Seattle Department of Transportation

Ballard-Interbay Regional Transportation System

Final Report

Seattle Department of Transportation

ACKNOWLEDGMENTS

City of Seattle

Diane Wiatr, Project Manager
Chisaki Muraki, Deputy Project Manager
Andrés Arjona, Intern and photographer
Matt Donahue
Jonathan Lewis
Kit Loo
Emily Reardon
Ellie Smith

Consultant Team Members

Nelson\Nygaard
Fehr & Peers
Concord Engineering
Community Attributes, Inc.
Heffron Transportation Inc.
Creative Inclusions

Interagency Team Members

King County Metro

Chris Arkills
Brand Koster

Port of Seattle

Geri Poor
Erick ffitch

Sound Transit

Chris Rule
Emily Yasukochi
Daniel Turner

Washington State Department of Transportation

Travis Phelps
Robin Mayhew

Washington State Freight Mobility Strategic Investment Board

Brian Ziegler

Washington State Military

Frank Gibson

LAND ACKNOWLEDGMENT

Ballard-Interbay is on the ancestral lands of the Coast Salish and their descendants. We honor their elders, past and present—and thank them for the stewardship of this land and surrounding waters.

As we look to the future, we actively recognize that we live, learn, and work on Indigenous land.

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STUDY PURPOSE

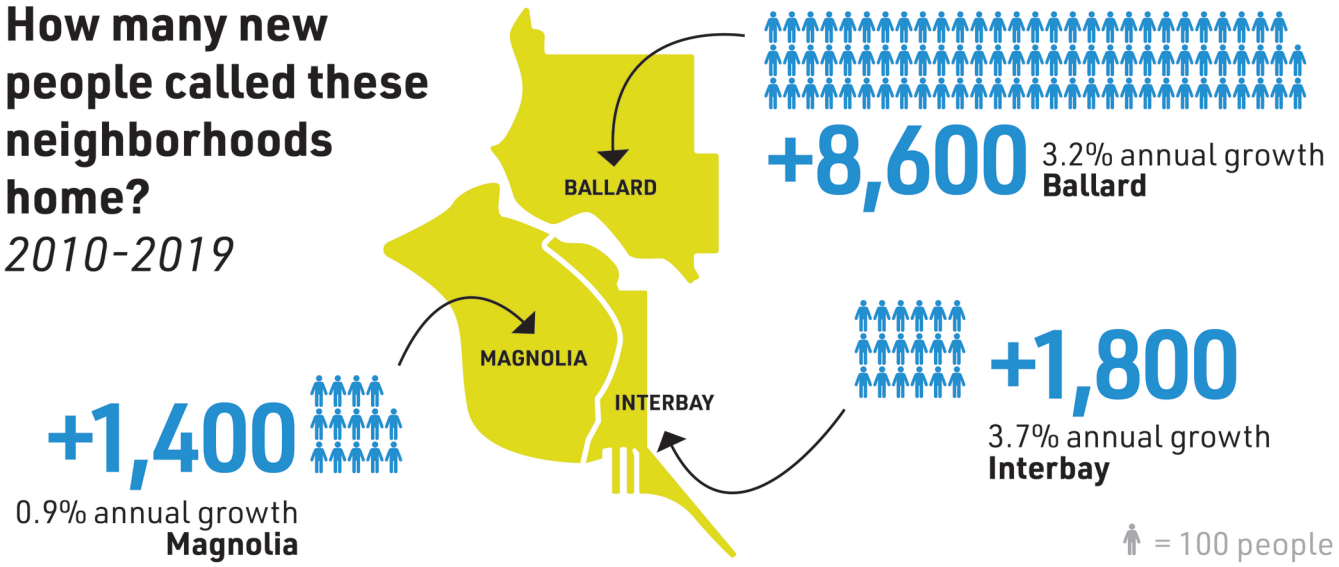
The Ballard-Interbay Regional Transportation System (BIRT) study was commissioned by the 2019 Washington State Legislature and completed by the Seattle Department of Transportation (SDOT) in 2020. Its intent is to improve travel for people and goods in this locally and regionally significant area of Seattle.

This report examines Ballard-Interbay as an entire transportation and economic ecosystem and provides recommendations on future projects to meet local and regional transportation needs. It includes bridge replacement guidance as well as proposed tactical transportation investments informed by study of future employment and residential growth scenarios.

The study was conducted in 5 key phases during 2020:

BALLARD-INTERBAY AREA

The Ballard-Interbay Northend Manufacturing and Industrial Center (BINMIC) is 1 of Seattle's 2 major industrial centers, hosting 28,700 jobs in 2018. Surrounding neighborhoods are now home to 95,200 people—roughly 13% of Seattle's population—and the population of the study area has increased 14% since 2010. The vibrant mix of maritime, industrial, commercial, and service industry jobs here is critical to the region and its economic success. Providing reliable access for over 32,000 workers and freight haulers is vitally important. Major redevelopment including Terminal 91 Uplands (Port of Seattle), Fishermen's Terminal (Port of Seattle), Armory site (Washington State National Guard), and additional employment growth at the Expedia campus will increase demand for a multimodal transportation system.



The Ballard-Interbay Manufacturing Industrial Center (BINMIC) is 1 of Seattle's 2 major industrial centers with about

28,700

jobs in 2018

50%

of study area jobs are in the service sector

12,000

jobs are freight-oriented

BINMIC and Port of Seattle facilities were sited in this area to provide access to Elliott and Shilshole bays and the international waterways connected by the Puget Sound. Excellent access to regional and international waterways is not complemented by as robust a system of roadway connections on the landside. The lowland area between Smith Cove and the Ship Canal is highly constrained by 2 glacially carved hills, now home to the Magnolia and Queen Anne neighborhoods. Just 1 central artery–15th Ave W–connects to the Manufacturing and Industrial Center south of the Lake Washington Ship Canal and provides access to Magnolia via the aging Magnolia Bridge along with the W Dravus and W Emerson St corridors. The Ballard and Magnolia bridges respectively carry roughly 59,000 and 20,000 vehicles each day with many more people using transit. Without the bridges, travel for people and goods would be significantly constrained.

Action by the State of Washington and City of Seattle is necessary to fund the critical bridge infrastructure that will keep Ballard and Interbay residents and businesses connected to the regional transportation system for decades to come.

The BIRT Study Area and the Ballard and Magnolia Bridges

PARTNERSHIPS

The Ballard and Interbay transportation systems are critical to many agency stakeholders and the people and businesses they represent. Six agency partners were named in the legislation and worked actively to develop this regional transportation strategy.

Agency	Key Coordination Elements
Seattle Department of Transportation	• Mayor's Maritime & Industrial Strategy (M&I) scenarios • Modal plans and major capital projects • Magnolia and Ballard bridge planning studies (2019-2020)
King County METRO	• Future bus system restructuring needs • Bus operations and bus priority
SoundTransit	• West Seattle and Ballard Link Extensions (WSBLE) • Interbay and Ballard WSBLE Station Area Access
Washington State Department of Transportation	• Regional freight and systems access • National Highway System
Port of Seattle	• Ballard-Interbay Northend Manufacturing and Industrial Center (BINMIC) • Cruise Terminal, Port lands access, and Terminal 91
Washington Military Department	• Coordination on Armory site redevelopment planning

SCENARIO ANALYSIS AND FINDINGS

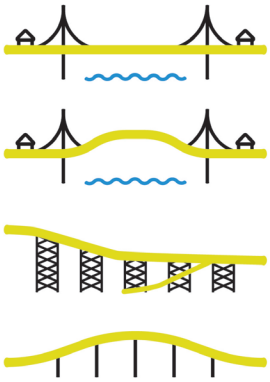
To fully understand future needs for moving people and goods in the study area, the BIRT team conducted transportation modeling based on future (2042) land use scenarios. Scenarios were developed based on adopted City of Seattle land use forecasts, recent analysis for the Armory site, and potential zoning changes currently under analysis through the Mayor's Maritime & Industrial Strategy.

Scenario modeling tested multiple alternatives for the replacement of the Ballard and Magnolia bridges while holding constant key future transportation infrastructure identified in SDOT modal plans, King County Metro's long-range plan METRO CONNECTS, and Sound Transit's West Seattle and Ballard Link Extensions draft Environmental Impact Statement.

Scenario Elements

Land Use

Potential scenarios for development or redevelopment of parcels in the study area



Bridge Alternatives

Alternatives for replacement of the Ballard Bridge and Magnolia Bridge

Transportation System

Multimodal transportation system projects and operations

Key findings of the scenario analysis include:

- The Ballard and Magnolia bridges are critical to regional travel for people and goods. Any of the replacement alternatives studied has the potential to accommodate future travel demand with supportive multimodal investments in their surrounding networks.
- 15th Ave W is the most critical transportation spine and will require investment to keep people moving to and through the area and ensure reliable freight and goods movement. Our traffic analysis identifies corridor management strategies and capital investments along 15th Ave W to ensure reliable travel as the area grows in jobs and residents.
- Providing a robust multimodal network that allows people to get around safely by transit, bicycling, and walking benefits everyone, including freight haulers and industrial businesses that rely on reliable movement of goods on surface streets. This study identifies opportunities to enhance safe access to and from bus and future light rail stations; reduce conflicts between motorists and vulnerable people walking or biking; and enhance efficiency for freight.
- Changes to zoning that allow a broader mix of uses—such as those being explored in the Maritime & Industrial Strategy, including residential development on the Armory site—could lead to more traffic and would intensify the need for investment across all modal systems. This study finds that 15th Ave W (including the Ballard Bridge) and W Dravus St require the highest capital and most traffic operations investments to prevent traffic delays and congestion expected with increased density.
- Bridge alternatives with the best transportation performance also cost the most:
  - Magnolia Bridge: The in-kind replacement alternative generally maintains the existing bridge alignment and transportation access but has high construction costs. The Armory Way Bridge alternative increases travel time for some market segments, particularly those connecting between southern Magnolia and points south (e.g., Downtown Seattle).
  - Ballard Bridge: A mid-level alternative reduces the need for bridge span openings and provides better connectivity between the bridge and local streets north of the Ship Canal. The low-level alternative provides an easier grade for people walking or biking.

FUNDING STRATEGIES AND TIMELINE FOR BRIDGE REPLACEMENT

Bridge and major infrastructure construction costs are notably high and pose a financial challenge to cities across the United States. At the time of this report, the City of Seattle faces funding and financial challenges on many fronts and across transportation priorities. Not only has the COVID-19 pandemic shifted City focus and reduced City tax revenue, but the West Seattle High Bridge emergency is now a priority for City and partner funding. As SDOT and its local, regional, state, and federal partners consider the funding required to rebuild or rehabilitate the Magnolia and Ballard bridges, several considerations emerge:

- What is best for the communities and businesses served by the Ballard and Magnolia bridges will drive the final bridge alternative and cost of replacement or rehabilitation
- The cost to replace the Magnolia Bridge and replace or rehabilitate the Ballard Bridge will far exceed the City's financial means without outside funding
- Like every major city in the United States, Seattle is stepping up to the challenge of maintaining our aging infrastructure in the face of grossly insufficient funding support from the federal government; further, a 2020 City of Seattle Bridge Audit identified additional investment and maintenance needs across 77 of the City's vehicle bridge assets

None of these realities reduces the importance of replacing or investing in the Magnolia and Ballard bridges. They do stress the need for financial partnerships and State of Washington funding support. Legislative support will be needed to:

- Direct appropriations or prioritize future state gas tax or transportation revenue to Seattle for Ballard and Magnolia bridge replacement or rehabilitation
- Seek new sources of funding to support state infrastructure replacement and maintenance
- Garner broader support from the federal government and our Congressional Delegation to bring competitive transportation infrastructure funds to Washington and to the City of Seattle
- Support local funding options such as facility tolling that may require approval from the Washington State Transportation Commission
- Support innovative finance and bridge design and delivery methods that could speed up the replacement timeline and/or allow for the delivery of multiple bridge projects simultaneously

Although the BIRT report does not recommend a single, preferred bridge alternative for either the Ballard Bridge or the Magnolia Bridge, it does utilize the 2 most technically viable and publicly supported alternatives as determined in SDOT's Ballard Bridge Planning Study and the Magnolia Bridge Planning Study.

Key Stages of a Bridge Project

Planning

Examines feasibility, alignment, multimodal connectivity, traffic operations, and high-level costs for multiple alternatives.

Type, Size, and Location Study

Includes drawings that depict the general type and size of a bridge, its location, and the proposed work to be done for the preferred alternative.

Engineering Design

Requires several major design phases that build on the Type, Size, and Location plans:

- Completion to 30%
- Completion to 60%
- Completion to 90%
- Final Design and Bid Documents

Environmental Assessment

Typically runs in parallel to 30% and 60% design.

Right-of-Way Acquisition

Begins process of acquiring any additional right-of-way needed for the bridge alignment, supports, or accessways. Can be concurrent with Engineering and Environmental Process.

Bid Process

The agency solicits bids for construction from private companies or partnerships.

Construction

- Construction management
- Construction mitigation
- Construction (various construction activities depending on bridge type, size, location)

BIRT defines the key phases of project development for each bridge and an associated timeline. The total estimated time to complete planning, design, and construction is 8-12 years for each bridge; this assumes that funding is available for each sequential phase. Given funding constraints, a multi-faceted program to leverage local, regional, state, and federal grants will be required to advance each incremental stage of planning, design, and engineering. This report provides a robust list of funding sources in Chapter 7.

This report lays the foundation for identifying funding opportunities in partnership with the Washington State Legislature to improve the movement of people and goods in Ballard-Interbay. SDOT will develop a Bridge Assessment Strategic Management Plan (following its September 2020 Bridge Audit[1]) and then can proceed with a Ballard and Magnolia bridge preferred alternative decision and Type, Size, and Location study. In the meantime, the City of Seattle and other agency partners will work to advance area transportation improvements within the SDOT program structure to keep this vital area of Seattle connected to our neighborhoods, employers, commercial centers, and the broader region.

1 Seattle Office of City Auditor. (September 2020). Seattle Department of Transportation: Strategic Approach to Vehicle Bridge Maintenance is Warranted. Available at: https://sdotblog.seattle.gov/wp-content/uploads/sites/10/2020/09/2020_03_SeattleBridges_FinalReport.pdf


ARCTIC STORM
ARCTIC FJORD
SEATTLE WA
AMERICAN SEAFOODS COMPANY

CHAPTER 1: INTRODUCTION

PROJECT OVERVIEW

The Ballard-Interbay Regional Transportation System (BIRT) study is a technical transportation study. Requested by the Washington State Legislature, its purpose is to evaluate and recommend future improvements to the Ballard and Magnolia bridges and the surrounding transportation networks to ensure a reliable transportation system. It addresses all types of travel – walking, biking, rolling, freight, transit, general purpose traffic – and builds on previous plans and studies, many of which had their own technical and community engagement processes.

This study:

- Reviews existing plans and previous studies
- Forecasts and assesses future travel volumes and capacity needs
- Prioritizes and recommends projects to support a multimodal and holistic transportation system
- Analyzes impacts and benefits of bridge and system scenarios
- Provides replacement timelines and funding strategies for the Ballard Bridge and Magnolia Bridge

A plan and report for the Ballard-Interbay Regional Transportation System project to improve mobility for people and freight.

STUDY PURPOSE

In 2019, the Washington State Legislature allocated funds for the City of Seattle's Department of Transportation to study the Ballard and Magnolia bridges in partnership with 5 other agencies including King County Metro, Washington State Department of Transportation, Sound Transit, Port of Seattle, and the Washington Military Department (National Guard):

ESHB 1160 - Section 311 (18)(a):

"Funding in this subsection is provided solely for the city of Seattle to develop a plan and report for the Ballard-Interbay Regional Transportation System project to improve mobility for people and freight. The plan must be developed in coordination and partnership with entities including but not limited to the city of Seattle, King county, the Port of Seattle, Sound Transit, the Washington state military department for the Seattle armory, and the Washington state department of transportation.

The plan must examine replacement of the Ballard bridge and the Magnolia bridge, which was damaged in the 2001 Nisqually earthquake. The city must provide a report on the plan that includes recommendations to the Seattle city council, King county council, and the transportation committees of the legislature by November 1, 2020. The report must include recommendations on how to maintain the current and future capacities of the Magnolia and Ballard bridges, an overview and analysis of all plans between 2010 and 2020 that examine how to replace the Magnolia bridge, and recommendations on a timeline for constructing new Magnolia and Ballard bridges."

PROJECT STUDY AREA AND CONTEXT

Ballard-Interbay is 1 of Seattle's 2 regionally-designated Manufacturing and Industrial Centers (MICs), with the Duwamish MIC being the other. Designated in 1994, the Ballard-Interbay Northend Manufacturing and Industrial Center (BINMIC) is approximately 971 acres and home to a diverse mix of businesses, working waterfront, wharfs, shipyards, and rail yards, including the Smith Cove Cruise Terminal at Pier 91. The BINMIC has experienced a decade of strong economic growth and development (2010 – 2020) and has been essential to the region's economy for much longer. Key trends and challenges within Ballard-Interbay include:

- **Growing numbers of residents and jobs.** The larger Ballard-Interbay area is home to a growing number of residents and jobs, and its industrial and maritime sectors are a critical source of low- and middle-wage jobs that support a thriving economy.[1]
- **Increasing commercial and industrial rents.** BINMIC has very low industrial vacancies which supports growth in industrial rents. Commercial development, currently prohibited by MIC zoning, may provide higher rates of return that are more attractive.
- **Aging infrastructure and growing density.** The Ballard and Magnolia bridges are 2 of 77 vehicle bridges the City of Seattle owns and is responsible for maintaining. Their condition ratings are currently "fair" and "poor," respectively. As Ballard-Interbay and the surrounding areas grow, more people and businesses will use and rely on these facilities.

People biking and jogging on the Ballard Bridge

1 U.S. Census Bureau, 2019; Community Attributes, Inc, 2020

FIGURE 1-1: MAP OF BALLARD-INTERBAY STUDY AREA

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

WHY STUDY THESE BRIDGES NOW

The Ballard and Magnolia bridges play critical roles in the mobility of people, businesses, goods, and services across the City and the region. The Ballard Bridge was built in 1917 and rebuilt in 1937. The Magnolia Bridge was built in 1930. Portions of the bridge were rebuilt following damage from 2 natural disasters—a landslide in 1997 and the Nisqually earthquake in 2001. The 2 bridges combined carry roughly 79,000 vehicles each day, and will eventually need to be rehabilitated or replaced. The City of Seattle and State of Washington need to prepare for the extensive process and appropriation of funds required to ensure the transportation system remains connected and functional for decades to come.

The 2020 closure of the West Seattle High Bridge for safety reasons reinforces the importance of major bridge infrastructure maintenance. There are many older bridges throughout the city with capital investment needs. The BIRT study equips the Washington State Legislature and Seattle Department of Transportation (SDOT) to prioritize limited transportation funds and positions the Ballard and Magnolia bridges for funding assistance through state, regional, and federal government sources.

Maintaining efficient movement of people and goods is a priority today and for the future.

Critical Links in a Local and Regional Economy

The importance of the Ballard and Magnolia bridges to the City and regional economies cannot be overstated. Residents need to be able to travel from homes in Magnolia and the north end to employment centers in Downtown Seattle and the greater eastside, and people who work at major employers in the BINMIC, such as Expedia, need access from many other parts of the city and the region.

