grade crossings in the study area located at:

- 30th Ave NW and NW 54th St;
- 28th Ave NW and NW 54th St;
- 26th Ave NW and NW 54th St;
- 24th Ave NW and NW 54th St;
- Shilshole Ave NW at 15th Ave NW;
- NW 45th St and 11th Ave NW;
- NW 45th St and 14th Ave NW;
- NW 46th St and 14th Ave NW; and

- NW 46th St near 11th Ave NW.

The rail line also crosses several driveways on the south side of Shilshole Ave NW, including the driveways at the Stimson Marina, Salmon Bay Center, Salmon Bay Sand and Gravel, Covich-Williams Chevron, Salmon Bay Café, and Ballard Mill Marina.

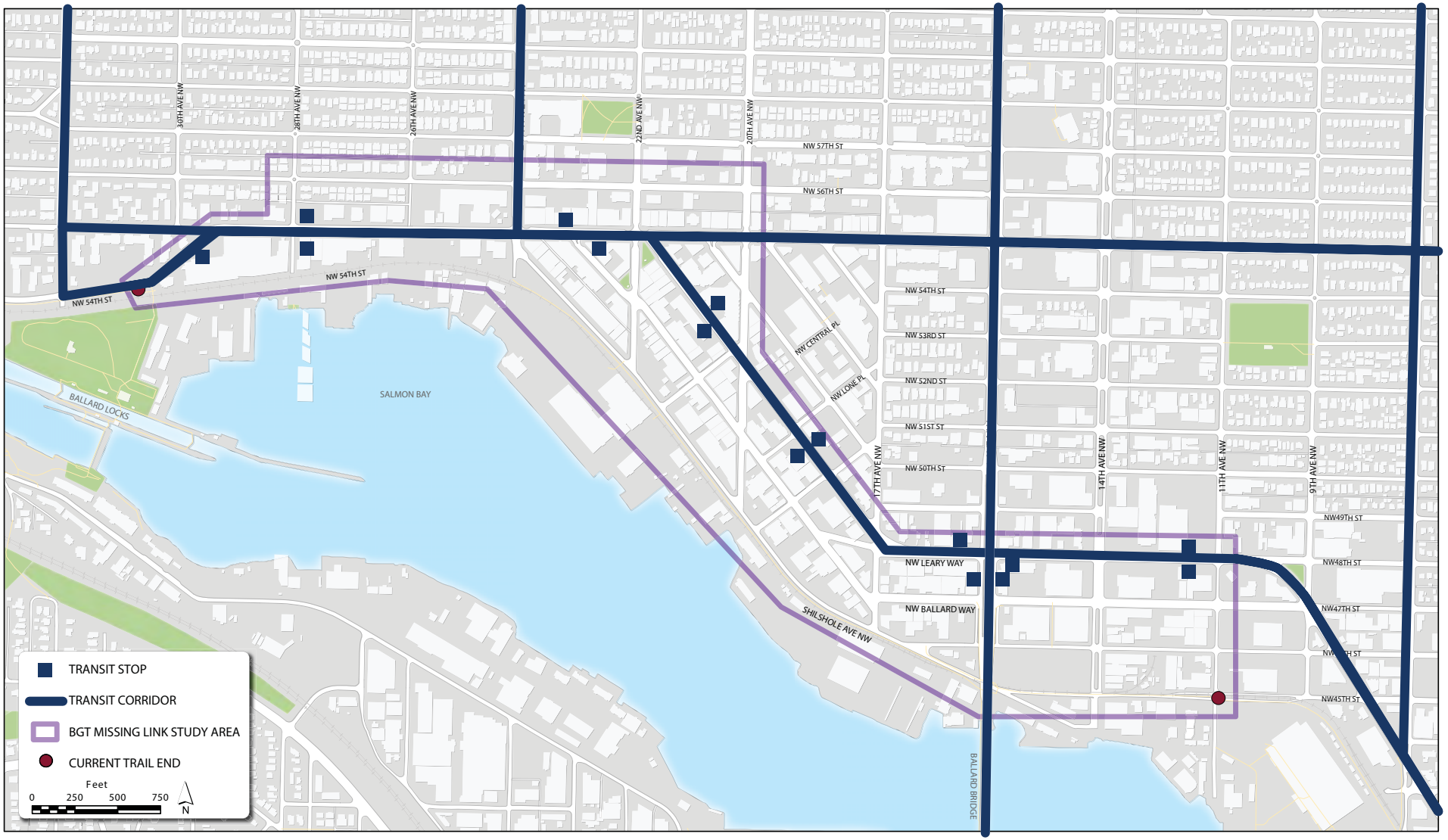
Trains do not regularly travel across all of the crossings. Currently, shipments destined for Salmon Bay Sand and Gravel are transferred from BNSF to BTR near the Seaview Boatyard (Cole, 2016). From this location, trains travel south and east along the BTR rail line to deliver shipments to Salmon Bay Sand and Gravel. The shipment is unloaded from the train cars and then empty cars are moved back to the transfer location between BTR and BNSF near the Seaview Boatyard. The train engine used by BTR is stored between NW 45th St and NW 46th St just east of 14th Ave NW. Currently, shipments to Salmon Bay Sand and Gravel occur approximately three times per week (Cole, 2016). Although train movements typically occur when traffic and nonmotorized volumes are lower, such as during the night, BTR can operate trains at any time of the day.

Trains typically travel at speeds of 5 to 10 miles per hour (mph) in the study area. Half of the crossings in the study area do not currently have safety enhancements, such as gates, advance warning signs, pavement markings, or crossbucks (signs in a letter "X" formation that indicate grade crossings). At a minimum, federal law requires all public at-grade crossings to have passive warning signs, such as crossbucks (FHWA, 2007). The following five crossings do not provide crossbucks:

- 30th Ave NW and NW 54th St (USDOT Crossing Number 101212H);
- Shilshole Ave NW at 15th Ave NW (USDOT Crossing Number 101226R);
- NW 46th St and 14th Ave NW (USDOT Crossing Number 101246C);
- NW 46th St near 11th Ave NW (USDOT Crossing Number 101258W); and
- NW 45th St and 11th Ave NW (USDOT Crossing Number 101264A).

4.2.7 **Safety**

This section summarizes recent reported collision data in the study area by frequency, type, and severity (including nonmotorized collisions) as well as nonmotorized incident response data (SDOT, 2015c; Seattle Fire Department, 2015). Between January 2012 and December 2014, there were 338 collisions in the study area. Roadway conditions in 2017 are similar to when collision data were collected between 2012 and 2014; these data were used to establish a baseline condition. Approximately 66% of all collisions were property damage-only collisions. None of the collisions were fatal. Table 4-11 summarizes all collisions in the study area, including motor vehicle and nonmotorized collisions, by corridor. Table 4-12 summarizes all collisions in the study area, including motor vehicle and nonmotorized collisions, by intersection.



SOURCE:
City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-11
Existing Conditions Transit Stops and Corridors

April 2017

Table 4-11. Collisions by Corridor 2012-2014

Corridor	*Total Collisions*	*Property Damage Only*	*Injury*	*Fatality*
11th Ave NW between southern dead end and NW Leary Way	2	2	0	0
14th Ave NW between NW 45th St and NW 49th St	9	5	0	0
15th Ave NW (including on-ramp from NW Ballard Way)	6	2	3	0
17th Ave NW between Shilshole Ave NW and NW 49th St	3	1	0	0
20th Ave NW between Shilshole Ave NW and Russell Ave NW	8	6	1	0
22nd Ave NW between Shilshole Ave NW and NW 57th St	12	11	1	0
24th Ave NW between Shilshole Ave NW and NW 57th St	7	6	1	0
28th Ave NW between southern dead end and NW 57th St	5	4	0	0
30th Ave NW between NW Market St and NW 56th St	1	1	0	0
Ballard Ave NW between NW Market St and NW 48th St, NW Ballard Way between Ballard Ave NW and 11th Ave NW	41	29	1	0
Leary Ave NW/NW Leary Way between NW Market St and NW Ballard Way	38	25	6	0
NW 45th St between 9th and 11th Ave NW, NW 45th St between 14th Ave and 15th Ave NW	3	1	1	0
NW 46th St between 9th Ave NW and 15th Ave NW	6	2	3	0
NW 54th St between 24th Ave NW and NW Market St	4	2	2	0
NW 56th St between 20th Ave NW and 30th Ave NW	9	5	1	0
NW Dock Pl between Shilshole Ave NW and Russell Ave NW	7	6	0	0
NW Ione Pl between Leary Ave NW and Russell Ave NW	2	2	0	0
NW Market St between Leary Ave NW and 32nd Ave NW	38	26	9	0
Shilshole Ave NW between 24th Ave NW and NW 45th St	26	19	5	0
Total	227	155	34	0

Source: SDOT, 2015c

Note: "Not Enough Damage" and "Non-State Matched" collision records are only included in the “Total Collisions” aggregation.

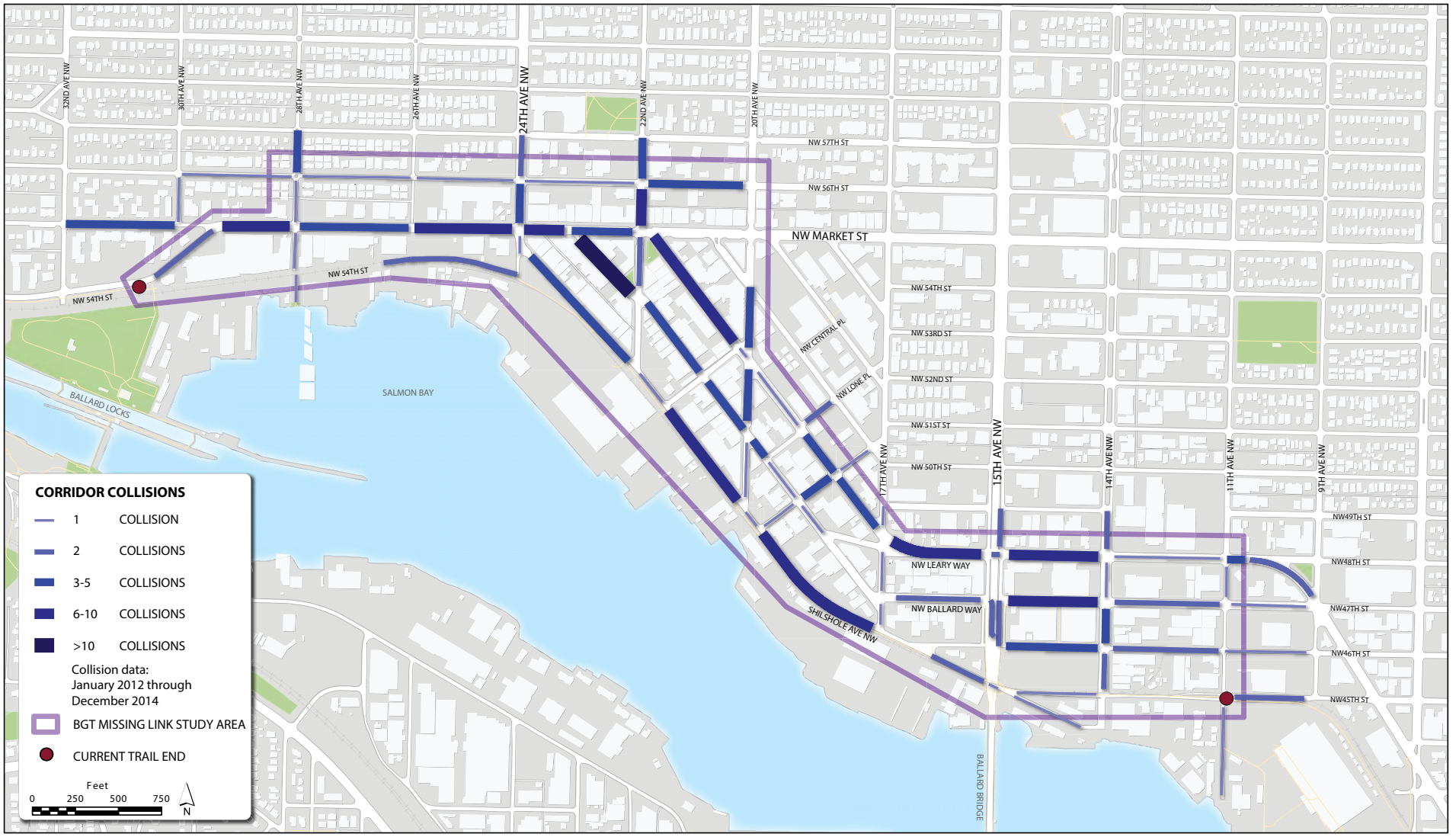
Table 4-12. Collisions by Intersection 2012-2014

Intersection	*Total Collisions*	*Property Damage Only*	*Injury*	*Fatality*
11th Ave NW and NW Ballard Way	2	1	0	0
11th Ave NW and NW Leary Way	6	2	3	0
14th Ave NW and NW 45th St	1	0	1	0
14th Ave NW and NW 46th St	18	13	5	0
14th Ave NW and NW Leary Way	8	4	3	0
15th Ave NW (Northbound) and NW Leary Way	15	12	3	0

Intersection	*Total Collisions*	*Property Damage Only*	*Injury*	*Fatality*
15th Ave NW (Southbound) and NW Leary Way	2	1	1	0
20th Ave NW and Ballard Ave NW	1	0	1	0
20th Ave NW and Leary Ave NW	3	2	0	0
20th Ave NW and Shilshole Ave NW	2	1	0	0
22nd Ave NW and Ballard Ave NW	1	0	1	0
22nd Ave NW and NW 56th St	2	1	1	0
22nd Ave NW and Shilshole Ave NW	3	1	1	0
24th Ave NW and NW Market St	4	3	1	0
24th Ave NW and NW 56th St	2	2	0	0
24th Ave NW and Shilshole Ave NW	2	1	1	0
26th Ave NW and NW Market St	1	1	0	0
28th Ave NW and NW 56th St	1	0	0	0
28th Ave NW and NW Market St	1	0	1	0
30th Ave NW and NW Market St	2	2	0	0
Ballard Ave NW and NW Ballard Way	2	2	0	0
Ballard Ave NW and NW Dock Pl	3	2	1	0
Ballard Bridge Off-Ramp and NW Ballard Way	3	2	1	0
Ballard Ave NW and NW Market St	2	2	0	0
Leary Ave NW and NW Dock Pl	3	2	1	0
Leary Ave NW and NW Ione Pl	3	2	1	0
Leary Ave NW And NW Leary Way	2	0	1	0
Leary Ave NW and NW Market St	7	4	3	0
Leary Ave NW and NW Vernon Pl	2	1	1	0
NW 54th St and NW Market St	4	3	1	0
Shilshole Ave NW and NW Vernon Pl	1	0	1	0
Shilshole Ave NW and NW 46th St	1	0	1	0
Shilshole Ave NW and NW Dock Pl	1	0	0	0
Total	111	67	35	0

Source: SDOT, 2015c
Note: "Not Enough Damage" and "Non-State Matched" collision records are only included in the “Total Collisions” aggregation

Figure 4-12 summarizes all of the collisions that occurred in the study area, including collisions between motor vehicles, pedestrians, and cyclists, for one-block segments (in Table 4-11, collisions are summarized for multi-block corridors). As shown on Figure 4-12, the single block segment of Ballard Ave NW between NW Market St and 22nd Ave NW had the highest number of collisions compared to other single block segments in the study area, with 13 collisions over the 3-year period. The majority of collisions in the study area were property damage-only collisions with parked vehicles.



SOURCE:
City of Seattle 2015; SDOT 2015c; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-12
Study Area Corridor Collisions

April 2017

The intersections with the highest concentrations of collisions—five or more collisions over the 3-year period—included (Figure 4-13):

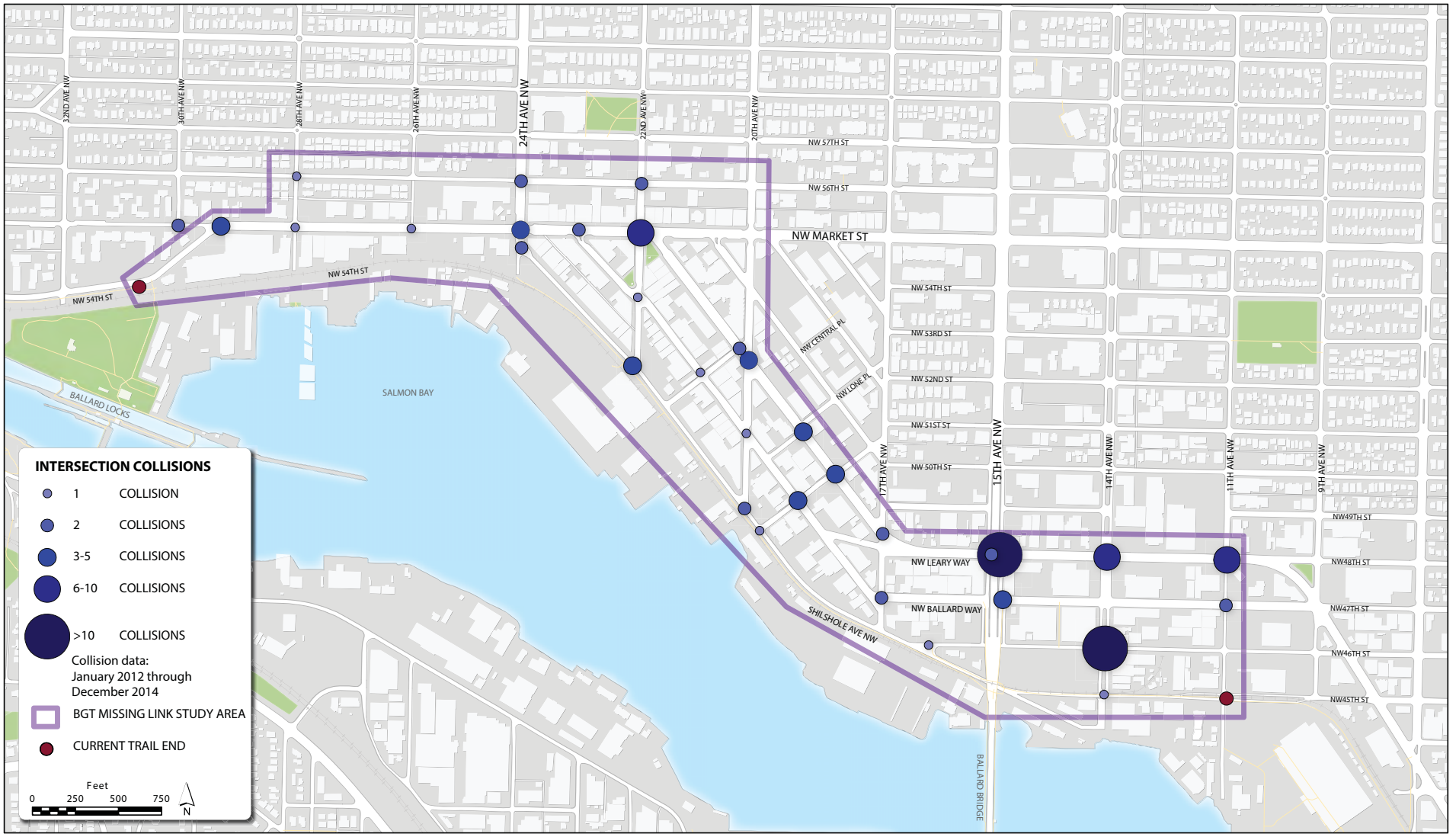
- NW 46th St and 14th Ave NW;
- 15th Ave NW northbound and NW Leary Way;
- NW Market St and Leary Ave NW;
- NW Leary Way and 14th Ave NW; and
- NW Leary Way and 11th Ave NW.

The collision type varied at each of the intersections. Right-angle collisions were the most frequent at NW 46th St and 14th Ave NW. At the intersections of NW Leary Way/15th Ave NW northbound, 14th Ave NW, and 11th Ave NW, the most frequent collision type was left-turn accidents. Rear-end collisions were the most common collisions at NW Market St and Leary Ave NW. Table 4-13 summarizes the number of collisions by collision type for the entire study area. Collisions are classified under only one type to prevent any overlap between collision records. The majority of collisions in the study area were with parked vehicles, followed by right-angle collisions, rear-end collisions, and left-turn collisions. Head-on and right-turn collisions had the lowest collision rates.

Collisions involving nonmotorized users are shown on Figure 4-14. Collisions involving pedestrians or cyclists were distributed throughout the study area with just over half occurring between intersections (on block segments). Of the nine collisions with pedestrians, most occurred when a turning or forward-moving vehicle struck a pedestrian who was crossing the street. The cause of collisions between cyclists and vehicles in the study area varies, although the majority of collisions occurred when both the vehicle and the cyclist were moving. For example, many collisions occurred when a vehicle was traveling in an opposite direction to the cyclist, such as a right-turning vehicle colliding with a forward-moving cyclist or a turning cyclist colliding with a forward-moving vehicle. There were no dedicated bicycle facilities in the locations where a collision between a vehicle and a cyclist occurred, with the exception of one collision that occurred on NW 45th St between 9th Ave NW and 11th Ave NW. In this location, there is a parallel facility, which is the existing BGT.

Nonmotorized safety in the study area is also affected by roadway conditions, including the presence of railroad tracks and other obstacles. Incident response data provided by the Seattle Fire Department indicate locations in the study area where roadway conditions could create unsafe passage for bicyclists and pedestrians (Seattle Fire Department, 2015). Table 4-14 and Figure 4-15 summarize the incident response data in the study area from January 2012 through December 2014. Between January 2012 and December 2014, there were 45 incidents in the study area. However, it is likely that additional incidents caused by roadway conditions occurred but were not recorded.

As shown on Figure 4-15, incident responses have been concentrated along NW 45th St and Shilshole Ave NW, and at the intersections of NW 45th St/14th Ave NW and under the Ballard Bridge. The presence of railroad tracks in these locations presents a safety concern for nonmotorized users, particularly cyclists. In September 2013, safety improvements were made to portions of NW 45th St between Shilshole Ave NW and 11th Ave NW and to Shilshole Ave NW between NW 45th St and NW 46th St. These improvements included installation of bicycle lanes to guide bicyclists over the rail tracks, lowering traffic speeds, and conversion of NW 45th St to one-way traffic. Incidents near railroad tracks typically occur when bicycle tires become trapped between the railroad tracks and the street. Other conditions unrelated to the railroad tracks could also result in incidents in the study area, such as falls during wet or icy roadway conditions.



SOURCE:
City of Seattle 2015; SDOT 2015c; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-13
Study Area Intersection Collisions

April 2017

Table 4-13. Collision Type 2012-2014

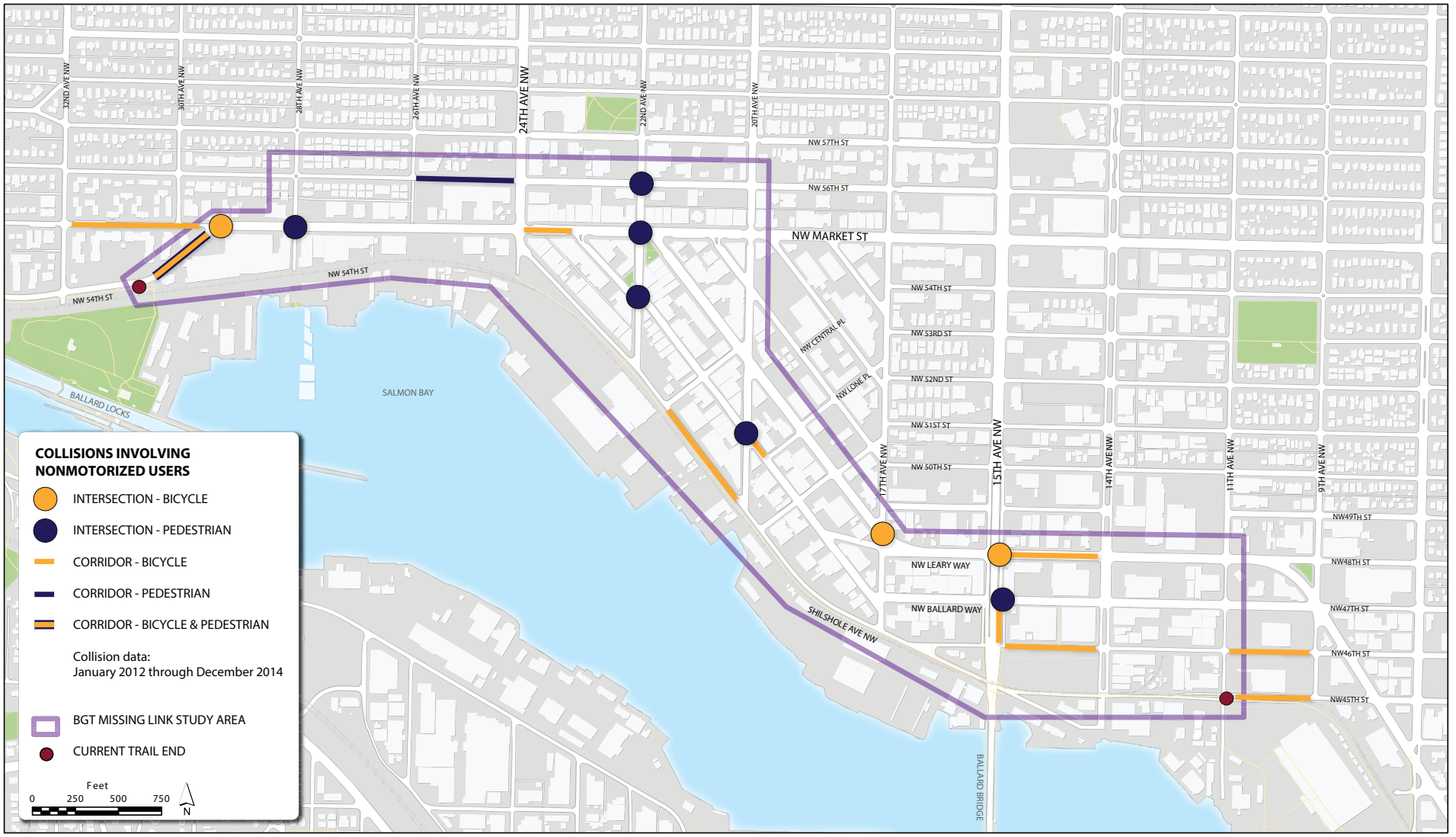
Location	Parked Car	Right angle	Right turn	Left turn	Side swipe	Head-on	Rear end	Other Collision Type	Bicycle	Pedestrian
Corridor										
11th Ave NW between southern dead end and NW Leary Way	1	1	0	0	0	0	0	0	0	0
14th Ave NW between NW 45th St and NW 49th St	2	0	0	0	0	0	0	0	0	0
15th Ave NW (including on-ramp from NW Ballard Way)	0	0	0	0	1	0	3	0	1	0
17th Ave NW between Shilshole Ave NW and NW 49th St	1	0	0	0	0	0	0	0	0	0
20th Ave NW between Shilshole Ave NW and Russell Ave NW	4	0	0	0	0	0	2	1	0	0
22nd Ave NW between Shilshole Ave NW and NW 57th St	9	0	0	1	1	0	1	0	0	0
24th Ave NW between Shilshole Ave NW and NW 57th St	2	0	0	0	3	0	1	0	0	0
26th Ave NW and NW Market St	0	0	0	0	0	0	0	0	0	0
28th Ave NW between southern dead end and NW 57th St	3	0	0	0	0	0	0	0	0	0
30th Ave NW between NW Market St and NW 56th St	1	0	0	0	0	0	0	0	0	0
Ballard Ave NW between NW Market St and NW 48th St, NW Ballard Way between Ballard Ave NW and NW Leary Way	23	0	0	0	2	0	1	0	1	0
Leary Ave NW/NW Leary Way between NW Market St and NW Ballard Way	10	4	1	1	3	0	6	5	1	0

Location	Parked Car	Right angle	Right turn	Left turn	Side swipe	Head-on	Rear end	Other Collision Type	Bicycle	Pedestrian
NW 45th St between 9th and 11th Ave NW, NW 45th St between 14th Ave and 15th Ave NW	0	0	0	0	0	0	0	1	1	0
NW 46th St between 9th Ave NW and 15th Ave NW	1	0	0	0	0	0	1	0	3	0
NW 54th St between 24th Ave NW and NW Market St	2	0	0	0	0	0	0	0	1	1
NW 56th St between 20th Ave NW and 30th Ave NW	5	0	0	0	0	0	0	0	0	1
NW Dock Pl between Shilshole Ave NW and Russell Ave NW	4	1	0	0	0	0	0	0	0	0
NW Ione Pl between Leary Ave NW and Russell Ave NW	2	0	0	0	0	0	0	0	0	0
NW Market St between Leary Ave NW and NW 54th St	12	1	0	0	5	1	4	4	1	1
Shilshole Ave NW between 24th Ave NW and NW 45th St	12	1	0	2	2	1	1	3	2	0
Intersection										
11th Ave NW and NW Ballard Way	0	0	0	0	0	0	0	0	0	0
11th Ave NW and NW Leary Way	0	1	1	3	0	0	0	0	0	0
14th Ave NW and NW 45th St	0	1	0	0	0	0	0	0	0	0
14th Ave NW and NW 46th St	0	15	0	0	1	0	0	0	0	0
14th Ave NW and NW Leary Way	0	1	0	5	0	0	1	0	0	0
15th Ave NW (northbound) and NW Leary Way	0	0	0	11	3	0	0	0	1	0
15th Ave NW (southbound) and NW Leary Way	0	0	0	1	0	0	0	1	0	0