Likewise, goods must be able to move efficiently between industrial facilities in Ballard and locations around the region, such as ports along the Duwamish Waterway and SeaTac airport. Without improvements to City facilities, including better accommodations and benefits for people walking, biking, and riding transit, automobile travel demand will grow and place further strain on regional facilities such as SR 99 and I-5. Both bridges sustain:

- Urban goods delivery
- Maritime and industrial commerce
- Supply chain activities
- Connections to the regional transportation system
- Access to jobs and employment centers from neighborhoods near and far
- Access to services and retail

Need for Multimodal Integration

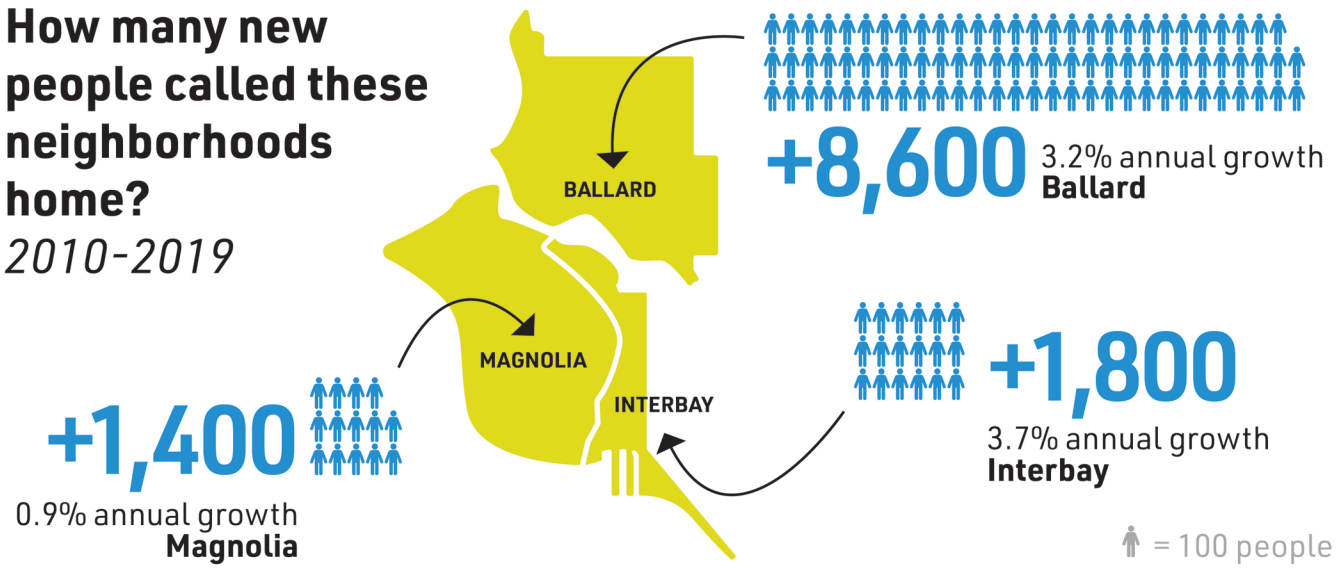
The Ballard and Magnolia bridges are part of a dynamic transportation system. The Ballard Bridge is a key north-south connection for freight and for people driving, walking, rolling, and bicycling. The bridge opens to grant passage of ships along the waterway between Salmon Bay and the Lake Washington Ship Canal. The Magnolia Bridge spans across the BNSF Railway tracks as well as the Port of Seattle's Terminal 91. Between them are growing residential, commercial, industrial, and maritime uses, and plans for Sound Transit light rail. Multimodal integration is critical to address:

- Existing gaps and deficiencies in walking, bicycling, and rolling connections
- Future high-capacity transit expansion and light rail access
- Facilities that cater to each travel mode and limit modal conflict
- Freight and major truck route corridor connections

Growing Neighborhoods and Density

The BIMNIC's surrounding neighborhoods are growing—particularly in areas zoned for mixed use and multifamily housing. Ballard and Interbay experienced significant population growth since 2000. Dense housing is zoned adjacent to the BIRT study project area with many new residential buildings, particularly in Ballard and Interbay.[2]

- Ballard's population grew from 26,200 residents in 2010 to 34,800 in 2019 (3.2% annual growth)
- Interbay grew from 4,600 residents in 2010 to 6,400 in 2019 (3.7% annual growth)
- Magnolia grew from 16,400 to 17,800 residents in the same time period (0.9% annual growth)



2 City of Seattle Land Use Map. Available at: https://data.seattle.gov/Permitting/Land-Use-Map/stev-f3r4

Ballard Bridge

The Ballard Bridge spans 2,854 feet across the Lake Washington Ship Canal. It connects Ballard to Magnolia, Queen Anne, and Downtown Seattle via Interbay. The bridge is a bascule bridge with a 44-foot vertical clearance that opens to allow taller ships to use the Ship Canal. It is 1 of 7 movable bridges in the city, of which 4 are owned by SDOT. The bridge carries about 59,000 vehicles each day and roughly 9,000 bus riders each weekday.

The Ballard Bridge, as with other Ship Canal bridges, has restrictions in place during the AM and PM peak commute to help keep people and goods moving. It stays closed to marine traffic on weekdays from 7-9AM and 4-6PM. During peak boating season in 2018, there was an average of 15.4 openings on weekdays and 16.4 on weekends. Openings last about 4.5 minutes each.

The Ballard Bridge opens to allow a barge and towboat to pass through
Source: flickr user Avgeek.joe

What is a bascule bridge?

A bascule bridge is a movable bridge with a counterweight that continuously balances a span, or leaf, throughout its upward swing to provide a clearance for boat traffic. The Ballard Bridge is a double-leaf bascule bridge.

Magnolia Bridge

The Magnolia Bridge is a truss bridge that spans 3,600 feet across the BNSF Railway tracks and filled-in tidelands of Smith Cove. It connects to Magnolia and Interbay neighborhoods, to Smith Cove Park and Elliott Bay Marina, Terminal 91, and 15th Ave W. The bridge carries roughly 20,000 vehicles each day and about 3,000 bus riders each weekday.

Aerial view of the Magnolia Bridge in 2002
Source: Seattle Municipal Archives

What is a truss bridge?

A truss bridge has a load-bearing superstructure composed of connected elements, usually forming triangular units.

2020 CITY OF SEATTLE VEHICULAR BRIDGE AUDIT

The Seattle Office of City Auditor reviewed the document noting the physical condition of and maintenance investments in vehicle bridges in Seattle. The audit was published in September 2020, based on a bridge condition assessment from 2019.[3]

The audit includes 77 vehicle bridges that are owned and maintained by SDOT.

- 10 bridges are located in the Ballard, Magnolia, Interbay area
- The median bridge age is 70 years
- 50 bridges are in "fair" condition, 22 are "good," and 5 are "poor"
- The Magnolia Bridge is 1 of 5 city bridges rated as "poor"
- The Ballard Bridge is 1 of 50 bridges rated as "fair"
- The W Emerson St and W Dravus St bridges are also in the study area and rated as "fair"

The audit suggests SDOT is spending tens of millions of dollars less per year than is needed to maintain its bridges. Over the past 14 years, the average amount SDOT spent on bridge maintenance was $6.6 million annually.

A "fair" rating does not ensure a bridge will remain in operable condition; rather, the decision to keep a bridge open depends on ongoing monitoring and regular assessments by SDOT bridge engineers. High traffic volumes and poor condition ratings mean a bridge has an elevated risk of an unexpected closure that could affect thousands of people.

FIGURE 1-2: BRIDGE CONDITION ASSESSMENT MAP

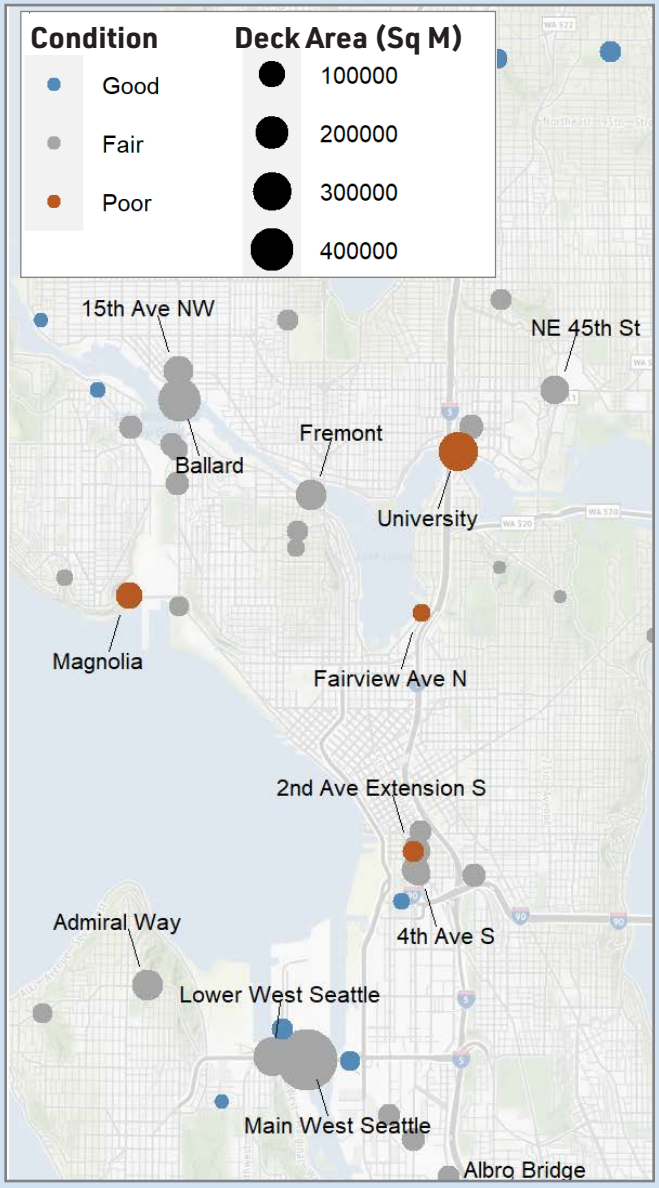


TABLE 1-1: FHWA'S BRIDGE CONDITION RATING SYSTEM

The Federal Highway Administration rates bridges as poor, fair, or good using a nine-point scale that considers the bridge's deck, superstructure, substructure, or culvert. A bridge condition rating is one look at the overall condition of a bridge; **however, given the many complex parts of a bridge, the condition rating alone does not necessarily mean a bridge is safe or unsafe**.

Poor	Fair	Good
The lowest rating of any of the four bridge elements is four or less.	The lowest rating of any of the four bridge elements is a five or a six.	The rating of all four bridge elements is a seven or above.

Source: Federal Highway Administration.

3 Seattle Office of City Auditor. (September 2020). Seattle Department of Transportation: Strategic Approach to Vehicle Bridge Maintenance is Warranted. Available at: https://sdotblog.seattle.gov/wp-content/uploads/sites/10/2020/09/2020_03_SeattleBridges_FinalReport.pdf

COORDINATION WITH ONGOING INITIATIVES AND CITY PRIORITIES

The BIRT study began in January 2020 amid several related and ongoing projects that called for coordination among project partners.

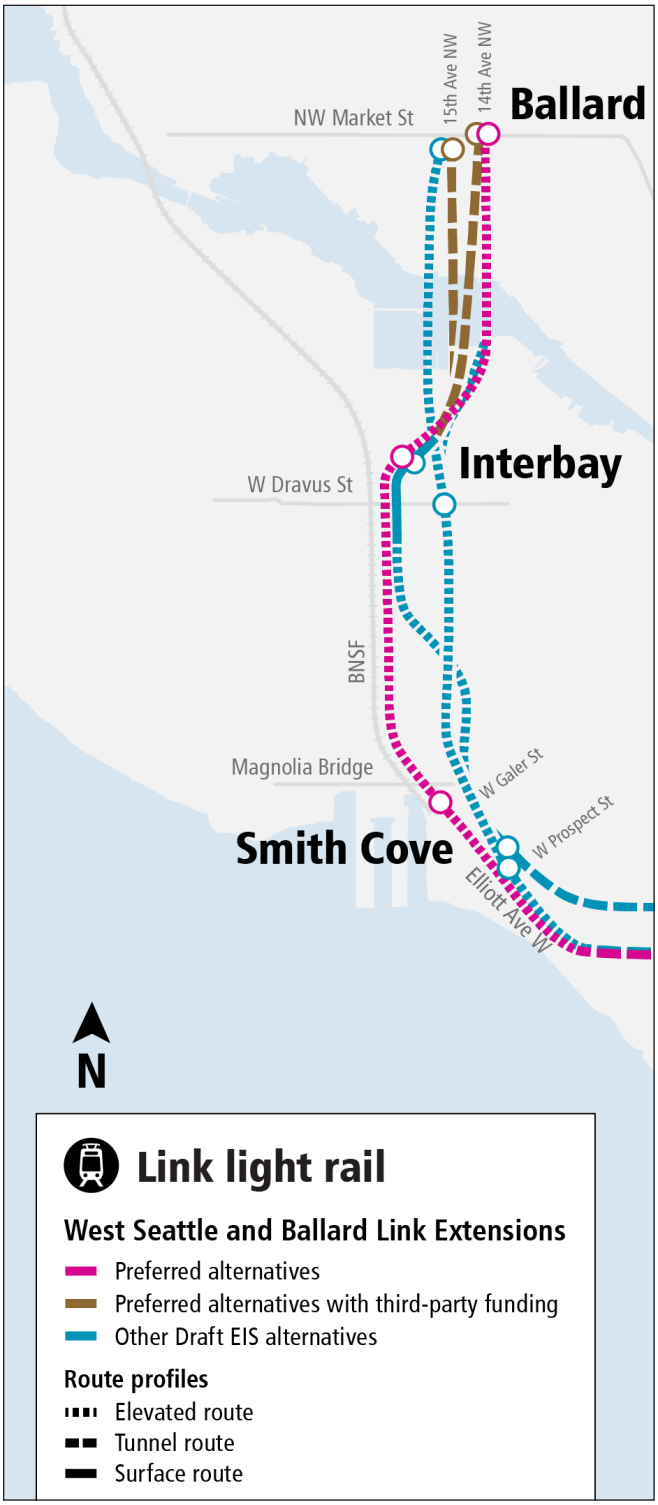
Mayor's Maritime & Industrial Strategy

The Mayor's Maritime & Industrial Strategy (M&I) is led by the City of Seattle's Office of Planning and Community Development.[4] The project intends to make recommendations to ensure a strong economic future for Seattle's Duwamish MIC and BINMIC, and takes into account forecasts for environment, land use, public safety, transportation, and workforce development. The BIRT study was informed by land use considerations proposed by the City's M&I strategy, which was delayed in 2020 due to the COVID-19 pandemic and is scheduled to be completed in Spring 2021.

Sound Transit West Seattle and Ballard Link Light Rail Extensions

As part of the voter-approved Sound Transit 3 package, the West Seattle and Ballard Link Extensions (WSBLE) include planning, environmental clearances, design, and eventual construction of a light rail extension to Ballard. The alignment will travel through Interbay and Smith Cove within the BIRT study area (projected start of service in 2035).[5] The WSBLE project is currently in environmental review, and Sound Transit is developing a Draft Environmental Impact Statement (DEIS). Station locations and rail alignments have not yet been finalized, but Sound Transit's preferred station area location alternatives are considered as a part of the BIRT system planning effort.

FIGURE 1-3: BALLARD LINK LIGHT RAIL EXTENSION ALTERNATIVES BEING STUDIED IN THE WSBLE DEIS



Source: Sound Transit

4 Seattle Office of Planning and Community Development (September 2020).Industrial and Maritime Strategy. Available at: https://www.seattle.gov/opcd/ongoing-initiatives/industrial-and-maritime-strategy

5 Sound Transit (October 2020). West Seattle and Ballard Link Extensions: What's happening now. Available at: https://wsblink.participate.online/

BINMIC Redevelopment

Several BINMIC sites are in the process of redevelopment planning or actual site redevelopment. The Port of Seattle Fishermen's Terminal Redevelopment is underway and expected to be completed in 2022.[6] The Port's Terminal 91 Uplands is also being redeveloped in 2 phases. The first phase is expected to be completed by 2023 and will support fishing and maritime supply chain companies needing to expand within the BINMIC.[7]

The National Guard Armory site, also known as The Interbay Project, is undergoing a planning effort to consider redevelopment of the site. Future concepts for the Armory site vary between industrial, housing, and commercial uses. The BIRT study evaluated multiple potential land use futures for this site, including the highest intensity land uses associated with redevelopment, to ensure that the team reviewed the transportation needs associated with the most impactful land use alternative. Details about each of the scenarios considered are described in Chapter 4.

Army Corps of Engineers Ballard Locks and Ship Canal Master Plan Update

Just beyond the study area, the U.S. Army Corps of Engineers is updating the Lake Washington Ship Canal Master Plan. The project is a 2-year effort scheduled for completion in September 2021, and it aims to reflect the current conditions and future needs of the Ship Canal and Locks.[8]

OTHER CONSIDERATIONS FOR THE BIRT STUDY

COVID-19 Impacts and Response

On March 23, 2020, Governor Jay Inslee signed a Stay Home, Stay Healthy order in response to COVID-19. Some non-essential manufacturing businesses were temporarily curtailed to reduce the spread of COVID-19, and many commuters in non-essential industries shifted to working from home, reducing traffic volumes and requiring adjustments to traffic data assumptions for this study. These conditions made outreach and engagement to workers across all industries more challenging.

West Seattle High Bridge Closure

On March 23, 2020—the same day as the statewide Stay Home, Stay Healthy order—the West Seattle High Bridge was closed to all vehicle traffic in response to inspections that indicated accelerated growth of new and existing cracks. Though this bridge is not located within the BIRT study area, its significance in the local transportation system and the attention it received from the public and SDOT staff illuminated the importance of dedicating resources to bridge maintenance and repair.

6 Port of Seattle (October 2020). Fishermen's Terminal Redevelopment. Available at: https://www.portseattle.org/projects/fishermens-terminal-redevelopment

7 Port of Seattle (October 2020). Terminal 91 Uplands Development Project. Available at: https://www.portseattle.org/projects/terminal-91-uplands-development-project

8 US Army Corps of Engineers (October 2020). The Lake Washington Ship Canal Master Plan. Available at: https://www.nws.usace.army.mil/Home/Master-Plans/LWSC-Master-Plan/igphoto/2002304318/

PROJECT GOALS

The following project goals establish the framework for the evaluation criteria that were developed to screen and score potential projects and investments. Project goals were developed through the legislation directing the project, review of SDOT's core values, and input from the public and the BIRT Interagency Advisory Team (IAT).

The evaluation criteria related to each goal are described in greater detail in Chapter 4: Transportation and Land Use Scenarios.

Goal 1: Mobility

Improve mobility for people and freight: Increase people's ability to move efficiently in the study area and accommodate the movement of freight and goods.

Goal 2: Safety

Provide a system that safely accommodates all travelers: Protect the most vulnerable travelers who walk, bike, roll, and use transit, and safely accommodate freight travel and deliveries.

Goal 3: Equity

Advance projects that meet the needs of communities of color and those of all incomes, abilities, and ages: Build a more racially equitable and socially just transportation system.

Goal 4: Action

Support timely and coordinated implementation: Maintain the current and future capacities of the Ballard and Magnolia bridge replacement alternatives and improve other elements of a connected transportation system.

COMMUNITY OUTREACH AND STAKEHOLDER ENGAGEMENT

Community members, area employees, and key stakeholders were engaged at several points in the project process (Figure 1-4). Other stakeholders, including area maritime and industrial businesses and agencies with property or transportation facilities in the study area, were consulted through the Interagency Team or meetings with the project team. While BNSF is a key property owner and freight operator in the study area, neither railway freight nor maritime traffic are the focus of the BIRT study.

Targeted Outreach to Stakeholders

Stakeholder outreach during the BIRT study faced unique challenges due to the COVID-19 pandemic. Effective outreach to workers depends on face-to-face interaction such as intercept surveys at or near a business, or focus groups held during the lunch hour at a workplace. Due to social distancing to limit exposure, and priorities by workers and their employers, outreach and engagement to workers across all industries were challenging after March 2020. Larger Interbay employers seem to depend on a higher percentage of workers of color and the inability to reach workers meant that BIRT's racial equity approach was highly compromised.

The following groups were engaged throughout this study for technical input and ground-truthing of study findings and project priorities.

FIGURE 1-4: KEY STAKEHOLDERS ENGAGED IN THE BIRT STUDY PROCESS

Elected officials

Briefings

SDOT staff and Seattle advisory boards

Bicycle Advisory Board

Freight Advisory Board

Planning Commission

Interagency team

Representatives attended 6 meetings, 3 of which were open to the public

Advocacy groups

Ballard/Fremont Neighborhood Greenways

Magnolia Community Council

North Seattle Industrial Association

Major employer/ small business interests

Meetings with SDOT staff

OPCD surveys

Flyering in business districts

Residents

Public meetings

Public comment at IAT meetings

Online survey

Visitors for work, personal trips, or recreation

Public meetings

Online survey

Note: All IAT and public meetings were hosted virtually starting in March 2020.

Interagency Team Coordination

The Interagency Team (IAT) for BIRT met 6 times throughout the course of the study. The IAT advised the project team at each stage of the technical work and served as liaisons to their agencies to communicate important information, provide data, or make introductions to businesses or stakeholders in the study area.

The IAT includes representatives from 6 agencies as required in the study legislation:

- Seattle Department of Transportation
- King County Metro
- Washington State Department of Transportation
- Sound Transit
- Port of Seattle
- Washington Military Department

Virtual Interagency Team Meeting Recording, May 2020

2020 Public and Stakeholder Outreach

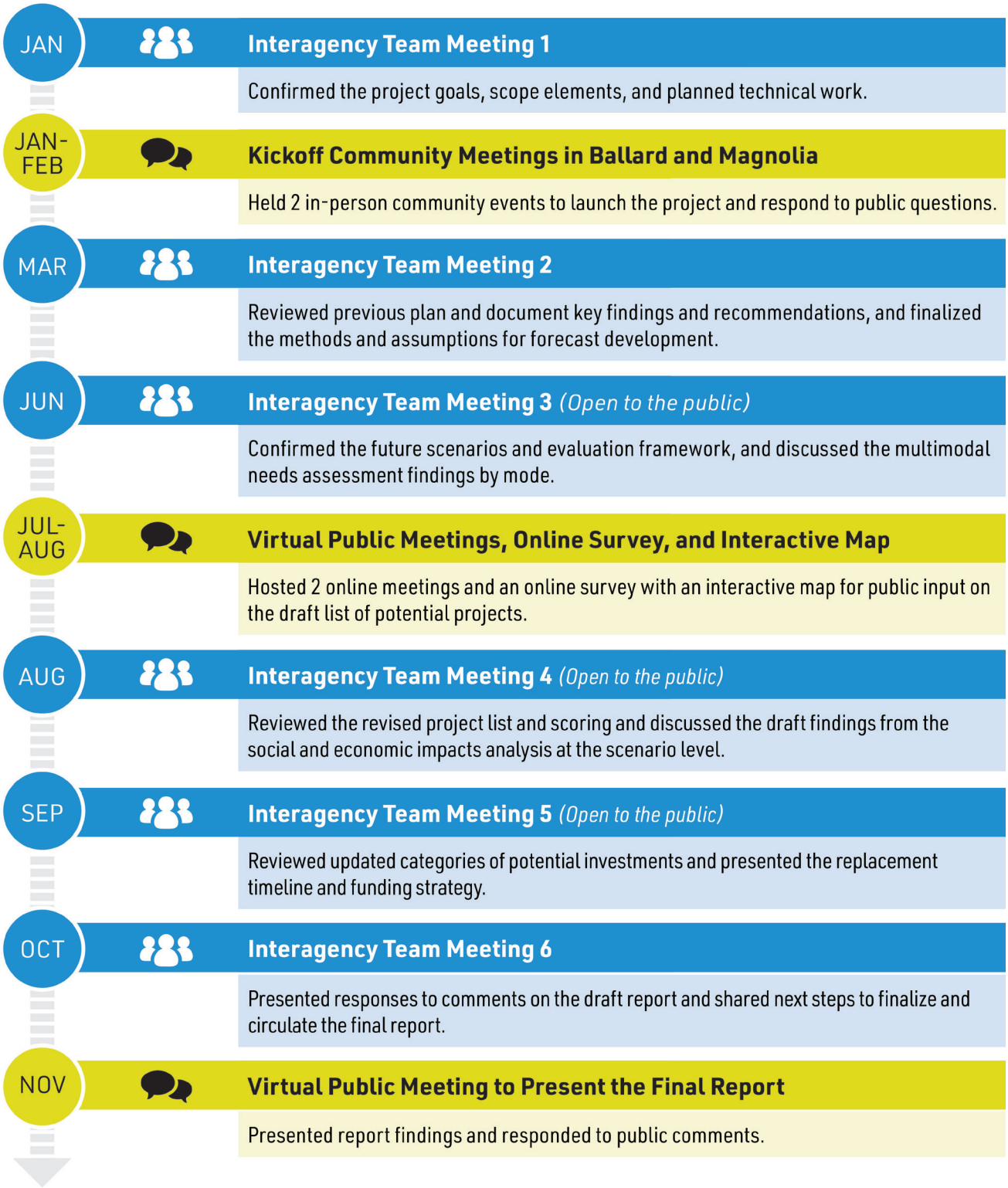
The project team engaged the IAT and public at key milestones, including public meetings in the beginning, mid-point, and end of the project. Figure 1-5 describes each event.

- 56 people at kickoff meetings (Jan/Feb)
- 528 online survey responses; 69 live stream attendees (Jul/Aug)

The final report was presented in a final public meeting after submittal to the Washington State Legislature in November 2020. Chapter 3: Network Needs and Opportunities describes how public feedback shaped potential investments in the study area. A full description of public engagement activities is included in Appendix A.

Poster to encourage public survey responses and meeting participation, July 2020

FIGURE 1-5: SCHEDULE OF KEY PUBLIC AND STAKEHOLDER OUTREACH EVENTS




YOU ARE HERE
BALLARD
SALMON BAY
DISCOVERY PARK
15th Ave W
FISHERMAN'S TERMINAL
W Emerson Pl
Gilman Ave W
Thorndyke Ave W
16th Ave W
17th Ave W
W Bertona St
W Dravus St
MAGNOLIA
20th Ave W
INTERBAY GOLF CENTER
23rd Ave W
15th Ave W
INTERBAY
W Garfield St
QUEEN ANNE
SMITH COVE
16th Ave W
STOPS
RENT
[MARCH 30]
CONTACT YOUR COUNCIL • MAYOR
NOW

CHAPTER 2: BALLARD-INTERBAY CONTEXT

This chapter explains the character and existing conditions of the BIRT study area, and the outcomes and recommendations of recent planning efforts. More than two dozen plans led by the City of Seattle, Port of Seattle, WSDOT, Sound Transit, King County Metro, and neighborhood organizations were completed between 2010 and 2020. This chapter summarizes transportation investments, land use and development plans, and recommendations from these previous plans and studies. It also includes a snapshot of neighborhood characteristics, including demographic and employment trends.

A full list of the plans reviewed is included in Appendix B.

FIGURE 2-1: PROCESS TO SUMMARIZE THE PLANNING CONTEXT

We reviewed previous plans and studies (2010-2020)

... with a focus on these three elements

Anticipated Transportation Investments

Sound Transit's West Seattle and Ballard Link Extensions

King County Metro bus routes and capital improvements

Bicycle, pedestrian, and freight facilities

Land Use and Development Plans

The Armory Development Concepts

Terminal 91

Expedia Campus

Fishermen's Terminal Redevelopment

Demographic Data

Population

Housing markets

Income

Commute patterns

Industry and employment

* The Ballard Bridge Planning Study will be published publicly in November 2020.

NEIGHBORHOOD CHARACTERISTICS

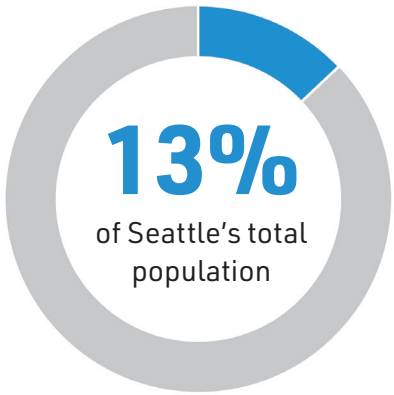
This section provides a snapshot of BIRT study area characteristics, including the economic and employment landscape, commute patterns, demographic and housing trends, development patterns, and the impacts of COVID-19 on businesses.

Population and Workforce Characteristics

Ballard and Interbay have experienced major population growth over the last decade. Population density in Ballard is greater than the average population density citywide.

In 2019, the study area population was approximately

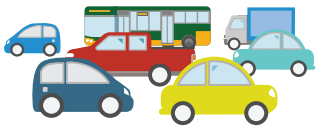
95,200



Commute Patterns

Most study area residents work in Downtown Seattle, the Duwamish Manufacturing Industrial Center (MIC), the University of Washington / U. District, downtown Ballard, downtown Bellevue, and the Bel-Red area.

Workers in the BIRT study area predominantly commute from areas north of the study area, and some commute from areas immediately to the east or west.



~23,000

workers commute into the study area's commercial and industrial zones from outside the study area

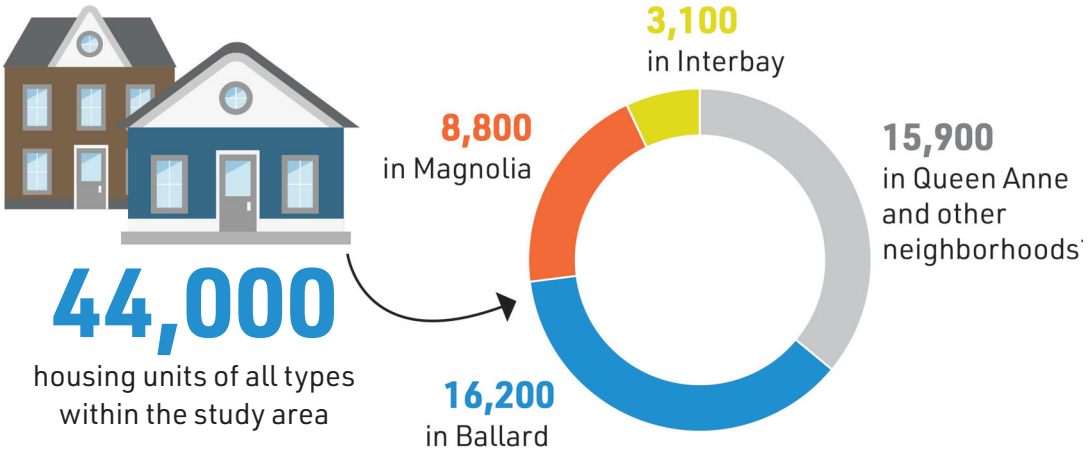
850

workers both live and work within the commercial boundaries

3,100

workers live within the residential study area boundaries

Housing



*Data is provided at the neighborhood level, therefore this figure includes the entire Queen Anne neighborhood, not just the potion within the BIRT study area.

The greatest density of housing units is in downtown Ballard and along the north end of 15th Ave W in Interbay. Areas of lower density in housing units are north of NW 65th St, east of 8th Ave NW, in central and western Magnolia, and in upper Queen Anne.

Magnolia has the greatest proportion of owner-occupied housing. Interbay and Ballard have a greater proportion of rental units than owner-occupied units.

Ballard

69% rentals

Interbay

56% rentals

Magnolia

45% rentals

AN INDUSTRIAL AND MARITIME CENTER

Seattle's connection to the water is at the heart of the City's history and economic success. The Ballard and Interbay areas embody the importance and diversity that Seattle's limited industrial and maritime lands bring to the City, the region, and the many people who live and work there. As areas to the north, south, and east densify, it becomes increasingly important to ensure people and goods have quality access to this economic center, and that connections to regional transportation facilities (including SR 99 and I-5) are maintained.

Port of Seattle facilities are an international gateway for imports and exports, and the freight corridor is critical to economic activity in commercial fishing, the cruise ship industry, and tourism.

Industry, Maritime, and Freight

The Ballard-Interbay Northend Manufacturing Industrial Center (BINMIC) is 1 of Seattle's 2 major industrial centers with about

28,700

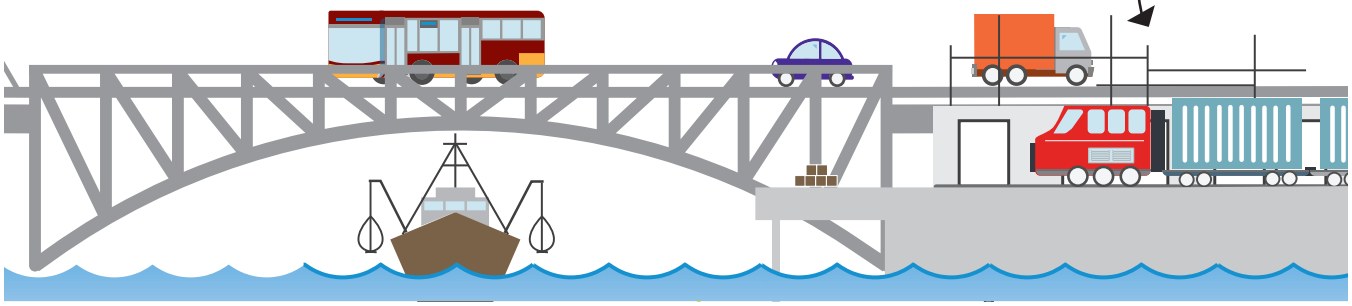
jobs in 2018

50%

of study area jobs are in the service sector

12,000

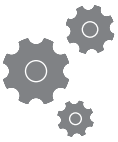
jobs are freight-oriented



Overall, employment within the BIRT commercial study area has grown by 0.7% annually since 2000, and by 2.1% annually since 2010.

Fastest growth:

Construction and resource sector



Decrease:

Government and manufacturing employment

Most growth:

The service sector—more than 3% annual growth

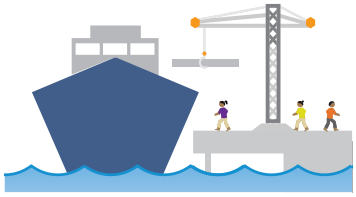
Vessels using BIRT docks employed

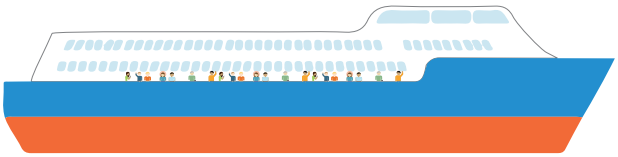
~7,200

workers and generated

$671 million

in business revenues in 2017





Seattle's cruise ship industry generated

$900 million

in local business revenue in 2019

The unique freshwater, tide-free marine environment of the Lake Washington Ship Canal reduces maintenance costs and prolongs vessel life for an estimated 700 commercial and 4,000 recreational vessels. These include vessels from 9 different commercial fishing fleets, plus ocean-going freight-shippers that communities in Alaska and elsewhere rely on year-round for crucial supplies and equipment.

Commercial fishing vessels that use the Locks represented an estimated $545 million in ex-vessel earnings and contributed roughly $785 million in seafood export value in 2015.

COVID-19 Business Impacts

Covid-19 has had a significant impact on Ballard-Interbay businesses.

In Spring 2020, a City of Seattle survey found that nearly half of business respondents expressed concern about making rent or mortgage payments, and uncertainty about future business activity. As of May 2020, more than 1,000 temporary and over 130 permanent layoffs were reported. The 2020 cruise season was also canceled, wielding significant economic impacts.

The top 3 impacts experienced by businesses in the study area were:

1. Decline in business activity due to uncertainty
2. Fewer visitors to the region
3. Reduced access to customers due to remote working

PREVIOUS BRIDGE STUDIES

The Ballard Bridge Planning Study (2020) and Magnolia Bridge Planning Study (2019) are the 2 most recent efforts to examine the rehabilitation and replacement of the 2 bridges. Bridge planning studies represent one early step in an extensive process to determine how to replace or rehabilitate each bridge. Chapter 7 describes in greater detail the timeline and funding requirements for the replacement of each bridge.

Below are general themes from the recent planning studies and related bridge studies conducted between 2010-2020.

Ballard Bridge

Ballard Bridge and 15th Ave W/NW

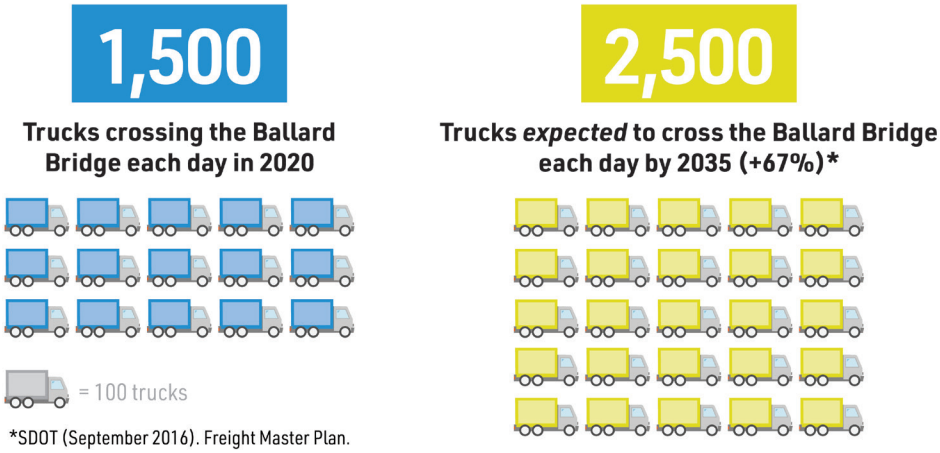
The Ballard-Interbay Northend Manufacturing Industrial Center (BINMIC) is one of Seattle's designated industrial centers, with the 15th Ave W/NW corridor heavily used for freight travel. The Ballard Bridge, as one of the City's significant north-south travel and freight corridors, carries about 59,000 vehicles each day, including roughly 1,500 trucks.[1] Daily truck volumes are projected to increase to 2,500 trucks by 2035. The bridge is also heavily used by commuters, including people driving, taking transit, bicycling, and walking. 15th Ave W and NW serves multiple express and local routes as well as the RapidRide D Line.

Industrial businesses in the study area depend on access to the 15th Ave W/NW freight corridor to transport many industrial materials to local and regional markets, such as primary metals; intermediate products, like fabricated metals; and final goods, including airplanes, food, and apparel. Many of these businesses are net exporters of products to the U.S. and internationally, and help drive Seattle's economy and job market.