Location	Parked Car	Right angle	Right turn	Left turn	Side swipe	Head-on	Rear end	Other Collision Type	Bicycle	Pedestrian
20th Ave NW and Ballard Ave NW	0	0	0	0	0	0	0	0	0	1
20th Ave NW and Leary Ave NW	0	1	0	1	0	0	0	0	0	0
20th Ave NW and Shilshole Ave NW	0	0	0	0	0	0	1	0	0	0
22nd Ave NW and Ballard Ave NW	0	0	0	0	0	0	0	0	0	1
22nd Ave NW and NW 56th St	0	0	0	0	0	0	0	0	0	1
22nd Ave NW and Shilshole Ave NW	0	1	0	0	0	0	0	1	0	0
24th Ave NW and NW Market St	0	1	0	0	1	0	2	0	0	0
24th Ave NW and NW 56th St	0	1	0	0	0	0	1	0	0	0
24th Ave NW and Shilshole Ave NW	1	0	0	0	0	0	0	1	0	0
26th Ave NW and NW Market St	0	1	0	0	0	0	0	0	0	0
28th Ave NW and NW 56th St	0	0	0	0	0	0	0	0	0	0
28th Ave NW and NW Market St	0	0	0	0	0	0	0	0	0	1
30th Ave NW and NW Market St	0	0	0	0	0	0	0	1	0	0
Ballard Ave NW and NW Ballard Way	0	1	0	0	0	0	0	0	0	0
Ballard Ave NW and NW Dock Pl	0	0	0	1	0	0	0	2	0	0
Ballard Bridge Off-Ramp and NW Ballard Way	0	1	0	0	1	0	0	0	0	1
Leary Ave NW and NW Dock Pl	0	1	0	1	0	0	0	1	0	0
Leary Ave NW and NW Ione Pl	0	3	0	0	0	0	0	0	0	0
Leary Ave NW and NW Leary Way	0	0	0	0	0	0	0	0	1	0
Leary Ave NW and NW Market St	1	0	0	1	0	0	4	0	0	1
Leary Ave NW and NW Vernon Pl	0	1	0	1	0	0	0	0	0	0

Location	Parked Car	Right angle	Right turn	Left turn	Side swipe	Head-on	Rear end	Other Collision Type	Bicycle	Pedestrian
NW 54th St and NW Market St	0	1	0	2	0	0	0	0	1	0
Shilshole Ave NW and NW Vernon Pl	0	1	0	0	0	0	0	0	0	0
Shilshole Ave NW and NW 46th St	0	1	0	0	0	0	0	0	0	0
Shilshole Ave NW and NW Dock Pl	0	0	0	0	0	0	0	0	0	0
Unclassified Collisions	68									
Total	96	41	2	31	23	2	29	21	14	9

Source: SDOT, 2015c



SOURCE:
City of Seattle 2015; SDOT 2015c; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

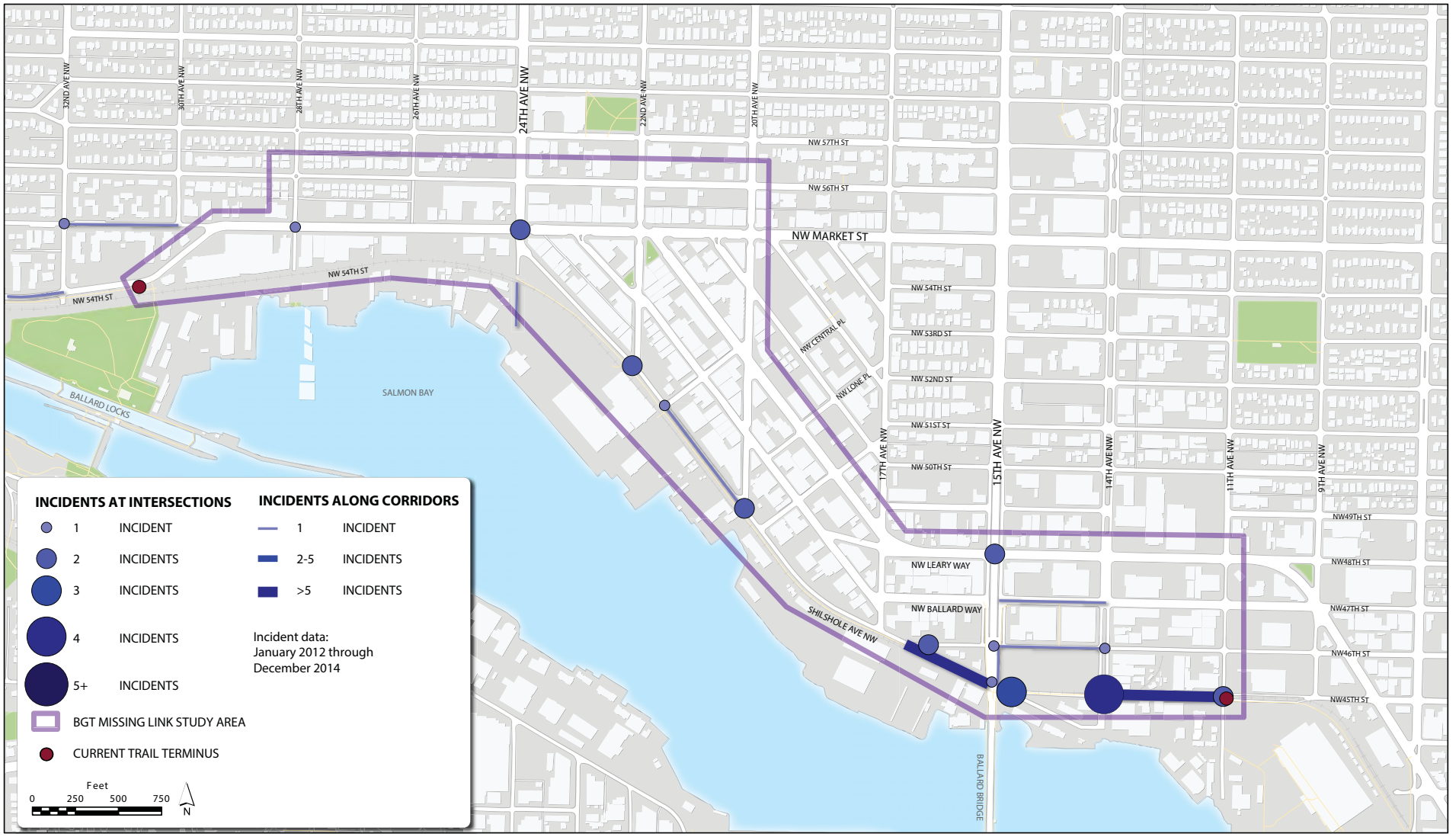
Figure 4-14
Study Area Collisions Involving Nonmotorized Users

April 2017

Table 4-14. Nonmotorized Incident Responses by Corridor and Intersection (2012-2014)

	Number of Incidents
Corridor	
NW Market St between 32nd Ave NW and 30th Ave NW	1
24th Ave NW between NW 54th St and Salmon Bay	1
Shilshole Ave NW between NW 46th St and 15th Ave NW	6
NW 45th St between 14th Ave NW and 11th Ave NW	7
NW 54th St between the Ballard Locks Driveway and 32nd Ave NW	1
15th Ave NW between NW 46th St and Shilshole Ave NW	1
Shilshole Ave NW between NW Vernon Pl and 20th Ave NW	1
NW Ballard Way between 15th Ave NW and 14th Ave NW	1
NW 46th St between 15th Ave NW and 14th Ave NW	1
Intersection	
NW 45th St and 14th Ave NW	4
Shilshole Ave NW and NW 45th St	3
Shilshole Ave NW and 20th Ave NW	2
Shilshole Ave NW and 22nd Ave NW	2
NW Market St and 24th Ave NW	2
Shilshole Ave NW and NW 46th St	2
NW Leary Way and 15th Ave NW	2
NW 46th St and 11th Ave NW	2
NW 46th St and 14th Ave NW	1
NW Market St and 28th Ave NW	1
NW Market St and 32nd Ave NW	1
Shilshole Ave NW and NW Vernon Pl	1
NW 46th St and 15th Ave NW	1
NW 45th Ave and 15th Ave NW	1
Total	45

Source: Seattle Fire Department, 2015



SOURCE:
City of Seattle 2015; Parametrix 2017; Seattle Fire Department 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-15
Study Area Nonmotorized Incident Responses

April 2017

CHAPTER 5 POTENTIAL IMPACTS

5.1 No Build Alternative

5.1.1 Construction

No construction activities would occur under the No Build Alternative for the BGT Missing Link project; therefore, there would be no construction impacts associated with the No Build Alternative.

5.1.2 Operation

5.1.2.1 *Roadway Network*

The roadway configuration and the 63 study area intersections and driveways for the No Build Alternative would be the same as the 2015 existing conditions described in Section 4.2, Existing Transportation Conditions.

5.1.2.2 *Traffic Volumes and Operations*

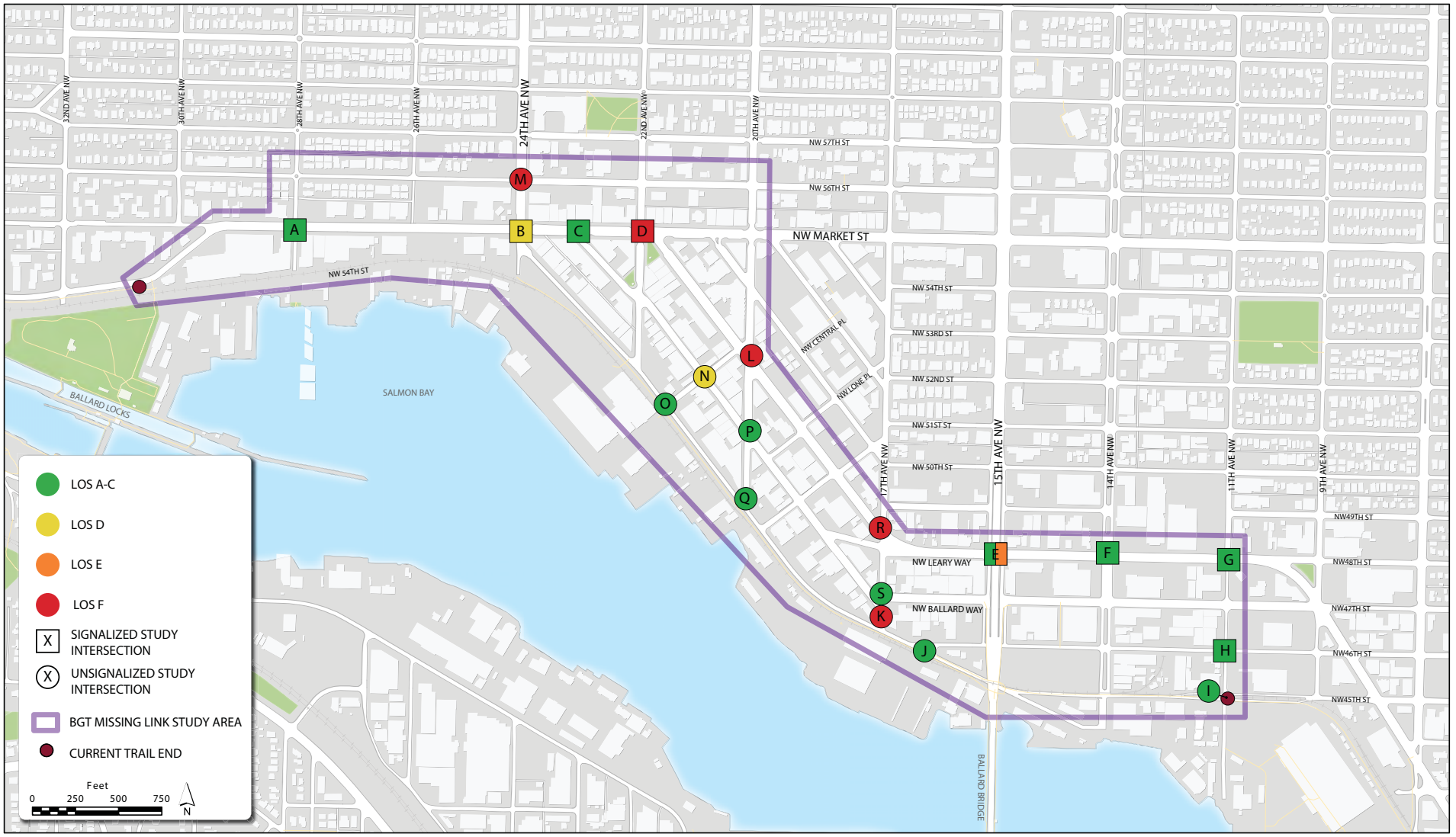
This section describes the PM peak hour traffic volumes and operations expected to exist in the 2040 No Build Alternative. Traffic volumes are expected to increase by 0.6% each year between 2015 and 2040 due to regional population and employment growth (Parsons Brinckerhoff, 2008; 2011). The roadway configuration is expected to be the same as the 2015 existing conditions.

The results of the analysis for the PM peak hour intersection operations for the 2040 No Build Alternative are summarized in Figure 5-1. Table 5-1 summarizes and compares the intersection operations results for the PM peak hour for both the 2015 existing conditions and the 2040 No Build Alternative. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stopped approach.

There would be more congestion and delay under the No Build Alternative compared to the 2015 existing conditions due to population and employment growth. The following intersections are expected to operate at LOS E or F in 2040 under the No Build Alternative:

- Intersection D: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection E2: 15th Ave NW/NW Leary Way Southbound Off-Ramp;
- Intersection K: Shilshole Ave NW/NW 17th St (southbound approach);
- Intersection L: Leary Ave NW/20th Ave NW (southbound approach on 20th Ave NW);
- Intersection M: NW 56th St/24th Ave NW (westbound approach); and
- Intersection R: NW Leary Way/17th Ave NW (southbound approach on 17th Ave NW).

All other intersections in the study area would operate at LOS D or better.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-1
2040 No Build Alternative PM Peak Hour Study Intersection Level of Service

April 2017

Table 5-1. Comparison of PM Peak Hour Study Intersection Levels of Service, 2015 Existing Conditions and 2040 No Build Alternative

ID	*Intersection*	*Traffic Control*	*2015 Existing Conditions PM Peak Hour*		*2040 No Build PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
A	NW Market St/28th Ave NW	Signal	A	6	A	6
B	NW Market St/24th Ave NW	Signal	D	42	D	45
C	NW Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
D	NW Market St/22nd Ave NW/Leary Ave NW	Signal	D	54	F	87
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	B	15	C	20
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	61	E	65
F	NW Leary Way/14th Ave NW	Signal	A	8	A	10
G	NW Leary Way/11th Ave NW	Signal	B	14	C	20
H	11th Ave NW/NW 46th St	Signal	B	18	C	22
I	11th Ave NW/NW 45th St	Unsignalized – All-way Stop	A	10	B	11
J	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	8	A	8
K	Shilshole Ave NW/NW 17th St	Unsignalized – Two-Way Stop	E	46	F	218
L	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	260	F	>300
M	NW 56th St/24th Ave NW	Unsignalized – Two-Way Stop	F	54	F	291
N	NW Vernon Pl/Ballard Ave NW	Unsignalized	C	18	D	27
O	NW Vernon Pl/Shilshole Ave NW	Unsignalized	C	19	C	24
P	Ballard Ave NW/20th Ave NW	Unsignalized	B	14	C	18
Q	Shilshole Ave NW/20th Ave NW	Unsignalized	C	18	C	24
R	NW Leary Way/17th Ave NW	Unsignalized	F	50	F	154
S	NW Ballard Way/17th Ave NW	Unsignalized	A	9	B	11

Table 5-2 summarizes and compares the average delay at study area driveways during the PM peak hour for both the 2015 existing conditions and the 2040 No Build Alternative. During the PM peak hour, delay at study area driveways could increase between 0 and 61 seconds compared to existing conditions.

Table 5-2. Comparison of PM Peak Hour Study Driveway Delay, 2015 Existing Conditions, and 2040 No Build Alternative

ID	*Driveway*	*2015 Existing Conditions PM Peak Hour Delay (sec)*	*2040 No Build PM Peak Hour Delay (sec)*	*Difference in Driveway Delay (sec)*
1	NW 54th St/Ballard Locks	14	19	5
2	NW 54th St/McGinnis Marine	0	0	0
3	NW 54th St/Ballard Oil	9	9	0
4	NW 54th St/Snow and Co	9	9	0
5	NW 54th St/Ballard Transfer	9	9	0
6	NW 54th St/Lieb Marine Services	0	0	0
7	Shilshole Ave NW/Stimson Marina	19	28	9
8	Shilshole Ave NW/Salmon Bay Center	20	25	5
9	Ballard Ave NW/Salmon Bay Sand and Gravel South	15	17	2
10	Shilshole Ave NW/Covich Williams	31	44	13
11	Shilshole Ave NW/Salmon Bay Café	17	23	6
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina	13	15	2
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina	19	25	6
14	NW 45th St/Ballard Insulation	10	11	1
15	NE 45th/Dovetail General Contractors	9	10	1
16	NW 54th St/Triad Ballard Development	14	17	3
17	NW 54th St/Trident Seafood Retail	14	17	3
18	Shilshole Ave NW/Shilshole West Building	21	27	6
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	15	18	3
20	Shilshole Ave NW/Magnum Self Storage	0	0	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	13	15	2
22	Shilshole Ave NW/Salmon Bay Sand and	21	29	8

ID	*Driveway*	*2015 Existing Conditions PM Peak Hour Delay (sec)*	*2040 No Build PM Peak Hour Delay (sec)*	*Difference in Driveway Delay (sec)*
	Gravel Loading Docks North			
23	Shilshole Ave NW/Ballard Hardware	21	29	8
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	22	30	8
25	NW 46th St/Ballard Marine	19	23	4
26	NW 46th St/Ballard Blocks Development	38	99	61
27	11th Ave NW/U.S. Post Office	0	0	0
28	28th Ave NW/Townhomes	9	9	0
29	NW 56th St/Mark24	9	9	0
30	NW 56th St/Ballard Square Parking	12	13	1
31	22nd Ave NW/Chase Bank	14	17	3
32	Ballard Ave NW/Ballard Sheet Metal Works	10	11	1
33	Ballard Ave NW/Ballard Hardware Loading Dock	0	0	0
34	NW Ballard Way/Warden Fluid Dynamics	11	11	0
35	NW 46th St/Radtke Marine	10	10	0
36	NW Market St/Alley	12	13	1
37	Leary Ave NW/Ballard Landmark	11	12	1
38	Leary Ave NW/Public Parking/Caffè Fiore	12	13	1
39	Leary Ave NW/Carter Subaru Ballard	9	10	1
40	NW Leary Way/BOLT Modern Storage	18	22	4
41	NW Leary Way/Quest Church	14	17	3
42	NW Leary Way/Office Max	10	11	1
43	NW Leary Way/U-Haul	19	25	6
44	11th Ave NW/7-Eleven	10	11	1

Note: Under the existing conditions and No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. This captures bicycle traffic in the study area without a trail.

5.1.2.3 ***Freight***

The primary freight corridors are expected to be the same under the No Build Alternative compared to the 2015 existing conditions. Freight would continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

Increased traffic congestion from background population and employment growth would likely adversely affect freight movement in the study area. Freight vehicles would experience the same delay at study area intersections as general-purpose vehicles. Intersection K (Shilshole Ave NW/NW 17th St) and Intersection D (NW Market St/22nd Ave NW/Leary Ave NW) would operate at LOS F in 2040 and are located on a primary freight corridor as designated by SDOT.

Driveway activity and usage would be similar under the No Build Alternative as compared to the existing conditions. There are a number of driveways where vehicles would continue to back into or out of the driveway, which could be a hazardous maneuver because vehicles could conflict with nonmotorized users. Vehicles backing into or out of driveways, particularly large vehicles, could have difficulty seeing other users in the area, including nonmotorized users crossing the driveway.

5.1.2.4 *Nonmotorized Users*

5.1.2.4.1 Study Area Facilities

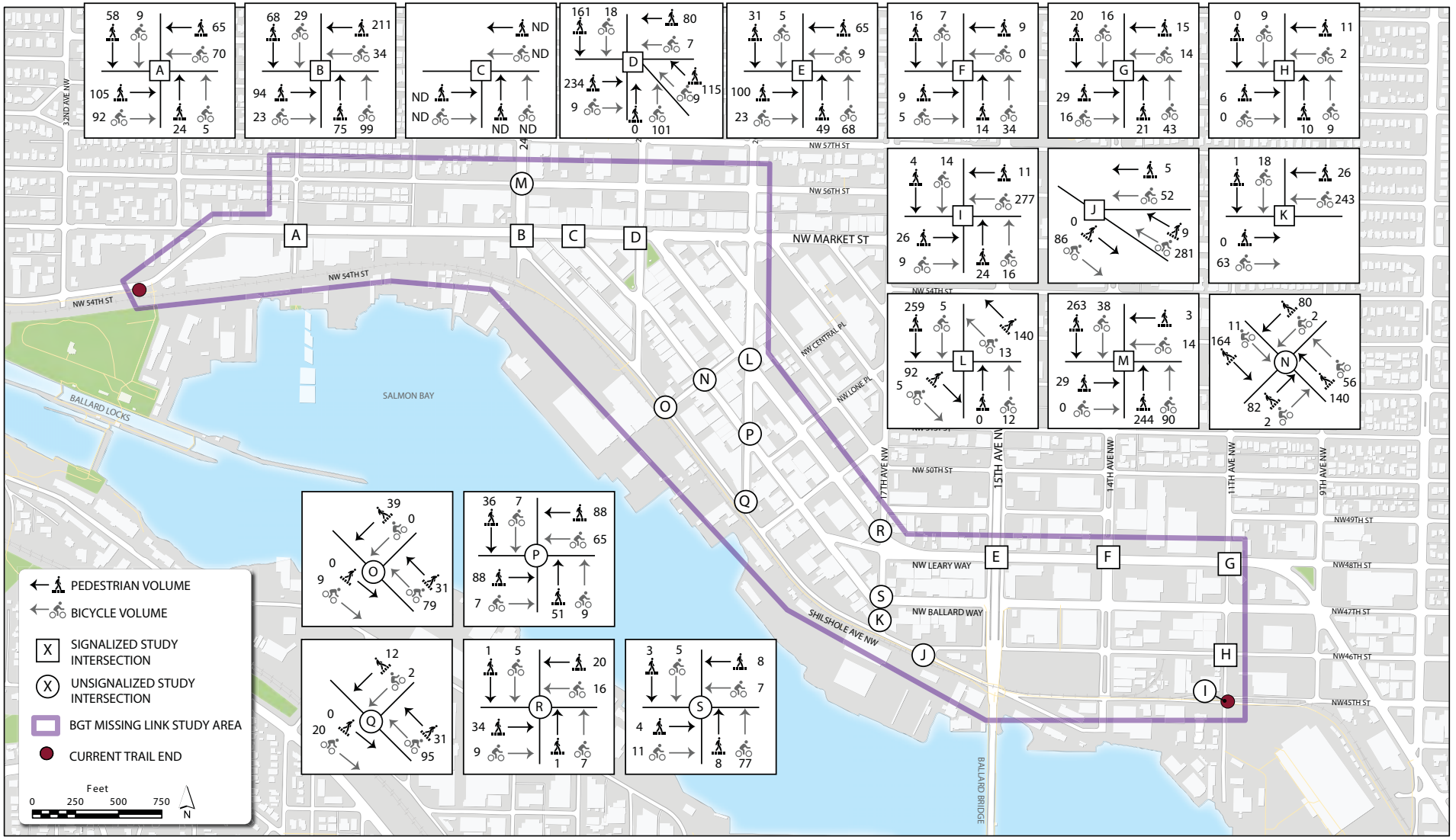
Pedestrian and bicycle facilities in and near the study area under the No Build Alternative would be the same as under the 2015 existing conditions. Bicycle facilities that would be provided in and near the study area under the No Build Alternative are shown on Figure 4-8. Most study area streets would have sidewalks and crosswalks provided at signalized intersections, as shown on Figure 4-9.

There would continue to be a gap in the BGT in the study area between 11th Ave NW and NW 45th St and approximately 300 feet east of 32nd Ave NW and NW 54th St.

5.1.2.4.2 Pedestrian and Bicycle Volumes

Bicycle volumes in the study area are projected to increase by 5% each year between 2015 and 2040 based on recent studies and counts on the BGT, expected land use changes and growth in the Ballard area, and input from SDOT (SDOT, 2015d, 2015e; Fehr & Peers and SvR Design Company, 2011; PSRC, 2015). Pedestrian volumes are projected to increase by 1% each year between 2015 and 2040 (Sound Transit, 2010; Fehr & Peers and SvR Design Company, 2011; PSRC, 2015).

Figure 5-2 summarizes the future bicycle and pedestrian volumes during the PM peak hour at study area intersections in 2040. Peak hour nonmotorized volumes on the BGT at 9th Ave NW in 2040 are summarized in Table 5-3. All nonmotorized counts were rounded to the nearest five users to account for daily fluctuations. For locations where the recorded volumes were between one and four, the count was rounded up to provide a conservative estimate of impacts. Similar to existing conditions, bicyclists are anticipated to primarily use Shilshole Ave NW to travel through the study area. Also similar to existing conditions, pedestrian volumes would likely be higher on facilities near transit stops and pedestrian-heavy land uses, such as retail and commercial areas.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-2
2040 No Build PM Peak Hour
Intersection Nonmotorized Volumes

April 2017

Table 5-3. 2040 PM Peak Hour Nonmotorized Volumes on the BGT at 9th Ave NW

PM Peak Hour	*Total Bicycles*	*Westbound Bicycles*	*Eastbound Bicycles*	*Total Pedestrians*	*Westbound Pedestrians*	*Eastbound Pedestrians*
5:00-6:00 PM	430	325	105	65	45	20

Under the No Build Alternative, increased pedestrian and bicycle volumes in the study area could result in increased conflicts between nonmotorized users and vehicular traffic, particularly for cyclists. Cyclists currently travel on study area roadways without designated bicycle facilities, particularly on Shilshole Ave NW. When there are more bicyclists on study area streets in the future, the lack of dedicated facilities could result in a greater likelihood of collisions between motor vehicles and cyclists due to increased exposure.

5.1.2.5 *Public Transportation*

Public transportation services under the No Build Alternative would be similar to the 2015 existing conditions. With increased population and employment growth, it is anticipated that demand for public transit would increase, which could result in the need for service expansion in the study area.

The intersections of NW Market St/22nd Ave NW/Leary Ave NW (Intersection D) and 15th Ave NW/NW Leary Way Northbound Off-Ramp (Intersection E2) are expected to operate at LOS E or F under the No Build Alternative. This could increase transit delay at these intersections. The intersection at NW 56th St and 24th Ave NW (Intersection M) would operate at LOS F under the No Build Alternative, but this would not affect transit because the delay would only be experienced by vehicles at the westbound approach. Similarly, the intersections at Leary Ave NW and 20th Ave NW (Intersection L) and NW Leary Way and 17th Ave NW (Intersection R) would also operate at LOS F under the No Build Alternative, but this would not affect transit because the delay would only be experienced by vehicles at the southbound approach on 20th Ave NW and 17th Ave NW.

5.1.2.6 *Freight Rail*

Rail operations in the study area under the No Build Alternative are expected to be similar to the 2015 existing conditions. No impacts are anticipated under the No Build Alternative.

5.1.2.7 *Safety*

Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. This could increase collision frequencies for both motor vehicle and nonmotorized users in the study area. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians; therefore, the frequency of motor vehicle-bicycle collisions could increase at a greater rate under the No Build Alternative. No new dedicated bicycle facilities would be provided under the No Build Alternative, which could result in a greater likelihood of collisions between motor vehicles and cyclists due to increased exposure. As discussed in Section 4.2.7, the majority of collisions between cyclists and motor vehicles to date have occurred when both the cyclist and the motor vehicle were in areas where there were no dedicated bicycle facilities. If this condition persists, there could be an increased likelihood for collisions between motor vehicles and cyclists because of increased volumes.

As mentioned in Section 5.1.2.1, the roadway network is expected to be the same under the No Build Alternative as under the 2015 existing conditions; as a result, collision types and severity for motor vehicles and nonmotorized users are expected to be similar.

Other roadway conditions that influence nonmotorized safety would also remain the same under the No Build Alternative, such as the presence of railroad tracks and other obstacles. If dedicated bicycle facilities are not provided to allow cyclists to avoid or safely traverse areas with obstacles such as railroad tracks, the number of nonmotorized incidents is expected to increase as nonmotorized volumes increase in the study area.

5.2 Impacts Common to all Build Alternatives

This section describes construction impacts common to all Build Alternatives. Impacts that are unique to a particular Build Alternative are described in the following sections.

5.2.1 Construction

5.2.1.1 *Traffic Volumes and Operations*

Construction activities could affect traffic operations in the vicinity of each alternative during the 12- to 18-month construction duration. Construction would occur in small segments that could range between three and four street blocks; therefore, isolated portions of the roadway would be affected.

During construction, traffic delay and congestion impacts are anticipated, particularly in areas where the roadway is reduced to one lane. There could also be traffic diversions to other study area streets during construction, which could increase delay and congestion on other roadways. However, traffic delay from diversions is expected to be minimal because it is likely that vehicles would be distributed along multiple adjacent roadways under each alternative.

Additional sources of potential traffic delay during construction could include:

- Visual distraction from construction activities; and
- Construction trucks entering and exiting the work zone and staging areas.

Delays resulting from these sources are likely to be temporary.

It is expected that driveway access to properties would be maintained during construction. It is possible that driveways could be narrowed during construction, or could be temporarily surfaced with ADA-compliant materials in place of asphalt or concrete. If properties have more than one access point, it is also possible that one driveway could be closed while the other remains open during periods of construction. Impacts are expected to be temporary for driveway access and for traffic accessing individual properties.

5.2.1.2 *Freight*

Impacts on freight traffic would be similar to those described for general-purpose traffic in Section 5.2.1.1. There could be some impacts from delay and congestion, but these are expected to be temporary. Access to businesses in the study area would be maintained throughout construction of the project. Because freight traffic peaks during the midday, roadway closures during the day could cause additional delay for freight vehicles. However, this impact is not anticipated to be significant because closures would only occur for several hours.

5.2.1.3 *Nonmotorized Users*

Pedestrian and cyclist access would be maintained within the construction areas in accordance with City policies for construction. Commercial businesses would remain open, and residential and industrial properties would remain accessible. Sidewalks would be temporarily replaced by temporary facilities that

would be ADA compliant within the construction area and for accessing other properties. Temporary pedestrian facilities could include asphalt sidewalks, steel plates over unfinished areas, wood sidewalks with railings, or cordoned off areas of parking lanes. When necessary during construction, nonmotorized users could be rerouted around active construction zones, which could lengthen nonmotorized trips and travel times. However, the impact would not be significant because construction is expected to occur in segments of three to four street blocks, resulting in minimal short-term re-routing.

5.2.1.4 *Public Transportation*

Similar to impacts discussed in Section 5.2.1.1, traffic diversion to other study area streets could increase delay and congestion for transit in the study area. However, this impact is not expected to be significant because it is likely that diverted vehicles would be distributed among multiple adjacent roadways under each of the alternatives, reducing delay on any specific street.

Specific construction impacts on public transportation that would only occur for the Preferred Alternative, Ballard Avenue Alternative, and Leary Alternative are described in Section 5.3, Section 5.6, and Section 5.7, respectively.

5.2.1.5 *Freight Rail*

Construction impacts on rail service would occur with the Preferred Alternative (Section 5.3) and the Shilshole South Alternative (Section 5.4). Construction activities for all other Build Alternatives are not expected to affect rail operations in the study area.

5.2.1.6 *Safety*

Construction activities for the Build Alternatives could temporarily affect safety in the study area. Temporary changes in roadside characteristics and surfacing could affect accident frequencies in isolated locations in the study area during construction. Changes in roadside characteristics could include the presence of construction equipment and activities, the loss of shoulders, and other alterations, which have the potential to create distractions for drivers. Changes in roadway surfacing could affect traffic speeds and braking.

5.2.2 Operation

Operation impacts for each alternative are discussed below.

5.3 Preferred Alternative

5.3.1 Construction

Under the Preferred Alternative, there could be traffic and freight delays on Shilshole Ave NW during construction. If construction activities require the closure of one lane of the roadway, a flagger could be required to direct travel to other routes within the construction zone. It is anticipated that this impact would occur for several hours during the midday but only for short segments of roadway (between three and four street blocks) at a time. Construction would also occur on NW Market St, a transit corridor, which could have temporary impacts on public transportation. These impacts would be similar to those described for general-purpose traffic. It is possible that delay and congestion could increase as a result of traffic diversion and road closures during construction. However, these impacts are expected to be minimal because construction would occur in segments of three or four street blocks and would be temporary. Construction activities could also require temporary relocations of bus stops in the study area. Any construction activities that could affect public transportation on NW Market St would be coordinated with King County Metro.

Under the Preferred Alternative, a portion of the BTR rail line between the Hatton Marine driveway (approximately 600 feet west of 17th Ave NW) and just east of the Ballard Bridge would be removed and reconstructed in a different location. Also, pavement would be added in portions of the rail line to decrease gaps between the tracks and the roadway to improve safety at driveways in the study area. These construction activities would be coordinated with BTR operations and would occur during times when BTR trains are not operating; construction equipment would be cleared from the tracks each day. Reconstruction of the rail line would be coordinated with BTR to create the least disruption to rail movements. New track could be laid prior to removing the old track to reduce the period of time when the tracks are unusable. As necessary, any construction activities near the BTR rail line would be coordinated with the appropriate agencies.

5.3.2 Operation

5.3.2.1 *Roadway Network*

The Preferred Alternative would alter the roadway network on NW 45th St, Shilshole Ave NW, NW Market St, and NW 54th St. As described in Chapter 1, Introduction and Project History, the Preferred Alternative would construct a multi-use trail on the south side of NW 45th St, Shilshole Ave NW, NW Market St, and NW 54th St between 11th Ave NW and the driveway at the Ballard Locks, where the BGT currently terminates.

The Preferred Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 10- to 12-feet wide with a 1- to 10-foot-wide buffer on both sides of the trail between the roadway and adjacent properties. The section of the trail on NW 54th St and NW Market St between the Ballard Locks and 24th Ave NW would have a 6- to 10-foot-wide sidewalk between the south side of the trail and adjacent properties. On NW 54th St, the westbound left-turn pocket provided at the Ballard Locks driveway that is adjacent to the Lockspot Café would be removed and replaced at 32nd Ave NW. The public angled parking lot along NW 54th St would be reoriented to provide eastbound one-way travel with angled parking.

Under the Preferred Alternative, NW 54th St between the Ballard Locks driveway and Shilshole Ave NW would have one lane of travel in each direction and a two-way center turn lane. In various locations, driveways would cross the trail to allow access to businesses. The roadway channelization on Shilshole Ave NW would be similar to the No Build Alternative, with one travel lane in each direction for vehicles. There are approximately 39 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative, but one property on NW 54th St with two driveways could have the driveways consolidated into a single access point, in coordination with SDOT and the property owner. On Shilshole Ave NW at 17th Ave NW, a left-turn pocket in the eastbound direction and new signal would be provided.

One travel lane in each direction would be provided on NW 45th St between Shilshole Ave NW and 11th Ave NW under the Preferred Alternative.

All other roadways in the study area would be the same as the No Build Alternative.

5.3.2.2 *Traffic Volumes and Operations*

Traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6% per year between 2015 and 2040 due to background population and employment growth.

Under the Preferred Alternative, traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-4 and Figure 5-3. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stopped approach.

Table 5-4. Comparison of PM Peak Hour Study Intersection Levels of Service, 2040 No Build Alternative and Preferred Alternative

ID	Intersection	Traffic Control	*2040 No Build Alternative PM Peak Hour*		*2040 Preferred Alternative PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
A	NW Market St/28th Ave NW	Signal	A	6	B	18
B	NM Market St/24th Ave NW	Signal	D	45	D	48
C	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
D	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	87	F	87
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	C	20
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	65	E	65
F	NW Leary Way/14th Ave NW	Signal	A	10	A	10
G	NW Leary Way/11th Ave NW	Signal	C	20	C	20
H	11th Ave NW/NW 46th St	Signal	C	22	B	17
I	11th Ave NW/NW 45th St	Unsignalized – All-way Stop	B	11	B	12
J	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	8	E	35
K	Shilshole Ave NW/NW 17th St[1]	Unsignalized – Two-way Stop	F	218	B	11
L	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
M	NW 56th St/24th Ave NW	Unsignalized – Two-way Stop	F	291	F	118
N	NW Vernon Pl/Ballard Ave NW	Unsignalized	D	27	C	22
O	NW Vernon Pl/Shilshole Ave NW	Unsignalized	C	24	C	21
P	Ballard Ave NW/20th Ave NW	Unsignalized	C	18	C	15
Q	Shilshole Ave NW/20th Ave NW	Unsignalized	C	24	C	21
R	NW Leary Way/17th Ave NW	Unsignalized	F	154	F	103
S	NW Ballard Way/17th Ave NW	Unsignalized	B	11	A	9

[1]Intersection at NW 17th St and Shilshole Ave NW becomes signalized under the Preferred Alternative.

The Preferred Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E that would otherwise operate at LOS D or better under the No Build Alternative. However, this delay would be experienced by a small number of vehicles and would be between the delay threshold for LOS D and E for unsignalized intersections. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

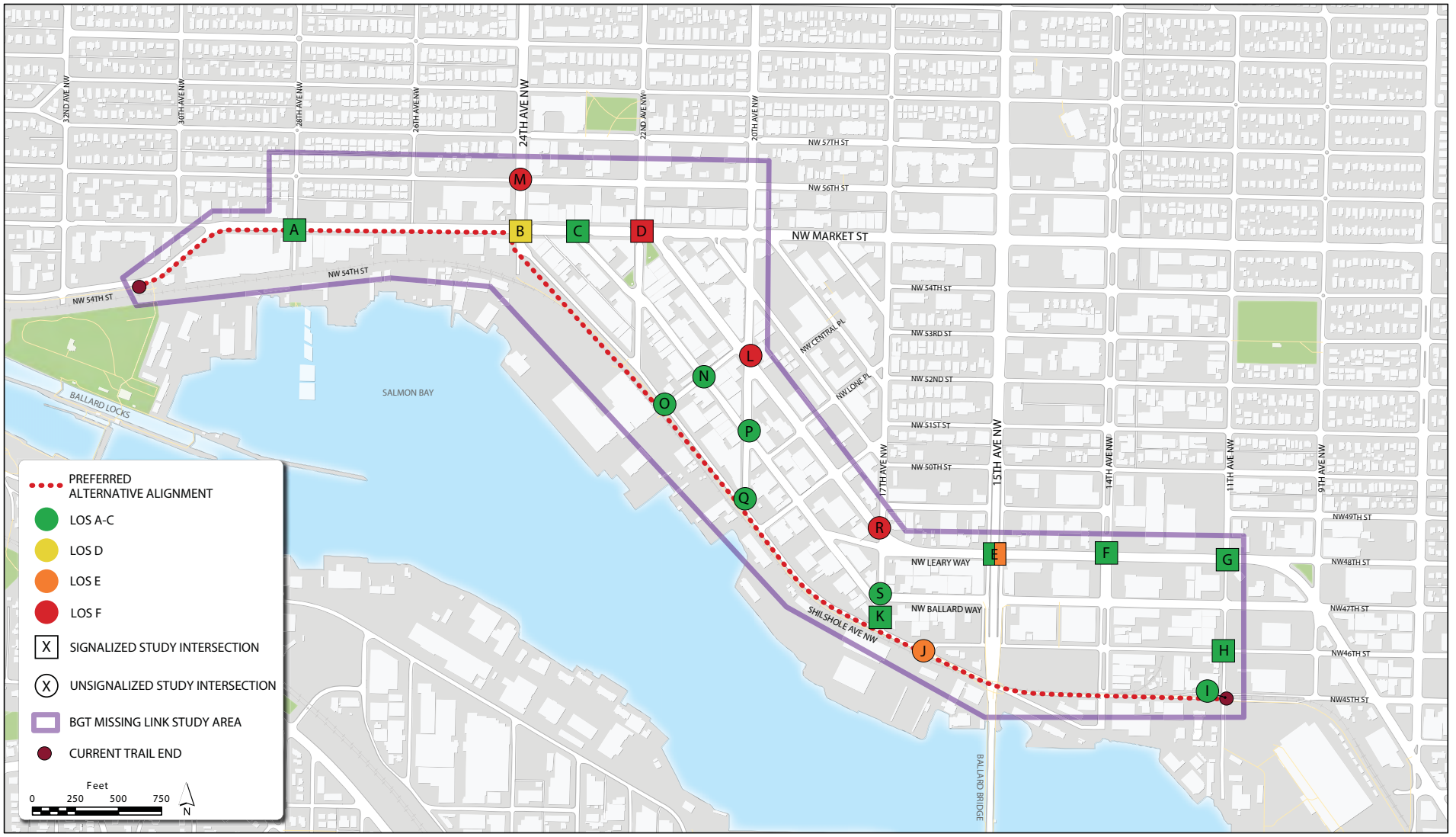
Seven intersections would operate at a different LOS or have a change in delay of at least 5 seconds when compared to the No Build Alternative.

Intersections where LOS would improve include:

- Intersection H (11th Ave NW and NW 46th St) would operate at LOS B compared to LOS C because traffic would shift from NW 46th St to NW 45th St as NW 45th St is restored to a two-way street.
- Intersection K (Shilshole Ave NW and 17th Ave NW) would be signalized under the Preferred Alternative. This would result in improved intersection operations (LOS B compared to LOS F under the No Build Alternative).
- Intersection M (NW 56th St/24th Ave NW), Intersection N (NW Vernon Pl/ Ballard Ave NW), Intersection R (NW Leary Way/17th Ave NW), and Intersection S (NW Ballard Way/17th Ave NW) would experience reduced delay under the Preferred Alternative compared to the No Build Alternative. Nonmotorized users in the study area would shift to the trail, which would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection.

LOS would worsen at the following intersection:

- Intersection A (NW Market St/28th Ave NW) would operate at LOS B compared to LOS A under the No Build Alternative. Under the Preferred Alternative, NW Market St would be reduced from four lanes to three lanes, which would increase delay during the PM peak hour. However, this intersection would still operate at an acceptable LOS.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-3
Preferred Alternative PM Peak Hour Study Intersection Level of Service

April 2017

The driveways shown in Table 5-5 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Preferred Alternative. Under the Preferred Alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 11 seconds of increased delay at driveways that would cross the BGT Missing Link compared to the No Build Alternative. Many driveways that would not cross the trail would experience no increase or decreases in delay because nonmotorized users would shift to the trail.

Table 5-5. Comparison of PM Peak Hour Study Driveway Delay between the 2040 No Build Alternative and Preferred Alternative

ID[1]	Driveway	2040 No Build Alternative PM Peak Hour (sec)	2040 Preferred Alternative PM Peak Hour (sec)	Difference in Driveway Delay (sec)
1	**NW 54th St/Ballard Locks**	**19**	**26**	**7**
2	NW 54th St/McGinnis Marine	0	0	0
3	NW 54th St/Ballard Oil	9	9	0
4	NW 54th St/Snow and Co	9	9	0
5	NW 54th St/Ballard Transfer	9	9	0
6	NW 54th St/Lieb Marine Services	0	0	0
7	**Shilshole Ave NW/Stimson Marina**	**28**	**34**	**6**
8	**Shilshole Ave NW/Salmon Bay Center**	**25**	**35**	**10**
9	**Shilshole Ave NW/Salmon Bay Sand and Gravel South**	**17**	**28**	**11**
10	**Shilshole Ave NW/Covich Williams**	**44**	**48**	**4**
11	**Shilshole Ave NW/Salmon Bay Café**	**23**	**29**	**6**
12	**Shilshole Ave NW/Hatton Marine/Ballard Mill Marina**	**15**	**25**	**10**
13	**Shilshole Ave NW/CSR Marine/Ballard Mill Marina**	**25**	**32**	**7**
14	**NW 45th St/Ballard Insulation**	**11**	**20**	**9**
15	**NE 45th/Dovetail General Contractors**	**10**	**20**	**10**
16	**NW 54th St/Triad Ballard Development**	**17**	**25**	**8**
17	**NW 54th St/Trident Seafood Retail**	**17**	**27**	**10**
18	Shilshole Ave NW/Shilshole West Building	27	25	-2
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	18	16	-2
20	Shilshole Ave NW/Magnum Self Storage	0	0	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	15	13	-2
22	Shilshole Ave NW/Salmon Bay Sand and	29	25	-4

ID[1]	Driveway	2040 No Build Alternative PM Peak Hour (sec)	2040 Preferred Alternative PM Peak Hour (sec)	Difference in Driveway Delay (sec)
	Gravel Loading Docks North			
23	Shilshole Ave NW/Ballard Hardware	29	25	-4
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	30	27	-3
25	NW 46th St/Ballard Marine	23	20	-3
26	NW 46th St/Ballard Blocks Development	99	65	-34
27	11th Ave NW/U.S. Post Office	0	0	0
28	28th Ave NW/Townhomes	9	9	0
29	NW 56th St/Mark24	9	9	0
30	NW 56th St/Ballard Square Parking	13	13	0
31	22nd Ave NW/Chase Bank	17	17	0
32	Ballard Ave NW/Ballard Sheet Metal Works	11	10	-1
33	Ballard Ave NW/Ballard Hardware Loading Dock	0	0	0
34	NW Ballard Way/Warden Fluid Dynamics	11	11	0
35	NW 46th St/Radtke Marine	10	9	-1
36	NW Market St/Alley	13	13	0
37	Leary Ave NW/Ballard Landmark	12	12	0
38	Leary Ave NW/Public Parking/Caffè Fiore	13	13	0
39	Leary Ave NW/Carter Subaru Ballard	10	10	0
40	NW Leary Way/BOLT Modern Storage	22	21	-1
41	NW Leary Way/Quest Church	17	15	-2
42	NW Leary Way/Office Max	11	11	0
43	NW Leary Way/U-Haul	25	24	-1
44	11th Ave NW/7-Eleven	11	11	0

[1]Bold denotes driveways that would be crossed by the BGT Missing Link.

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.3.2.3 *Freight*

The primary freight corridors are expected to be the same under the Preferred Alternative compared to the No Build Alternative. Freight would continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;

- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

Operations at most study area intersections are expected to have similar impacts on freight mobility under the Preferred Alternative compared to the No Build Alternative. The Preferred Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E or F that would otherwise operate at LOS D or better under the No Build Alternative. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

Freight mobility at the intersections of 11th Ave NW and NW 46th St would be improved under the Preferred Alternative compared to the No Build Alternative. This is because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area. Freight mobility at the intersection of Shilshole Ave NW and 17th Ave NW would also be improved under the Preferred Alternative because a signal would be provided, improving intersection operations from LOS F to LOS B compared to the No Build Alternative.

There are approximately 39 driveways and loading docks along the alignment of the Preferred Alternative. Freight vehicles would be required to stop before the trail to check for nonmotorized users before advancing to the roadway, which could result in an increase in delay of up to 11 seconds on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread out, this delay would occur sporadically during the PM peak hour and throughout the day. Although some driveways could experience additional delay compared to the No Build Alternative, this delay would not be considered a significant impact because this additional delay, while inconvenient, would not be expected to become severe enough to substantially affect freight operations (ECONorthwest, 2016). Please see the Economic Considerations Report for additional detail.

Driveway activity and usage would be similar under the Preferred Alternative as compared to the No Build Alternative. Backing into or out of driveways adjacent to the trail could be considered a hazardous maneuver. Vehicles backing into or out of driveways, particularly large vehicles, could have difficulty seeing other users in the area, including nonmotorized users crossing the driveway.

Up to two driveways at a private property on NW 54th St could change because the BGT Missing Link would be constructed within the City's right-of-way along the south side of NW 54th St, NW Market St, Shilshole Ave NW, and NW 45th St. This property is served by a parking lot with two access points that could be consolidated to improve safety and decrease the number of driveway crossings while still providing adequate access to the property.

There could also be some changes in access that would potentially change how private property owners use the space between their buildings and the City's right-of-way. Some businesses may not be able to access their businesses as they currently do and may have to reorient their business operations to accommodate freight by relocating loading areas. Businesses that are currently using the public right-of-way for loading and unloading activities may have to alter their operations under the Preferred Alternative. All other loading docks and driveways along the Preferred Alternative would remain the same as the No Build Alternative.

5.3.2.4 ***Nonmotorized Users***

5.3.2.4.1 Study Area Facilities

Under the Preferred Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT Missing Link. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated 10- to 12-foot-wide

multi-use trail for nonmotorized users for the entire length of the study area. Additional nonmotorized improvements under the Preferred Alternative could include curb treatments, pavement markings and treatments, signage, wayfinding, and lighting.

Curb bulbs would be provided at the following intersections:

- Shilshole Ave NW and 22nd Ave NW;
- Shilshole Ave NW and NW Vernon Pl;
- Shilshole Ave NW and 20th Ave NW;
- Shilshole Ave NW and NW Dock Pl;
- Shilshole Ave NW and 17th Ave NW;
- NW 45th St and 14th Ave NW; and
- NW 45th St and 11th Ave NW.

The trail would cross approximately 39 driveways and loading docks under the Preferred Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area compared to the No Build Alternative by organizing and creating predictability at potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway and trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait 15 to 25 seconds for a vehicle to clear the trail (see the second bullet under Section 3.5.2.1 for additional information on how this was calculated).

5.3.2.4.2 Pedestrian and Bicycle Volumes

Between 2015 and 2040, bicycle volumes are anticipated to grow by 5% annually and pedestrian volumes are expected to grow by 1% annually in the study area. As described in Section 3.3.3, these growth rates are based on recent studies and counts on the BGT, expected land use changes and growth in the Ballard area, and input from SDOT (SDOT, 2015d; 2015e; Sound Transit, 2010; Fehr & Peers and SvR Design Company, 2011; PSRC, 2015). Anticipated nonmotorized volumes on the BGT Missing Link in 2040 are summarized in Table 5-6. All nonmotorized counts were rounded to the nearest five users to account for daily fluctuations. For locations where the recorded volumes were between one and four, the count was rounded to provide a conservative estimate of impacts. As described in Section 3.5.2.1, analysts assumed that bicycle traffic would shift to the trail corridor proposed under each Build Alternative. This assumption provides the most conservative estimate of impacts for each of the Build Alternatives. Nonmotorized users who have destinations in other parts of the study area may use the trail on Shilshole Ave NW through the study area for only a short distance. This would result in nonmotorized users continuing to use other roadways in the study area as well, but the majority of users would shift to the trail.

Table 5-6. 2040 PM Peak Hour Nonmotorized Volumes on the BGT

PM Peak Hour	*Total Bicycles*	*Westbound Bicycles*	*Eastbound Bicycles*	*Total Pedestrians*	*Westbound Pedestrians*	*Eastbound Pedestrians*
BGT at the eastern end						
5:00-6:00 PM	430	325	105	65	45	20
BGT at the western end						
5:00-6:00 PM	160	90	70	125	85	40

The BGT Missing Link project would be designed to accommodate a high volume of nonmotorized users; therefore, BGT Missing Link users are not expected to be affected by diversion of nonmotorized users from other parts of the study area. Signal timing for both vehicles and nonmotorized users would be included in the design at study area intersections; timing would be optimized so that delays would be minimized for nonmotorized users and vehicles.

5.3.2.5 *Public Transportation*

There would be minimal impacts from the Preferred Alternative on transit. At the intersection of NW Market St and 28th Ave NW, which is located along a transit corridor, there could be additional delay compared to the No Build Alternative. As shown in Table 5-4, this intersection would operate at LOS B under the Preferred Alternative compared to LOS A under the No Build Alternative. This could affect transit travel times and speeds near this intersection. However, this intersection would continue to operate at an acceptable LOS and mitigation would not be required.

5.3.2.6 *Freight Rail*

Under the Preferred Alternative, the BTR tracks would be relocated between the Hatton Marine driveway (approximately 600 feet west of 17th Ave NW) and just east of the Ballard Bridge. This could include removing pieces of siding, or passing rail (rail line that allows trains to pass each other) that are no longer used, or relocating track to allow additional right-of-way space for the trail. All track relocation would be coordinated with BTR so that impacts on rail operations would be minimized and so that rail operations could continue as before once construction is complete.

The Preferred Alternative would provide improved separation between nonmotorized users and the rail line, which would improve safety and provide adequate sight distance along Shilshole Ave NW. The BGT Missing Link would cross the rail line near the Ballard Mill Marina. Signage and other design elements would be provided to warn nonmotorized users of train activity.

5.3.2.7 *Safety*

The Preferred Alternative would improve safety for nonmotorized users and motor vehicles in the study area. Under this alternative, a dedicated bicycle facility would improve predictability at conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as the railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Although the Preferred Alternative would improve overall safety compared to the No Build Alternative, there is potential for some new impacts depending on final design. Those potential impacts include:

- Sight distance concerns at driveway crossings with the BGT Missing Link;
- Conflicts between vehicles and nonmotorized users at trail crossings;
- Conflicts between nonmotorized users and trail design features, such as planter strips and curbing; and
- Conflicts between vehicles and trail design features, such as planter strips and curbing.

These potential new impacts would be minimized through detailed review during the trail design process, such as conducting detailed sight distance reviews at each driveway intersection during final design. However, these impacts may not be eliminated entirely.

Under the Preferred Alternative, there would be sight distance concerns for exiting vehicles at four driveways on the south side of NW Market St between the Ballard Locks driveway and 26th Ave NW where buildings are constructed up to the property lines. Buildings and structures adjacent to the trail could reduce visibility for both vehicles and trail users. Sidewalks would be provided between the properties and the trail, which would improve sight distances by providing a buffer of 10 feet from the property frontage.

There could be conflicts at trail crossings with driveways and intersections, including delay for either nonmotorized users and vehicles while waiting for shared areas to clear, as well as collisions. As discussed in Section 1.4, Features Common to All Build Alternatives, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles. There would be no sight distance issues on Shilshole Ave NW because the BTR tracks would be relocated to allow the trail to be placed farther from the property lines, as discussed in Section 5.3.2.6. Wherever possible at driveways along the alignment of the Preferred Alternative, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify trail users and vehicle drivers that there is a trail crossing. In addition to these safety enhancements, drivers would be required to stop before continuing across the trail as described under SMC 11.58.230, which states:

> "Except as directed otherwise by official traffic-control devices, the driver of a vehicle emerging from any alley, driveway, private property, or building shall stop such vehicle immediately prior to driving onto a sidewalk or onto the sidewalk area extending across any alley or driveway, or onto a public path, and shall yield the right-of-way to any pedestrian or bicyclist as may be necessary to avoid collision, and upon entering the roadway of a street shall yield the right-of-way to all vehicles approaching on the roadway."

There would be no sight distance concerns for vehicles entering driveways because trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate industrial and commercial traffic.

Nonmotorized users on the BGT Missing Link would also be traveling in both directions on one side of the street. This would require vehicles crossing the trail to look both directions for nonmotorized users before continuing across the trail. For drivers of large vehicles with reduced visibility, it could be difficult to see in both directions of travel. As mentioned previously, a number of design solutions will be considered in the final design to delineate and provide adequate sight distance for both nonmotorized users and vehicles at trail crossings.

Trail design features, such as vegetated planting areas and curbs, could be obstacles if nonmotorized users lost control of their bicycle, had to dodge other trail users, or if trail users were distracted. Similarly, vehicles could conflict with trail design features if drivers miscalculated a turning movement or veered away from their path of travel. These impacts are expected to occur infrequently, which is typical for other nonmotorized trails in the area. Trail design features would be consistent with applicable Seattle design standards, including National Association of City Transportation Officials (NACTO) and American Association of State Highway and Transportation Officials (AASHTO) guidelines.

5.4 Shilshole South Alternative

5.4.1 Construction

Under the Shilshole South Alternative, there could be traffic and freight delays on Shilshole Ave NW during construction. If construction activities require the closure of one lane of the roadway, a flagger could be required to direct travel to other routes within the construction zone. It is anticipated that this impact would occur for several hours during the midday but only for short segments of roadway (between three and four street blocks).

Pavement would be added to portions of the BTR rail line to decrease gaps between the tracks and the roadway to improve safety at driveways in the study area. The BTR tracks could also be relocated in various isolated locations along NW 54th St, Shilshole Ave NW, and NW 45th St. This could include removing pieces of passing rail that are no longer used or relocating track to allow additional right-of-way space for the trail. These construction activities would be coordinated with BTR operations and would occur during times when BTR trains are not operating; construction equipment would be cleared from the tracks each day. Because construction activities near the rail line would be coordinated with BTR train movements, impacts on rail operations would be minimized from construction activities. Any construction activities near the BTR rail line would be coordinated with the appropriate agencies.

5.4.2 Operation

5.4.2.1 *Roadway Network*

The Shilshole South Alternative would alter the roadway network on NW 45th St, Shilshole Ave NW, and NW 54th St. As described in Chapter 1, Introduction and Project History, the Shilshole South Alternative would construct a multi-use trail on the south side of NW 45th St and Shilshole Ave NW, and on the north side of NW 54th St between 11th Ave NW and the driveway at the Ballard Locks, where the BGT currently terminates. Under the Shilshole South Alternative, driveways would cross the trail, which would not occur under the No Build Alternative.

The Shilshole South Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 10- to 12-feet wide with a 1- to 6-foot-wide buffer on both sides of the trail between the roadway and adjacent properties.