Ballard Bridge safety improvements and replacement

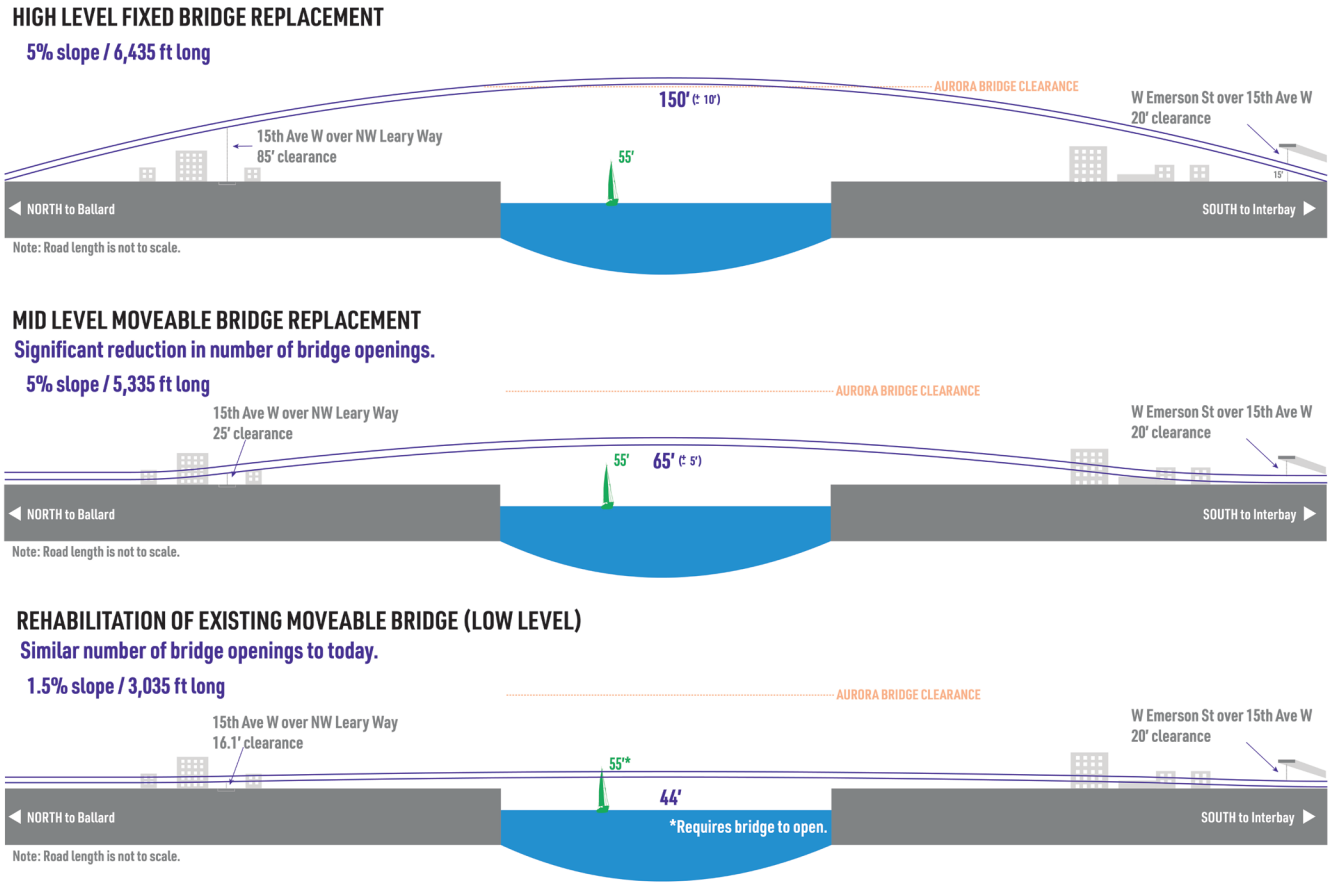
The 15th Ave W/NW freight corridor provides access to Port of Seattle facilities which are an international gateway for imports and exports. The freight corridor is critical to economic activity in diverse maritime industries, including cruise and tourism.

The Ballard Bridge Planning Study (2020) considered several alternatives for bridge rehabilitation or replacement. The Bridge Safety Analysis (2018) and Ballard Bridge Sidewalk Widening Study (2014) explored ways to make the sidewalk safer and more comfortable for people walking and biking across the bridge as a key north-south connector for non-motorized travelers. In 2014, SDOT's Bridge Seismic Retrofit Program completed work to minimize movement on the Ballard Bridge in the event of an earthquake.



1 SDOT (2018). SDOT 2018 Traffic Report. Available at: https://www.seattle.gov/Documents/Departments/SDOT/About/DocumentLibrary/Reports/2018_Traffic_Report.pdf

FIGURE 2-2: BALLARD BRIDGE REHABILITATION AND REPLACEMENT OPTIONS



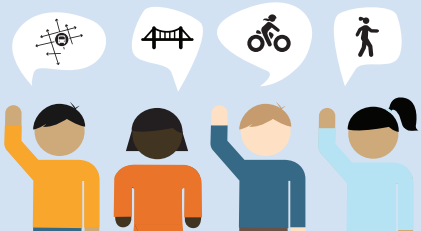
Note: Images are not to scale.

This graphic represents 3 of the technical alternatives under consideration in the Ballard Bridge Planning Study. Bridge design will be determined at a future date.

Public Engagement Themes

Key themes from public engagement related to the Ballard Bridge include:

- Improvements to the pedestrian and bicycle facilities are a top consideration; Ballard Bridge is too narrow and uncomfortable for people walking and biking
- Coordination between the bridge replacement and Sound Transit is important to ensure access to future light rail stations and multimodal connections based upon the final rail alignments
- Access to bicycle facility corridors like the Burke-Gilman Trail, Ship Canal Trail, and Leary Way NW need improvement
- The low-level bridge alternative received significant support because it maintains existing connections to the north bridge terminus.The low-level bridge offers the least grade and climb for people walking, biking, and rolling
- A key benefit to a mid-level bridge is the reduced number of bridge lifts required for passing ships



Magnolia Bridge

The Magnolia Bridge connects the neighborhoods of Magnolia and Interbay, providing 1 of 3 street connections between Magnolia and the rest of Seattle. It also provides access to the Elliott Bay Marina, Smith Cove Park, and the west side of Terminal 91. The bridge crosses the Smith Cove tidelands, which are filled in and are now in use for port and industrial activities, including a seasonal two-berth cruise ship terminal. The bridge serves residents of Magnolia traveling to and from work; employees of local businesses in the Magnolia Village area; buses connecting Magnolia to Downtown Seattle, Queen Anne, Ballard and other neighborhoods further north; emergency response services; and visitors that come to enjoy the commercial area, parks, and other amenities.

The Magnolia Bridge provides transit connections for buses from Magnolia to Downtown Seattle, Queen Anne, and Ballard. Roughly 20,000 vehicles cross the Magnolia Bridge every day,[2] which is similar to less than other bridges in the area (e.g., 20,000 vehicles/day on the W Dravus St bridge and 25,000 vehicles/day on the West Emerson St bridge).

Magnolia Bridge replacement

The Magnolia Bridge was built 90 years ago and received structural updates in 1957. After damage from the 2001 Nisqually earthquake, SDOT prepared an Environmental Assessment to study the bridge's replacement and comply with the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). However, since the project did not proceed with construction and a Finding of No Significant Impact (FONSI) was not issued, the document is expired. In 2019, SDOT completed the Magnolia Bridge Planning Study[3] to identify route alternatives that meet the needs of the community, update the bridge replacement cost estimate to adjust for inflation, and create an emergency transportation plan for unexpected closures. The study determined the 2 most viable and publicly supported alternatives to be the following:

1. Alternative 1: New Armory Way Bridge and Western Perimeter Road to Smith Cove Park/ Elliott Bay Marina
2. Alternative 4: In-Kind Replacement of the existing bridge adjacent to its current location

Every day, the Magnolia Bridge serves ...

20,000

Vehicles

75

Bus trips

King County Metro Routes 19, 24, 33
(based on pre-COVID-19 schedules)

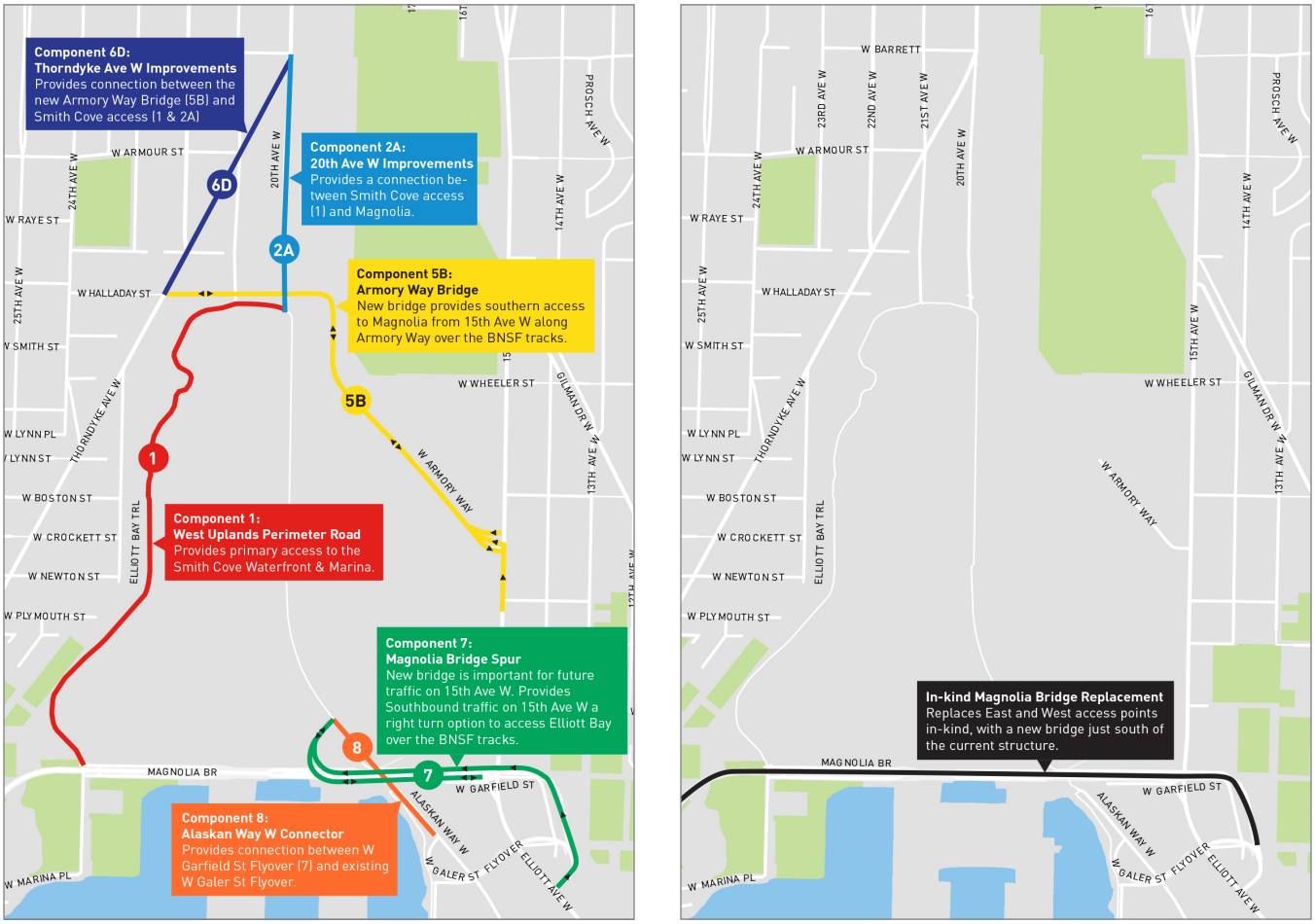
3,000

Bus passengers

2 SDOT (November 2017). Magnolia Bridge Traffic Maintenance During Bridge Closure. Available at: https://www.seattle.gov/documents/Departments/SDOT/BridgeStairsProgram/bridges/MagnoliaBridgeTrafficMaintenance.pdf

3 SDOT (April 2019). Magnolia Bridge Planning Study. Available at: https://www.seattle.gov/Documents/Departments/SDOT/BridgeStairsProgram/bridges/Magnolia/MBPS-AlternativeAnalysisMemo-Spring2019.pdf

FIGURE 2-3: MAGNOLIA BRIDGE REPLACEMENT ALTERNATIVE 1: NEW ARMORY WAY BRIDGE AND WEST UPLANDS PERIMETER ROAD (LEFT); ALTERNATIVE 4: IN-KIND REPLACEMENT (RIGHT)



Public Engagement Themes

Key themes from public engagement related to the Magnolia Bridge include:

- Most of the Magnolia community who participated in study engagement stated a preference for the in-kind Magnolia Bridge replacement
- The Port of Seattle prefers the In-Kind Replacement over the New Armory Way Bridge components' multiple turns and tight curves en-route to and from Terminal 91, as well as the property impacts associated with those components
- There was concern that the Armory Way Bridge would reduce parking and access to nearby residences, increase light and noise pollution impacting adjacent residents and businesses, and increase travel times for certain trips
- People expressed concern about the ability of W Dravus St to successfully accommodate more trips and multimodal traffic as the area grows
- Limit environmental impacts and right-of-way acquisition with bridge alternatives; the ideal solution avoids or mitigates impacts to environmentally sensitive areas, minimizes impacts to natural hazards, and limits right-of-way acquisition
- Maintain access to the Smith Cove waterfront and improve connections between the Magnolia neighborhood and the Smith Cove waterfront

ANTICIPATED TRANSPORTATION INVESTMENTS

A variety of transportation projects are planned or proposed in the study area to connect existing trails, improve safety for vulnerable travelers, improve access to current and future transit stops and stations, deliver reliable, high-capacity transit for residents and workers, and enhance reliability for freight and goods. Table 2-1 shows some of the most important projects and network enhancements.

TABLE 2-1: TRANSPORTATION SYSTEM INVESTMENTS UNDERWAY OR PLANNED IN THE STUDY AREA

Completing Connections in the Bike and Trail Network	Map Label
The Burke-Gilman Trail is a 20-mile regional, mixed-use facility that serves as a major transportation corridor for commuters and recreational users. It is complete except for a 1.4-mile segment through the Ballard neighborhood, known as the "Missing Link," which is identified as one of the City of Seattle's top-rated trail priorities in the 2014 Bicycle Master Plan. Elements of the project continue to work their way through the legal system, which has delayed construction of the trail until at least 2022. SDOT will continue to pursue resolution through the courts to complete the Burke-Gilman Trail Missing Link as planned.[4]	
Bicycle network connections are also recommended in the Bicycle Master Plan and Interbay Trail Connections Project to provide protected facilities between the Ballard Locks and the Ship Canal Trail to the east and the Elliott Bay Trail to the south.	
Improving Intersection Safety	
The City of Seattle's adopted 2017 Pedestrian Master Plan (PMP) presents a Priority Investment Network, which identifies the street segments that are priorities for improvements such as adding sidewalks where they are currently missing. Many of the missing sidewalks in the study area are unlikely to be prioritized in the upcoming years considering economic conditions and the City's emphasis on prioritizing neighborhoods with historical underinvestment.	
Intersection signalization or capacity improvements are recommended at several locations including 15th Ave W/Gilman Dr W, and W Galer St/Thorndyke Ave W.	
Transit and Light Rail Expansion	
Today, 15th Ave W/NW (including the Ballard Bridge) is part of the Very Frequent Transit Network and the Magnolia Bridge is part of the Frequent Transit Network.[5,6] Multiple King County Metro express and local routes use the 15th Ave W/NW corridor, including the RapidRide D Line.	
Sound Transit's West Seattle and Ballard Link Extensions will provide light rail connections to residential and job centers throughout the region. The Ballard-to-Downtown extension is expected to start service in 2035 and will add 7.1 miles of light rail service from Downtown Seattle to Ballard, including a new Downtown Seattle rail-only tunnel. There are 3 stations planned in the study area: Smith Cove, Interbay, and Ballard stations.	
Metro Connects, King County Metro Transit's vision, includes new bus services in the 2040 enhanced transit network from east Seattle and east King County that will terminate in Interbay. Metro and Sound Transit will identify bus layover and transfer facilities as new Ballard light rail extension stations are planned. Other investments will include bus-only lanes and transit priority features.	

4 SDOT (October 2020). Ballard Multimodal Corridor. Available at: https://www.seattle.gov/transportation/projects-and-programs/programs/bike-program/ballard-multimodal-corridor

5 SDOT (2016). Seattle Transit Master Plan. Available at: https://www.seattle.gov/Documents/Departments/SDOT/TransitProgram/TMP2016CH4.pdf

FIGURE 2-4: TRANSPORTATION SYSTEM INVESTMENTS UNDERWAY OR PLANNED IN THE STUDY AREA

LAND USE AND DEVELOPMENT PLANS

Redevelopment is being considered in several locations that would support industrial uses, repurpose underutilized land, and increase density near planned high-capacity transit.

TABLE 2-2: DEVELOPMENTS UNDERWAY OR PLANNED IN THE STUDY AREA

Terminal 91 Uplands Redevelopment	Map Label
The Port of Seattle plans to develop two 50,000 square-foot(100,000 total) light industrial facilities and associated site infrastructure development. Phase 2 will develop another 300,000 square feet of light industrial facilities. Infrastructure improvements include paving, water, sanitary sewers, storm sewers, lighting, electrical power, natural gas, communications, and landscaping.	1
Fishermen's Terminal Redevelopment	
Roughly 60,000 square feet of new light industrial space will be developed for complementary maritime businesses by the end of 2022. The new "Gateway" building is planned in the area of the existing vacant bank building and Net Sheds 7 and 8.	2
Armory Site Redevelopment	
The National Guard's Armory relocation needs prompted the Department of Commerce to convene the Interbay Public Development Advisory Committee to make recommendations for possible future uses for the site.[7] Armory site development concepts include a mix of uses including industrial, manufacturing, housing, office, and open space. The Department of Commerce explored 6 redevelopment scenarios for consideration, but the site's land uses have yet to be determined by the City of Seattle.	3
Transit-Oriented Development	
Anticipated investments in high-capacity transit, including RapidRide and the West Seattle and Ballard Link Extensions light rail, call for higher-density development at stations and transit hubs, and along transit corridors. Accessible and convenient connections to transit stops and stations–for buses and light rail– are identified as critical for ensuring that transit is a viable mode for residents and workers in the area.	4
Connections to the Waterfront	
Neighborhood plans in Ballard and Magnolia recommend improving connections between residential neighborhoods and waterfront areas. Access for people walking or biking to Salmon Bay from Ballard, or to Smith Cove from Magnolia, should be safe, seamless, and comfortable.	5

6 Washington State Department of Commerce (October 2020). Interbay Public Development Advisory Board Committee. Available at: https://www.commerce.wa.gov/about-us/research-services/interbay-public-development-advisory-committee/

FIGURE 2-5: DEVELOPMENTS UNDERWAY OR PLANNED IN THE STUDY AREA


SALMON
BAY
COVICH

CHAPTER 3: NETWORK NEEDS AND OPPORTUNITIES

APPROACH TO IDENTIFYING NEEDS

This chapter highlights key transportation system needs identified through this study and through other plans and studies completed between 2010 and 2020. Input from the community, key stakeholders, and partner agencies contributed to the issue identification. The study considers all modes of travel–walking, bicycling, rolling, taking transit, driving, and road freight. Highlights from a more detailed review included in Appendices B and D are presented in this chapter.

MULTIMODAL NEEDS AND GAPS

The study team conducted a thorough review of existing and anticipated future (2042) transportation system uses and needs for the Ballard-Interbay study area. The following sections highlight key findings and are organized first by corridor, then by mode. The BIRT study does not commit funding to address the needs and their corresponding opportunities.

Pedestrians, bicyclists, drivers, and road freight at 21st Ave/W Emerson Pl

CORRIDOR CHARACTERISTICS

Six key corridors were identified for evaluation in the BIRT study area. They represent the primary vehicular travel routes today and anticipated in 2042, assuming bridge replacement. The modal assessments that follow include projects specifically targeting improvements for pedestrians, bicyclists, general purpose traffic, freight, and transit. The primary purpose of identifying corridor-wide needs is to identify challenges for vehicular operations that impede person throughput including bus riders and the movement of goods.

Corridor characteristics in terms of extents, classifications, speeds, average daily traffic volumes (ADT) and peak traffic volumes are described in Table 3-1, along with the primary uses each corridor serves today. Full descriptions of corridors are included in Appendix F.