Under the Shilshole South Alternative, NW 54th St between the Ballard Locks driveway and Shilshole Ave NW would allow travel in both directions; however, only one vehicle could travel in the lane at a time. In various locations, driveways would cross the trail to allow access to businesses. The roadway channelization on Shilshole Ave NW would be similar to the No Build Alternative, with one travel lane in each direction for vehicles. There are approximately 37 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative, but some properties with multiple accesses could have the driveways consolidated into a single access point in coordination with SDOT and property owners. On Shilshole Ave NW at 17th Ave NW, a left-turn pocket and new signal would be provided in the eastbound direction.

One travel lane in each direction would be provided on NW 45th St between Shilshole Ave NW and 11th Ave NW under the Shilshole South Alternative. At the intersection of 14th Ave NW and NW 45th St, a left-turn pocket would be provided in both the eastbound and westbound directions. At the intersection of 11th Ave NW and NW 45th St, a left-turn pocket would be provided in the eastbound direction. A 5- to 17-foot-wide median would be provided between the Ballard Bridge overpass and 11th Ave NW on NW 45th St. The 17-foot-wide median would be centered on the railroad tracks for clearance and safety.

All other roadways in the study area would be the same as the No Build Alternative.

5.4.2.2 *Traffic Volumes and Operations*

Traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6% per year between 2015 and 2040 due to background population and employment growth.

Under the Shilshole South Alternative, traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-7 and Figure 5-4. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stopped approach.

Table 5-7. Comparison of PM Peak Hour Study Intersection Levels of Service between the 2040 No Build Alternative and Shilshole South Alternative

			2040 No Build Alternative PM Peak Hour		*2040 Shilshole South Alternative PM Peak Hour*	
ID	*Intersection*	*Traffic Control*	*LOS*	*Delay (sec)*	*LOS*	*Delay (sec)*
A	NW Market St/28th Ave NW	Signal	A	6	A	7
B	NM Market St/24th Ave NW	Signal	D	45	D	45
C	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
D	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	87	F	87
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	C	20
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	65	E	65
F	NW Leary Way/14th Ave NW	Signal	A	10	A	10
G	NW Leary Way/11th Ave NW	Signal	C	20	C	20
H	11th Ave NW/NW 46th St	Signal	C	22	B	17
I	11th Ave NW/NW 45th St	Unsignalized – All-way Stop	B	11	B	12
J	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	8	E	35
K	Shilshole Ave NW/NW 17th St[1]	Unsignalized – Two-way Stop	F	218	B	11
L	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
M	NW 56th St/24th Ave NW	Unsignalized – Two-way Stop	F	291	F	118

ID	Intersection	Traffic Control	2040 No Build Alternative PM Peak Hour		2040 Shilshole South Alternative PM Peak Hour	
			LOS	Delay (sec)	LOS	Delay (sec)
N	NW Vernon Pl/Ballard Ave NW	Unsignalized	D	27	C	22
O	NW Vernon Pl/Shilshole Ave NW	Unsignalized	C	24	C	23
P	Ballard Ave NW/20th Ave NW	Unsignalized	C	18	C	15
Q	Shilshole Ave NW/20th Ave NW	Unsignalized	C	24	C	21
R	NW Leary Way/17th Ave NW	Unsignalized	F	154	F	103
S	NW Ballard Way/17th Ave NW	Unsignalized	B	11	A	9

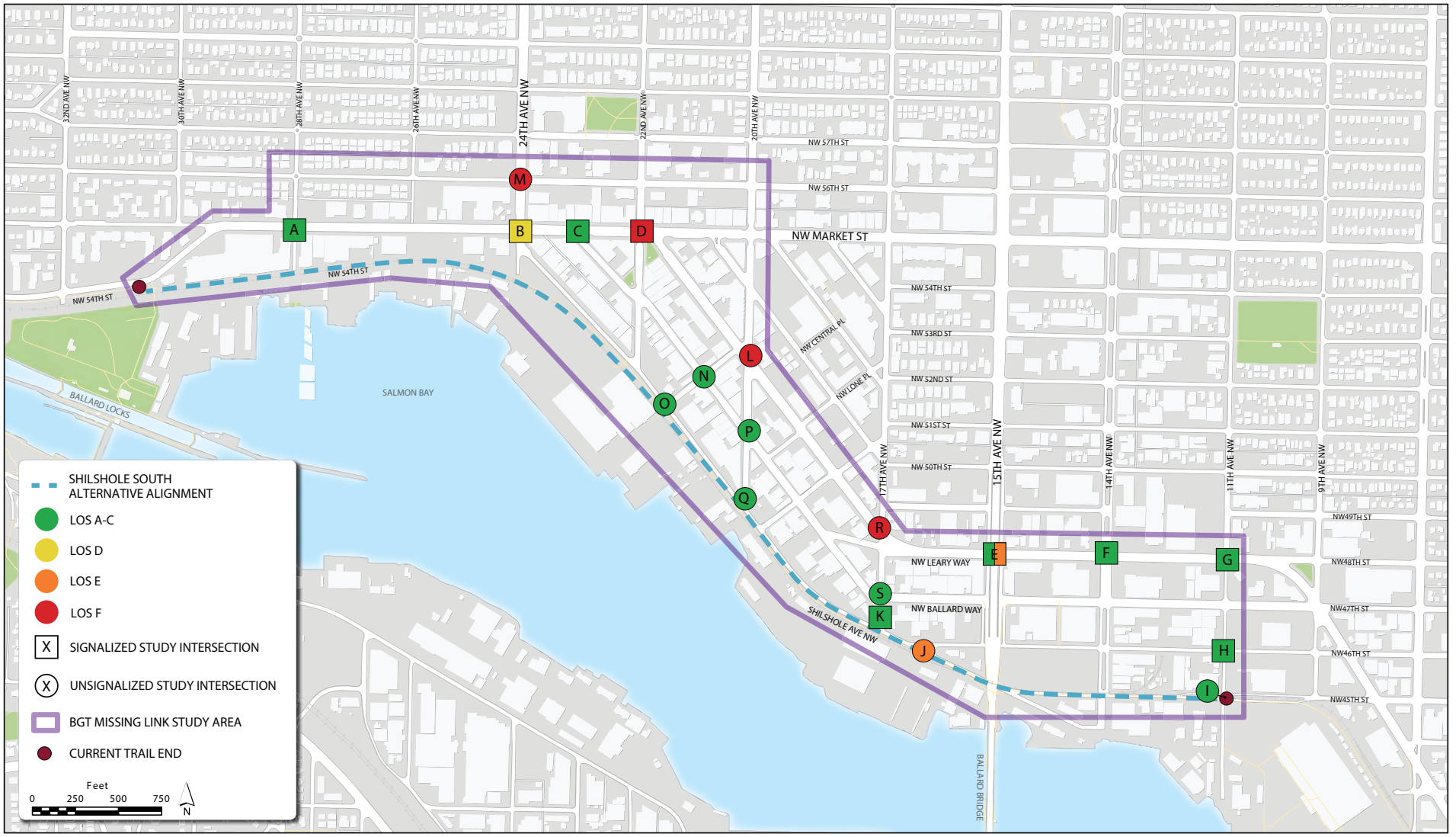
[1] Intersection at NW 17th St and Shilshole Ave NW becomes signalized under the Shilshole South Alternative.

The Shilshole South Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E that would otherwise operate at LOS D or better under the No Build Alternative. However, this delay would be experienced by a small number of vehicles and would be between the delay threshold for LOS D and E for unsignalized intersections. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

Six intersections would operate at a different LOS or have a change in delay of at least 5 seconds when compared to the No Build Alternative.

Intersections where LOS would improve include:

- Intersection H (11th Ave NW and NW 46th St) would operate at LOS B compared to LOS C because traffic would shift from NW 46th St to NW 45th St as NW 45th St is restored to a two-way street.
- Intersection K (Shilshole Ave NW and 17th Ave NW) would be signalized under the Shilshole South Alternative. This would result in improved intersection operations (LOS B compared to LOS F under the No Build Alternative).
- Intersection M (NW 56th St/24th Ave NW), Intersection N (NW Vernon Pl/ Ballard Ave NW), Intersection R (NW Leary Way/17th Ave NW), and Intersection S (NW Ballard Way/17th Ave NW) would experience reduced delay under the Shilshole South Alternative compared to the No Build Alternative. Nonmotorized users in the study area would shift to the trail, which would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-4
Shilshole South Alternative PM Peak Hour Study Intersection Level of Service

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The driveways shown in Table 5-8 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Shilshole South Alternative. Under the Shilshole South Alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 11 seconds of increased delay at driveways that would cross the BGT Missing Link compared to the No Build Alternative. However, many driveways that would not cross the trail would experience no increases or decreases in delay because nonmotorized users would shift to the trail.

Table 5-8. Comparison of PM Peak Hour Study Driveway Delay between the 2040 No Build Alternative and Shilshole South Alternative

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole South Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
1	**NW 54th St/Ballard Locks**	**19**	**24**	**5**
2	**NW 54th St/McGinnis Marine**	**0**	**11**	**11**
3	**NW 54th St/Ballard Oil**	**9**	**20**	**11**
4	**NW 54th St/Snow and Co**	**9**	**9**	**0**
5	**NW 54th St/Ballard Transfer**	**9**	**19**	**10**
6	**NW 54th St/Lieb Marine Services**	**0**	**0**	**0**
7	**Shilshole Ave NW/Stimson Marina**	**28**	**34**	**6**
8	**Shilshole Ave NW/Salmon Bay Center**	**25**	**31**	**6**
9	**Shilshole Ave NW/Salmon Bay Sand and Gravel South**	**17**	**28**	**11**
10	**Shilshole Ave NW/Covich Williams**	**44**	**48**	**4**
11	**Shilshole Ave NW/Salmon Bay Café**	**23**	**29**	**6**
12	**Shilshole Ave NW/Hatton Marine/Ballard Mill Marina**	**15**	**25**	**10**
13	**Shilshole Ave NW/CSR Marine/Ballard Mill Marina**	**25**	**32**	**7**
14	**NW 45th St/Ballard Insulation**	**11**	**20**	**9**
15	**NE 45th/Dovetail General Contractors**	**10**	**20**	**10**
16	NW 54th St/Triad Ballard Development	17	14	-3
17	NW 54th St/Trident Seafood Retail	17	15	-2
18	Shilshole Ave NW/Shilshole West Building	27	25	-2

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole South Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	18	16	-2
20	Shilshole Ave NW/Magnum Self Storage	0	0	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	15	13	-2
22	Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North	29	25	-4
23	Shilshole Ave NW/Ballard Hardware	29	25	-4
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	30	27	-3
25	NW 46th St/Ballard Marine	23	20	-3
26	NW 46th St/Ballard Blocks Development	99	65	-34
27	11th Ave NW/U.S. Post Office	0	0	0
28	28th Ave NW/Townhomes	9	9	0
29	NW 56th St/Mark24	9	9	0
30	NW 56th St/Ballard Square Parking	13	13	0
31	22nd Ave NW/Chase Bank	17	17	0
32	Ballard Ave NW/Ballard Sheet Metal Works	11	10	-1
33	Ballard Ave NW/Ballard Hardware Loading Dock	0	0	0
34	NW Ballard Way/Warden Fluid Dynamics	11	11	0
35	NW 46th St/Radtke Marine	10	9	-1
36	NW Market St/Alley	13	13	0
37	Leary Ave NW/Ballard Landmark	12	12	0
38	Leary Ave NW/Public Parking/Caffè Fiore	13	13	0
39	Leary Ave NW/Carter Subaru Ballard	10	10	0
40	NW Leary Way/BOLT Modern Storage	22	21	-1
41	NW Leary Way/Quest Church	17	15	-2

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole South Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
42	NW Leary Way/Office Max	11	11	0
43	NW Leary Way/U-Haul	25	24	-1
44	11th Ave NW/7-Eleven	11	11	0

[1]Bold denotes driveways that would be crossed by the BGT Missing Link.

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.4.2.3 ***Freight***

The primary freight corridors are expected to be the same under the Shilshole South Alternative compared to the No Build Alternative. Freight would continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

Operations at most study area intersections are expected to have similar impacts on freight mobility under the Shilshole South Alternative compared to the No Build Alternative. The Shilshole South Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E or F that would otherwise operate at LOS D or better under the No Build Alternative. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

Freight mobility at the intersections of 11th Ave NW and NW 46th St would be improved under the Shilshole South Alternative compared to the No Build Alternative. This is because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area. Freight mobility at the intersection of Shilshole Ave NW and 17th Ave NW would also be improved under the Shilshole South Alternative because a signal would be provided, improving intersection operations from LOS F to LOS B compared to the No Build Alternative.

There are approximately 37 driveways and loading docks located along the alignment of the Shilshole South Alternative. Freight vehicles would be required to stop before the trail to check for nonmotorized users before advancing to the roadway, which could result in an increase in delay of up to 11 seconds on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread out, this delay would occur sporadically during the PM peak hour and throughout the day. Although some driveways could experience additional delay compared to the No Build Alternative, this delay would not be considered a significant impact because while it would be an inconvenience, this additional delay is not expected to be substantial enough to alter freight operations (ECONorthwest, 2016). Please see the Economic Considerations Report for additional detail.

Driveway activity and usage would be similar under the Shilshole South Alternative as compared to the No Build Alternative. Backing into or out of driveways adjacent to the trail could be considered a

hazardous maneuver. Vehicles backing into or out of driveways, particularly large vehicles, could have difficulty seeing other users in the area, including nonmotorized users crossing the driveway.

Up to 10 freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the north side of NW 54th St, the south side of Shilshole Ave NW, and the south side of NW 45th St. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties might need to relocate their access points to driveways or possibly to the ends of the blocks. The change in access would potentially change how private property owners use the space between their buildings and the City's right-of-way. Some businesses may not be able to access their businesses as they currently do and may have to reorient their business operations to accommodate freight by relocating loading docks or driveways. Businesses that are currently using the public right-of-way for loading and unloading activities would no longer be allowed to continue this unpermitted use under the Shilshole South Alternative. Properties with multiple driveways or access points may need to consolidate accesses where possible to improve safety and operations. All other loading docks and driveways along the Shilshole South Alternative would remain the same as the No Build Alternative.

5.4.2.4 *Nonmotorized Users*

5.4.2.4.1 Study Area Facilities

Under the Shilshole South Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT Missing Link. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated 8- to 12-foot-wide multi-use trail for nonmotorized users for the entire length of the study area. Additional nonmotorized improvements under the Shilshole South Alternative could include curb treatments, pavement markings and treatments, signage, wayfinding, and lighting.

Curb bulbs would be provided at the following intersections:

- Shilshole Ave NW and NW Vernon Pl;
- Shilshole Ave NW and 20th Ave NW;
- Shilshole Ave NW and NW Dock Pl;
- NW 45th St and 14th Ave NW; and
- NW 45th St and 11th Ave NW.

The trail would cross approximately 37 driveways and loading docks under the Shilshole South Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area compared to the No Build Alternative. The BGT Missing Link would organize and create predictability at potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway and trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait 15 to 25 seconds for a vehicle to clear the trail (see Section 3.5.2.1 for additional information on how this was calculated).

5.4.2.4.2 Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes would be similar to those described under the Preferred Alternative, Section 5.3.2.4.2, Pedestrian and Bicycle Volumes.

5.4.2.5 *Public Transportation*

No impacts on transit under the Shilshole South Alternative are anticipated because transit service is not available on streets along this alignment.

5.4.2.6 *Freight Rail*

Under the Shilshole South Alternative, the BTR tracks could be relocated in various isolated locations along NW 54th St, Shilshole Ave NW, and NW 45th St. This could include removing pieces of passing rail that are no longer used or relocating track to allow additional right-of-way space for the trail. All track relocation would be coordinated with BTR so that impacts on rail operations would be minimized.

The Shilshole South Alternative would provide improved separation between nonmotorized users and the rail line, which would improve safety. The BGT Missing Link would cross the rail line near the Ballard Mill Marina. Signage and other design elements would be provided to warn nonmotorized users of train activity.

5.4.2.7 *Safety*

The Shilshole South Alternative would improve safety for nonmotorized users and motor vehicles in the study area. Under this alternative, a dedicated bicycle facility would improve predictability at conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as the railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Although the Shilshole South Alternative would improve overall safety compared to the No Build Alternative, there is potential for some new impacts depending on final design. Those potential impacts include:

- Sight distance concerns at driveway crossings with the BGT Missing Link;
- Conflicts between vehicles and nonmotorized users at trail crossings;
- Conflicts between nonmotorized users and trail design features, such as planter strips and curbing; and
- Conflicts between vehicles and trail design features, such as planter strips and curbing.

These potential new impacts would be minimized through detailed review during the trail design process, such as conducting detailed sight distance reviews at each driveway intersection during final design. However, these impacts may not be eliminated entirely.

Under the Shilshole South Alternative, there would be sight distance concerns for exiting vehicles at up to eight driveways on the south side of Shilshole Ave NW between 20th Ave NW and 11th Ave NW where buildings are constructed up to the property lines. Buildings and structures adjacent to the trail could reduce visibility for both vehicles and trail users.

There could be conflicts at trail crossings with driveways and intersections, including delay for nonmotorized users and vehicles while waiting for shared areas to clear, as well as collisions. However, as discussed in Section 1.4, Features Common to All Build Alternatives, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles. The placement of the trail could also be moved to locations farther from the property lines, but this would require additional relocation of

the BTR tracks. The final placement of the trail would be decided during final design. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify trail users and vehicle drivers that there is a trail crossing. Under SMC 11.58.230 (summarized in Section 5.3.2.7), driveways along the Shilshole South Alternative would operate safely. Drivers would be required to stop before crossing the trail, which would allow drivers to look for trail users before continuing to the roadway. There would be no sight distance concerns for vehicles entering driveways because trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate industrial and commercial traffic.

Nonmotorized users on the BGT Missing Link would also be traveling in both directions on one side of the street. This would require vehicles crossing the trail to look in both directions for nonmotorized users before continuing across the trail. For drivers of large vehicles with reduced visibility, it could be difficult to see in both directions of travel. As discussed previously, a number of design solutions will be considered in the final design to delineate and provide adequate sight distance for both nonmotorized users and vehicles at trail crossings.

Trail design features, such as vegetated planting areas and curbs, could be obstacles if nonmotorized users lost control of their bicycle, had to dodge other trail users, or if trail users were distracted. Similarly, vehicles could conflict with trail design features if drivers miscalculated a turning movement or veered away from their path of travel. However, this impact is expected to occur infrequently, which is typical for other nonmotorized trails in the area. Trail design features would be consistent with applicable Seattle design standards and NACTO and AASHTO guidelines.

5.5 Shilshole North Alternative

5.5.1 Construction

Under the Shilshole North Alternative, there could be additional traffic and freight delay during construction on Shilshole Ave NW because the roadway is a two-lane street (one lane of traffic in each direction). If construction activities would require the closure of one lane of the roadway, traffic on Shilshole Ave NW would have to be controlled by a flagger to direct travel through the construction zone. It is anticipated that traffic would be affected for several hours during midday.

Under the Shilshole North Alternative, construction would occur on NW Market St, a transit corridor, which could have temporary impacts on public transportation. These impacts would be similar to those described for general-purpose traffic. It is possible that delay and congestion could increase as a result of traffic diversion and road closures during construction. However, these impacts are expected to be minimal because construction would occur in segments of three or four street blocks. Construction activities could also require temporary relocations of bus stops in the study area. Any construction activities that could affect public transportation on NW Market St would be coordinated with King County Metro.

5.5.2 Operation

5.5.2.1 *Roadway Network*

Under the Shilshole North Alternative, the roadway network on NW 54th St, NW Market St, Shilshole Ave NW, and NW 46th St would be altered. As described in Chapter 1, Introduction and Project History, the Shilshole North Alternative would construct a multi-use trail on the south side of NW 54th St and NW Market St and on the north side of Shilshole Ave NW and NW 46th St between the Ballard Locks driveway and 11th Ave NW. The multi-use trail would continue south on the east side of 11th Ave NW one block to the existing end of the BGT at 11th Ave NW and NW 45th St.

The Shilshole North Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 10- to 12-feet wide with a 3- to 11-foot-wide buffer between the roadway and the trail. A sidewalk between 5- and 12-feet wide would be provided between the trail and adjacent properties. There are approximately 54 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative. However, some properties with multiple accesses could have their driveways consolidated into a single access point in coordination with SDOT and property owners.

Under this alternative, NW 54th St between NW Market St and 32nd Ave NW would be a two-lane roadway with one lane in each direction. A left-turn pocket would be provided at 32nd Ave NW in the westbound direction. NW Market St between 30th Ave NW and 24th Ave NW would be a three-lane roadway with one travel lane in each direction and a two-way center-turn lane. At the intersection of NW Market St and 24th Ave NW, right- and left-turn pockets would be provided in the eastbound direction. On Shilshole Ave NW and NW 46th St, one travel lane in each direction would be provided. A signal at 17th Ave NW and Shilshole Ave NW would be provided.

All other roadways in the study area would be the same as the No Build Alternative.

5.5.2.2 *Traffic Volumes and Operations*

Under the Shilshole North Alternative, traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6% per year between 2015 and 2040 due to background population and employment growth. Traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-9 and Figure 5-5. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stopped approach.

Table 5-9. Comparison of PM Peak Hour Study Intersection Level of Service between the 2040 No Build Alternative and Shilshole North Alternative

			2040 No Build Alternative PM Peak Hour		*2040 Shilshole North Alternative PM Peak Hour*	
ID	*Intersection*	*Traffic Control*	*LOS*	*Delay (sec)*	*LOS*	*Delay (sec)*
A	NW Market St/28th Ave NW	Signal	A	6	B	18
B	NM Market St/24th Ave NW	Signal	D	45	D	47
C	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
D	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	87	F	87
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	C	20
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	65	E	65
F	NW Leary Way/14th Ave NW	Signal	A	10	A	10
G	NW Leary Way/11th Ave NW	Signal	C	20	C	20
H	11th Ave NW/NW 46th St	Signal	C	22	B	16
I	11th Ave NW/NW 45th St	Unsignalized –	B	11	B	12

ID	Intersection	Traffic Control	2040 No Build Alternative PM Peak Hour		2040 Shilshole North Alternative PM Peak Hour	
			LOS	Delay (sec)	LOS	Delay (sec)
		All-way Stop				
J	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	8	E	35
K	Shilshole Ave NW/NW 17th St[1]	Unsignalized – Two-way Stop	F	218	B	11
L	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
M	NW 56th St/24th Ave NW	Unsignalized – Two-way Stop	F	291	F	118
N	NW Vernon Pl/Ballard Ave NW	Unsignalized	D	27	C	22
O	NW Vernon Pl/Shilshole Ave NW	Unsignalized	C	24	D	32
P	Ballard Ave NW/20th Ave NW	Unsignalized	C	18	C	15
Q	Shilshole Ave NW/20th Ave NW	Unsignalized	C	24	D	32
R	NW Leary Way/17th Ave NW	Unsignalized	F	154	F	103
S	NW Ballard Way/17th Ave NW	Unsignalized	B	11	A	9

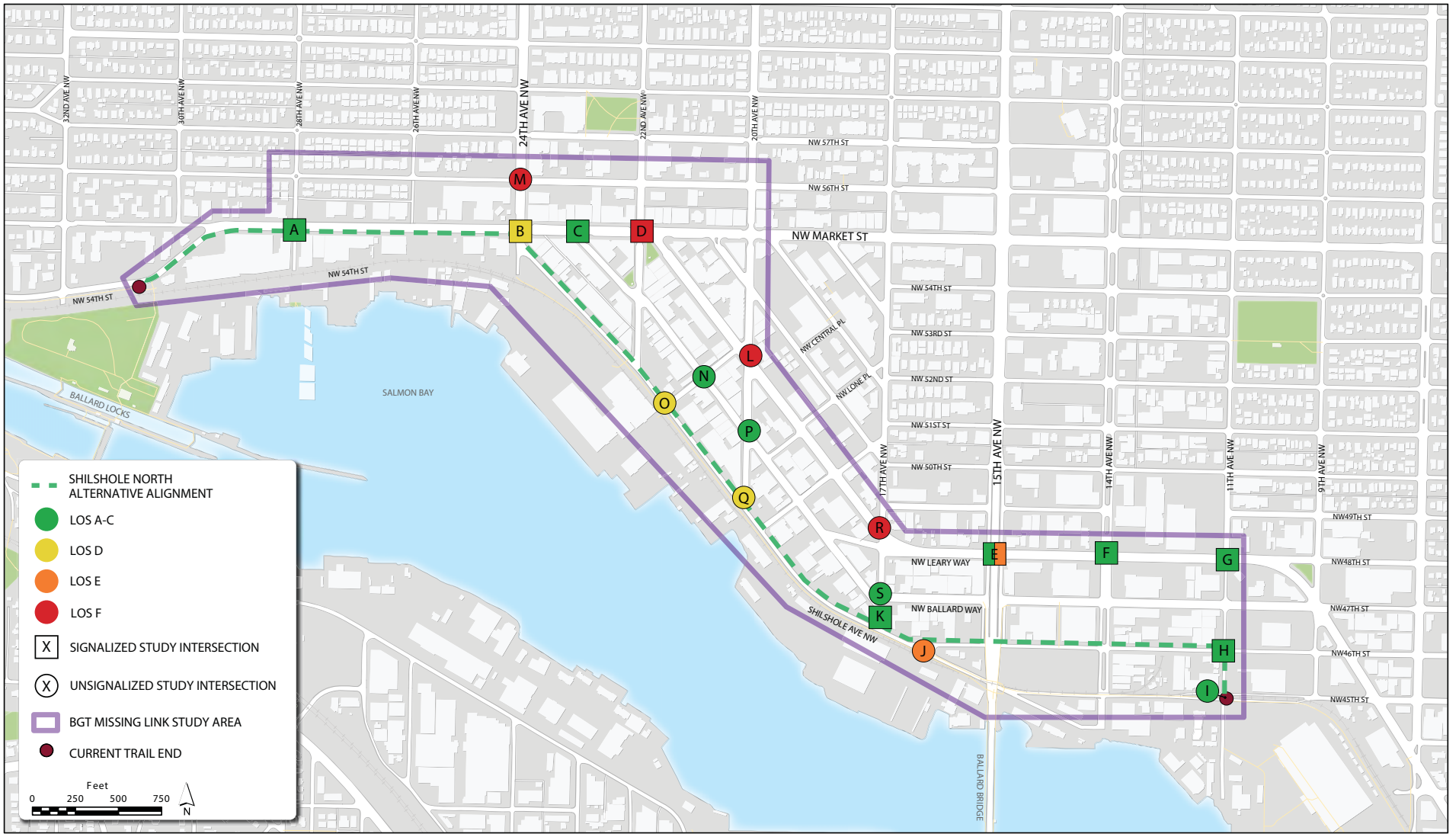
[1] Intersection at NW 17th St and Shilshole Ave NW becomes signalized under the Shilshole North Alternative.

The Shilshole North Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E that would otherwise operate at LOS D or better under the No Build Alternative. However, this delay would be experienced by a small number of vehicles and would be between the delay threshold for LOS D and E for unsignalized intersections. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

Nine intersections would operate at a different LOS or have changes in delay of at least 5 seconds when compared to the No Build Alternative.

The intersections where LOS would improve include:

- Intersection H (11th Ave NW and NW 46th St) would operate better under the Shilshole North Alternative (LOS B) compared to the No Build Alternative (LOS C). This is because traffic would shift from NW 46th St to NW 45th St because NW 45th St would be restored to a two-way street.
- Intersection K (Shilshole Ave NW and 17th Ave NW) would be signalized under the Shilshole North Alternative. This would result in improved intersection operations to LOS B as compared to LOS F under the No Build Alternative.
- Intersection M (NW 56th St/24th Ave NW), Intersection N (NW Vernon Pl/ Ballard Ave NW), Intersection R (NW Leary Way/17th Ave NW), and Intersection S (NW Ballard Way/17th Ave NW) would experience reduced delay under the Shilshole North Alternative compared to the No Build Alternative. Nonmotorized users in the study area would shift to the trail, which would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-5
Shilshole North Alternative PM Peak Hour Study Intersection Level of Service

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LOS would worsen at the following intersections:

- Intersection A (NW Market St and 28th Ave NW) would operate at LOS B under the Shilshole North Alternative compared to LOS A under the No Build Alternative. Under the Shilshole North Alternative, NW Market St would be reduced from four lanes to three lanes, which would increase delay during the PM peak hour. However, this intersection would still operate at an acceptable LOS.
- Intersection O (NW Vernon Pl/Shilshole Ave NW) and Intersection Q (Shilshole Ave NW/20th Ave NW) would both operate at LOS D under the Shilshole North Alternative compared to LOS C under the No Build Alternative. This is because the trail would cross the north leg of the intersection as it continues along Shilshole Ave NW, which would create some additional delay. However, this delay is not expected to have an adverse impact on traffic operations because the intersection would still operate at LOS D or better.

The driveways shown in Table 5-10 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Shilshole North Alternative. Under the Shilshole North Alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 10 seconds of additional delay at driveways that would cross the BGT Missing Link compared to the No Build Alternative. However, many driveways that would not cross the trail would experience no increases or decreases in delay because nonmotorized users would shift to the trail.

Table 5-10. Comparison of PM Peak Hour Study Driveway Delay between the 2040 No Build Alternative and Shilshole North Alternative

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole North Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
1	**NW 54th St/Ballard Locks**	**19**	**24**	**5**
2	NW 54th St/McGinnis Marine	0	0	0
3	NW 54th St/Ballard Oil	9	9	0
4	NW 54th St/Snow and Co	9	9	0
5	NW 54th St/Ballard Transfer	9	9	0
6	NW 54th St/Lieb Marine Services	0	0	0
7	Shilshole Ave NW/Stimson Marina	28	23	-5
8	Shilshole Ave NW/Salmon Bay Center	25	23	-2
9	Ballard Ave NW/Salmon Bay Sand and Gravel South	17	17	0
10	Shilshole Ave NW/Covich Williams	44	37	-7
11	Shilshole Ave NW/Salmon Bay Café	23	18	-5
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina	15	14	-1
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina	25	20	-5

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole North Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
14	NW 45th St/Ballard Insulation	11	9	-2
15	NE 45th/Dovetail General Contractors	10	9	-1
16	**NW 54th St/Triad Ballard Development**	**17**	**25**	**8**
17	**NW 54th St/Trident Seafood Retail**	**17**	**27**	**10**
18	**Shilshole Ave NW/Shilshole West Building**	**27**	**34**	**7**
19	**Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive**	**18**	**26**	**8**
20	**Shilshole Ave NW/Magnum Self Storage**	**0**	**0**	**0**
21	**Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North**	**15**	**24**	**9**
22	**Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North**	**29**	**35**	**6**
23	**Shilshole Ave NW/Ballard Hardware**	**29**	**36**	**7**
24	**Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance**	**30**	**38**	**8**
25	**NW 46th St/Ballard Marine**	**23**	**31**	**8**
26	**NW 46th St/Ballard Blocks Development**	**99**	**78**	**-21**
27	**11th Ave NW/U.S. Post Office**	**0**	**0**	**0**
28	28th Ave NW/Townhomes	9	9	0
29	NW 56th St/Mark24	9	9	0
30	NW 56th St/Ballard Square Parking	13	13	0
31	22nd Ave NW/Chase Bank	17	17	0
32	Ballard Ave NW/Ballard Sheet Metal Works	11	10	-1
33	Ballard Ave NW/Ballard Hardware Loading Dock	0	0	0
34	NW Ballard Way/Warden Fluid Dynamics	11	11	0
35	NW 46th St/Radtke Marine	10	9	-1
36	NW Market St/Alley	13	13	0
37	Leary Ave NW/Ballard Landmark	12	12	0
38	Leary Ave NW/Public Parking/Caffè Fiore	13	13	0
39	Leary Ave NW/Carter Subaru Ballard	10	10	0

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole North Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
40	NW Leary Way/BOLT Modern Storage	22	21	-1
41	NW Leary Way/Quest Church	17	15	-2
42	NW Leary Way/Office Max	11	11	0
43	NW Leary Way/U-Haul	25	24	-1
44	11th Ave NW/7-Eleven	11	11	0

[1]Bold denotes driveways that would be crossed by the BGT Missing Link.

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.5.2.3 ***Freight***

The primary freight corridors are expected to be the same under the Shilshole North Alternative compared to the No Build Alternative. Freight would likely continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

Operations at most study area intersections are expected to have similar impacts on freight mobility under the Shilshole North Alternative compared to the No Build Alternative. The Shilshole North Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E or F that would otherwise operate at LOS D or better under the No Build Alternative. Mitigation is not required because the City does not have an adopted intersection LOS standard.

Freight mobility at the intersections of 11th Ave NW and NW 46th St would be improved under the Shilshole North Alternative compared to the No Build Alternative. This is because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area. Freight mobility at the intersection of Shilshole Ave NW and 17th Ave NW would also be improved under the Shilshole North Alternative because a signal would be provided, improving intersection operations from LOS F to LOS B compared to the No Build Alternative.

There are approximately 54 driveways and loading docks located along the alignment of the Shilshole North Alternative. Freight vehicles would be required to stop before the trail to check for nonmotorized users before advancing to the roadway, which could result in a delay of up to 10 seconds on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread throughout the day, this delay would occur sporadically during the PM peak hour. Although some driveways could experience additional delay compared to the No Build Alternative, this would not be considered as an impact because this additional delay, while inconvenient, will not be substantial enough to affect freight operations (ECONorthwest, 2016). Please see the Economic Considerations Report for additional detail.

Driveway activity and usage would be similar under the Shilshole North Alternative as compared to the No Build Alternative. Backing into or out of driveways adjacent to the trail could be considered a hazardous maneuver. Vehicles backing into or out of driveways, particularly large vehicles, could have difficulty seeing other users in the area, including nonmotorized users crossing the driveway.

Up to six freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the south side of NW 54th St/Market St NW, the north side of Shilshole Ave NW, and the north side of NW 46th St. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties would need to relocate their access points to driveways or possibly to the ends of the blocks. Approximately four loading docks could be affected between 24th Ave NW and 17th Ave NW on Shilshole Ave NW, and two driveways on NW Market St between NW 54th St and 26th Ave NW.

The change in access could potentially change how private property owners use the space between their buildings and the City's right-of-way by preventing some businesses from accessing their properties as they currently do. This may require some property owners to reorient their business operations to accommodate freight by moving driveways or loading docks. Businesses that are currently using the public right-of-way for loading and unloading activities would no longer be allowed to continue this unpermitted use under the Shilshole North Alternative. Properties with multiple driveways or access points, such as properties along NW Market St with two access points to a single parking lot, may need to consolidate accesses where possible to improve safety and operations. This would reduce the number of conflict points with the trail while maintaining adequate access to properties. All other loading docks and driveways along the Shilshole North Alternative would remain the same as the No Build Alternative.

5.5.2.4 ***Nonmotorized Users***

5.5.2.4.1 Study Area Facilities

Under the Shilshole North Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT Missing Link. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated 10- to 12-foot-wide multi-use trail for nonmotorized users for the entire study area. A 3- to 11-foot-wide buffer would be provided between the roadway and the trail. A sidewalk between 5- and 12-feet wide would also be provided between the trail and properties along NW 54th St, NW Market St, Shilshole Ave NW, and NW 46th St. Additional nonmotorized improvements under the Shilshole North Alternative could include curb treatments, pavement markings and treatments, signage and wayfinding, and lighting.

Curb bulbs would be provided at the following intersections:

- NW Market St and 28th Ave NW;
- NW Market St and 24th Ave NW;
- Shilshole Ave NW and 22nd Ave NW;
- Shilshole Ave NW and 20th Ave NW;
- Shilshole Ave NW and 17th Ave NW;
- NW 46th St and 14th Ave NW;
- NW 46th St and 11th Ave NW; and
- 11th Ave NW and NW 45th St.

The trail would cross approximately 54 driveways and loading docks under the Shilshole North Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area. The BGT Missing Link would

organize and create predictability at potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway and trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait 15 to 25 seconds for a vehicle to clear the trail.

5.5.2.4.2 Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes would be similar to those described under the Preferred Alternative, Section 5.3.2.4.2, Pedestrian and Bicycle Volumes.

5.5.2.5 *Public Transportation*

There would be minimal impacts from the Shilshole North Alternative on transit. At the intersection of NW Market St and 28th Ave NW, which is located along a transit corridor, there could be additional delay compared to the No Build Alternative. As shown in Table 5-9, this intersection would operate at LOS B under the Shilshole North Alternative compared to LOS A under the No Build Alternative. This could affect transit travel times and speeds near this intersection. However, this intersection would operate at an acceptable LOS and mitigation would not be required.

5.5.2.6 *Freight Rail*

No impacts on rail from the Shilshole North Alternative are anticipated because rail facilities and operations would not be altered.

5.5.2.7 *Safety*

Under the Shilshole North Alternative, safety would be improved for nonmotorized users and motor vehicles in the study area. Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians. Under the Shilshole North Alternative, a dedicated bicycle facility would provide a safer nonmotorized environment in the study area compared to the No Build Alternative. A dedicated facility would improve predictability at conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, allowing motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Although the Shilshole North Alternative would improve overall safety compared to the No Build Alternative, there is potential for some new impacts depending on final design. Those potential impacts include:

- Sight distance concerns at driveway crossings with the BGT Missing Link;
- Conflicts between vehicles and nonmotorized users at trail crossings;
- Conflicts between nonmotorized users and trail design features, such as planter strips and curbing; and
- Conflicts between vehicles and trail design features, such as planter strips and curbing.

These potential new impacts would be minimized through detailed review during the trail design process, such as conducting detailed sight distance reviews at each driveway intersection during final design. However, these impacts may not be eliminated entirely.

Under the Shilshole North Alternative, there would be sight distance concerns for exiting vehicles at approximately 8 driveways on NW Market St, approximately 16 driveways on Shilshole Ave NW, and approximately 4 driveways on NW 46th St where buildings are constructed up to the property lines. Sidewalks would be provided between the properties and the trail, which would improve sight distances by providing a buffer of 5- to 12-feet wide from the property frontage.

There could be conflicts at trail crossings with driveways and intersections, including delay for either nonmotorized users and vehicles while waiting for shared areas to clear, as well as collisions. As discussed in Section 1.4, Features Common to All Build Alternatives, the final design of the trail would reduce conflicts between trail users and vehicles. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify sidewalk and trail users and vehicle drivers that there is a trail crossing. Under SMC 11.58.230 (summarized in Section 5.3.2.7), driveways along the Shilshole North Alternative would operate safely. Drivers would be required to stop before crossing the trail, which would allow drivers to look for trail users before continuing to the roadway.

There would be no sight distance concerns for vehicles entering driveways because the trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate industrial and commercial traffic.

Nonmotorized users on the BGT Missing Link would also be traveling in both directions on one side of the street. This would require vehicles crossing the trail to look both directions for nonmotorized users before continuing across the trail. For drivers of large vehicles with reduced visibility, it could be difficult to see in both directions of travel. As discussed previously, a number of design solutions will be considered in the final design to delineate and provide adequate sight distance for both nonmotorized users and vehicles at trail crossings.

Trail design features, such as vegetated planting areas and curbs, could be obstacles if nonmotorized users lost control of their bicycle, had to dodge other trail users, or if trail users were distracted. Similarly, vehicles could conflict with trail design features if drivers miscalculated a turning movement or veered away from their path of travel. This impact is expected to occur infrequently, which is typical for other nonmotorized trails in the area. Trail design features would be consistent with applicable Seattle design standards and NACTO and AASHTO guidelines.

5.6 **Ballard Avenue Alternative**

5.6.1 **Construction**

Under the Ballard Avenue Alternative, there could be additional traffic and freight delay during construction on 28th Ave NW, NW 56th St, 22nd Ave NW, and Ballard Ave NW because these streets are two-lane streets (one lane of traffic in each direction). If construction activities require the closure of one lane of the roadway, a flagger could be required to direct travel via alternative routes within the construction zone, which could be three to four street blocks. It is expected that this impact would be minimal because roadway closures would occur temporarily during the midday for several hours.

5.6.2 Operation

5.6.2.1 *Roadway Network*

The Ballard Avenue Alternative would alter the roadway network on NW 54th St, 28th Ave NW, NW 56th St, 22nd Ave NW, Ballard Ave NW, 15th Ave NW, NW 46th St, and 11th Ave NW. As described in Chapter 1, Introduction and Project History, the Ballard Avenue Alternative would construct a multi-use trail with the following alignment:

- North side of NW 54th St;
- East side of 28th Ave NW;
- South side of NW 56th St;
- West side of 22nd Ave NW;
- Southwest side of Ballard Ave NW;
- South side of NW Ballard Way;
- West side of southbound one-way portion of 15th Ave NW (entire right-of-way would be trail use);
- South side of NW 46th St; and
- East side of 11th Ave NW.

The Ballard Avenue Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be between 10- to 12-feet wide with a 4- to 5-foot-wide buffer between the roadway and the trail. A block-long section of trail between NW Ballard Way and NW 46th St would be 20 feet wide. A sidewalk 6- to 10-feet wide would be provided between the trail and adjacent properties.

Under the Ballard Avenue Alternative, all streets along the trail alignment would have one lane in each direction (two-lane roadway), with the exception of the western right-of-way adjacent to 15th Ave NW, which would be converted to only trail use. There are approximately 41 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative, but some properties with multiple accesses could have their driveways consolidated into a single access point, in coordination with the City and property owners.

All other roadways in the study area would be the same as the No Build Alternative.

5.6.2.2 *Traffic Volumes and Operations*

Traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6% per year between 2015 and 2040 due to background population and employment growth.

Under the Ballard Avenue Alternative, traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-11 and Figure 5-6. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stop approach.

Table 5-11. Comparison of PM Peak Hour Study Intersection Levels of Service between the 2040 No Build Alternative and Ballard Avenue Alternative

ID	Intersection	Traffic Control	2040 No Build Alternative PM Peak Hour		2040 Ballard Avenue Alternative PM Peak Hour	
			LOS	Delay (sec)	LOS	Delay (sec)
A	NW Market St/28th Ave NW	Signal	A	6	A	6
B	NM Market St/24th Ave NW	Signal	D	45	D	49
C	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
D	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	87	F	87
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	C	20
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	65	E	65
F	NW Leary Way/14th Ave NW	Signal	A	10	A	10
G	NW Leary Way/11th Ave NW	Signal	C	20	C	20
H	11th Ave NW/NW 46th St	Signal	C	22	B	17
I	11th Ave NW/NW 45th St	Unsignalized –All-way Stop	B	11	B	12
J	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	8	E	35
K	Shilshole Ave NW/NW 17th St	Unsignalized – Two-way Stop	F	218	E	62
L	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
M	NW 56th St/24th Ave NW[1]	Unsignalized – Two-way Stop	F	291	C	16
N	NW Vernon Pl/Ballard Ave NW	Unsignalized	D	27	D	34
O	NW Vernon Pl/Shilshole Ave NW	Unsignalized	C	24	C	21
P	Ballard Ave NW/20th Ave NW	Unsignalized	C	18	D	27
Q	Shilshole Ave NW/20th Ave NW	Unsignalized	C	24	C	21
R	NW Leary Way/17th Ave NW	Unsignalized	F	154	F	103
S	NW Ballard Way/17th Ave NW	Unsignalized	B	11	D	33

[1] Intersection at NW 56th St and 24th Ave NW (Intersection M) becomes signalized under the Ballard Avenue Alternative.

The Ballard Avenue Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E that would otherwise operate at LOS D or better under the No Build Alternative. However, this delay would be experienced by a small number of vehicles and would be between the delay threshold for LOS D and E for unsignalized intersections. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

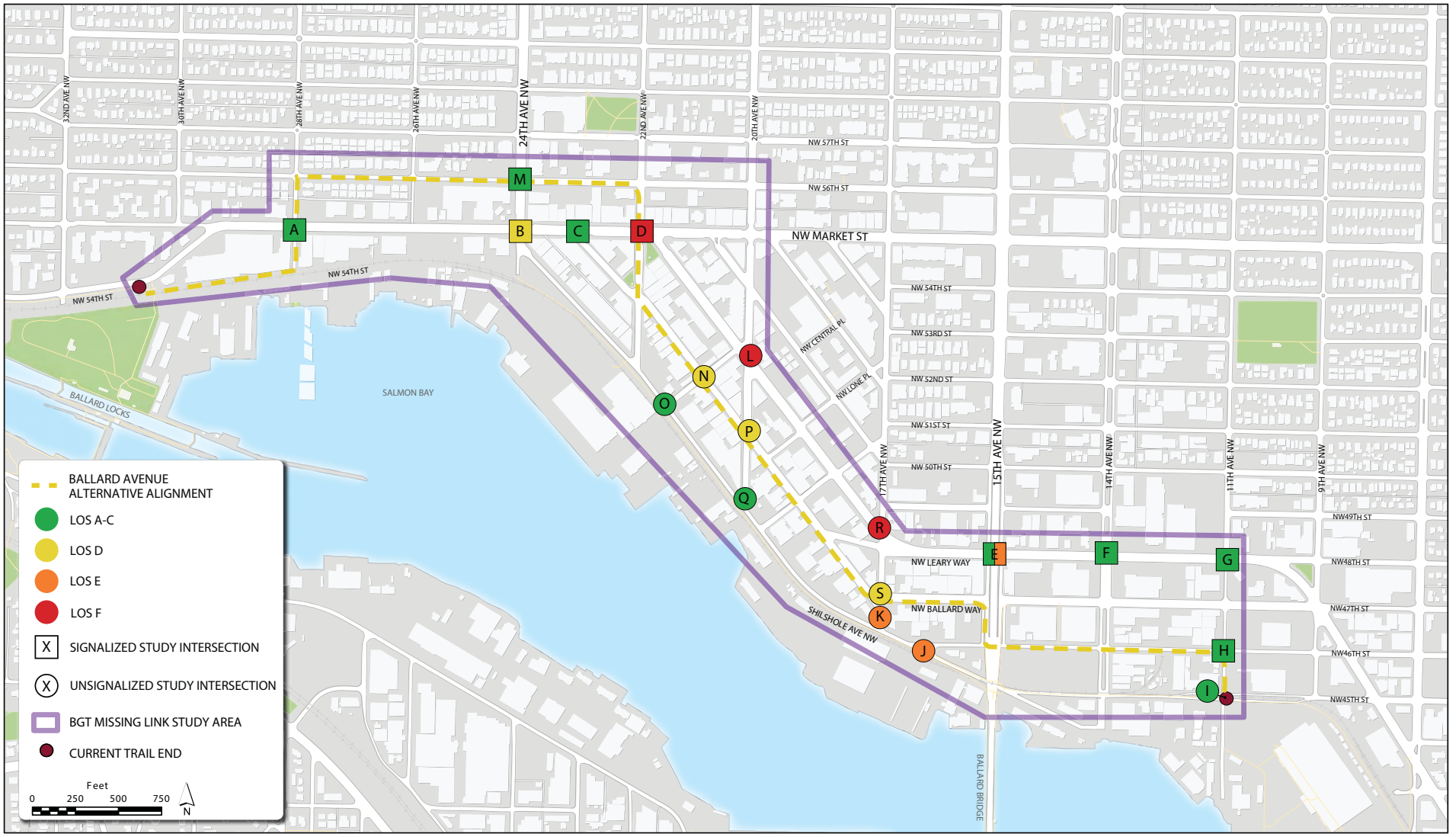
Seven intersections would operate at a different LOS or change in delay by at least 5 seconds when compared to the No Build Alternative.

The intersections where LOS would improve include:

- Intersection H (11th Ave NW and NW 46th St) would operate at LOS B compared to LOS C under the No Build Alternative. Traffic would shift from NW 46th St to NW 45th St because NW 45th St would be restored to a two-way street.
- Intersection K (Shilshole Ave NW and 17th Ave NW) would operate at LOS E under the Ballard Avenue Alternative compared to LOS F under the No Build Alternative. Trail users would shift to the trail on NW Ballard Ave/Ballard Ave NW rather than ride in a lane with traffic on Shilshole Ave NW. This would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection, which would reduce overall delay.
- Intersection M (NW 56th St and 24th Ave NW) would operate at LOS C under the Ballard Avenue Alternative compared to LOS F under the No Build Alternative. Under the Ballard Avenue Alternative, this intersection would be signalized to improve safety for nonmotorized users, which would also improve operations for vehicles compared to the No Build Alternative.
- Intersection R (NW Leary Way/17th Ave NW) would experience reduced delay under the Ballard Avenue Alternative compared to the No Build Alternative. Nonmotorized users in the study area would shift to the trail, which would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection.

LOS would worsen at the following intersections:

- Intersection N (NW Vernon Pl/ Ballard Ave NW), Intersection P (Ballard Ave NW/20th Ave NW), and Intersection S (NW Ballard Way/17th Ave NW) would have 7 to 22 seconds of additional delay compared to the No Build Alternative. Nonmotorized users would cross the south leg of the intersections, which would result in additional delay.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-6
Ballard Avenue Alternative PM Peak Hour Study Intersection Level of Service

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The driveways shown in Table 5-12 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Ballard Avenue Alternative. Under the Ballard Avenue Alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 12 seconds of additional delay at driveways that would cross the BGT Missing Link compared to the No Build Alternative. However, many driveways that would not cross the trail would experience no increases or decreases in delay because nonmotorized users would shift to the trail.

Table 5-12. Comparison of PM Peak Hour Study Driveway Delay between the 2040 No Build Alternative and Ballard Avenue Alternative

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Ballard Avenue Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
1	**NW 54th St/Ballard Locks**	**19**	**24**	**5**
2	**NW 54th St/McGinnis Marine**	**0**	**11**	**11**
3	NW 54th St/Ballard Oil	9	9	0
4	NW 54th St/Snow and Co	9	9	0
5	NW 54th St/Ballard Transfer	9	9	0
6	NW 54th St/Lieb Marine Services	0	0	0
7	Shilshole Ave NW/Stimson Marina	28	23	-5
8	Shilshole Ave NW/Salmon Bay Center	25	20	-5
9	Ballard Ave NW/Salmon Bay Sand and Gravel South	17	17	0
10	Shilshole Ave NW/Covich Williams	44	37	-7
11	Shilshole Ave NW/Salmon Bay Café	23	18	-5
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina	15	14	-1
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina	25	20	-5
14	NW 45th St/Ballard Insulation	11	9	-2
15	NE 45th/Dovetail General Contractors	10	9	-1
16	NW 54th St/Triad Ballard Development	17	14	-3
17	NW 54th St/Trident Seafood Retail	17	15	-2
18	Shilshole Ave NW/Shilshole West Building	27	25	-2
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	18	16	-2
20	Shilshole Ave NW/Magnum Self Storage	0	0	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	15	13	-2

ID[1]	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Ballard Avenue Alternative PM Peak Hour (sec)*	*Difference in Driveway Delay (sec)*
22	Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North	29	25	-4
23	Shilshole Ave NW/Ballard Hardware	29	25	-4
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	30	27	-3
25	NW 46th St/Ballard Marine	23	20	-3
26	NW 46th St/Ballard Blocks Development	99	65	-34
27	**11th Ave NW/U.S. Post Office**	**0**	**0**	**0**
28	**28th Ave NW/Townhomes**	**9**	**19**	**10**
29	**NW 56th St/Mark24**	**9**	**19**	**10**
30	**NW 56th St/Ballard Square Parking**	**13**	**23**	**10**
31	**22nd Ave NW/Chase Bank**	**17**	**27**	**10**
32	**Ballard Ave NW/Ballard Sheet Metal Works**	**11**	**21**	**10**
33	**Ballard Ave NW/Ballard Hardware Loading Dock**	**0**	**0**	**0**
34	**NW Ballard Way/Warden Fluid Dynamics**	**11**	**23**	**12**
35	**NW 46th St/Radtke Marine**	**10**	**21**	**11**
36	NW Market St/Alley	13	13	0
37	Leary Ave NW/Ballard Landmark	12	12	0
38	Leary Ave NW/Public Parking/Caffè Fiore	13	13	0
39	Leary Ave NW/Carter Subaru Ballard	10	10	0
40	NW Leary Way/BOLT Modern Storage	22	21	-1
41	NW Leary Way/Quest Church	17	15	-2
42	NW Leary Way/Office Max	11	11	0
43	NW Leary Way/U-Haul	25	24	-1
44	11th Ave NW/7-Eleven	11	11	0

[1]Bold denotes driveways that would be crossed by the BGT Missing Link.

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.6.2.3 ***Freight***

The primary freight corridors are expected to be the same under the Ballard Avenue Alternative compared to the No Build Alternative. Freight would likely continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;

- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

Operations at most study area intersections are expected to have similar impacts on freight mobility under the Ballard Avenue Alternative compared to the No Build Alternative. The Ballard Avenue Alternative would cause one intersection, NW 46th St/Shilshole Ave NW (Intersection J), to operate at LOS E or F that would otherwise operate at LOS D or better under the No Build Alternative. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

Freight mobility at the intersection of 11th Ave NW and NW 46th St would be improved under the Ballard Avenue Alternative compared to the No Build Alternative. This is because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area.

There are approximately 41 driveways and loading docks located along the alignment of the Ballard Avenue Alternative. Freight vehicles would be required to stop before the trail to check for nonmotorized users before advancing to the roadway, which could result in an increase in delay of up to 12 seconds on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread throughout the day, this delay would occur sporadically during the PM peak hour. Although some driveways could experience additional delay compared to the No Build Alternative, this would not be considered as a significant impact because this additional delay, while inconvenient, is not expected to be substantial enough to alter freight operations (ECONorthwest, 2016). Please see the Economic Considerations Report for additional detail.

Driveway activity and usage would be similar under the Ballard Avenue Alternative as compared to the No Build Alternative. Backing into or out of driveways adjacent to the trail could be considered a hazardous maneuver. Vehicles backing into or out of driveways, particularly large vehicles, could have difficulty seeing other users in the area, including nonmotorized users crossing the driveway.

Under the Ballard Avenue Alternative, up to eight freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the north side of NW 54th St, the east side of 28th Ave NW, the south side of NW 56th St, the west side of 22nd Ave NW, the southwest side of Ballard Ave NW/NW Ballard Way, the south side of NW 46th St, and the east side of 11th Ave NW. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties would need to relocate their access points to driveways or possibly to the ends of the blocks. Up to three loading docks could be affected between NW 54th St and NW Market St on 28th Ave NW.

The change in access could potentially alter how private property owners use the space between their buildings and the City's right-of-way. Some businesses may not be able to access their properties as they currently do and may have to reorient their business operations to accommodate freight by moving driveways or loading docks. Businesses that are currently using the public right-of-way for loading and unloading activities would no longer be allowed to continue this unpermitted use under the Ballard Avenue Alternative. Properties with multiple driveways or access points, such as properties along NW 56th St with two access points to a single parking lot, may need to consolidate access points where possible to improve safety and operations. This would reduce the number of conflict points with the trail while maintaining adequate access to properties. All other loading docks and driveways along the Ballard Avenue Alternative would remain the same as the No Build Alternative.

5.6.2.4 *Nonmotorized Users*

5.6.2.4.1 Study Area Facilities

Under the Ballard Avenue Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT Missing Link. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated, 10- to 12-foot-wide multi-use trail for nonmotorized users for the entire study area. A 4- to 5-foot-wide buffer would be provided between the roadway and the trail. A sidewalk 6- to 10-feet wide would also be provided between the trail and properties along NW 54th St, 28th Ave NW, NW 56th St, Ballard Ave NW, NW 46th St, and 11th Ave NW. Additional nonmotorized improvements under the Ballard Avenue Alternative could include curb treatments, pavement markings and treatments, signage, wayfinding, and lighting. Curb bulbs would be provided at most intersections along the alignment.

The trail would cross approximately 41 driveways and loading docks under the Ballard Avenue Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area. The BGT Missing Link would organize and create predictability at potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway and trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait 15 to 25 seconds for a vehicle to clear the trail.

5.6.2.4.2 Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes would be similar to those described under the Preferred Alternative, Section 5.3.2.4.2, Pedestrian and Bicycle Volumes.

5.6.2.5 *Public Transportation*

No impacts on transit under the Ballard Avenue Alternative are anticipated because there would be no additional delay on transit corridors compared to the No Build Alternative.

5.6.2.6 *Freight Rail*

No impacts on rail from the Ballard Avenue Alternative are anticipated because rail operations and facilities would not be altered.

5.6.2.7 *Safety*

Under the Ballard Avenue Alternative, safety would be improved for nonmotorized users and motor vehicles in the study area. Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians. Under the Ballard Avenue Alternative, a dedicated bicycle facility would provide a safer nonmotorized environment in the study area compared to the No Build Alternative. A dedicated facility would improve predictability at conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Although the Ballard Avenue Alternative would improve overall safety compared to the No Build Alternative, there is potential for some new impacts depending on final design. Those potential impacts include:

- Sight distance concerns at driveway crossings with the BGT Missing Link;
- Conflicts between vehicles and nonmotorized users at trail crossings;
- Conflicts between nonmotorized users and trail design features, such as planter strips and curbing; and
- Conflicts between vehicles and trail design features, such as planter strips and curbing.

These potential new impacts would be minimized through detailed review during the trail design process, such as conducting detailed sight distance reviews at each driveway intersection during final design. However, these impacts may not be eliminated entirely.

Under the Ballard Avenue Alternative, there could be sight distance concerns for exiting vehicles at up to 16 driveways on the southwest/south side of Ballard Ave NW/NW Ballard Way and up to two driveways on the south side of NW 46th St where buildings are constructed up to the property lines. Sidewalks would be provided between the properties and the trail, which would improve sight distances by providing a buffer of 7 to 10 feet from the property frontage.