TABLE 3-1: TRAFFIC, FREIGHT, AND TRANSIT CHARACTERISTICS OF CORRIDORS

Corridor	Extents	Posted Speed	Vehicle Traffic	Transit Routes
Corridor 1: 15th Ave W *Principal Arterial* **Primary Need:** *The corridor experiences southbound congestion in AM and northbound congestion in PM*	NW Market St to W Mercer Pl	SPEED LIMIT 30	ADT: **59,000** AM Peak: 3,600 PM Peak: 3,700 Freight Class: **Major**	15, 17, 18, 19, 24, 29, 32, 33, D Line
Corridor 2: NW Leary Way *Principal Arterial* **Primary Need:** *Leary Way needs increased mobility of people and goods through closely spaced, signalized, high-access locations*	17th Ave NW to 14th Ave NW	SPEED LIMIT 30	ADT: **21,000** AM Peak: 1,200 PM Peak: 1,600 Freight Class: **Major**	17, 18, 40
Corridor 3: W Emerson St / W Nickerson St *Principal Arterial* **Primary Need:** *Maintain mobility of people and goods while balancing serving access points*	Gilman Ave W to 13th Ave W	SPEED LIMIT 25	ADT: **18,700** AM Peak: 1,200 PM Peak: 1,400 Freight Class: **Major and Minor**	29, 31, 32
Corridor 4: W Dravus St *Principal Arterial* **Primary Need:** *Trucks are unable to make in-lane turning maneuvers at intersections with 15th Ave W ramps*	20th Ave W to 14th Ave W	SPEED LIMIT 30	ADT: **16,200** AM Peak: 1,000 PM Peak: 1,300 Freight Class: **Minor**	994 (school route)
Corridor 5: New Armory / Thorndyke *Minor Arterial* **Primary Need:** *Maintain mobility of people and goods while balancing serving access points*	W Galer St / Thorndyke Ave W to 15th Ave W	SPEED LIMIT 30	ADT: **5,000** AM Peak: 300 PM Peak: 500 Freight Class: n/a	31, 33
Corridor 6: Magnolia Bridge *Minor Arterial* **Primary Need:** *Maintain mobility of people and goods*	W Galer St / Thorndyke Ave W to W Galer St Flyover / Elliott Ave W	SPEED LIMIT 35	ADT: **20,000** AM Peak: 1,100 PM Peak: 1,200 Freight Class: **First/Last Mile Connector**	19, 24, 33

FIGURE 3-1: CORRIDOR-WIDE OPPORTUNITIES

Public Engagement Themes

- Trucks on 15th Ave W are a necessity, but they should travel at slower, safer speeds
- W Dravus St is a critical east-west corridor and would benefit from improvements in every mode of travel

PEDESTRIAN NETWORK ASSESSMENT

This section highlights key pedestrian system needs and identifies specific locations where improvements are desired by the community or have been identified through this study. Identified needs focus on pedestrian safety and comfort such as sidewalk presence and condition, crosswalk presence and design, and distance between formal crossings along arterials. Opportunities mapped in Figure 3-2 consider where people walk today and how new projects and land uses will generate more demand for pedestrian trips in the future (e.g., light rail stations).

A runner on the Ballard Bridge

TABLE 3-2: PEDESTRIAN NETWORK NEEDS AND CHALLENGES

Needs and Challenges	Opportunities
Ballard's industrial areas have poor walking conditions. Sidewalks have gaps and are narrow, parking abuts property lines, and sidewalks are obstructed by objects such as utility poles.	A D
Ballard Bridge is very uncomfortable for people walking. Narrow sidewalks are close to vehicle traffic and are shared with people biking. The on/off ramp crossings limit pedestrian visibility, and there is a gap in the sidewalk on the east side.	B
The 15th Ave W/W Emerson St intersection is inconvenient for pedestrians. Lack of at-grade pedestrian crossings requires stair use, and it is difficult to access the RapidRide bus stop on the east side.	C
Poor sidewalk conditions on Emerson, 17th, and 20th, W Dravus St, and Gilman Ave. Narrow sidewalks exist on only one side of the street with no buffer from vehicles, and sometimes with adjacent industrial parking. There are goat trails to the 20th Ave W bus stop.	E J
Limited pedestrian crossings over railroad tracks and along 15th Ave W. The W Dravus St bridge is narrow with minimal buffer, and 15th Ave W is wide with high traffic volumes and few crossings. In addition, the industrial areas north of the Ship Canal Trail and east of the Ballard Bridge lack sidewalks and designated crossings for pedestrians over railroad tracks.	E K
Redevelopment sites have inconsistent sidewalks and crosswalks: The Armory, the area between the Armory and Interbay Golf Center, the Expedia campus, and Terminal 91 are challenging to navigate as a pedestrian.	D
Sidewalks are missing along W Mercer Pl east of Elliott Ave W, which is a key route into Lower Queen Anne.	I
Magnolia Bridge is a challenging environment for walking. It has a narrow sidewalk with limited buffer from vehicles. Some bicyclists use sidewalks due to the lack of on-street bicycle facilities.	F
Segments of the Elliott Bay Trail north of W Galer St are extremely narrow. Fencing on both sides of the trail makes the path feel narrow and unsafe for shared-use or two-way travel.	H
Future light rail stations need convenient pedestrian access. Analysis is needed to identify potential improvements within a 10-minute/half-mile walk from stations. Walkshed analysis should account for wait time at signalized intersections and steep grades (some are greater than 10%). The Smith Cove station area in particular has limited crosswalk visibility and crosswalks located far apart on arterials.	G

Public Engagement Themes

- The most desired improvements include new and improved connections to fill sidewalk gaps or connect over and across physical barriers such as railroad tracks
- Pedestrian facilities are critical in bridge studies and analyses since bridge sidewalks are often the only pedestrian option to access certain corridors
- Many sidewalks along corridors in the study area are narrow and located along bike routes without dedicated bicycling facilities, forcing people walking and biking to share limited space on sidewalks–especially on Ballard Bridge and W Dravus St Bridge
- Create safe walking connections between Ballard neighborhoods and areas south of the Ship Canal for commuting, shopping, and recreation

FIGURE 3-2: PEDESTRIAN NETWORK OPPORTUNITIES

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.


CAUTION
NARROW
PATHWAY
Please Walk Your Bikes

BICYCLE NETWORK ASSESSMENT

This section highlights key bicycle system needs and identifies specific areas where improvements can enhance safety and connectivity and address desires identified by the community. The review of current conditions identifies factors that influence bicyclist safety and comfort, such as bicycle facility presence and type, level of comfort for users of all ages and abilities (or Level of Traffic Stress, LTS), and distance to the nearest crosswalk along arterial streets. Opportunities mapped in Figure 3-3 consider current bicycling travel patterns and anticipated demand for bicycling trips based on future land use and growth.

People biking on the Ship Canal Trail

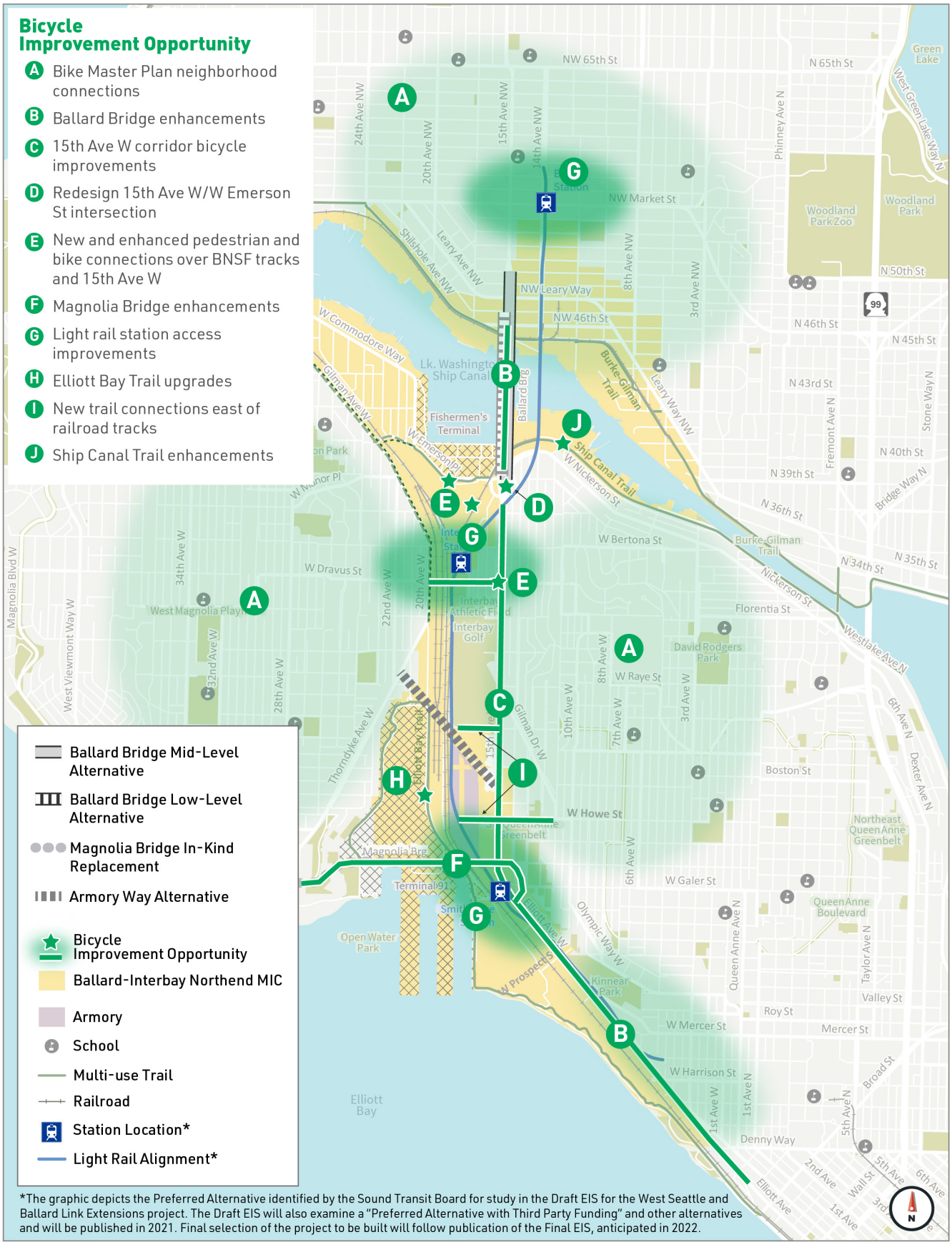
TABLE 3-3: BICYCLE NETWORK NEEDS AND CHALLENGES

Needs and Challenges	Opportunities
The bike network does not serve people of all ages and abilities. Most connections between existing bicycle facilities are difficult and do not support people of all ages and abilities.	A
Poor connections to regional trail network. Interbay has no neighborhood greenways or protected bicycle facilities, limiting safe bicycling access to the Ship Canal Trail, Elliott Bay Trail, and protected bicycle lanes on Gilman Ave W/20th Ave W.	A C D E I J
The Ballard Bridge sidewalks are too narrow for comfortable bicycling and there are few alternatives. Narrow sidewalks pose points of conflict and safety threats to people walking and biking. Alternative routes such as the Ballard Locks or Fremont Bridge add significant travel distance for southbound bicyclists, though the Bicycle Master Plan suggests exploring a new bicycle and pedestrian crossing between the Fremont and Ballard bridges.	B
Interbay lacks a north-south spine for bicyclists east of the railroad tracks. The Ballard Bridge lacks dedicated bicycle facilities, there are no designated north-south bicycle routes east of the tracks, and there are limited connections between the neighborhoods and destinations on 15th Ave W.	C
The intersection of 15th Ave W/W Emerson St lacks dedicated bicycle facilities. Bicyclists either take the lane on the high volume roadway, or divert to W Emerson St to cross the intersection.	D
The Magnolia Bridge has no marked bicycle facilities, and traffic speeds are too high for comfortable in-lane riding, particularly going uphill.	F
Topographic constraints to low-stress east-west bicycle travel highlight the importance of comfortable dedicated bicycle facilities to expand access sheds of future Sound Transit light rail station locations in Smith Cove and Interbay.	G
Narrow sections of the Elliott Bay Trail create pinch points, conflict areas, and safety hazards. The trail connection on 20th Ave W to Thorndyke Ave W has limited pavement markings for bicyclists.	H

Public Engagement Themes

- The Ballard Bridge is a choke point in the bicycle network. The bridge and its southern terminus are uncomfortable and stressful places to ride. Other north-south connections are out of the way (Ballard Locks or Fremont Bridge).
- The west end of the Magnolia Bridge is too steep of a grade for most people to ride comfortably, and the bridge has no dedicated space for bicyclists
- Several places along the Elliott Bay Trail are narrow and require people to dismount and walk their bikes
- Many destinations of interest are located along 15th Ave W, and bicyclists want safe, protected facilities to access businesses and services
- Many bicycle facilities in the study area do not meet design safety standards that encourage people of all ages and abilities to ride a bicycle

FIGURE 3-3: BICYCLE NETWORK OPPORTUNITIES



*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

TRANSIT ASSESSMENT

This section highlights transit needs, including access to stops and stations, capital investments to enhance transit speed and reliability, and passenger amenities. Transit in the project area is currently provided by King County Metro, but Sound Transit Link light rail is expected to open by 2035. Opportunities shown in Table 3-4 and Figure 3-4 consider current ridership, transit priority needs, and stop comfort and accessibility.

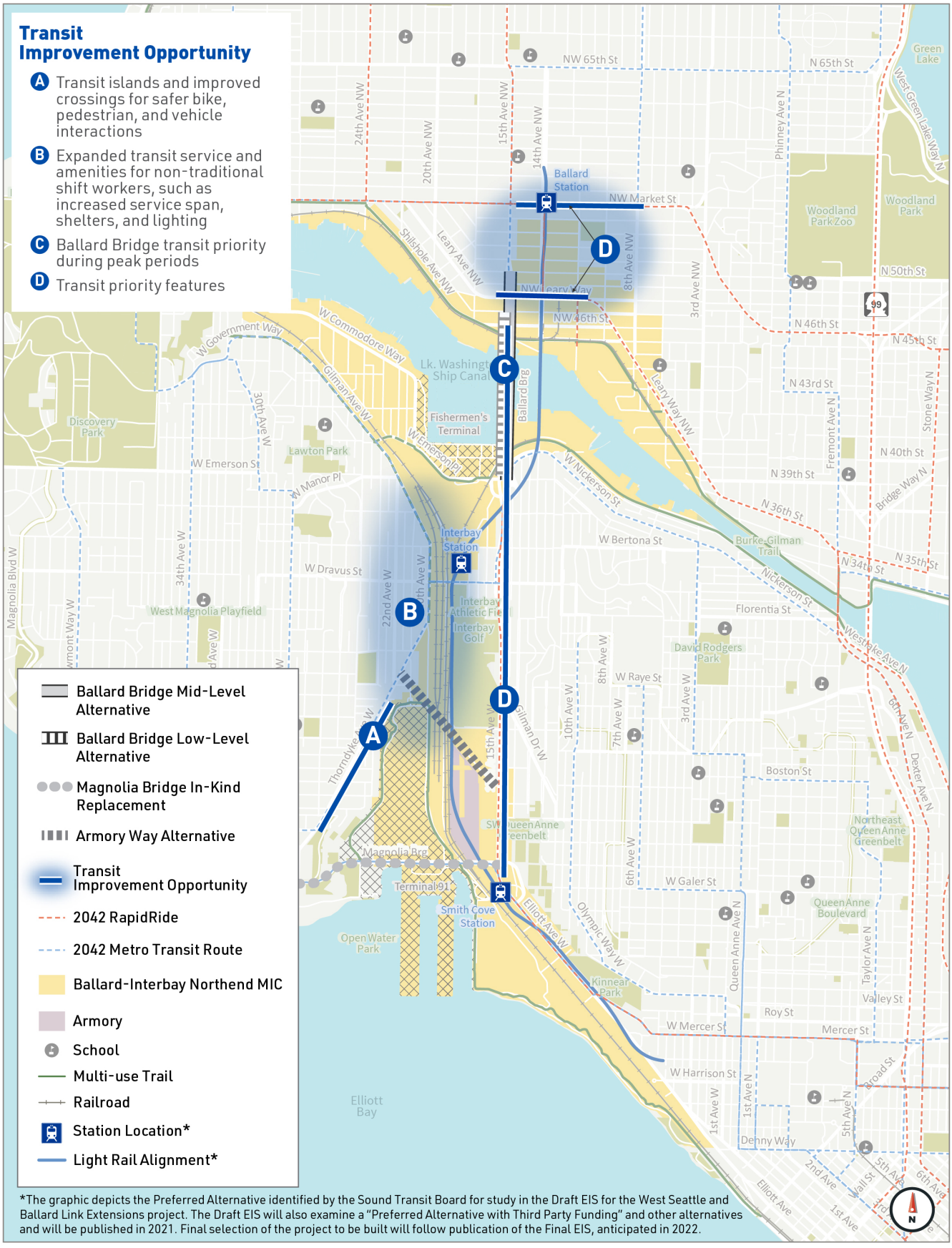
TABLE 3-4: TRANSIT NETWORK NEEDS AND CHALLENGES

Needs and Challenges	Opportunities
Some stops and stations lack safe and convenient connections to activity centers. Many high-frequency stops lack safe and comfortable pedestrian access. Obstacles include major arterials, narrow sidewalks, and steep grades.	A B
Pedestrian lighting is lacking near many transit stops. Walking and biking environment may be dark and feel unsafe at night, in the winter, and for workers with late or early shifts.	B
Transit travel time in the study area can vary significantly due to traffic congestion and bottlenecks. Despite dedicated transit lanes, high traffic volumes on 15th Ave W can lead to transit delay. W Nickerson St can be a bottleneck for east-west transit.	C D
Transit speed and reliability improvements are needed most on frequent transit routes and key corridors that service multiple routes, including: 15th Ave W/NW, NW Market St, and NW Leary Way.	D

Public Engagement Themes

- Safe, convenient access to future Link light rail stations is critical for people walking, biking, and transferring to/from other transit services; elevators are particularly important for people with strollers, mobility devices, or other mobility needs
- Travel through the study area should emphasize transit priority, speed, and reliability, beyond existing business access and transit (BAT) lanes on 15th Ave W/NW
- Many transit stops in the study area are located on arterials or busy streets without safe crossings nearby (e.g., W Emerson St and 15th Ave W)
- Evening and weekend transit service is limited such that shift workers in the study area have little choice but to drive to get to Ballard-Interbay
- Transit stops and stations in the study area lack many of the amenities that help to make transit trips comfortable and convenient

FIGURE 3-4: TRANSIT NETWORK OPPORTUNITIES

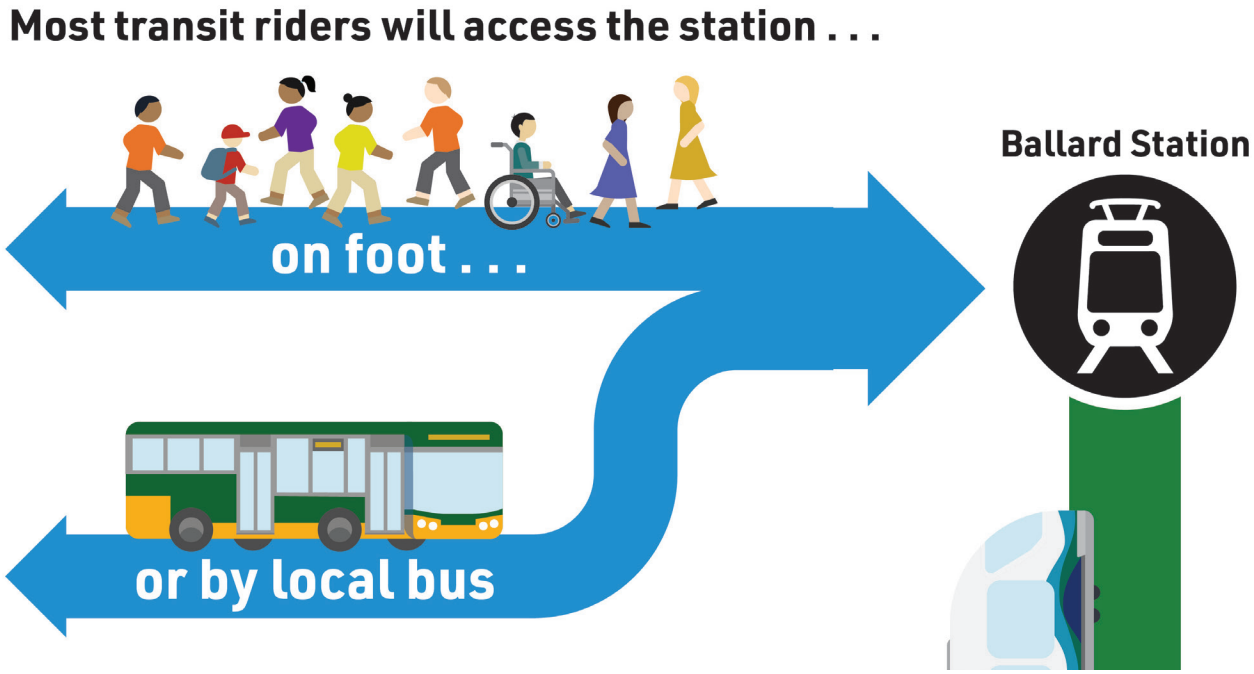


*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

West Seattle and Ballard Link Extensions

The West Seattle and Ballard Link Extensions (WSBLE) project will build 3 new Sound Transit light rail stations in the study area: Ballard, Interbay, and Smith Cove. The Ballard Station is expected to have the highest number of transit transfers and pickups/dropoffs because it is a terminus station, and is located in a densely populated and growing neighborhood.

By 2042, riders are expected to access these stations predominantly through a mix of walking, biking, or transit transfer, with some riders being picked up or dropped off. This highlights the importance of pedestrian, bicycle, and transit access for riders.



Sound Transit's preliminary forecasts anticipate that the number of people boarding light rail at the Interbay station will be about one-third of the ridership at the Ballard station in 2042. Buses serve and provide access to the Magnolia and Queen Anne neighborhoods. At the Smith Cove Station, ridership would be slightly lower than at the Interbay station, and more than half of riders would arrive on foot.

FIGURE 3-5: KING COUNTY METRO ROUTES IN THE PROJECT AREA AS OF SEPTEMBER 2019

ROAD FREIGHT AND AUTO NETWORK ASSESSMENT

This section focuses on mobility for general-purpose autos, road freight, and goods movement, and identifies specific areas where improvements are needed. As the epicenter of Seattle's fishing and maritime industry, there are several critical freight corridors that pass through the BIRT study area. 15th Ave W/NW serves as the primary north-south spine, highlighting the importance of the Ballard Bridge and connectivity within the overall study area and to the broader region. Opportunities shown in Table 3-5 and Figure 3-6 consider improvements to safety and efficiency for freight and passenger vehicle traffic.

TABLE 3-5: ROAD FREIGHT AND AUTO NETWORK NEEDS AND CHALLENGES

Needs and Challenges	Opportunities
15th Ave W/NW is the only major north-south corridor that accommodates transit, truck, and general-purpose traffic. As a critical connector to the regional system, it is often congested.	A
Serious injury collisions were located primarily on 15th Ave W and in downtown Ballard. As walking and biking increase with light rail station openings,the need for safe crossings of major arterials such as 15th Ave W will increase.	B
Major freight routes are subject to traffic congestion. 15th Ave W/NW, NW Market St, NW Leary Way, and Shilshole Ave NW are identified as Major Truck Streets.	A
Freight access in industrial centers needs to be maintained for efficient goods delivery. Freight access to Manufacturing and Industrial Centers is critical to the economy (15th Ave W/NW, Smith Cove, Salmon Bay and the Lake Washington Ship Canal, Terminal 91, etc.)	C D
There is limited dedicated curb space for freight and delivery vehicles in Interbay, and narrow streets and tight turning radii present challenges for large trucks with cargo accessing industrial or maritime sites.	D
Many conflicts exist between freight and people walking and biking. An abundance of driveways around industrial land uses are challenging for bicyclists and pedestrians as drivers may not see them, and freight is challenged to make turns with narrow curb radii.	B

Public Engagement Themes

- Many businesses and industries in the study area rely on trucks to transfer goods to and from market
- Reliability of truck travel is essential for industrial and maritime businesses
- Maintaining and improving truck travel time on 15th Ave W/NW are priorities for industrial businesses and freight haulers, as it is the primary connection to the regional highway system
- The rise of online retail has contributed to an increase in small package delivery to homes and businesses; planning should consider increased use of small delivery vehicles in the study area

FIGURE 3-6: ROAD FREIGHT AND AUTO NETWORK OPPORTUNITIES

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

CHAPTER 4: TRANSPORTATION AND LAND USE SCENARIOS

The Ballard-Interbay Regional Transportation System (BIRT) study undertook a scenario planning exercise to develop an understanding of how different potential futures are related to bridge alternatives, land use changes, and transportation investments inform BIRT recommendations. This chapter discusses 4 scenarios for the planning year 2042, and their 3 key elements. It includes a summary of: (1) the scenarios and how future land use and transportation assumptions were used to inform BIRT recommendations and (2) how specific projects were identified and evaluated.

Based on future needs identified by the scenario evaluation and current needs identified by the BIRT needs evaluation (Chapter 3), a comprehensive list of potential projects was developed. This list included recommendations from previous plans, as well as partner agency, stakeholder, and public input (Chapter 2 and Appendices A, B, and D). Projects were evaluated and prioritized based on a set of evaluation criteria, aligned with the project goals described in Chapter 1.

Planned development of the Terminal 91 Uplands is one of the future land uses considered in BIRT scenario planning

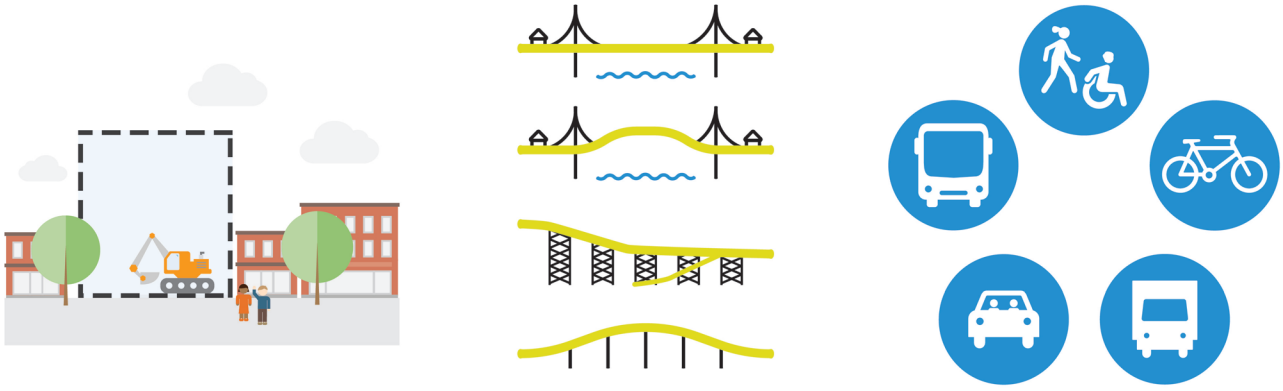
FUTURE LAND USE AND TRANSPORTATION SCENARIOS

The BIRT study evaluated 4 scenarios to anticipate different potential outcomes by 2042, considering elements such as transportation system, bridge alternatives, and land use. Planned changes to the transportation system and proposals under consideration for future land redevelopment influence the need for additional transportation investments. Beyond these certainties, there are many land use and redevelopment considerations that could influence transportation system needs between today and the planning horizon year of 2042. The scenario evaluation ensures that realistic future outcomes are considered and addressed by proposed investments.

Scenario Elements

Each of the 2042 scenarios were built around combinations of the following elements:

FIGURE 4-1: SCENARIO ELEMENTS



Land Use
Potential scenarios for development or redevelopment of parcels in the study area

Bridge Alternatives
Alternatives for replacement of the Ballard Bridge and Magnolia Bridge

Transportation System
Multimodal transportation system projects and operations

The BIRT study does not recommend a single preferred bridge alternative for either the Ballard or Magnolia bridges, but evaluates future transportation system improvements based on potential replacement alternatives.

A current year (2019) scenario was developed and evaluated to provide a baseline and ensure travel demand models are calibrated to current system operations. Models were calibrated to 2019 conditions given the abnormal traffic conditions experienced in 2020 due to the COVID-19 pandemic and its impacts to regional travel demand and economic activity.

Land Use and Transportation Scenarios

All of the scenarios considered regional growth through 2042 and the mobility benefits of long-term investments such as Sound Transit's Ballard Link Extensions and implementation of the City's modal plans. The alternatives varied in their assumptions for the replacement alternatives selected for the Magnolia and Ballard bridges, as well as land uses permitted in the City's industrial zones. Scenarios 1 and 2 are consistent with Comprehensive Plan land use projections. Scenarios 3 and 4 envision higher zoning or land use intensity associated largely with the Armory site redevelopment. Magnolia and Ballard bridge alternatives are born out of the recent bridge studies completed in 2019 and 2020, respectively. A total of 4 land use and transportation scenarios were considered for this study.

TABLE 4-1: LAND USE , BRIDGE, AND TRANSPORTATION SCENARIOS

Element	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Land Use	A Maintain Industrial Character	A Maintain Industrial Character	B Future of Industry	C Transition to Mixed Use District
Ballard Bridge	 Ballard Bridge Mid-Level	 Ballard Bridge Low-Level	 Ballard Bridge Low-Level	 Ballard Bridge Low-Level
Magnolia Bridge	 Magnolia Bridge In-Kind Replacement	 New Armory Way Bridge	 New Armory Way Bridge	 New Armory Way Bridge
Transportation Infrastructure	 Transportation Investments	 Transportation Investments	 Transportation Investments	 Transportation Investments

Scenarios 1 and 2 test differences in the Magnolia and Ballard Bridge configurations with the same land use assumptions in place. The land use tested in Scenarios 1 and 2 is most similar to what current zoning would support. Scenarios 3 and 4 utilize the bridge alternatives assumed to have the greatest impact on the transportation system. These scenarios are used to evaluate impacts of potential future housing, employment, and land use growth. The proposed land use scenarios from the Mayor's Maritime & Industrial Strategy (M&I) were used to model traffic and potential growth intensities in Ballard-Interbay. The M&I inputs were provided before that process was complete so should be considered representative.

Scenario Performance

Specific high-level measures of effectiveness were derived from the BIRT study goals and scored for each scenario to understand which provide the most benefits in terms of mobility, safety, equity, and potential for action. Table 4-2 shows the scores, ranging from a blank circle showing low performance, to a full circle for high performance. A No Build scenario is included for comparison, which represents a scenario where no specific BIRT-related projects are constructed. As shown below, Scenarios 2, 3, and 4 provide the greatest multimodal transportation benefit, all of which incorporate a low-level Ballard Bridge and new Armory Way bridge.

TABLE 4-2: COMPARISON OF PERFORMANCE BY SCENARIO

Category	Element: *Metric Considered*	No Build	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Mobility	Motorized Modes (Bus, Freight, Auto): *Travel time*					
	Active Modes (Walking and Biking): *Pedestrian/ bicyclist comfort*					
Safety	Safe and Comfortable Options: *Addresses high-collision locations*					
Equity	Social Impacts: *Provides amenities to low-income communities and people of color*					
Action	Transportation Capital Costs: *Overall cost of capital projects (best performance = lowest cost)*					
	Response to Urgent Needs: *Rebuilds deficient facility*					

 = Lowest performance  = High performance

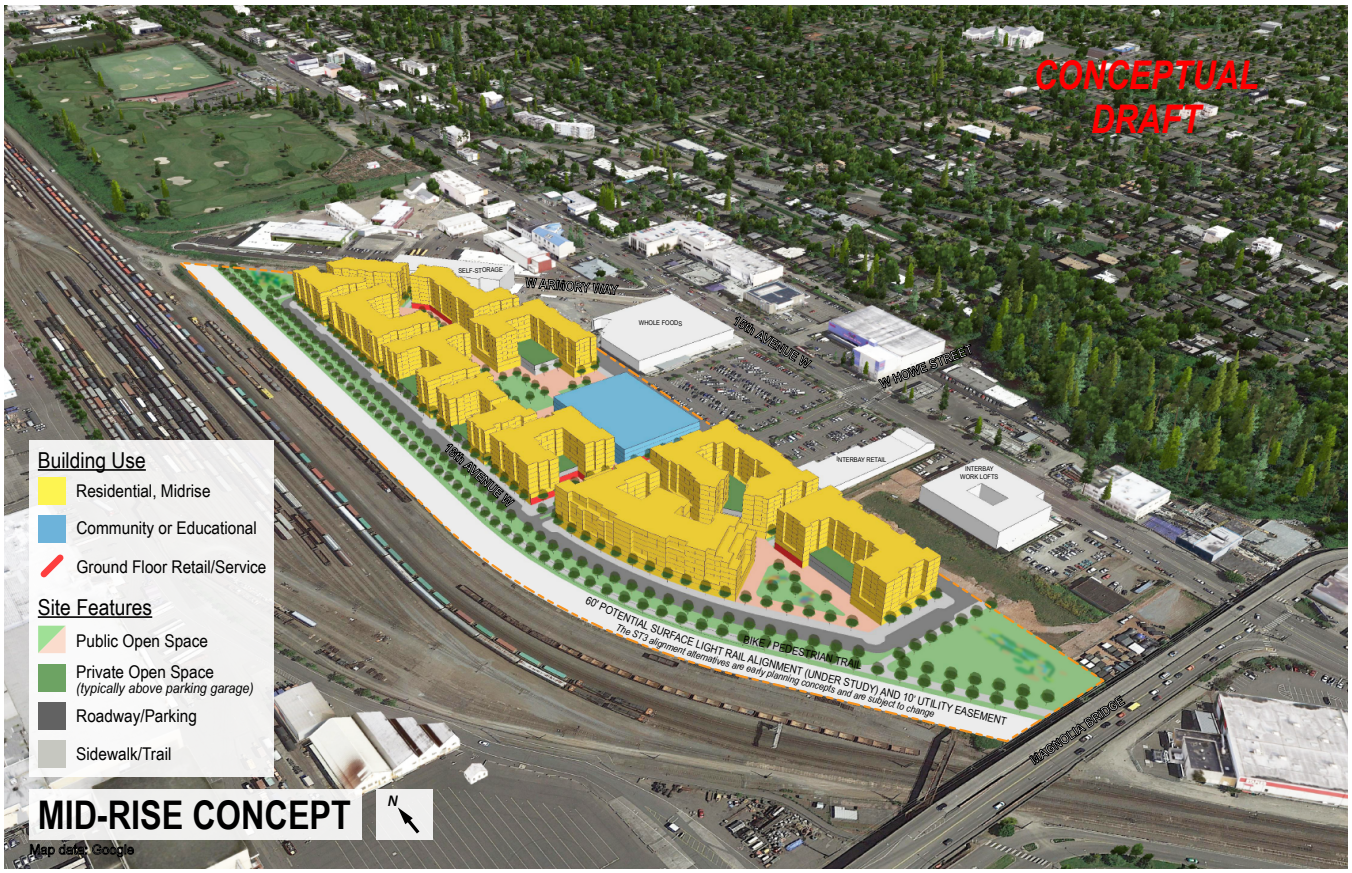
Figure 4-2 provides a high-level summary of scenarios based on measures of effectiveness that align with project goals. A more detailed evaluation of projects was conducted and is described later in this chapter.

Land Use Alternatives

The land uses considered in this study are informed by alternatives analysis being conducted as part of the Mayor's Maritime & Industrial Study (M&I). The M&I was in progress at time of this work, so land use inputs were not final; rather the team used assumptions that represented ranges of growth and intensity. It is important for the BIRT study to test more aggressive future land uses to ensure plan priorities account for the potential impacts to the transportation system those may generate. No decisions about changes to zoning in the study have been made to support these conceptual scenarios. These land use alternatives have similar foundational elements. The Armory site redevelopment scenarios are a primary variable among land uses considered. The Department of Commerce worked with the Washington State Military (National Guard) and an advisory board including elected officials to evaluate potential future uses of the Interbay Property per legislative direction in 2018.[1]

Table 4-3 provides additional detail on the land use scenarios mentioned in Table 4-1.

FIGURE 4-2: ARMORY SITE MID-RISE REDEVELOPMENT CONCEPT



Potential changes to land use at the Armory site could represent the most significant changes to land use in the study area. No changes to current zoning (required for this redevelopment concept) have been made by the City of Seattle at the time of this study and all assumptions about this site used in the BIRT study are for purpose of understanding the impact that more intense uses of the site could have on the transportation network.

1 https://deptofcommerce.app.box.com/v/Interbay-plan

Table 4-3 describes the 3 land use scenarios considered within the BIRT study. All 3 future year scenarios look out to 2042 and assume regional land use growth consistent with that forecast in the Puget Sound Regional Council travel model applied for the West Seattle and Ballard Link Extensions Project. All 3 scenarios also assume the following key developments within the BIRT study area:

- Terminal 91 Uplands: Phase I development in the Port of Seattle's Terminal 91 Uplands over the next 10-15 years will consist of approximately 100,000 square feet of light industrial space and associated site infrastructure improvements, with phase II developing another 300,000 square feet of light industrial facilities.
- Fishermen's Terminal: The Port of Seattle's Fishermen's Terminal redevelopment (2019-2023) will include roughly 60,000 square feet of new light industrial space for complementary maritime businesses by the end of 2022. A new "Gateway" building is planned in the existing vacant bank building and Net Sheds 7 and 8.
- Expedia Site: The Expedia Site will accommodate 8,000 employees by 2031.

The 3 land use scenarios differ in their assumed development of the City's Maritime and Industrial Zones and assumptions about redevelopment of the Armory site. These assumptions were developed in coordination with upcoming M&I Study (Mayor's Office, expected 2021) and The Interbay Public Development Advisory Committee's Recommendations and Implementation Plan (Department of Commerce, 2018). The last 3 rows of Table 4-3 will continue to evolve and be informed by the Mayor's M&I strategy work.