There could be conflicts at trail crossings with driveways and intersections, including delay for either nonmotorized users and vehicles while waiting for shared areas to clear, as well as collisions. As discussed in Section 1.4, Features Common to All Build Alternatives, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify sidewalk and trail users and vehicles that there is a trail crossing. Under SMC 11.58.230 (summarized in Section 5.3.2.7), driveways along the Ballard Avenue Alternative would operate safely. Drivers would be required to stop before crossing the trail, which would allow drivers to look for trail users before continuing to the roadway.

There would be no sight distance concerns for vehicles entering driveways because trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate commercial traffic.

Nonmotorized users on the BGT Missing Link would also be traveling in both directions on one side of the street. This would require vehicles crossing the trail to look both directions for nonmotorized users before continuing across the trail. For drivers of large vehicles with reduced visibility, it could be difficult to see in both directions of travel. As discussed previously, a number of design solutions will be considered in the final design to delineate and provide adequate sight distance for both nonmotorized users and vehicles at trail crossings.

Trail design features, such as vegetated planting areas and curbs, could be obstacles if nonmotorized users lost control of their bicycle, had to dodge other trail users, or if trail users were distracted. Similarly, vehicles could conflict with trail design features if drivers miscalculated a turning movement or veered away from their path of travel. This impact is expected to occur infrequently, which is typical for other nonmotorized trails in the area. Trail design features would be consistent with applicable Seattle design standards and NACTO and AASHTO guidelines.

There could also be potential safety impacts associated with the Ballard Sunday Farmers Market (the Market) under the Ballard Avenue Alternative. The market occurs every Sunday, year-round, and is located on Ballard Ave NW between Vernon Pl and 22nd Ave NW and on 22nd Ave NW between Ballard Ave NW and NW Market St. When the market is open, Ballard Ave NW, between Vernon Pl and 22nd

Ave NW and 22nd Ave NW between Ballard Ave NW and NW Market St, is closed to vehicle traffic to accommodate market stalls, which are set up in the right-of-way. The market attracts a large number of pedestrians to the area when open, which could conflict with trail use. The potential for collisions between trail users and visitors to the market could be a safety concern under the Ballard Avenue Alternative. Trail users could be required to dismount or the trail could be closed during market hours to reduce safety impacts.

5.7 Leary Alternative

5.7.1 Construction

Under the Leary Alternative, there could be additional traffic and freight delay during construction on 11th Ave NW because 11th Ave NW is a two-lane street (one lane of traffic in each direction). If construction activities would require the closure of one lane of the roadway, a flagger could be required to direct travel to alternative routes through the construction zone. It is anticipated that this impact would be temporary.

Under the Leary Alternative, construction would occur on a transit corridor, which could have temporary impacts on public transportation similar to those described for general-purpose traffic. Increases in delay and congestion from traffic diversion and road closures could be possible during construction. However, these impacts are expected to be minimal because construction would occur in segments of three to four street blocks. Construction activities could also require temporary relocations of bus stops in the study area. Any construction activities that could affect public transportation would be coordinated with the transit provider.

5.7.2 Operation

5.7.2.1 *Roadway Network*

The Leary Alternative would alter the roadway network on NW 54th St, NW Market St, Leary Ave NW, and 11th Ave NW. As described in Chapter 1, Introduction and Project History, the Leary Alternative would construct a multi-use trail along the south side of NW 54th St and NW Market St, the southwest side of NW Leary Way, and the east side of 11th Ave NW.

The Leary Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 10- to 12-feet wide with a 3- to 13-foot-wide buffer between the roadway and the trail. A sidewalk 6- to 10-feet wide would be provided between the trail and adjacent properties.

Under the Leary Alternative, NW Market St and Leary Ave NW/NW Leary Way would no longer be two lanes in each direction (four-lane roadway) along the trail alignment; these streets would have one travel lane in each direction and a center two-way left-turn lane (three-lane roadway). NW 54th St would have one travel lane in each direction (two-lane roadway), similar to existing conditions. There are approximately 29 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative. However, some properties with multiple access points could have their driveways consolidated into a single access point in coordination with the City and property owners.

At the intersection of NW Market St and 24th Ave NW, right- and left-turn lanes would be provided in the eastbound and westbound directions. At the NW Leary Way and 15th Ave NW intersection, left-turn lanes would be provided in the eastbound and westbound directions.

All other roadways in the study area would be the same as the No Build Alternative.

5.7.2.2 *Traffic Volumes and Operations*

Traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6% per year between 2015 and 2040 due to background population and employment growth.

Under the Leary Alternative, traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-13 and Figure 5-7. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stop approach.

Table 5-13. Comparison of PM Peak Hour Study Intersection Level of Service between the 2040 No Build Alternative and Leary Alternative

			2040 No Build Alternative PM Peak Hour		*2040 Leary Alternative PM Peak Hour*	
ID	*Intersection*	*Traffic Control*	*LOS*	*Delay (sec)*	*LOS*	*Delay (sec)*
A	NW Market St/28th Ave NW	Signal	A	6	B	18
B	NW Market St/24th Ave NW	Signal	D	45	D	47
C	NW Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
D	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	87	F	87
E1	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	E	63
E2	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	65	F	81
F	NW Leary Way/14th Ave NW	Signal	A	10	D	35
G	NW Leary Way/11th Ave NW	Signal	C	20	F	82
H	11th Ave NW/NW 46th St	Signal	C	22	B	17
I	11th Ave NW/NW 45th St	Unsignalized –All-way Stop	B	11	B	12
J	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	8	E	35
K	Shilshole Ave NW/NW 17th St	Unsignalized – Two-way Stop	F	218	E	62
L	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
M	NW 56th St/24th Ave NW	Unsignalized – Two-way Stop	F	291	F	118
N	NW Vernon Pl/Ballard Ave NW	Unsignalized	D	27	C	22
O	NW Vernon Pl/Shilshole Ave NW	Unsignalized	C	24	C	21
P	Ballard Ave NW/20th Ave NW	Unsignalized	C	18	C	15
Q	Shilshole Ave NW/20th Ave NW	Unsignalized	C	24	C	21
R	NW Leary Way/17th Ave NW	Unsignalized	F	154	F	113
S	NW Ballard Way/17th Ave NW	Unsignalized	B	11	A	9

The Leary Alternative would cause the intersections of 15th Ave NW/NW Leary Way southbound off-ramp, NW Leary Way/11th Ave NW, and NW 46th St/Shilshole Ave NW to operate at LOS E or worse that would otherwise operate at LOS D or better under the No Build Alternative. In addition, this alternative would cause delay to increase by 5 seconds or more at the intersection of 15th Ave NW/NW Leary Way northbound off-ramp (Intersection E2) that operates at LOS E or worse under both alternatives.

Because NW Leary Way/Leary Ave NW would be reduced from four lanes to three lanes to accommodate the trail, Intersections E1 and G on NW Leary Way/Leary Ave NW would operate at LOS D or better under the No Build Alternative and LOS E or F under the Leary Alternative. The delay at Intersection E2 would increase by more than 5 seconds under the Leary Alternative compared to the No Build Alternative even though the intersection would operate at LOS E or F under both alternatives. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

The Leary Alternative would also cause the intersection of NW 46th St/Shilshole Ave NW (Intersection J) to operate at LOS E that would otherwise operate at LOS D or better under the No Build Alternative. However, this delay would be experienced by a small number of vehicles and would be between the delay threshold for LOS D and E for unsignalized intersections. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

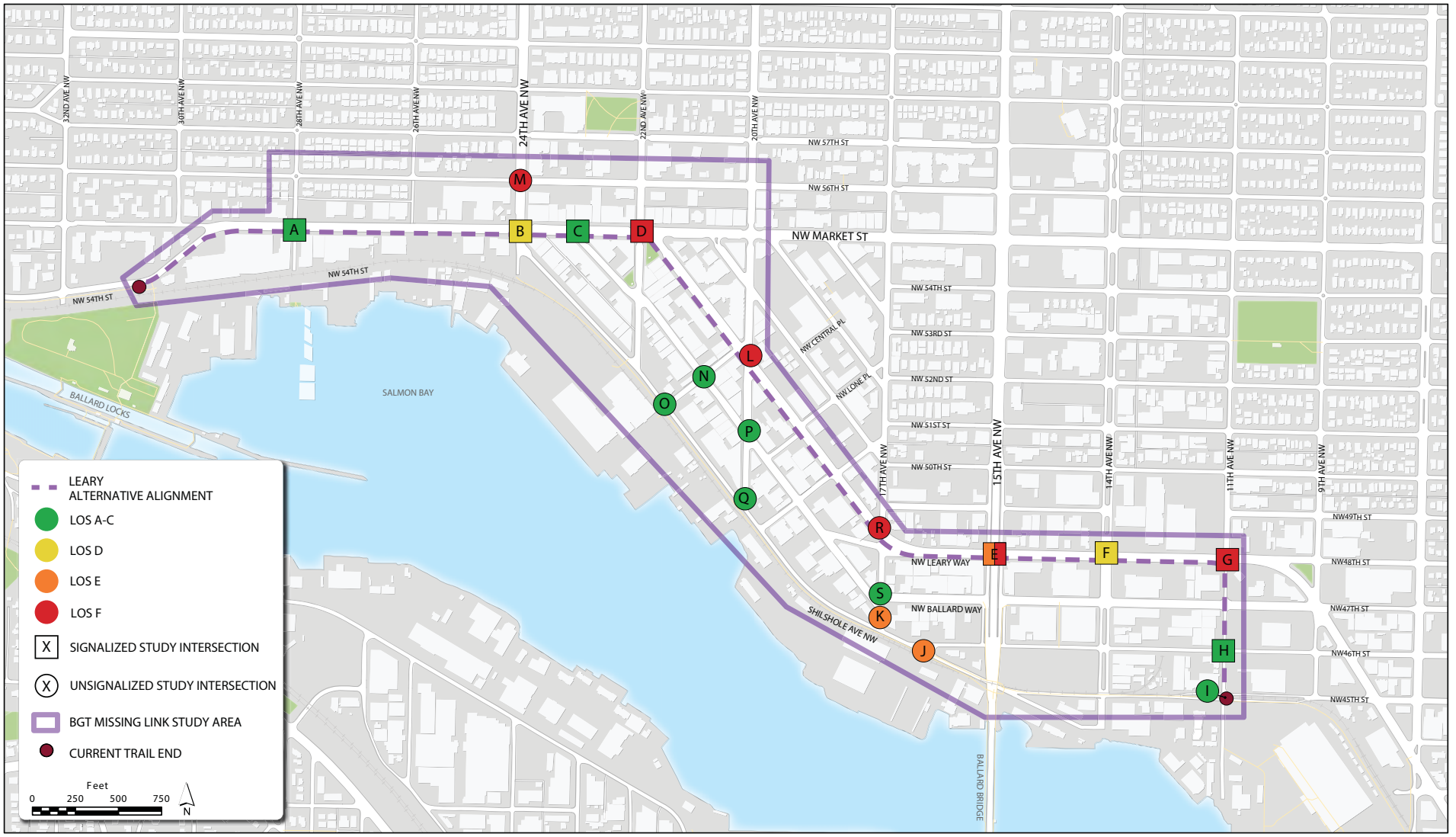
Eight additional intersections would operate at a different LOS or experience a change in delay of at least 5 seconds when compared to the No Build Alternative.

The intersections where LOS would improve include:

- Intersection H (11th Ave NW and NW 46th St) would operate at LOS B compared to LOS C under the No Build Alternative. Traffic would shift from NW 46th St to NW 45th St because NW 45th St would be restored to a two-way street.
- Intersection K (Shilshole Ave NW/17th Ave NW), Intersection M (NW 56th St/24th Ave NW), Intersection N (NW Vernon Pl/Ballard Ave NW), and Intersection S (NW Ballard Way/17th Ave NW) would experience reduced delay under the Leary Alternative compared to the No Build Alternative. Nonmotorized users in the study area would shift to the trail, which would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection.
- Intersection R (NW Leary Way/17th Ave NW) would experience reduced delay under the Leary Alternative compared to the No Build Alternative because the southbound turning movements at 17th Ave NW would no longer be conflicting with cyclists riding in-lane with traffic.

LOS would worsen at the following intersections:

- Intersection A (NW Market St and 28th Ave NW) would operate at LOS B under the Leary Alternative compared to LOS A under the No Build Alternative. Under the Leary Alternative, NW Market St would be reduced from four lanes to three lanes, which would increase delay during the PM peak hour. However, this intersection would still operate at an acceptable LOS.
- Intersection F (NW Leary Way/14th Ave NW) would operate at an acceptable LOS under the No Build Alternative and the Leary Alternative, but LOS would be reduced to LOS D from LOS A. This is because NW Leary Way/Leary Ave NW would be reduced from four lanes to three lanes to accommodate the trail.



SOURCE:
IDAX 2015; IDAX 2017; City of Seattle 2015; Parametrix 2017
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-7
Leary Alternative PM Peak Hour Study Intersection Level of Service

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The driveways shown in Table 5-14 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Leary Alternative at driveways. Under the Leary Alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 27 seconds of additional delay at driveways that would cross the BGT Missing Link compared to the No Build Alternative. However, many driveways that would not cross the trail would experience no increases or decreases in delay because nonmotorized users would shift to the trail.

Table 5-14. Comparison of PM Peak Hour Study Driveway Delay between the 2040 No Build Alternative and Leary Alternative

ID[1]	Driveway	2040 No Build Alternative PM Peak Hour (sec)	2040 Leary Alternative PM Peak Hour (sec)	Difference in Driveway Delay (sec)
1	**NW 54th St/Ballard Locks**	**19**	**24**	**5**
2	NW 54th St/McGinnis Marine	0	0	0
3	NW 54th St/Ballard Oil	9	9	0
4	NW 54th St/Snow and Co	9	9	0
5	NW 54th St/Ballard Transfer	9	9	0
6	NW 54th St/Lieb Marine Services	0	0	0
7	Shilshole Ave NW/Stimson Marina	28	23	-5
8	Shilshole Ave NW/Salmon Bay Center	25	20	-5
9	Ballard Ave NW/Salmon Bay Sand and Gravel South	17	17	0
10	Shilshole Ave NW/Covich Williams	44	37	-7
11	Shilshole Ave NW/Salmon Bay Café	23	18	-5
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina	15	14	-1
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina	25	20	-5
14	NW 45th St/Ballard Insulation	11	9	-2
15	NE 45th/Dovetail General Contractors	10	9	-1
16	**NW 54th St/Triad Ballard Development**	**17**	**25**	**8**
17	**NW 54th St/Trident Seafood Retail**	**17**	**27**	**10**
18	Shilshole Ave NW/Shilshole West Building	27	25	-2
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	18	16	-2
20	Shilshole Ave NW/Magnum Self Storage	0	0	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	15	13	-2
22	Shilshole Ave NW/Salmon Bay Sand and	29	25	-4

ID[1]	Driveway	2040 No Build Alternative PM Peak Hour (sec)	2040 Leary Alternative PM Peak Hour (sec)	Difference in Driveway Delay (sec)
	Gravel Loading Docks North			
23	Shilshole Ave NW/Ballard Hardware	29	25	-4
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	30	27	-3
25	NW 46th St/Ballard Marine	23	20	-3
26	NW 46th St/Ballard Blocks Development	99	65	-34
27	**11th Ave NW/U.S. Post Office**	**0**	**0**	**0**
28	28th Ave NW/Townhomes	9	9	0
29	NW 56th St/Mark24	9	9	0
30	NW 56th St/Ballard Square Parking	13	13	0
31	22nd Ave NW/Chase Bank	17	17	0
32	Ballard Ave NW/Ballard Sheet Metal Works	11	10	-1
33	Ballard Ave NW/Ballard Hardware Loading Dock	0	0	0
34	NW Ballard Way/Warden Fluid Dynamics	11	11	0
35	NW 46th St/Radtke Marine	10	9	-1
36	**NW Market St/Alley**	**13**	**22**	**9**
37	**Leary Ave NW/Ballard Landmark**	**12**	**25**	**13**
38	**Leary Ave NW/Public Parking/Caffè Fiore**	**13**	**25**	**12**
39	**Leary Ave NW/Carter Subaru Ballard**	**10**	**22**	**12**
40	**NW Leary Way/BOLT Modern Storage**	**22**	**49**	**27**
41	**NW Leary Way/Quest Church**	**17**	**34**	**17**
42	**NW Leary Way/Office Max**	**11**	**25**	**14**
43	**NW Leary Way/U-Haul**	**25**	**52**	**27**
44	**11th Ave NW/7-Eleven**	**11**	**22**	**11**

[1]Bold denotes driveways that would be crossed by the BGT Missing Link.

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.7.2.3 *Freight*

The primary freight corridors are expected to be the same under the Leary Alternative compared to the No Build Alternative. Freight will continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;

- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

The Leary Alternative would cause the following four intersections to operate at LOS E or F that would otherwise operate at LOS D or better under the No Build Alternative:

- Intersection E1: 15th Ave NW/NW Leary Way southbound off-ramp;
- Intersection E2: 15th Ave NW/NW Leary Way northbound off-ramp; and
- Intersection G: NW Leary Way/11th Ave NW; and
- Intersection J: NW 46th St/Shilshole Ave NW.

The decline in LOS experienced on these corridors is described in the previous section. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections.

Operations at many study area intersections are expected to have similar impacts or to perform better for freight mobility under the Leary Alternative compared to the No Build Alternative. As described in Section 5.7.2.2, intersection operations at the following intersections would be similar to or improve under the Leary Alternative when compared to the No Build Alternative:

- Intersection H (11th Ave NW and NW 46th St) would experience improvements in freight mobility because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area.
- Intersections K, L, M, Q, and R would experience improvements in freight mobility because trail users would shift to the trail on NW Leary Way/Leary Ave NW rather than ride in a lane with traffic on Shilshole Ave NW.
- Intersections B and I would have similar amounts of delay under the Leary Alternative compared to the No Build Alternative.

The following two intersections would operate at a lower LOS under the Leary Alternative when compared to the No Build Alternative:

- Intersection A: NW Market St/28th Ave NW, and
- Intersection F: NW Leary Way/14th Ave NW.

However, this would not be considered an impact because the intersections would still operate at an acceptable LOS.

There are approximately 29 driveways and loading docks along the alignment of the Leary Alternative. Delay at driveways along the Leary Alternative is expected to be similar to those indicated in Table 5-14. Freight vehicles would be required to stop before the trail to check for nonmotorized users before advancing to the roadway, which could result in up to 27 additional seconds of delay on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread throughout the day, this delay would occur sporadically during the PM peak hour. Although some driveways could experience additional delay compared to the No Build Alternative, this would not be considered as a significant impact because this additional delay is not expected to substantially alter freight operations (ECONorthwest, 2016). Please see the Economic Considerations Report for additional detail.

Driveway activity and usage would be similar under the Leary Alternative as compared to the No Build Alternative. Backing into or out of driveways adjacent to the trail could be considered a hazardous

maneuver. Vehicles backing into or out of driveways, particularly large vehicles, could have difficulty seeing other users in the area, including nonmotorized users crossing the driveway.

Up to three freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the south side of NW 54th St/NW Market St, the southwest side of Leary Ave NW/NW Leary Way, and the east side of 11th Ave NW. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties might need to relocate their access points to driveways or possibly to the ends of the blocks because this is an unpermitted use of public right-of-way. Two driveways on NW Market St and one driveway on NW Leary Way/Leary Ave NW might need to be moved. The change in access could potentially change how private property owners use the space between their buildings and the City's right-of-way. Some businesses may not be able to access their properties as they currently do and may have to reorient their business operations to accommodate freight by relocating access. Properties with multiple driveways or access points, such as properties along NW 54th St with two access points to a single parking lot, may need to consolidate access points where possible to improve safety and operations. This would reduce the number of conflict points with the trail while maintaining adequate access to properties. All other loading docks and driveways along the Leary Alternative would remain the same as the No Build Alternative.

5.7.2.4 *Nonmotorized Users*

5.7.2.4.1 Study Area Facilities

Under the Leary Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT Missing Link. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated 10- to 12-foot-wide multi-use trail for nonmotorized users for the entire study area. A 3- to 13-foot-wide buffer would be provided between the roadway and the trail. A sidewalk 6- to 10-feet wide would also be provided between the trail and adjacent properties. Curb bulbs would be provided at most study area intersections.

The trail would cross approximately 29 driveways and loading docks under the Leary Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area. Vehicles would be required to stop for trail users at all driveway and trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait between 15 and 25 seconds for a vehicle to clear the trail.

Additional nonmotorized improvements under the Leary Alternative could include curb treatments, pavement markings and treatments, signage and wayfinding, and lighting.

5.7.2.4.2 Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes would be similar to those described under the Preferred Alternative, Section 5.3.2.4.2, Pedestrian and Bicycle Volumes.

5.7.2.5 *Public Transportation*

Under the Leary Alternative, impacts on public transportation would be similar to those described for general-purpose traffic on NW Leary Way/Leary Ave NW and NW Market St, which are both transit corridors. Additional congestion and delay at intersections on these streets could affect public transportation service on King County Metro Routes 17, 18, 29, 40, and 44.

5.7.2.6 *Freight Rail*

No impacts on rail from the Leary Alternative are anticipated because rail operations and facilities would not be altered.

5.7.2.7 *Safety*

Under the Leary Alternative, safety would be improved for nonmotorized users and motor vehicles in the study area. Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians. Under the Leary Alternative, a dedicated bicycle facility would provide a safer nonmotorized environment in the study area compared to the No Build Alternative. A dedicated facility would improve predictability at conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Although the Leary Alternative would improve overall safety compared to the No Build Alternative, there is potential for some new impacts depending on the final design. Those potential impacts include:

- Sight distance concerns at driveway crossings with the BGT Missing Link;
- Conflicts between vehicles and nonmotorized users at trail crossings;
- Conflicts between nonmotorized users and trail design features, such as planter strips and curbing; and
- Conflicts between vehicles and trail design features, such as planter strips and curbing.

These potential new impacts would be minimized through detailed review during the trail design process, such as conducting detailed sight distance reviews at each driveway intersection during final design. However, these impacts may not be eliminated entirely.

Under the Leary Alternative, there could be sight distance concerns for exiting vehicles at up to nine driveways on the southwest/south side of Leary Ave NW/NW Leary Way and up to eight driveways on the south side of NW Market St where buildings are constructed up to the property lines. Sidewalks would be provided between the properties and the trail, which would improve sight distances by providing a buffer of 8- to 10-feet wide from the property frontage.

There could be conflicts at trail crossings with driveways and intersections, including delay for either nonmotorized users and vehicles while waiting for shared areas to clear, as well as collisions. As discussed in Section 1.4, Features Common to All Build Alternatives, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify sidewalk and trail users and vehicles that there is a trail crossing. Under SMC 11.58.230 (summarized in Section 5.3.2.7), driveways along the Leary Alternative would operate safely. There would be no sight distance concerns for vehicles entering driveways because trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate industrial and commercial traffic.

The Leary Alternative would reduce the existing sidewalk on NW Market St between 24th Ave NW and 22nd Ave NW by up to 12 feet to accommodate the BGT Missing Link. This location is a heavy-use pedestrian corridor, and the potential for conflicts between pedestrians and trail users could increase if the sidewalk was narrowed to accommodate the trail. Safety improvements, such as pavement variations and signage, could be used to slow trail user traffic through this portion of the Leary Alternative.

Nonmotorized users on the BGT Missing Link would also be traveling in both directions on one side of the street. This would require vehicles crossing the trail to look in both directions for nonmotorized users before continuing across the trail. For drivers of large vehicles with reduced visibility, it could be difficult to see in both directions of travel. As discussed previously, a number of design solutions will be considered in final design to delineate and provide adequate sight distance for both nonmotorized users and vehicles at trail crossings.

Trail design features, such as vegetated planting areas and curbs, could be obstacles if nonmotorized users lost control of their bicycle, had to dodge other trail users, or if trail users were distracted. Similarly, vehicles could conflict with trail design features if drivers miscalculated a turning movement or veered away from their path of travel. This impact is expected to occur infrequently, which is typical for other nonmotorized trails in the area. Trail design features would be consistent with applicable Seattle design standards and NACTO and AASHTO guidelines.

5.8 Connector Segments

5.8.1 Construction

Construction impacts on traffic volumes and operations, freight, nonmotorized users, public transportation, rail, and safety would be similar among all of the connector segments to those described for the Build Alternatives.

5.8.2 Operation

The specific design and impacts of the Connector Segments would depend on which alignments were being connected. Potential impacts associated with any Connector Segment could include the following:

- Increased intersection LOS and delay for general-purpose vehicles, freight, and public transportation;
- Altered loading dock and driveway access for businesses;
- Pedestrian congestion if sidewalks are reduced; and
- Potential sight distance concerns at driveways.

However, improvements on any of the Connector Segments would include improved safety and comfort for nonmotorized users and vehicles.

CHAPTER 6 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

6.1 **Measures Common to All Build Alternatives**

6.1.1 **Construction**

To mitigate impacts from construction, SDOT would require the contractor to develop a Traffic Control Plan to reduce impacts on traffic operations and to protect and control motor vehicle, pedestrian, and bicycle traffic during all phases of construction. The plan would be developed in accordance with City construction specifications and would be updated as appropriate for each construction phase. The plan would outline specific impact-reducing measures, including the following:

- Clearly marked detours for motor vehicles, developed in coordination with other agencies and adjacent construction projects, to provide alternative routes for access through the study area and to avoid active construction areas;
- Accommodations for vehicles that require loading zone access to properties for services such as business deliveries, taxi and bus service, and garbage pickup;
- Use of flaggers, uniformed police officers, barricades, signing, or other traffic control devices;
- Designated construction haul routes to minimize construction traffic impacts on other roadways;
- Accommodations for oversized freight vehicles to travel through construction zones, if necessary, during road closures;
- Clearly marked pedestrian and bicycle access routes as well as proposed locations of detour signage and other wayfinding elements; accessible routes to be within a reasonable distance of temporarily closed trails and other pathways;
- Transit stop closures, alternative transit stop locations, and interim transit routes developed and publicized in coordination with King County Metro;
- Arrangements for emergency access to and travel through construction areas to minimize impacts on emergency response times, developed in coordination with emergency response providers; and
- Maintenance of rail facilities and operations to minimize impacts on freight rail service, developed in accordance with BTR specifications.

The City would maintain access to private property to the maximum extent feasible, and would notify property owners in advance of activities that might temporarily limit access. In addition, SDOT would coordinate with businesses affected by construction to provide wayfinding information for customers and support other outreach activities to minimize the potential adverse impacts of construction.

6.1.2 **Operation**

Traffic impacts were determined at intersections by comparing intersection LOS for the No Build and Build Alternatives during the PM peak hour. Impacts would occur if a Build Alternative would increase traffic congestion levels to LOS E or LOS F, but the intersection operates at LOS D or better under the No Build Alternative. Impacts would also occur if a Build Alternative would increase the delay at intersections operating at LOS E or F under the No Build Alternative by 5 seconds or more.

Avoidance, minimization, and mitigation measures for potential impacts on operations under each alternative are discussed below.

SDOT will work with individual property and business owners as well as with interested stakeholders and the general public throughout the design process. Roadway modifications, intersection treatments, driveway design, and parking lot changes would be incorporated during the final design phase of the project to address safety, access, nonmotorized users, and vehicle types. Similar concepts can be found implemented throughout Seattle, consistent with Seattle design standards and presented in design documents such as the NACTO Urban Bikeway Design Guide (NACTO, 2014), and AASHTO Guide for Development of Bicycle Facilities (AASHTO, 2012). Roadway designs would vary for each alternative based on factors such as intersection geometry, vehicle volumes, and types of vehicles. These roadway design considerations would be discussed with business owners, with the understanding that SDOT would make final design decisions.

6.2 Preferred Alternative

6.2.1 Traffic Operations

One intersection (Intersection J) is anticipated to operate at LOS E or worse under the Preferred Alternative when it would operate at LOS D or better under the No Build Alternative. Mitigation is not required because the City does not have an adopted intersection LOS standard for either signalized or unsignalized intersections. Further monitoring of traffic volumes and intersection operations at this intersection could be completed in the future to determine if signalization is needed.

6.2.2 Freight

Mitigation measures for freight would be similar as described above for traffic operations.

Two access points to a business along NW 54th St could be combined into one access point to improve safety and operations along the BGT Missing Link. Because access to the parking lot can be accommodated by a single access point, combining access points would not be considered a significant impact. This would decrease the potential driveway conflicts while not significantly affecting business access.

6.2.3 Nonmotorized Users

Under the Preferred Alternative, nonmotorized facilities and comfort in the study area would be improved compared to the No Build Alternative. Therefore, no mitigation measures would be required.

6.2.4 Public Transportation

The Preferred Alternative is not expected to adversely affect public transportation compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.2.5 Freight Rail

The Preferred Alternative would require relocation of the BTR tracks between the Hatton Marine driveway (approximately 600 feet west of 17th Ave NW) and just east of the Ballard Bridge. All track relocation would be coordinated with BTR so that impacts to rail operations would be minimized. BTR would complete removal and reconstruction of any track segments prior to construction of the BGT Missing Link.

6.2.6 Safety

The Preferred Alternative would improve safety in the study area compared to the No Build Alternative by providing a dedicated facility for nonmotorized users. The final design would also include safety considerations to improve trail safety, such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting. In locations with sight distance concerns, design elements such as pavement markings, signage, or bubble mirrors would be used to further improve safety. Variations in the use of asphalt and concrete, different paint or thermoplastic striping and symbols, and elevations at driveway entrances could be used to clearly identify where the trail intersects with driveways. Trail speed signage and driveway notification signage could be used to maintain trail usage at safe speeds and to notify trail users and vehicles that a trail intersection exists. Therefore, no additional mitigation would be required.

SDOT will work with individual property and business owners, as well as with key stakeholders, the bicycle and pedestrian community, and the general public throughout the design process to determine the best means of reducing potential conflicts along the trail alignment. During the design process, SDOT will evaluate other improvements, such as intersection signalization or advanced warning systems with vehicle detection that activates elevated flashing beacons, that could be used to improve safety at key intersections or driveways. In coordination with businesses, driveways could also be combined into fewer access points to reduce the number of conflict locations. In areas of highest concern, SDOT could also choose to yield the trail to driveways.

6.3 Shilshole South Alternative

6.3.1 Traffic Operations

One intersection (Intersection J) is anticipated to operate at LOS E or worse under the Shilshole South Alternative when it would operate at LOS D or better under the No Build Alternative. Mitigation measures would be similar to those described for the Preferred Alternative.

6.3.2 Freight

Mitigation measures for freight delay would be similar to those mentioned above for traffic operations.

Up to 10 access points to businesses along NW 54th St, Shilshole Ave NW, and NW 45th St could be reoriented to improve safety and operations along the BGT Missing Link. To mitigate this impact, SDOT would coordinate with affected businesses to reorient their access points to access driveways or possibly to the ends of the blocks. This would result in different access locations but overall access to properties would be maintained. If access to businesses could not be relocated, SDOT could provide relocation assistance and benefits to affected property owners.

6.3.3 Nonmotorized Users

Under the Shilshole South Alternative, nonmotorized facilities and comfort in the study area would be improved compared to the No Build Alternative. Therefore, no mitigation measures would be required.

6.3.4 Public Transportation

The Shilshole South Alternative is not expected to adversely affect public transportation compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.3.5 Freight Rail

Mitigation measures for impacts to freight rail would be similar to those described for the Preferred Alternative.

6.3.6 Safety

Mitigation measures for safety would be similar to those described for the Preferred Alternative.

6.4 Shilshole North Alternative

6.4.1 Traffic Operations

One intersection (Intersection J) is anticipated to operate at LOS E or worse under the Shilshole North Alternative when it would operate at LOS D or better under the No Build Alternative. Mitigation measures would be similar to those described for the Preferred Alternative.

6.4.2 Freight

Mitigation measures for freight delay would be similar to those mentioned above for traffic operations.

Mitigation measures for changes to access points to businesses would be similar to those described for the Shilshole South Alternative.

6.4.3 Nonmotorized Users

Under the Shilshole North Alternative, nonmotorized facilities and comfort in the study area would be improved compared to the No Build Alternative. Therefore, no mitigation measures would be required.

6.4.4 Public Transportation

The Shilshole North Alternative is not expected to adversely affect public transportation compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.4.5 Freight Rail

The Shilshole North Alternative is not expected to adversely affect rail compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.4.6 Safety

Mitigation measures for safety would be similar to those described for the Preferred Alternative.

6.5 Ballard Avenue Alternative

6.5.1 Traffic Operations

One intersection (Intersection J) is anticipated to operate at LOS E or worse under the Ballard Avenue Alternative when it would operate at LOS D or better under the No Build Alternative. Mitigation measures would be similar to those described for the Preferred Alternative.

6.5.2 Freight

Mitigation measures for freight delay would be similar to those mentioned above for traffic operations.

Mitigation measures for changes to access points to businesses would be similar to those described for the Shilshole South Alternative.

6.5.3 Nonmotorized Users

Under the Ballard Avenue Alternative, nonmotorized facilities and comfort in the study area would be improved compared to the No Build Alternative. Therefore, no mitigation measures would be required.

There could be some impacts on nonmotorized users and mobility near the Ballard Farmers Market during operating hours. Potential mitigation measures could include:

- Nonmotorized users on the trail could be required to walk through the market area during operating hours.
- The trail could be closed near the market during operating hours.

6.5.4 Public Transportation

The Ballard Avenue Alternative is not expected to adversely affect public transportation compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.5.5 Freight Rail

The Ballard Avenue Alternative is not expected to adversely affect rail compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.5.6 Safety

Mitigation measures for safety would be similar to those described for the Preferred Alternative.

Pedestrian safety near the Ballard Farmers Market during operating hours could be affected by the BGT Missing Link project under the Ballard Avenue Alternative. To mitigate this impact, SDOT could require trail users to walk through the market area during operating hours, or the BGT Missing Link in the market area could be closed during operating hours.

6.6 Leary Alternative

6.6.1 Traffic Operations

The Leary Alternative would cause three intersections to operate at LOS E or worse that would otherwise operate at LOS D or better under the No Build Alternative (Intersections E1, G, and J). This alternative would cause delay to increase by 5 seconds or more at one intersection (Intersection E2) that operates at LOS E or worse under both alternatives.

Because the right-of-way at NW Market St and Leary Ave NW/Leary Way NW is constrained, additional right-of-way would be required if SDOT were to mitigate additional delay at Intersections E1, E2, and G. It is likely that this would result in additional impacts on properties and businesses near the intersections. The additional delay that would be experienced at Intersections E1, E2, and G would likely occur only during the PM peak hour when traffic volumes are highest. Also, the City does not have an adopted intersection LOS standard; therefore, mitigation is not required for these four intersections.

The intersection of NW 46th St and Shilshole Ave NW (Intersection J) would operate at LOS E under the Leary Alternative compared to LOS A under the No Build Alternative. Mitigation measures would be similar to those described for the Preferred Alternative.

6.6.2 Freight

Mitigation measures for freight delay would be similar to those mentioned above for traffic operations.

Mitigation measures for changes to access points to businesses would be similar to those described for the Shilshole South Alternative.

6.6.3 Nonmotorized Users

Under the Leary Alternative, the sidewalk on NW Market St between 24th Ave NW and 22nd Ave NW would be reduced to accommodate the BGT Missing Link. This could create some pedestrian congestion. Design elements such as landscaping, pavement variations and markings, and signage could be used to mitigate impacts. Elsewhere in the study area, nonmotorized facilities and comfort would be improved compared to the No Build Alternative.

6.6.4 Public Transportation

The Leary Alternative could affect public transportation on Leary Ave NW/NW Leary Way similarly to impacts discussed in Section 6.6.1, Traffic Operations. SDOT could evaluate mitigation measures such as queue jumps to mitigate transit impacts under the Leary Alternative. Queue jumps are additional travel lanes provided for transit vehicles only that give transit priority over general-purpose vehicles at intersections. Queue jumps are often accompanied by a signal that provides an early green light for transit vehicles only.

6.6.5 Freight Rail

The Leary Alternative is not expected to adversely affect rail compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.6.6 Safety

Mitigation measures for the reduction in sidewalk width on NW Market St would be similar to those mentioned above for nonmotorized users. Mitigation for other safety impacts would be similar to those described for the Preferred Alternative.

CHAPTER 7 CUMULATIVE IMPACTS

7.1 Introduction

Cumulative impacts are the accumulation of impacts from past, present, and reasonably foreseeable actions. These impacts are analyzed so that decision-makers can consider how impacts from actions over time "add up" to affect a resource. Analysts reviewed potential cumulative effects on transportation resources resulting from other past, present, or reasonably foreseeable future actions that could affect transportation, either directly or indirectly.

The Ballard area has experienced significant development and re-development in the past several years, and this trend is anticipated to continue as long as favorable economic conditions persist. This growth has resulted in construction of numerous apartments and condominiums throughout the area, and above-average construction activity. Several larger construction and development projects are summarized below that are known and are reasonably expected to occur in the near future in the project vicinity.

7.2 Known or Anticipated Projects

7.2.1 Ship Canal Water Quality Project

Seattle Public Utilities (SPU) is proposing a large project to reduce combined sewer overflow (CSO) that would occur in the vicinity of the proposed BGT Missing Link project. The project would be under construction over an approximate 6-year period, beginning in approximately 2018. Over the course of construction, active construction would occur in phases at different locations, but would be heavily involved in the Ballard area over much of the construction period.

7.2.2 C.D. Stimson Development

Developer C.D. Stimson Co. plans to build a 500,000-square-foot office complex consisting of five 5-story buildings at 5423 Shilshole Ave NW. The project will start with one 105,000-square-foot building, with the remaining added in the following years. Construction of the first building is anticipated to take 2 years beginning in 2018.

The C.D. Stimson Development project could increase all modes of travel in the study area. An increase in nonmotorized trips is not expected to have a substantial impact because the nonmotorized facilities in the study area, including the BGT Missing Link project, would be able to accommodate additional users. Additional traffic related to the C.D. Stimson Development project could create more congestion and delays in the study area. However, the developer of the site would be expected to mitigate any impacts on transportation resources as part of the project.

Transportation resources could be temporarily affected if construction of the C.D. Stimson Development project occurred simultaneously with construction of the BGT Missing Link project. Construction activities related to this project would be coordinated with SDOT to minimize impacts during construction.

7.2.3 Sound Transit 3

The Sound Transit 3 ballot measure passed in November 2016. Sound Transit has developed a priority projects list as part of their planning process to expand the regional mass transit system to meet anticipated population growth expected by 2040. The schedule for these potential projects is not yet known. The projects identified in Sound Transit 3 in the study area are:

> ***C-02 Ballad to University District***. This project would build light rail in a tunnel from Ballard's Market Street area to the vicinity of the University District light rail station. This project was funded as a Future Investment Study Only; therefore, construction of the BGT Missing Link project would be completed prior to construction of this project.
>
> ***Light Rail Downtown Seattle to Ballard (Market S Vicinity).*** There are several alternative projects that would build light rail from downtown Seattle to Ballard's Market St area. The project is estimated to be completed and in operation by the year 2035. Construction of the BGT Missing Link project would be completed by the start of the construction schedule for this project; therefore, construction of both projects would not occur simultaneously.

All of Sound Transit's proposed priority projects would likely decrease personal vehicle use in the study area, which could reduce congestion and delay for motor vehicles in this area. Nonmotorized facilities would be complementary to increased transit service.

7.2.4 SDOT Move Seattle Transportation Strategy

There are two projects in Move Seattle that overlap in the study area: the Ballard to Downtown Enhanced Transit Corridor, and Market/45th Transit Improvement Project. Both projects are proposed to be implemented by 2024.

Ballard to Downtown Enhanced Transit Corridor. In preparation for the Ballard light rail line as proposed in Sound Transit 3, the Ballard to Downtown Enhanced Transit Corridor project improves the corridor's existing transit operations and adds interim safety improvements for bicyclists and pedestrians crossing the Lake Washington Ship Canal.

Market/45th Transit Improvement Project. The Market/45th transit project enhances transit speed and reliability on one of the city's primary east-west corridors and most chronically congested routes.

Both of the Move Seattle projects could decrease personal vehicle use in the study area. This could improve congestion and delays for motor vehicles in the study area. Improved transit corridors would also be complementary to nonmotorized facilities in the study area. Safety improvements on these corridors would also improve safety for nonmotorized users in the study area.

7.2.5 Seattle Bicycle Master Plan Projects

The Bicycle Master Plan proposes a number of bicycle improvements in and near the BGT Missing Link project study area. These projects include constructing neighborhood greenways on NW 50th St, 11th Ave NW, 28th Ave NW, and NW 64th St. Bicycle lanes with minor separation are proposed for NW Market St between 24th Ave NW and 32nd Ave NW, and on 14th Ave NW. The completion of projects in the Seattle Bicycle Master Plan could decrease personal vehicle use in the study area and increase bicycle use. This could improve congestion and reduce delay for motor vehicles in the study area.

7.2.6 Move Ballard

Move Ballard will identify and prioritize near-term multimodal transportation improvements for the Ballard Hub Urban Village in response to the area's rapid recent growth. The plan will also evaluate potential future high-capacity (light rail, streetcar, bus rapid transit) transit station areas in anticipation of possible Metro and Sound Transit investments in the area.

Projects and improvements identified in Move Ballard will support transit-oriented development, multimodal mobility, freight access and circulation, and promote safety for all users of the transportation system. They will also reflect the goals and objectives of existing neighborhood plans, citywide modal plans, previous transportation studies, and overall city goals and objectives.

If construction of any Move Ballard projects occurs simultaneously with construction of the BGT Missing Link project, impacts on transportation could be increased. SDOT should coordinate construction activities for both projects to minimize the short-term impacts on transportation that could occur.

7.2.7 Private Development

The Ballard neighborhood has been experiencing growth in the last few years and it is anticipated that this growth will continue (City of Seattle, 2016). The types of development expected are commercial buildings, as well as residential medium-density and high-density housing, including multi-family complexes with commercial development on the ground floor.

Private development could increase all modes of travel in the study area. An increase in nonmotorized trips is not expected to have a substantial impact because the nonmotorized facilities in the study area, including the BGT Missing Link project, would be able to accommodate additional users. Additional traffic related to private development could create more congestion and delays in the study area. However, private developers would be expected to mitigate any impacts on transportation resources as part of their project.

Transportation resources could be temporarily affected if construction of other private development projects occurred simultaneously with construction of the BGT Missing Link project. Construction activities related to private development in the study area could be coordinated with SDOT to minimize impacts during construction.

7.3 Mitigation Measures for Cumulative Impacts

The BGT Missing Link and a number of reasonably foreseeable actions could create additional delay and congestion for vehicles in the study area. This impact would be mitigated in conjunction with the environmental process for specific projects. SDOT and other project proponents could implement measures similar to those presented in Section 6.1.1, Construction, to minimize the effect of construction-related cumulative impacts on transportation resources. Such measures could maintain mobility and safety to the extent feasible during construction and facilitate the efficient use of the transportation system.

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APPENDIX A
SPECIAL CONSIDERATIONS FOR DRIVEWAYS

Table A1. Special Considerations for Driveways

ID	Driveway	Special Considerations
1	NW 54th St/Ballard Locks (NW 54th St/30th Ave NW)	• Beginning of trail • Commercial driveway • High traffic volume driveway
2	NW 54th St/McGinnis Marine (5320 28th Ave NW)	• Medium trucks • Industrial driveway
3	NW 54th St/Ballard Oil (5300 26th Ave NW)	• Medium, Large trucks • Special vehicle maneuvers, including trucks backing into driveway • Industrial driveway
4	NW 54th St/Snow and Co (5302 26th Ave NW)	• Medium, Large trucks • Special vehicle maneuvers, including trucks backing into driveway • Industrial driveway
5	NW 54th St/Ballard Transfer (2425 NW 54th St)	• Medium trucks • Special vehicle maneuvers, including trucks backing into driveway • Industrial driveway • Forklift activity
6	NW 54th St/Lieb Marine Services (2406 NW 54th St)	• Industrial driveway • Special vehicle maneuvers, including trucks backing into driveway
7	Shilshole Ave NW/Stimson Marina (5435 Shilshole Ave NW)	• High traffic volume driveway • Medium trucks • Commercial/office driveway
8	Shilshole Ave NW/Salmon Bay Center (5281 Shilshole Ave NW)	• High traffic volume driveway • Medium trucks • Commercial/office driveway
9	Ballard Ave NW/Salmon Bay Sand and Gravel South (5231 Shilshole Ave NW)	• Medium trucks • Forklift activity • Special vehicle maneuvers, including trucks backing into driveway, vehicles pulling in front of building, and moving to other side of street • Industrial driveway
10	Shilshole Ave NW/Covich Williams (5219 Shilshole Ave NW)	• Medium, Large trucks • Industrial driveway • Special vehicle maneuvers, including trucks backing into driveway

Table A1. Special Considerations for Driveways, continued

ID	Driveway	Special Considerations
11	Shilshole Ave NW/Salmon Bay Café (5109 Shilshole Ave NW)	• Medium, large trucks • Commercial driveway
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina (4733 Shilshole Ave NW)	• Industrial driveway • Medium trucks • Forklift activity • Special vehicle maneuvers, including vehicles pulling in front of building
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina (4611 Shilshole Ave NW)	• Industrial driveway • Medium, large trucks
14	NW 45th St/Ballard Insulation (1125 NW 45th St)	• Industrial driveway • Medium, large trucks • Forklift activity
15	NE 45th/Dovetail General Contractors (1143 NW 45th St)	• Industrial driveway • Medium, large trucks
16	NW 54th St/Triad Ballard Development (2839 NW 54th St)	• Commercial driveway
17	NW 54th St/Trident Seafood Retail (2983 NW Market St)	• Medium trucks • Commercial driveway
18	Shilshole Ave NW/Shilshole West Building (5470 Shilshole Ave NW)	• Commercial/office driveway
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive (5450 Shilshole Ave NW)	• Commercial driveway • Special vehicle maneuvers, including vehicles pulling in front of building and moving to other side of street
20	Shilshole Ave NW/Magnum Self Storage (5422 Shilshole Ave NW)	• Commercial driveway
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North (5232-5228 Shilshole Ave NW)	• Industrial driveway • Forklift activity • Medium trucks • Special vehicle maneuvers, including vehicles pulling in front of building and moving to other side of street
22	Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North (5232-5228 Shilshole Ave NW)	• Industrial driveway • Forklift activity
23	Shilshole Ave NW/Ballard Hardware (4764 Shilshole Ave NW)	• Commercial driveway • Forklift activity • Medium trucks • Special vehicle maneuvers, including vehicles pulling in front of building and

Table A1. Special Considerations for Driveways, continued

ID	Driveway	Special Considerations
		vehicles backing into driveway/parking spaces
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance (4700-4764 Shilshole Ave NW)	• Industrial driveway • Medium trucks
25	NW 46th St/Ballard Marine (1530 NW 46th St)	• Industrial driveway • Forklift activity • Special vehicle maneuvers, including trucks backing into driveway
26	NW 46th St/Ballard Blocks Development (1438 NW 46th St)	• Commercial/retail driveway • High traffic volume driveway
27	11th Ave NW/U.S Post Office (4501 11th Ave NW)	• Industrial driveway • Medium, heavy trucks • Flagger activity • Special vehicle maneuvers, including vehicles pulling in front of driveway
28	28th Ave NW/Townhomes (5518 28th Ave NW)	• Residential driveway
29	NW 56th St/Mark24 (2443 NW 56th Ave)	• Residential driveway
30	NW 56th St/Ballard Square Parking (2291 NW 56th St)	• Commercial/retail driveway • High traffic volume driveway • Medium trucks
31	22nd Ave NW/Chase Bank (5509 22nd Ave NW)	• Commercial/retail driveway
32	Ballard Ave NW/Ballard Sheet Metal Works (4763 Ballard Ave NW)	• Commercial/retail driveway • Medium trucks • Forklift activity
33	Ballard Ave NW/Ballard Hardware Loading Dock (4741 Ballard Ave NW)	• Commercial/retail driveway • Medium, large trucks • Forklift activity • Special vehicle maneuvers, including trucks backing into driveway
34	NW Ballard Way/Warden Fluid Dynamics (1515 NW Ballard Way)	• Commercial driveway • Special vehicle maneuvers, including vehicles pulling in front of driveway
35	NW 46th St/Radtke Marine (1119 NW 46th St)	• Commercial driveway • Medium trucks
36	NW Market St/Alley (2359 NW Market St)	• Commercial/retail driveway • Medium trucks • Special vehicle maneuvers, including vehicles pulling in front of driveway

Table A1. Special Considerations for Driveways, continued

ID	Driveway	Special Considerations
37	Leary Ave NW/Ballard Landmark (5433 Leary Ave NW)	• Residential driveway • High vehicle volume driveway
38	Leary Ave NW/Public Parking/Caffé Fiore (5409 Leary Ave NW)	• Commercial/retail driveway • Special vehicle maneuvers, including vehicles using parking lot to turn around
39	Leary Ave NW/Carter Subaru Ballard (5221 Leary Ave NW)	• Commercial driveway • Special vehicle maneuvers, including vehicles pulling in front of driveway
40	NW Leary Way/BOLT Modern Storage (1515 NW Leary Way)	• Commercial driveway • Medium trucks • Special vehicle maneuvers, including vehicles using driveway to turn around
41	NW Leary Way/Quest Church (1451 NW Leary Way)	• Commercial/retail driveway • High vehicle volume driveway
42	NW Leary Way/Office Max (1139 NW Leary Way)	• Retail driveway • Medium, large trucks
43	NW Leary Way/U-Haul (1119 NW Leary Way)	• Commercial driveway • Medium, large trucks
44	11th Ave NW/7-Eleven (4701 11th Ave NW)	• Commercial/retail driveway • High vehicle volume driveway • Medium, large trucks

APPENDIX B
DRIVEWAY INTERVIEW NOTES

BGT Interview Questions

Date/Time: 10/17/2016

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Ryder Wragg

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Ballard Industrial

Contact Information (email, phone, mailing address):

Preferred means of future contact: EMAIL

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - *Motorcycles, passenger vehicles - YES*
   - *Light trucks (< 14,000#) - YES*
   - *Medium trucks (vans, box trucks, flatbeds) - YES*
   - *Heavy trucks (dump trucks, Class 8s) - YES*
   - *Tractor-trailers (5th wheelers) - YES*
   - *Other/special (boat transporters, lowboys, tankers, buses)*

On Shilshole Ave, pull in parallel loading/unloading at dock

Parking area/loading to south of retail store: Small parcel comes in from Ballard Ave 2 times per day, load some trucks as well, 4-15 enter/exits per day, vehicles back in straight and pull out

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

N/A

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Ballard Ave side loading – mid morning/afternoon

Spread throughout on other side

Mon – Fri spread out

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Busiest Fall, Winter, Spring

5. Are there driveways to your property that are one-way (entries, exits)?

Yes, parking lot to retail store. Occasionally people use driveways as through way, enter/exit from the wrong direction

6. Are there driveways where vehicles typically back out?

Back in from loading dock south of retail store on Ballard Ave

7. How would you characterize your use of these driveways by types of drivers?
   - *Occasional customers - YES*
   - *Frequent customers – YES, Mostly frequent customers*
   - *Employee – commuters – 50, some park on Shilshole, Most arrive 7:30 – 8am*
   - *Employee – not commuters*
   - *Delivery service drivers (FedEx, UPS) - YES*
   - *Long haul or specially trained*
8. How many driveways serve your business and what purposes do they each serve?

See above

9. Are any of your driveways shared with other nearby businesses?

No

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

Shilshole Ave NW – 10/day 10-30 minutes

Retail lot – near full every day

BGT Interview Questions

Date/Time: 9/26/2016

Interviewer(s): Brian Macik, Parametrix

Interview Location: Phone

Interviewee and Title: Bob Warner, Owner and CEO (and truck driver)

Connection to Property Owner (property owner, property manager, business tenant): Business Tenant

Business Name(s): Ballard Insulation

Contact Information (email, phone, mailing address):

Preferred means of future contact: Phone

1. Can you give us a general description of your business and describe the type of vehicles that use *your driveway?*
   - ☐ *Motorcycles, passenger vehicles*
   - ☐ ***Light trucks (< 14,000#)***
   - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

   Specific Answer: Every day, one 30-foot truck supplies the business, then Ballard Insulation Ford F-150s deliver finished product.

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

   Currently, every day one 30-foot supply truck backs up to the loading dock in and east-west direction. The truck faces west, and backs up to east to the loading dock. This loading dock is located within the public right-of-way.

   The Ballard Insulation delivery trucks then use the loading dock in the same fashion to load up finished product and deliver it.

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?
   - *Weekends: Seldom working*
   - *Weekdays (M-F): Normal work hours*
   - *They try to get supply truck deliveries by 10am to miss the morning rush hour.*
   - *At the busiest, one big supply truck serves the business, and a few times per day the Ballard Insulation delivery vehicles (Ford F-150s) deliver insulation to boats.*
4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

   Busiest: October through June

5. Are there driveways to your property that are one-way (entries, exits)?

   The driveway serving the business is two-way.

6. Are there driveways where vehicles typically back out?
   - *No, vehicles that use the driveway pull all the way and turn around before leaving.*
   - *However, vehicles back into the loading dock in an east-west direction (facing west, backing east).*
7. How would you characterize your use of these driveways by types of drivers?
   - ☐ Occasional customers
   - ☐ Frequent customers
   - ☐ Employee – commuters
   - ☐ Employee – not commuters
   - ☐ Delivery service drivers (FedEx, UPS)
   - ☐ Long haul or specially trained

   - *Large supply trucks: 3 different suppliers; they use the loading dock*
   - *Ballard Insulation small delivery trucks: parked in back, use the driveway, load via loading dock*
   - *Employees: 3 park in the back, 3 park on the street*
   - *Delivery service (FedEx, UPS): About once per day use the driveway*
8. How many driveways serve your business and what purposes do they each serve?

   One. It serves: employee parking, delivery truck parking, and delivery services.

9. Are any of your driveways shared with other nearby businesses?

   Yes. It is shared with Northern Lights and people on the live-aboard boats.

10. Could you please try to estimate how many vehicles use your driveway on a typical day?
    - *6-7 trips of Ballard Insulation delivery trucks*
    - *3 employees parked*
    - *1 delivery service vehicle*
11. Additional Information

    - *Homeless/campers park along NW 45th Street.*
    - *Data collection for the EIS is missing the busiest time for the 14th Avenue NW Boat Ramp: summer.*
    - *The busiest time for BGT usage is summer.*
    - *Bob Wagner assumes that SDOT already knows where the trail is going.*
    - *The Draft EIS has an error, saying that there aren't any utilities on NW 45th St that would need to be relocated. There are telephone poles and fire mains on this street.*
    - *If the trail is built on the south side of the street, the 30-foot supply truck would have to align N/S with the loading dock and block the trail and roadway.*

BGT Interview Questions

Date/Time: 10/14/2016

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Dale

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Ballard Marine

Contact Information (email, phone, mailing address):

Preferred means of future contact: EMAIL, PHONE

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ *Motorcycles, passenger vehicles*
   - ☐ *Light trucks (< 14,000#)*
   - ☐ *Medium trucks (vans, box trucks, flatbeds)*
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

Trailer Mobile Boats: 10foot boats – 30foot boat up to 50foot boats brought in on truck, trailer combo

Sometimes use Fork lift to move them into shop

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

To the east of the chain link fence, there is also have roll-up door and gate where boats are brought into the property.

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Spread throughout the day (open 8-5) and during the weekdays

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Summer is much busier

5. Are there driveways to your property that are one-way (entries, exits)?

No but driveways don't permit two directions of travel

6. Are there driveways where vehicles typically back out?

Mostly back-in to all driveways since they are narrow

Sometimes customer pull-in if they are unfamiliar with how to access the property, then have to be backed out with a flagger.

Vehicles often pull up across the street and are backed in with flaggers

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers - both***
   - ☐ ***Frequent customers - both***
   - ☐ ***Employee – commuters – 3 employees and up to 5 park in street***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS) – everyday pull up outside***
   - ☐ *Long haul or specially trained*

Engine deliveries, in spring and summer time,

Larger detached tractor truck, smaller than 50 foot

8. How many driveways serve your business and what purposes do they each serve?

3 access points, use all 3 depending on type of boat

9. Are any of your driveways shared with other nearby businesses?

No

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

~50 – 60 per day at high point

Folks buying small parts

11. Other Comments

Don't want in front of business

BGT Interview Questions

Date/Time: 10/17/16

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Will Black

Connection to Property Owner (property owner, property manager, business tenant): Manager

Business Name(s): Ballard Mill Marina

Contact Information (email, phone, mailing address):

Preferred means of future contact: PHONE, EMAIL

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
    - *Motorcycles, passenger vehicles - YES*
    - *Light trucks (< 14,000#)- YES*
    - *Medium trucks (vans, box trucks, flatbeds) - YES*
    - *Heavy trucks (dump trucks, Class 8s)*
    - *Tractor-trailers (5th wheelers) - YES*
    - *Other/special (boat transporters, lowboys, tankers, buses) - YES*
2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

4733 Shilshole – mostly small boat trailers, cars, also vehicles for Hatton Marine with heavy equipment big-rigs (5-7 per day)

Just east of CSR Marine – lowboy trucks daily (1-2 per day)

4601 Shilshole - east of building is used by container trucks, smaller passengers up to container trucks, lots of year-round traffic, uphill driveway

Just to east of small blue building – trailers bringing in boats

Driveway closest to 15th come in/out with boats, RVs, trailers

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

8am to 4pm busy for commercial weekdays. Closer to 15th more on weekends but still traffic all week.

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Around beginning/end of the fishing seasons.