TABLE 4-3: FUTURE LAND USE ALTERNATIVES

Alternative	Land Use A: Maintain Industrial Character	Land Use B: Future of Industry	Land Use C: Transition to Mixed Use District
	A	B	C
Regional Land Use	Scenarios include land use growth assumptions adopted by the City of Seattle (Seattle 2035: Comprehensive Plan) and included in the Puget Sound Regional Council land use forecast.		
Site Specific Development	Terminal 91 Uplands: Phase I development in the Port of Seattle's Terminal 91 Uplands over the next 10-15 years will consist of approximately 100,000 square feet of light industrial space and associated site infrastructure improvements, with phase II developing another 300,000 square feet of light industrial facilities.		
	Fishermen's Terminal: The Port of Seattle's Fishermen's Terminal redevelopment (2019-2023) will include roughly 60,000 square feet of new light industrial space for complementary maritime businesses by the end of 2023. A new "Gateway" building is planned in the existing vacant bank building and Net Sheds 7 and 8. Redevelopment includes a new Gateway and Maritime Innovation Center.		
	Expedia Site: The Expedia Site may accommodate up to 8,000 employees by 2031.		
	Armory Site: Assumes a mid-point of the Armory site development concepts, similar to the 'Mid-Rise' concept which includes 1,800 new units of multifamily housing and 102,000 SF of retail space by 2035. No decisions have been made about the Armory site redevelopment. Land use alternatives are based upon conceptual zoning and land use scenarios.		Armory Site: Assumes Armory Development 'High-Rise' concept which includes dense high-rise multi-family residential, retail, and civic space. The proposed Armory site will include 2,900 new dwelling units and 110,000 SF of retail space by 2035.
Industrial and Maritime Zones	Industry and Maritime: No change in industrial zoning	Industry and Innovation: Greater mix of production, research, design, and industrial office uses Makers Zone: Mix of small-scale industrial firms and incubator and prototyping activity	Mixed Use: Allows dense multi-family housing and expanded opportunities for retail and office space
	Housing: No new housing assumed within industrial zones	Housing: No new housing assumed within industrial zones	Housing: 1:1 job to housing ratio within targeted industrial zones
	Employment: No change in employment assumed within industrial zones	Employment: 27% growth in employment in targeted industrial zones	Employment: 6% growth in employment in targeted industrial zones

Bridge Alternatives

Each scenario incorporates 1 of 2 bridge alternatives for the Ballard Bridge (low-level and mid-level) and 1 of 2 for the Magnolia Bridge (in-kind replacement of the existing bridge and a new bridge on Armory Way that replaces the current bridge). Bridge alternatives were developed through the Ballard and Magnolia Bridge Planning Studies. Each of those studies evaluated a range of alternatives; BIRT evaluates the 2 most viable and publicly supported alternatives from each study. Bridge alternatives provide varying access to and from the Ballard Bridge, the Magnolia neighborhood, and 15th Ave W/NW.

Ballard Bridge Alternatives

Figure 4-3 shows the alignment and describes the features of the mid-level Ballard Bridge alternative. Figure 4-4 shows the alignment and describes the features of the low-level bridge alternative.

FIGURE 4-3: MID-LEVEL BALLARD BRIDGE ALTERNATIVE

Ballard Bridge Mid-Level

The Ballard Bridge mid-level alternative, which is assumed in Scenario 1, would replace the existing structure and re-design access to and from the bridge on the northern and southern ends to enhance freight mobility. It is a lift bridge with less need to open than today.

1. Northbound off-ramp at NW 49th St on the east side
2. Southbound on-ramp from 17th Ave NW & NW Leary Way; 2 new signals at 17th Ave NW at Leary Way
3. Shared-use path for people biking, walking, and rolling
4. Longer on and off ramps from 15th Ave W on the southern end of the bridge
5. W Nickerson/W Emerson St will include a modified single point urban interchange (SPUI)

FIGURE 4-4: LOW-LEVEL BALLARD BRIDGE ALTERNATIVE

Ballard Bridge Low-Level

The Ballard Bridge low-level alternative in Scenarios 2, 3, and 4 will be similar to the existing bridge but will include improved access for all modes at the south landing. It is a lift bridge with need to open similar to today.

1. Similar access on northern section as with baseline conditions
2. Shared-use path for people biking, walking, and rolling
3. Enhanced access on southern section
4. W Nickerson/W Emerson St will include a modified single point urban interchange (SPUI)

Magnolia Bridge Alternatives

Figure 4-5 describes the Magnolia Bridge in-kind replacement and Figure 4-6 shows the proposed Armory Way bridge and associated network improvements.

FIGURE 4-5: MAGNOLIA BRIDGE IN-KIND REPLACEMENT

Magnolia Bridge In-Kind Replacement

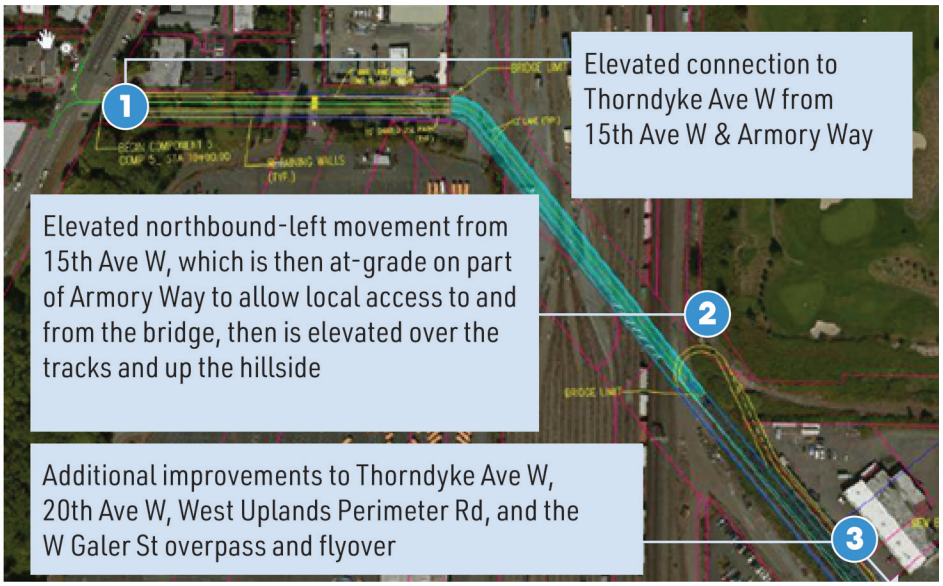
Scenario 1 considers a one-to-one replacement of the Magnolia Bridge.

1. New bridge built immediately south of existing Magnolia Bridge
2. Connections at the east and west would be similar to existing bridge

FIGURE 4-6: ARMORY WAY BRIDGE

Armory Way Bridge

The other 3 scenarios assume a new bridge along Armory Way, which would replace the existing Magnolia Bridge.



Transportation Investments

In addition to the bridge replacement alternatives, other key transportation infrastructure and network assumptions included in the scenarios are:

- Sound Transit West Seattle and Ballard Link Extensions (WSBLE)
- King County METRO CONNECTS 2040 Network
- Bike Master Plan project completion
- Freight Master Plan project completion

Sound Transit West Seattle and Ballard Link Extensions

The most transformational change expected for the BIRT study area in the next 20 years is the arrival of Link light rail, which will serve 3 study area stations: Ballard, Interbay, and Smith Cove.

King County METRO CONNECTS 2040 Network

As a result of the WSBLE project, King County Metro anticipates major changes to the bus network that restructures service to enhance bus connections to light rail and other regional centers. Metro's 2040 METRO CONNECTS network is consistent with Scenario 1 (Magnolia Bridge in-kind replacement) since no changes to the transit environment would be made. Scenarios 2 through 4 (Armory Way bridge alternative) assumes all transit using the Magnolia Bridge in the baseline/Scenario 1 network would shift to Armory Way and use W Thorndyke Ave to access the various transit pathways.

Bicycle Master Plan

The City of Seattle's adopted 2014 Bicycle Master Plan (BMP) outlines proposed improvements to the City's bicycle network. Although the plan has a 20-year horizon, implementation is dependent on funding availability. The most relevant projects for Ballard that have not yet been implemented include:

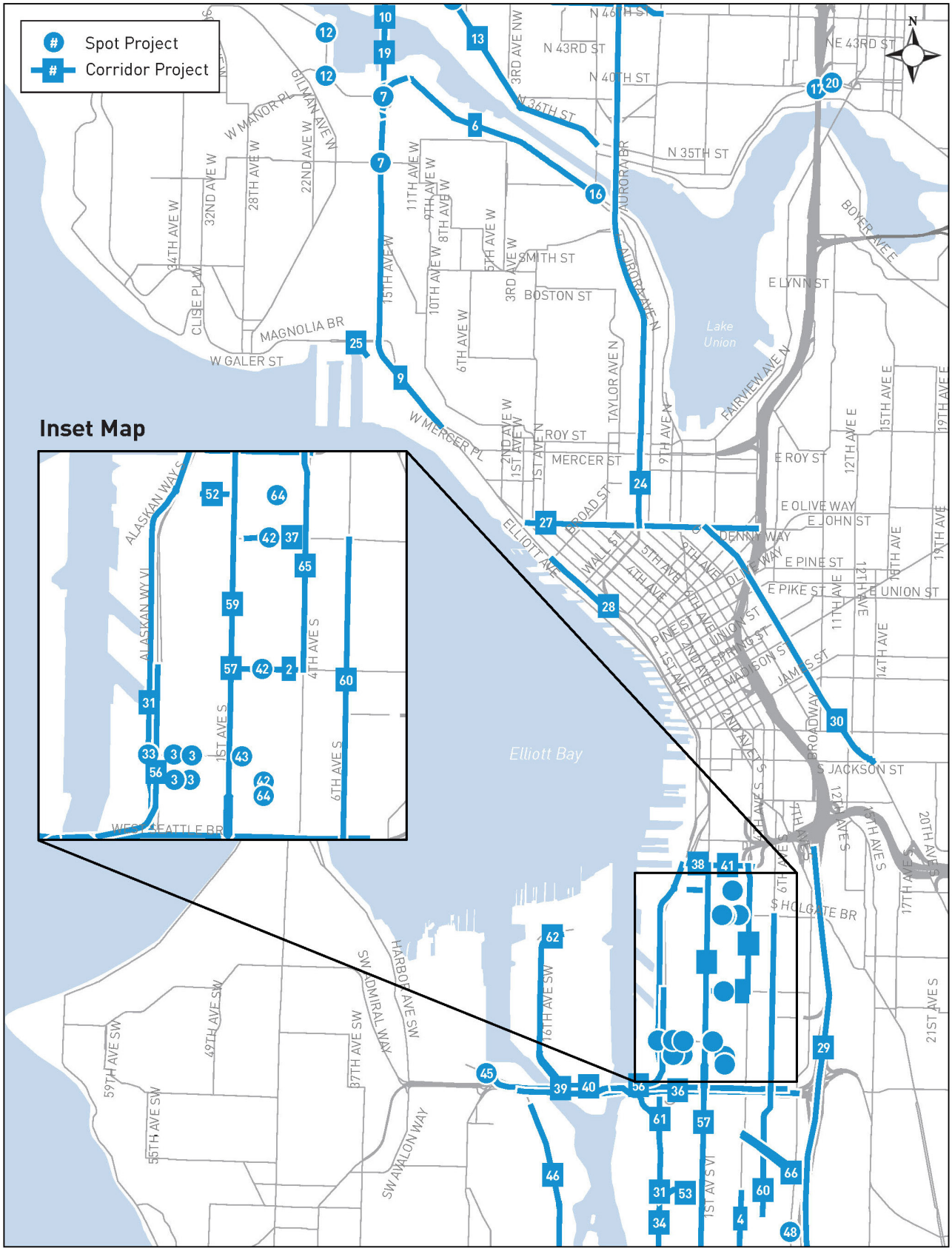
- Complete the missing link of the Burke-Gilman Trail (planned start of construction is 2022)
- Provide a shared-use path on the new Ballard Bridge*
- Add bicycle lanes on 14th Ave NW and 32nd Ave NW*
- Create a variety of neighborhood greenways that are oriented both north-south and east-west, providing additional route options*
- Build an additional Ship Canal bicycle-pedestrian crossing between the Ballard and Fremont bridges to provide a new connection between the Burke-Gilman Trail and Ship Canal Trail, though the BMP doesn't specify an exact location*

**Unfunded project as of 2020*

Freight Master Plan

The City adopted its first Freight Master Plan in September 2016. The plan directs the City to maintain primary and secondary freight routes, including those connecting Interbay to the regional freeway network. A map from the 2016 plan illustrated in Figure 4-7 shows key projects and corridors in Central Seattle. None of the future scenarios assume the freight network changes meaningfully beyond what currently exists since there is limited right-of-way and land to create new freight network connections.

FIGURE 4-7: CENTRAL SEATTLE FREIGHT PROJECTS (2016 FREIGHT MASTER PLAN)



Specific project details can be found in the Seattle Freight Master Plan: https://www.seattle.gov/Documents/Departments/SDOT/About/DocumentLibrary/FMP_Report_2016E.pdf

PROJECT IDENTIFICATION AND EVALUATION

The study identifies project-level improvements that are location- or corridor-specific and support the modal networks that keep people and goods moving in the study area. This comprehensive list of potential improvements was developed based on the review of documented needs and recommendations from previous plans, the BIRT needs assessment (Chapter 3), as well as partner agency, stakeholder, and public input (Chapter 2 and Appendices A, B, and D). Projects were evaluated based on a set of evaluation criteria aligned with the project goals (Chapter 1).

Projects identified in this study aim to improve one or more of these forms of transportation ...

Walking and rolling

Bicycling

Transit

Freight and goods movement

Auto and taxi/ridehail

Evaluation Framework

A project evaluation framework was developed to identify the projects and that best support the legislative directive for the project, SDOT's goals and values, and the interests of the interagency team and study area communities. The following framework was developed with public and Interagency Team input. Each project was evaluated based on the full set of criteria. A complete list of projects and their scores per metric is included in Appendix G, and detailed recommendations resulting from the technical evaluation and public input are provided in Chapter 6.

GOAL 1: MOBILITY

Improve mobility for people and freight

Objective 1: Increase person mobility in the study area

METRICS AND EVALUATION CRITERIA

- **Throughput:** Project increases person trips and person throughput.
- **Transit Mobility:** Project improves transit mobility.
- **Access:** Project increases the geographic reach for walking or biking to key destinations (light rail station, existing RapidRide, local, and express bus stops, or major jobs center [Terminal 91, Expedia, Armory]) under low-stress conditions.
- **Connectivity:** Project increases the number of high-quality travel choices through improved connectivity.

Objective 2: Accommodate the needs of freight and goods movement

METRICS AND EVALUATION CRITERIA

- **Travel Time and Reliability:** Project reduces or maintains freight travel times on key corridors.
- **Route Resiliency:** Project adds to available freight paths at key locations in the study area.

GOAL 2: SAFETY

Provide a system that safely accommodates all travelers

Objective 1: Protect the most vulnerable travelers

METRICS AND EVALUATION CRITERIA

- **Safe and Comfortable Options:** Project makes walking, rolling, biking, and using transit safer and more comfortable.
- **Crossing Safety:** Project makes crossing roadways safer and more comfortable for those walking, rolling, biking, and accessing transit.
- **Collision Histories and Factors:** Project addresses safety at a location where many collisions have occurred or are identified in the City's Bicycle and Pedestrian Safety Analysis.

Objective 2: Recognize the unique needs to safely accommodate freight

METRICS AND EVALUATION CRITERIA

- **Roadway Geometrics:** Project improves mobility for trucks and deliveries.
- **Modal Separation:** Project limits conflicts with other modes.

GOAL 3: EQUITY

Advance projects that meet the needs of communities of color and those of all incomes, abilities, and ages

Objective 1: Build a more racially equitable and socially just transportation system

METRICS AND EVALUATION CRITERIA

- **Social Impacts - Residents:** Project minimizes impacts on people of color and low-income households that live in the BIRT study area.
- **Social Impacts - Employees:** Project minimizes impacts on low-wage workers and people of color that work in the BIRT study area.
- **Americans with Disabilities Act (ADA) Access:** Project makes it easier for people with disabilities to travel in the study area.

GOAL 4: ACTION

Support timely and coordinated implementation

Objective1: Maintain the current and future capacities of the Ballard and Magnolia bridges

Objective 2: Provide other necessary infrastructure in Ballard-Interbay to facilitate overall mobility

METRICS AND EVALUATION CRITERIA

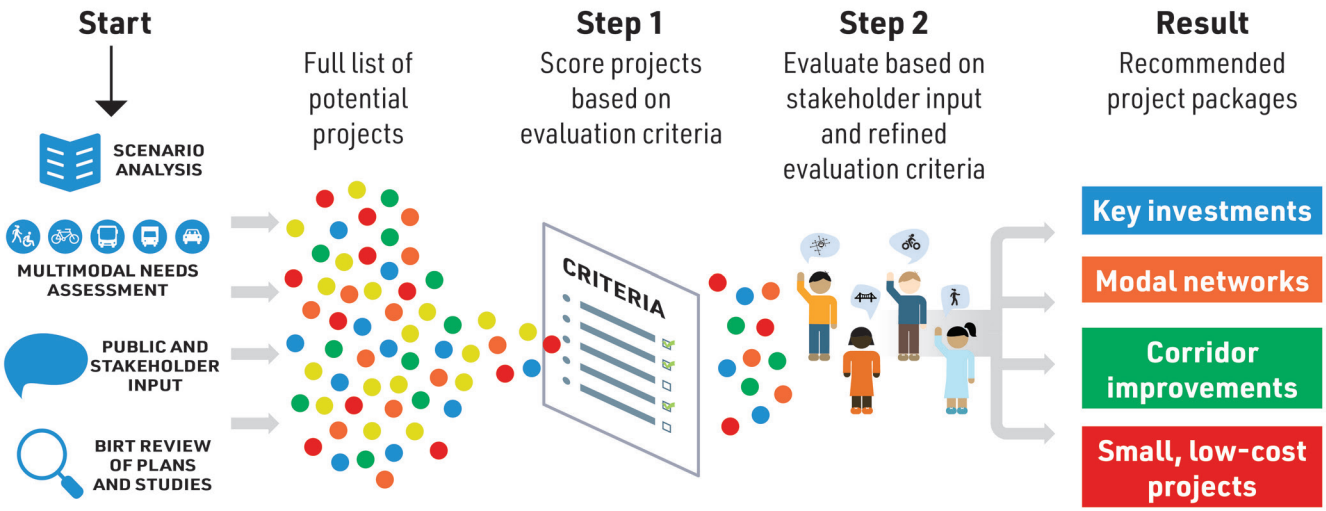
- **Timely Implementation:** Project is implementable within a reasonable timeframe given technical and right-of-way considerations.
- **Constructability, Risk, and Complexity:** Project limits construction impacts.
- **Environmental Impacts:** Project minimizes impacts on the ecological environment.
- **Economic Impacts:** Project supports the Manufacturing and Industrial Center (BINMIC) and maritime industries.
- **Responds to Urgent Needs:** Project addresses an identified seismic or structural deficiency.
- **Funding Viability:** Project is likely to be funded through local, regional, state, or federal funding.[2]

2 Funding viability means a project has earmarked funds, is competitive for grant funding, or can be included as part of another City-funded project or program.

Project Identification

The 4 land use and transportation scenarios, review of previous plans and studies, public engagement, and an extensive needs assessment conducted during this study were used to identify modal needs, resulting in more than 80 individual projects for evaluation. Projects were evaluated and scored based upon the evaluation criteria described on pages 61-62, and were further refined with agency and stakeholder input as shown in Figure 4-8.

FIGURE 4-8: PROJECT IDENTIFICATION PROCESS



The initial project scoring resulted in about 50 projects being advanced for further evaluation. Additional stakeholder input and refinement of the evaluation criteria brought the list down to about 40 top projects. These projects were categorized and prioritized based on how they would improve the transportation system under different scenarios. The top rated projects are described in more detail in Chapter 6: Potential Transportation Investments. Many of the highest-scoring projects are applicable with any of the proposed bridge alternatives. For those projects that are only viable with specific bridge alternatives, those dependencies are highlighted.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CHAPTER 5: SOCIAL AND ECONOMIC IMPACTS

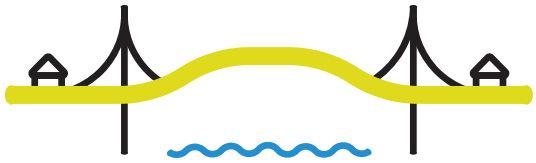
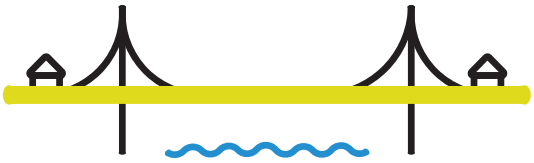
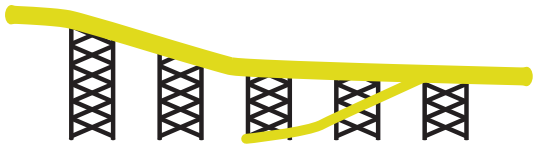
The Ballard-Interbay Regional Transportation System (BIRT) study area encompasses one of the city's most important industrial and manufacturing centers and is surrounded by growing residential neighborhoods. Like much of Seattle, the area is changing as the city grows.