5. Are there driveways to your property that are one-way (entries, exits)?

No

6. Are there driveways where vehicles typically back out?

No backing out

7. How would you characterize your use of these driveways by types of drivers?
   - ***Occasional customers – but also occasional people 25%***
   - ***Frequent customers – mostly familiar people 75%***
   - ***Employee – commuters - ~300 employees***
   - *Employee – not commuters*
   - ***Delivery service drivers (FedEx, UPS) – come in on most driveway***
   - *Long haul or specially trained*

w/50 employees/day some don't come in everyday. Park on street. Hatton, CSR 7am – 3:30pm

8. How many driveways serve your business and what purposes do they each serve?

See above Q2

9. Are any of your driveways shared with other nearby businesses?

Hatton, CSR

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

~400 per day maybe

BGT Interview Questions

Date/Time: 10/3/2016

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Warren Aakervik (Retired)

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Ballard Oil

Contact Information (email, phone, mailing address):

Preferred means of future contact: PHONE

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ ***Motorcycles, passenger vehicles***
   - ☐ ***Light trucks (< 14,000#)***
   - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
   - ☐ ***Heavy trucks (dump trucks, Class 8s)***
   - ☐ ***Tractor-trailers (5th wheelers)***
   - ☐ ***Other/special (boat transporters, lowboys, tankers, buses)***

Big trucks come in off 24th & down NW 54th Street & use Snow & Co driveway

If going onto Shilshole from 24th, have to go into oncoming traffic to make turn

Semis going into Stabbert back down driveway

Poor sight distance at 26th Ave NW: trees and building block sight distance

Feels that there is poor sight distance all around NW 54th Street

NW 54th is center of maritime fishing industries

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

See above

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Varies depending on customer needs

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

July, sometimes August may have some slack time

5. Are there driveways to your property that are one-way (entries, exits)?

Yes, all driveways, NW 54th are too narrow to allow two trucks to move past each other at the same time

6. Are there driveways where vehicles typically back out?

Backing in off of NW 54th

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers – 50/50***
   - ☐ ***Frequent customers – 50/50***
   - ☐ *Employee – commuters*
   - ☐ *Employee – not commuters*
   - ☐ *Delivery service drivers (FedEx, UPS)*
   - ☐ *Long haul or specially trained*

Stabbart – Warren doesn't know where vehicles are coming/going

Ballard Oil is familiar customers

8. How many driveways serve your business and what purposes do they each serve?

2 serve Ballard Oil

9. Are any of your driveways shared with other nearby businesses?

4 businesses using 2 driveways

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

For just Ballard Oil – big trucks ~20 round trips, 10 employees

~60 crew member round trips

~100 coming and going

11. Other Comments

When not busy, traffic is about 25% of total busy day

Could estimate driveway usage based on gallons

Has letter from insurance company that says they could get cancelled if trail is placed on NW 54th St

Busy time is right before fishing seasons, everyone leaves again Jan 10th

BGT Interview Questions

Date/Time: 9/27/2016; 3:00pm

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Dave Miller

Connection to Property Owner (property owner, property manager, business tenant): President

Business Name(s): Ballard Transfer

Contact Information (email, phone, mailing address):

Preferred means of future contact: TELEPHONE, EMAIL

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ *Motorcycles, passenger vehicles*
   - ☐ *Light trucks (< 14,000#)*
   - ☐ *Medium trucks (vans, box trucks, flatbeds)*
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

Semi Trucks

Machinery Movings

Flatbed Cartage

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

Access to the west of the building (parking area) and behind building; unloading on NW 54th Street

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Morning, Evenings

Mon-Fri typical, sometimes Sat, Sunday

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Spread out throughout the year

5. Are there driveways to your property that are one-way (entries, exits)?

Yes, see Q6

6. Are there driveways where vehicles typically back out?

Trucks are backed in to loading dock or parking, and then pull out

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ *Occasional customers*
   - ☐ *Frequent customers*
   - ☐ ***Employee – commuters – up to 8 employees who drive into work***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS) –Yes***
   - ☐ *Long haul or specially trained*

Various employees are driving trucks

8. How many driveways serve your business and what purposes do they each serve?

Only access to business, none on Market. Two major – loading dock and parking area

9. Are any of your driveways shared with other nearby businesses?

Lundgren Enterprises shares driveway

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

15-20 trucks

BGT Interview Questions

Date/Time: 10/14/2016; 10:30am

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Bob Williams

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Covich Williams

Contact Information (email, phone, mailing address):

Preferred means of future contact:

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
    - ☐ ***Motorcycles, passenger vehicles***
    - ☐ ***Light trucks (< 14,000#)***
    - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
    - ☐ ***Heavy trucks (dump trucks, Class 8s)***
    - ☐ ***Tractor-trailers (5th wheelers)***
    - ☐ ***Other/special (boat transporters, lowboys, tankers, buses)***

Truck and Trailer, Flatbeds – 30 feet, Box trucks, Pickups, Customer vehicles

Load 20 foot containers set back at least whats shown up to 100 feet now if not more

Move product from fuel dock to warehouse on Ballard Ave, often

Usually come in east gate, but sometimes use west gate to enter

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

2 access points

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Usually spread throughout the day but higher during commute time Monday through Saturday

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Really busy in summer and in January

Long liners in Feb, March creates some traffic

Another fishing season creates more traffic right after Christmas until Jan 15

5. Are there driveways to your property that are one-way (entries, exits)?

Both provide ingress, egress

Sometimes park on track and use forklift

Need both driveways to go in and out due to large trucks

6. Are there driveways where vehicles typically back out?

Back into driveway from Shilshole Ave NW when delivering fuel on 50 footer

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers***
   - ☐ ***Frequent customers - mostly recent***
   - ☐ ***Employee – commuters –employees park on Shilshole Ave NW, 3 park on property***
   - ☐ ***Employee – not commuters ~20 employees 8-5pm 8-12pm***
   - ☐ ***Delivery service drivers (FedEx, UPS) - daily***
   - ☐ ***Long haul or specially trained***

Main warehouse across the street

8. How many driveways serve your business and what purposes do they each serve?

2 driveways - the ones that serve fuel dock

9. Are any of your driveways shared with other nearby businesses?

No

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

15-20 ingress, egress

11. Other comments

Would like to see on Leary Avenue

Shoot email with contact

BGT Interview Questions

Date/Time: 9/27/2016; 3:20pm – 3:30pm

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Davee Liebrich

Connection to Property Owner (property owner, property manager, business tenant): Business owner

Business Name(s): Lieb Marine

Contact Information (email, phone, mailing address):

Preferred means of future contact: EMAIL

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ *Motorcycles, passenger vehicles*
   - ☐ *Light trucks (< 14,000#)*
   - ☐ *Medium trucks (vans, box trucks, flatbeds)*
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

Bring in lots of boats on trailers. Boats of various sizes - 38-40 feet in length to 16 feet

Large pickups with trailers on them

Come off 24th Ave NW and then come in off 54th

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Spread out throughout the day

Weekdays busier

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Summertime is busier

5. Are there driveways to your property that are one-way (entries, exits)?

No

6. Are there driveways where vehicles typically back out?

Always back in

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers***
   - ☐ ***Frequent customers***
   - ☐ ***Employee – commuters – 8 employees***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS) - sporadically throughout the week***
   - ☐ *Long haul or specially trained*

Mainly repeat customers

8. How many driveways serve your business and what purposes do they each serve?

1 driveway, main access

9. Are any of your driveways shared with other nearby businesses?

Don't share with other businesses

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

6 per day

BGT Interview Questions

Date/Time: 10/14/2016

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Mike Hall

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Magnum Self Storage

Contact Information (email, phone, mailing address):

Preferred means of future contact: PHONE

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ ***Motorcycles, passenger vehicles***
   - ☐ ***Light trucks (< 14,000#)***
   - ☐ *Medium trucks (vans, box trucks, flatbeds)*
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

3 places where we do loading, B, D, E on Google Maps

Some customers park and carry between cars and building

Vehicles can pull up to the loading docks but don't go inside the building

Pickups, U-Hauls mostly, Sometimes 24-ft moving truck

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

See Q1

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Really busy on Saturday, Sunday, Closed Mondays all-day

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Spread out throughout year

5. Are there driveways to your property that are one-way (entries, exits)?

No entries/exits into building; pull up only

6. Are there driveways where vehicles typically back out?

Most customers back up to door, and then pull away

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers***
   - ☐ ***Frequent customers – mostly repeats***
   - ☐ ***Employee – commuters – 3 per day – parking in building***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS) – vary rarely***
   - ☐ *Long haul or specially trained*

8. How many driveways serve your business and what purposes do they each serve?

3 driveways/ garage loading docks

9. Are any of your driveways shared with other nearby businesses?

No

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

~10, 12 per day

11. Other comments

2-hr parking is not enforced, would help free parking up on Shilshole.

Prefer to have Shilshole South alternative

BGT Interview Questions

Date/Time: 9/26/2016

Interviewer(s): Brian Macik, Parametrix

Interview Location: Phone

Interviewee and Title: Kate Gill, Property Manager

Connection to Property Owner (property owner, property manager, business tenant): Property Manager

Business Name(s): Sagstad Marina

Contact Information (email, phone, mailing address):

Preferred means of future contact: Phone

1. *Can you give us a general description of your business and describe the type of vehicles that use your driveway?*
    - ☐ ***Motorcycles, passenger vehicles***
    - ☐ ***Light trucks (< 14,000#)***
    - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
    - ☐ *Heavy trucks (dump trucks, Class 8s)*
    - ☐ ***Tractor-trailers (5th wheelers)***
    - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

    Specific Answer: Flatbeds, semi-trucks, panel vans. Both flatbeds and semi-trucks deliver copper and steel. Semi-trucks deliver wood to the woodworking shop.

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

    Vehicles enter the property between the Shilshole Café parking strip and the parking area to the south.

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?
    - *Weekends – Industrial businesses are generally closed, but this is offset by recreational boaters whose use is heavier on the weekends.*
    - *Weekdays – more use by industrial businesses than recreational boaters*
    - *Time – no specific time*
4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?
    - *Industrial buildings – not seasonal*
    - *Recreational boats – busier during spring/summer/fall*
5. Are there driveways to your property that are one-way (entries, exits)?

Driveway is two-way

6. Are there driveways where vehicles typically back out?

   Café users may back out, but typically people use the Marina parking lot to turn around

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ *Occasional customers*
   - ☐ ***Frequent customers***
   - ☐ *Employee – commuters*
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS)***
   - ☐ *Long haul or specially trained*
   - *Businesses get deliveries from reoccurring suppliers.*
   - *How often depends on the particular business, but suppliers/deliveries come throughout the day.*
   - *Delivery services (FedEx, UPS) come about twice a week per business, with 7 total businesses.*
8. How many driveways serve your business and what purposes do they each serve?

   One driveway serves all purposes.

9. Are any of your driveways shared with other nearby businesses?

   No

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

    Approximately 40

11. Additional Information

Parking

- *There is one parking spot reserved per business (7 total).*
- *15 parking spaces are dedicated to the recreational boater marina.*
- *Remainder is for delivery parking (approximately 10 spaces based on aerial).*
- *Circulation: have to keep cars clustered in middle of lot so trucks can circulate around.*

Driveway Entrance on Shilshole

- *The Marina has to paint its own driveway.*
- *They place barrels on Shilshole to demarcate the driveway, but they often get hit.*
- *As a result, they are afraid of people getting hit.*

Specific Business Concern

- *Integrated Marine Systems – gets deliveries of large pieces of metal*

Safety

- *Kate Gill has been working at the Marina for over 10 years, and has observations on ped/bike environment:*

- *She crosses Shilshole every day, and has to wait a long time to cross the street.*
- *Shilshole is very dangerous.*
- *It has an intense amount of industrial traffic.*
- *There is a lot of gravel, which makes it dangerous.*
- *She is a cyclists and wouldn't cycle on Shilshole.*
- *The live railroad tracks require people to be very careful.*

BGT Interview Questions

Date/Time: 10/3/2016

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Paul Nerdum

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Salmon Bay Sand & Gravel

Contact Information (email, phone, mailing address):

Preferred means of future contact: EMAIL OR PHONE

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ Motorcycles, passenger vehicles
   - ☐ ***Light trucks (< 14,000#)***
   - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
   - ☐ ***Heavy trucks (dump trucks, Class 8s)***
   - ☐ ***Tractor-trailers (5th wheelers)***
   - ☐ ***Other/special (boat transporters, lowboys, tankers, buses)***

Fork lifts, flat bed truck w/trailer 80-90 feet

Volume varies for them – someone can come (daily) twice to 6-7 times per day

Tractor w/trailer; a trailer is most difficult because through movement is necessary.

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Mon-Fri busier, not open on weekends

Spread throughout the day

8am loading and leave at end around 6pm

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

9-10 hour days in winter

Up to 12 hour days in summer

5. Are there driveways to your property that are one-way (entries, exits)?
6. Are there driveways where vehicles typically back out?

No backing out, encourage customers to back in

7. How would you characterize your use of these driveways by types of drivers?
   - ***Occasional customers****– 30% less frequent*
   - ***Frequent customers*** *– upwards of 100 per day -70%-80% frequent customers*
   - ***Employee – commuters – 10-12 people***
   - *Employee – not commuters*
   - ***Delivery service drivers*** *(FedEx, UPS) - daily*
   - *Long haul or specially trained*
8. How many driveways serve your business and what purposes do they each serve?

12 - 15

9. Are any of your driveways shared with other nearby businesses?

Second Ascent, Tractor Tavern, Deep Sea Fishermans Union: All have materials/deliveries everyday 1-3pm, 3-5 times per day

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

325-475 per day

11. Additional Comments

Happy to do a site visit

Warehouses 3,4,5,6,7 is M for those warehouses. M is heavier for incoming

9th b/w 46th & Ballard Way & 7th bordered by NW 41st/42nd S/W Burke Gilman are staging, pre-cast yard areas

South most entrance on main bldg.: mixer truck, cement trucks, tankers, larger trucks may need to come in (in/out – mostly out)

Door that rolls up/load up door: pickup trucks get loaded up, nothing over 20ft flatbed

Material scale, part of batching have the following types of vehicles: mixer truck, truck and trailers, dump truck, and ponies, pickup to larger trucks

Rail car unloading, truck transloading 1 per day at south side of Shilshole

Warehouse 3: pickup, mixer, dump trucks

North most door: has Mixer truck, cement bulk tankers, dump trucks, flat beds. Pull in door #5 or #1 and pull out opposite; through movement inside building

Access directly across from #5 – shared use agreement

West-most warehouse is mostly trucks & forklifts

Warehouse #4 – forklifts loading up trucks

Door #1: Dump trucks, flatbed to pickups

Truck repair facility near Walrus & Carpenter, can come and go through either driveway

All property b/w canvas & supply to repair building is Salmon Bay

BGT Interview Questions

Date/Time: 10/14/2016

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Michael Peck

Connection to Property Owner (property owner, property manager, business tenant): Owner

Business Name(s): Shilshole West Building

Contact Information (email, phone, mailing address):

Preferred means of future contact: PHONE

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ ***Motorcycles, passenger vehicles***
   - ☐ ***Light trucks (< 14,000#)***
   - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

Full size trucks and passenger vehicles, dump trucks

Tenants include Fishermen, attorneys, building contractors, technology

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

Some vehicles exit in alley on north side of building

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Spread throughout the day

Congestion/queuing on Shilshole/24th intersection blocks building entrance

Weekdays are busier

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Spread out throughout year

5. Are there driveways to your property that are one-way (entries, exits)?

Entrance on Shilshole is both entry and exit

6. Are there driveways where vehicles typically back out?

No

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers***
   - ☐ ***Frequent customers***
   - ☐ ***Employee – commuters***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS) – pull up out front***
   - ☐ *Long haul or specially trained*

8. How many driveways serve your business and what purposes do they each serve?

2 total

9. Are any of your driveways shared with other nearby businesses?

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

~20 parking stalls in building; combo of employees and guests

11. Other comments

Sidewalk on northeast side of street

Already congested with bikes, pedestrians

Already difficult to access driveways

BGT Interview Notes
Date/Time: 9/27/16 2:30-3:00 PM

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Brett Snow, Owner Snow and Company

Connection to Property Owner (property owner, property manager, business tenant): Property tenant of Ballard Oil

Business Name(s): Snow and Company

Contact Information (email, phone, mailing address):

Preferred means of future contact: Email

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
    - ☐ ***Motorcycles, passenger vehicles***
    - ☐ ***Light trucks (< 14,000#)***
    - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
    - ☐ ***Heavy trucks (dump trucks, Class 8s)***
    - ☐ ***Tractor-trailers (5th wheelers)***
    - ☐ ***Other/special (boat transporters, lowboys, tankers, buses)***

Company-owned fork lifts, 1 small flatbed, pickup trucks, drop deck trailers to load boats, semi-trucks for delivery, every day delivery steel and metal Drop deck

Come off 24th onto 54th and head down to business to Ballard transfer and Ballard Oil drop deck

Has agreement w/Ballard Oil to never block driveway – can unload smaller loads but not big trucks that take longer.

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

Multiple trucks serving multiple businesses at one time on NW 54th St.

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?
    - *Between 10am and 2pm but depends on the shipment*
    - *Wide-loads leave early in the morning*
    - *Weekdays are busiest for delivery – couple of deliveries per day*
4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Spread throughout year

Really busy December, November, May, June

5. Are there driveways to your property that are one-way (entries, exits)?

No one-way, one car at a time

6. Are there driveways where vehicles typically back out?

Trucks back out of driveway because they can't turn around in property

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers***
   - ☐ ***Frequent customers***
   - ☐ ***Employee – commuters***
   - ☐ ***Employee – not commuters – up to 40 employees***
   - ☐ ***Delivery service drivers (FedEx, UPS) – Sometimes 3 times per week – Post office every day***
   - ☐ ***Long haul or specially trained – 2 times a month***

Truck drivers always different. Some venders have same drivers that are the same.

3 venders per day.

8. How many driveways serve your business and what purposes do they each serve?

Could use other driveway at Ballard Oil but it is highly inconvenient.

Only driveway

9. Are any of your driveways shared with other nearby businesses?

Only Ballard Oil and other tenants of Ballard Oil, tug & barge companies

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

Grow business by up to 2 times

Can grow in place

This project would probably be the biggest impact

Potential follow-up for in-person interview.

BGT Interview Questions

Date/Time: 10/3/2016 2:30

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Tom Bayley

Connection to Property Owner (property owner, property manager, business tenant): President

Business Name(s): Stimson

Contact Information (email, phone, mailing address):

Preferred means of future contact: EMAIL

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ ***Motorcycles, passenger vehicles***
   - ☐ ***Light trucks (< 14,000#)***
   - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

250 boat slips in summer, service tenants and guests ~200 cars/day

Not many boat trailers

Box trucks w/Trident Seafood

India Tree semi's, large box trucks daily

750 employees ; ~2,000 sq feet offices

Pacific studio has display cases in building

Deliveries of lumber on truck

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

6-9am arriving, 3:30-5pm leaving

Work week is busier

Park vendor vehicles

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Equal throughout the year

5. Are there driveways to your property that are one-way (entries, exits)?

Driveways are both ways

6. Are there driveways where vehicles typically back out?

No

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers***
   - ☐ ***Frequent customers***
   - ☐ ***Employee – commuters***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS)***
   - ☐ *Long haul or specially trained*

8. How many driveways serve your business and what purposes do they each serve?

2, entering and exiting for all businesses on property

9. Are any of your driveways shared with other nearby businesses?

Warehouses, offices on property in addition to Stimson Marina

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

~1,000 cars per day

11. Other comments

Redevelopment of the site: 5 Office Buildings

Driveway would potentially be reoriented directly across from Vernon Pl on Stimson Property

Light @ Vernon Pl would be complimentary

Brian Cerat mentioned that trail could be on Shilshole north side between 17th to Vernon w/light & switch there to south side

BGT Interview Questions

Date/Time:

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Ron Hildebrandt

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Trident Seafoods

Contact Information (email, phone, mailing address):

Preferred means of future contact: EMAIL

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ ***Motorcycles, passenger vehicles – Office suppliers, food***
   - ☐ ***Light trucks (< 14,000#)***
   - ☐ ***Medium trucks (vans, box trucks, flatbeds)***
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ ***Tractor-trailers (5th wheelers) – 10-12 trucks per day up to 53 footers, 24 trailers 65 foot trailers***
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*

2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Concentrate morning and evening 5:30-9am and 3:30-6:30pm

Spread out throughout the week, Sunday lowest, 6 days/week

Equally spread through both driveways

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Higher concentrations in Jan, Feb, June, July

5. Are there driveways to your property that are one-way (entries, exits)?

No

6. Are there driveways where vehicles typically back out?

No

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers – rental cars, taxis***
   - ☐ ***Frequent customers – rental cars, taxis***
   - ☐ ***Employee – commuters – 400 (1,000 trips) 5:30am-7pm***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS) - daily***
   - ☐ ***Long haul or specially trained - yes***

Cross walk on Vernon Place – Employees on busses come down Vernon Pl

8. How many driveways serve your business and what purposes do they each serve?

2 driveways

9. Are any of your driveways shared with other nearby businesses?

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

~1,000 trips

BGT Interview Questions

Date/Time: 10/14/2016; 11am – 11:15am

Interviewer(s): Erinn Ellig

Interview Location: via phone

Interviewee and Title: Matt Wilson

Connection to Property Owner (property owner, property manager, business tenant):

Business Name(s): Wilson Pros Automotive

Contact Information (email, phone, mailing address):

Preferred means of future contact: PHONE

1. Can you give us a general description of your business and describe the type of vehicles that use your driveway?
   - ☐ ***Motorcycles, passenger vehicles – Cars pull up out front***
   - ☐ ***Light trucks (< 14,000#) - Delivery Trucks pull up out front***
   - ☐ *Medium trucks (vans, box trucks, flatbeds)*
   - ☐ *Heavy trucks (dump trucks, Class 8s)*
   - ☐ *Tractor-trailers (5th wheelers)*
   - ☐ *Other/special (boat transporters, lowboys, tankers, buses)*
2. (As needed) Could you examine this site map and help us identify the places where vehicles cross from the property into the public right-of-way?

One garage door into building

3. Could you describe the vehicle operations at your driveway by time of day (morning, midday, evening, all-day) and by time of the week (weekends, mid-week, beginning of the week)?

Customers drop cars off in morning and pick up in evening

4. Are there busier times of the year for traffic at your driveway (i.e. more traffic during the summer than winter)?

Spread throughout the year

5. Are there driveways to your property that are one-way (entries, exits)?

No

6. Are there driveways where vehicles typically back out?

Drive in to the garage and back out

7. How would you characterize your use of these driveways by types of drivers?
   - ☐ ***Occasional customers***
   - ☐ ***Frequent customers – repeat customers mostly***
   - ☐ ***Employee – commuters – employees park wherever they can find a spot, work 9-5 Mon-Fri***
   - ☐ *Employee – not commuters*
   - ☐ ***Delivery service drivers (FedEx, UPS) – Deliveries pull up out front***
   - ☐ *Long haul or specially trained*
8. How many driveways serve your business and what purposes do they each serve?

Only one entrance

9. Are any of your driveways shared with other nearby businesses?

None

10. Could you please try to estimate how many vehicles use your driveway on a typical day?

~30 times per day

11. Other comments

Silly idea to put on Shilshole

APPENDIX C
DAILY DRIVEWAY TURNING MOVEMENTS BY VEHICLE CLASSIFICATION DATA

Table C-1. Daily Driveway Turning Movements by Vehicle Classification

ID	Driveway Location	Total		Small						Medium and Large					
		In	Out	Right In	Left In	Thru In	Thru Out	Right Out	Left Out	Right In	Left In	Thru In	Thru Out	Right Out	Left Out
1	NW 54th St/Ballard Locks	300	210	85	200	-	-	145	50	5	10	0	0	10	5
2	NW 54th St/McGinnis Marine	165	165	0	0	160	155	0	5	0	0	5	5	0	0
3	NW 54th St/Ballard Oil	230	230	5	40	165	175	25	5	0	5	15	20	5	0
4	NW 54th St/Snow and Co	50	50	5	35	-	-	30	10	0	10	0	0	10	0
5	NW 54th St/Ballard Transfer	30	30	10	15	-	-	15	5	5	0	0	0	5	5
6	NW 54th St/Lieb Marine Services	5	5	5	0	-	-	0	5	0	0	0	0	0	0
7	Shilshole Ave NW/Stimson Marina	475	505	215	240	-	-	315	170	5	15	0	0	15	5
8	Shilshole Ave NW/Salmon Bay Center	435	405	130	295			270	125	5	5	0	0	5	5
9	Ballard Ave NW/Salmon Bay Sand and Gravel South	125	135	25	20	5	5	20	30	5	70	0	0	70	10
10	Shilshole Ave NW/Covich Williams	40	30	10	10	-	-	15	5	5	15	0	0	10	0
11	Shilshole Ave NW/Salmon Bay Café	150	130	50	85	-	-	85	40	5	10	0	0	5	0
12	Shilshole Ave NW/Hatton Marine/Ballard Mill Marina	185	200	50	125	-	-	145	45	5	5	0	0	5	5
13	Shilshole Ave NW/CSR Marine/Ballard Mill Marina	155	165	50	90	-	-	70	75	5	10	0	0	15	5
14	NW 45th St/Ballard Insulation	65	30	50	5	-	-	15	5	10	0	0	0	10	0
15	NE 45th/Dovetail General Contractors	110	140	95	5	-	-	120	0	10	0	0	0	15	5
16	NW 54th St/Triad Ballard Development	170	105	65	95	-	-	60	45	5	5	0	0	0	0

Table C-1. Daily Driveway Turning Movements by Vehicle Classification (continued)

ID	Driveway Location	Total		Small						Medium and Large					
		In	Out	Right In	Left In	Thru In	Thru Out	Right Out	Left Out	Right In	Left In	Thru In	Thru Out	Right Out	Left Out
17	NW 54th St/Trident Seafood Retail	195	230	15	170	-	-	205	20	5	5	0	0	5	0
18	Shilshole Ave NW/Shilshole West Building	20	20	10	10	-	-	10	10	0	0	0	0	0	0
19	Shilshole Ave NW/Wilson Bros Automotive/Rathburn Automotive	25	25	20	5	-	-	20	5	0	0	0	0	0	0
20	Shilshole Ave NW/Magnum Self Storage	10	5	5	5	-	-	5	0	0	0	0	0	0	0
21	Shilshole Ave NW/Salmon Bay Sand and Gravel Retail North	55	70	35	15	0	5	20	35	5	0	0	0	5	5
22	Shilshole Ave NW/Salmon Bay Sand and Gravel Loading Docks North	20	20	10	5	-	-	10	5	5	0	0	0	5	0
23	Shilshole Ave NW/Ballard Hardware	30	160	10	10	-	-	70	80	5	5	0	0	5	5
24	Shilshole Ave NW/Salmon Bay Sand and Gravel Maintenance	40	35	10	5	-	-	5	5	20	5	0	0	20	5
25	NW 46th St/Ballard Marine	10	10	5	5	-	-	5	5	0	0	0	0	0	0
26	NW 46th St/Ballard Blocks Development	895	960	680	215	-	-	565	395	0	0	0	0	0	0
27	11th Ave NW/US Post Office	45	60	15	15	-	-	30	10	5	10	0	0	15	5
28	28th Ave NW/Townhomes	10	10	5	5	-	-	5	5	0	0	0	0	0	0
29	NW 56th St/Mark24	35	40	10	25	-	-	30	10	0	0	0	0	0	0
30	NW 56th St/Ballard Square Parking	490	490	230	250	5	5	330	145	0	5	0	0	5	5
31	22nd Ave NW/Chase Bank	10	355	5	5	0	5	185	165	0	0	0	0	0	0

Table C-1. Daily Driveway Turning Movements by Vehicle Classification (continued)

ID	Driveway Location	Total		Small						Medium and Large					
		In	Out	Right In	Left In	Thru In	Thru Out	Right Out	Left Out	Right In	Left In	Thru In	Thru Out	Right Out	Left Out
32	Ballard Ave NW/Ballard Sheet Metal Works	60	70	30	20	-	-	35	25	5	5	0	0	5	5
33	Ballard Ave NW/Ballard Hardware Loading Dock	30	30	5	5	-	-	5	5	10	10	0	0	10	10
34	NW Ballard Way/Warden Fluid Dynamics	25	30	10	10	-	-	15	10	5	0	0	0	5	0
35	NW 46th St/Radtke Marine	30	25	10	10	-	-	10	10	5	5	0	0	5	0
36	NW Market St/Alley	20	30	5	10	0	0	15	5	5	0	0	0	5	5
37	Leary Ave NW/Ballard Landmark	260	255	80	175	0	5	175	75	5	0	0	0	0	0
38	Leary Ave NW/Public Parking/Caffe Fiore	235	210	60	170	0	0	180	25	0	5	0	0	5	0
39	Leary Ave NW/Carter Subaru Ballard	245	45	50	185	5	0	35	5	5	0	0	0	5	0
40	NW Leary Way/BOLT Modern Storage	75	55	15	50	0	0	40	10	5	5	0	0	5	0
41	NW Leary Way/Quest Church	480	355	325	140	5	5	250	95	5	5	0	0	5	0
42	NW Leary Way/Office Max	200	150	170	20	0	0	95	50	10	0	0	0	5	0
43	NW Leary Way/U-Haul	75	75	25	30	0	0	35	20	10	10	0	0	15	5
44	11th Ave NW/7-11	440	320	185	230	0	0	215	85	10	15	0	0	15	5