As part of the BIRT study, the project team developed a data-rich overview of the economic, social, and community significance of the Ballard-Interbay study area. The detailed report included in Appendix E provides an assessment of the current economic and employment landscape, commute patterns, demographic and housing trends, development patterns, and typical uses of the transportation network. Appendix H reviews the replacement and rehabilitation alternatives for the Ballard and Magnolia bridges, including an analysis of the impacts and benefits associated with the alternatives from social and economic dimensions. This chapter summarizes the findings in Appendices E and H, and presents the trade-offs associated with the bridge alternatives evaluated in Scenarios 1 and 2.

ALTERNATIVES EVALUATED

The social and economic assessment focuses on differentiating between Ballard Bridge and Magnolia Bridge alternatives using Scenarios 1 and 2 described in Chapter 4 as the primary comparison.

FIGURE 5-1: BRIDGE SCENARIOS

Scenario 1	Scenario 2
 Ballard Bridge Mid-Level	 Ballard Bridge Low-Level
 Magnolia Bridge In-Kind Replacement	 Armory Way Bridge

Chapter 4 presents detailed information about each bridge alternative and scenario

SOCIAL AND ECONOMIC IMPACTS ASSESSMENT

The social and economic impacts of future bridge replacement scenarios frame how alternatives will affect residents, workers, and businesses in daily life. Potential impacts considered for each bridge alternative include travel time, safety, vehicle operating costs, housing accessibility, market desirability, and bridge costs.

FIGURE 5-2: IMPACTS ANALYSIS CRITERIA

The study did **not** conduct a detailed evaluation of construction impacts of bridge alternatives. All impacts are for the operational period of the bridges, and the study year used for analysis is 2042. Detailed assumptions and a more thorough discussion of the analysis are available in Appendix H.

The findings presented in this chapter draw on multiple data and information sources, including previous bridge plans and studies, traffic analysis conducted as part of this study, and state and federal sources (e.g., Washington State Employment Security Department, Office of Financial Management, U.S. Bureau of Labor Statistics). All estimated costs are in 2018 dollars, except in the case of Ballard Bridge costs (page 78) which are forecasted in 2019 dollars.

Summary

Key takeaways from the social and economic impacts analysis include:

- The study area encompasses commuter and distribution networks that are criticial to the region by connecting Seattle's southern industrial areas, downtown Seattle, and areas north. It complements north-south corridors, SR 99 and I-5. Bridge alternatives do not suggest any significant differences in terms of vehicle operating costs or market desirability.
- Both Ballard Bridge and Magnolia Bridge alternatives are expected to provide safety benefits for commuters and people that travel either facility. The proposed bicycle and pedestrian facilities on the Ballard Bridge provide safer active travel.
- Seattle neighborhoods and study area workers rely heavily on the corridor to access jobs and services. The surrounding Ballard, Queen Anne, and Magnolia neighborhoods depend on the Ballard-Interbay corridor for daily work and personal trips. These important neighborhoods are in high demand for housing of all types, yet affordability and limited multifamily housing options require many workers to live outside the study area. The growing diversity of housing in proximity to downtown and industrial employment centers attracts talent to Seattle, and supports the economy and vibrant commercial areas.
- While there is little difference in terms of travel time between the Ballard Bridge replacement alternatives being considered, the impacts associated with the Magnolia Bridge replacement alternatives differ substantially. Transportation access to a new Armory Way Bridge could result in higher vehicular delay and vehicle miles traveled than the In-Kind Alternative. If this alternative is chosen, SDOT would need to work in close partnership with agencies like King County Metro and Sound Transit to minimize impacts to access, mobility, and travel time.

TABLE 5-1. SUMMARY OF IMPACTS ASSESSMENT FINDINGS

Criteria	Travel Time	Safety	Operating Cost	Housing Accessibility	Market Desirability	Bridge Costs
Ballard Bridge Mid-Level	Improves by 0.6 minutes	Reduces risk of collisions	No significant change	No impact	No change	$680M to $1,460M
Ballard Bridge Low-Level	Improves by 0.2 minutes	Reduces risk of collisions	No significant change	No impact	No change	$330M to $710M
Magnolia Bridge In-Kind Replacement	Increases by 0.7 minutes	Minimal safety benefits	No significant change	No impact	No change	$340M to $420M
Armory Way Bridge	Increases by 12.7 minutes	Minimal safety benefits	No significant change	Could increase commute time	No change	$200M to $350M

Travel Time

How will each bridge alternative impact travel time for commuters and freight that use the bridges?

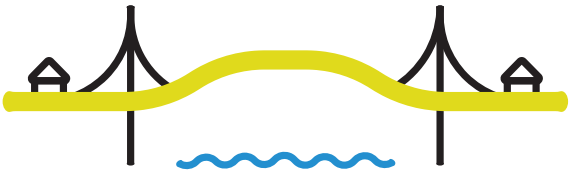
People's time has value. Increased time spent traveling reflects loss of productivity for individuals and is costly to businesses that move goods and freight on the public street system. A reduction in travel time can increase people's personal time for other activities and have a net economic benefit for businesses and goods haulers. Travel time impacts are estimated using data on projected traffic volumes and travel time changes taken from transportation modeling conducted by the BIRT study team. The change in travel time represented is the average of the change for representative trips crossing each bridge for the AM and PM peak periods.

Ballard Bridge

From the perspective of travel time alone, the 2 Ballard Bridge alternatives considered are forecasted to have a small benefit for people using vehicles, including those operating trucks and goods delivery vehicles.[1] The forecasted travel time impacts of the bridge replacement alternatives are compared to the No Build option in 2042, which assumes no change in the existing transportation network. A mid-level alternative reduces the need for bridge span openings compared with the low-level alternative The Ballard Bridge opens approximately 7 times each weekday with an average delay of 5 minutes per opening. The low-level alternative would not change the number of openings or amount of delay. According to the BBPS, the mid-level alternative would significantly reduce the number of bridge opening daily. It also provides better connectivity between the bridge and local streets north of the Ship Canal.

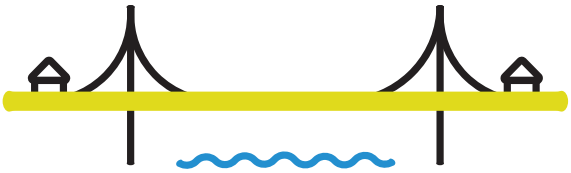
The Ballard-Interbay corridor will continue to experience high demand for housing and commercial development, which will result in a steady increase in trip volumes throughout the corridor. The potential investments identified in Chapter 6 provide much needed maintenance and improvements to mitigate continued growth and demand on the transportation system.

BALLARD BRIDGE MID-LEVEL



Improves travel time by **0.6 minutes** per vehicle, resulting in total annual travel time savings of **$3.9 million** in 2042 (in 2018 dollars).

BALLARD BRIDGE LOW-LEVEL



Improves travel time by **0.2 minutes** per vehicle, resulting in total travel time savings of **$1.4 million** in 2042 (in 2018 dollars).

1 Travel times used for the estimation of travel time savings are average daily general-purpose traffic travel times per vehicle, for all travel purposes including commuting, freight, and other (HOV, SOV).

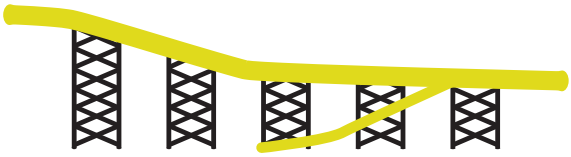
Magnolia Bridge

The analysis found that the Armory Way Bridge would likely result in higher vehicular delay and vehicle miles traveled compared to a No Build option or the In-Kind Replacement alternative (which have the same forecasted travel time due to their similar designs). The Armory Way Bridge alternative is forecasted to increase travel time by approximately 13 minutes for trips that connect from west of the current Magnolia Bridge terminus at Thorndyke Ave W/W Galer St to the east at Elliott Ave W/W Galer St Flyover.

This translates to an estimated economic impact of $23.1 million in 2042. It should be noted that this is an extremely conservative estimate, as it assumes that all 20,000 daily bridge users would travel between the existing Magnolia Bridge terminus at Thorndyke Ave W/W Galer St to the east terminus at Elliott Ave W/W Galer St Flyover, via the new Armory Way Bridge. This is a very circuitous route that many travelers will not take, as they would more likely access the new bridge from points further to the north. If this bridge replacement alternative is selected, it is recommended that additional surface route modeling be performed to better understand travel time impacts, and that the City collaborate with entities like King County Metro and Sound Transit to minimize travel time impacts.

In addition to travel time impacts from the Armory Way alternative, there are impacts to Port of Seattle access at Terminal 91. Port lands are required to build new access roads and a series of 90 degree turn-movements are required, impacting larger vehicles accessing the north end of Terminal 91.

IN-KIND REPLACEMENT



- Increases travel times by **0.7 minutes** per commuting and general-purpose vehicle and by **1.3 minutes** per freight vehicle.
- Negative impacts to the economy from travel time delays are estimated at **$1.5 million** in 2042 (in 2018 dollars).

ARMORY WAY BRIDGE

- Increases travel times by **12.7 minutes** per vehicle. Travel time impacts depend on the origin and destination and apply to a subset of trips that currently use the Magnolia Bridge.
- Negative impacts to the economy from travel time delays are estimated at **$23.1 million** in 2042.

Magnolia Village, the commercial core of Magnolia, provides neighborhood services and retail; it is not, however, a major employment center. Workers may commute into the Magnolia neighborhood from elsewhere, and those that rely on the Magnolia Bridge would be affected by increased travel to Armory Way.

Other Corridors

The analysis of travel time impacts also considered potential impacts to other corridors in the BIRT study area from changes to the network produced by the proposed Ballard Bridge and Magnolia Bridge alternatives. According to travel time analysis results, travel time impacts for general-purpose and freight traffic are projected to be minimal on NW Leary Way between 17th Ave NW and 14th Ave NW, W Emerson St/W Nickerson St between Gilman Ave W and 13th Ave W, and W Dravus St.

Travel time impacts are projected to be minimal on W Dravus St (pictured) and other corridors in the BIRT study area

Figure 5-3 (next page) shows the forecasted 2042 travel times for common vehicle trips within the study area during the AM and PM peak periods, when there is the most delay. The values are from traffic modeling conducted during the BIRT study. The modeling assumes major projects such as West Seattle and Ballard Light Rail Extensions are in place (and all projects assumed in our baseline scenario described in Chapter 4), but does not include the benefits of recommended BIRT investments. Of note is that the Armory Way bridge option increases travel delay on the 15th Ave W corridor as well as increasing travel time between points south and Magnolia neighborhoods.

FIGURE 5-3: PROJECTED AM AND PM PEAK VEHICLE TRAVEL TIMES, COMPARISON OF MAGNOLIA BRIDGE IN-KIND BRIDGE REPLACEMENT AND AMORY WAY BRIDGE ALTERNATIVE TO 2042 NO BUILD

Safety

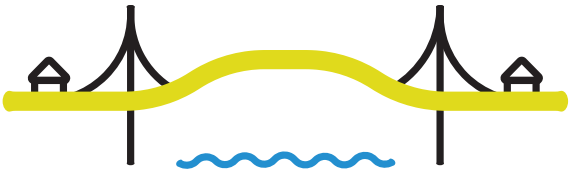
How will each bridge alternative impact safety for various modes of transportation?

The safety analysis considers whether the proposed Ballard Bridge and Magnolia Bridge alternatives reduce the likelihood of fatalities, injuries, and property damage and improve safety outcomes for residents and workers in the BIRT study area. Traffic collisions can impose various types of non-market costs such as pain, grief, and reduced quality of life, as well as medical and rehabilitation care costs, emergency services, lost productivity and disability compensation, and property damage. Transportation projects that improve road safety can enhance economic performance by improving labor productivity and reducing economic losses that result from injuries and disabilities. This study does not project future crashes and therefore a full quantification of safety benefits was not possible.

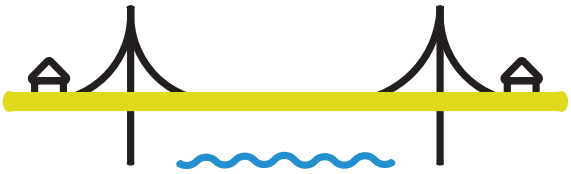
Ballard Bridge

Both Ballard Bridge alternatives provide improved bicycle and pedestrian facilities that will increase travel safety for people walking, rolling, and biking. The Ballard Bridge Planning Study (2020) evaluated collision data for the Ballard Bridge and the ramp junctions north and south of the bridge. Five years of collision data show no collisions involving people walking or biking on the main segment of the Ballard Bridge between the ramp junctions, and only 1 collision involving a person walking or biking at each interchange on 15th Ave W and south of the bridge. None of these collisions resulted in serious injuries or fatalities. The probability of collisions could increase with growth in all modes of travel.

BALLARD BRIDGE MID-LEVEL



BALLARD BRIDGE LOW-LEVEL

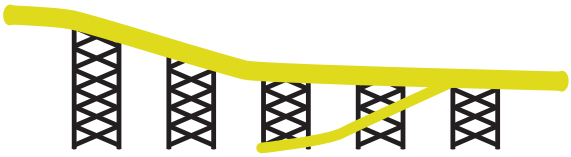


The shared use path included in both alternatives for the Ballard Bridge has the potential to save **$2.65 million per fatal crash and $62,650 per injury crash** by reducing the risk of collisions involving people walking and biking. According to data from the Federal Highway Administration, a shared use path can reduce fatal and non-fatal crashes by 25%.

Magnolia Bridge

Previous studies suggest people walking and biking will continue using existing travel routes regardless of bridge alternative due to natural grades in the area. A relatively small increase in bicycle and pedestrian traffic is expected with both alternatives. Low collision rates in this part of the study area—no collisions involving people walking or biking on the Magnolia Bridge between 2014 and 2019—suggest safety benefits for non-motorized access would be minimal; however, both alternatives will improve facilities for walking, rolling, and bicycling. The In-Kind Replacement and the Armory Way Bridge alternative will feature a non-motorized, shared-use path on the south side. Prior studies on the Magnolia Bridge assume a connection to the Elliott Bay Trail from the Armory Way bridge via 20th Ave W. While they do not explicitly assume a connection to the Elliott Bay Trail from an in-kind replacement bridge, the shared-use path on the bridge could connect to the Elliott Bay Trail using the off-ramp to Smith Cove, and this report recommends including this in the design.

IN-KIND REPLACEMENT



ARMORY WAY BRIDGE

For the Magnolia Bridge alternatives, **minimal safety benefits** are expected for non-motorized access due to low levels of historic collisions involving people walking or biking on the Magnolia Bridge and a relatively small projected increase in pedestrian and bicyclist volumes with both alternatives.

The Cost of a Crash

Federal guidelines estimate the cost savings of a prevented crash based upon productivity losses, property damage, medical costs, rehabilitation costs, congestion costs, legal and court costs, emergency services (such as medical, police, and fire services), insurance administration costs, and the costs to employers. Values for more intangible consequences such as physical pain or lost quality-of-life are also examined in estimates of comprehensive costs, which include both economic cost components and quality-of-life valuations.

Seattle is committed to achieving the Vision Zero goal to eliminate transportation-related serious injuries and deaths. The cost savings estimated for each bridge alternative above are based upon federal guidelines and do not project or assume future crashes.

Based on the National Highway Traffic Safety Administration (NHTSA) *The Economic and Societal Impact of Motor Vehicle Crashes*

Operating Costs

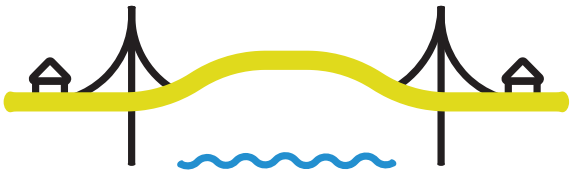
How will each bridge alternative impact vehicle operating costs for transit, freight, and autos?

Vehicle operating cost savings are realized when transportation improvements lead to a decrease in vehicle miles traveled (VMT). Data from the travel demand model does not provide sufficient evidence to suggest any changes in VMT occurring from the implementation of the proposed bridge alternatives. Changes are attributed largely to future increases in density and changes to land uses in the study area rather than improvements specific to bridge alternatives.

The travel demand model used for the study is a version of the Puget Sound Regional Council (PSRC) model that is currently being used for the West Seattle and Ballard Light Rail Extensions project. The model incorporates future land development projects such as Terminal 91 development, later phases of the Expedia Headquarters Campus, and Armory site development. VMT changes are annual and show the difference between the existing VMT and the future 2042 scenarios.

Ballard Bridge

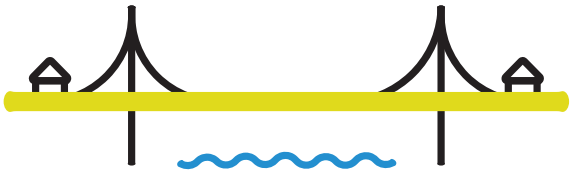
BALLARD BRIDGE MID-LEVEL



No significant change

- Commuting + 607 VMT
- Freight - 1,943 VMT

BALLARD BRIDGE LOW-LEVEL

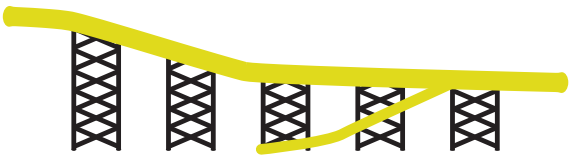


No significant change

- Commuting + 893 VMT
- Freight - 1,721 VMT

Magnolia Bridge

IN-KIND REPLACEMENT



No significant change

- Commuting + 809 VMT
- Freight - 272 VMT

ARMORY WAY BRIDGE

No significant change

- Commuting + 709 VMT
- Freight - 463 VMT

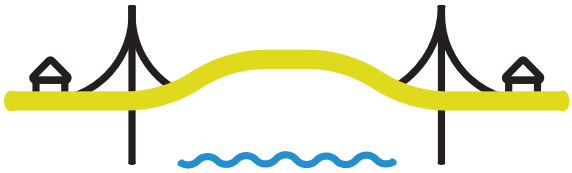
Housing Accessibility

How will each bridge alternative impact access to housing for workers in the study area?

The accessibility analysis assessed how the proposed bridge alternatives would impact access to housing for workers in the BIRT study area. The bridge alternatives and access to the bridges do not rank high among the challenges to workforce housing in the area. Among employers interviewed for this study and other Seattle industrial lands work, the greatest concern for workforce housing in the area is the supply of housing, and the zoned capacity of the land to accommodate demand and development of more affordable housing. Surface traffic circulation affects the experience and time cost of living in the area, but ranks low as a determinant of affordability.

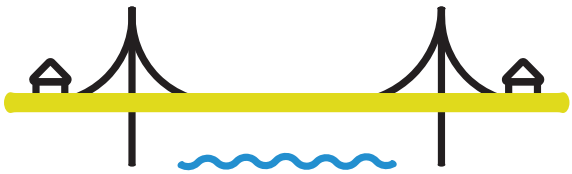
Ballard Bridge

BALLARD BRIDGE MID-LEVEL



No impact to access to housing due to modest improvement in travel time.

BALLARD BRIDGE LOW-LEVEL

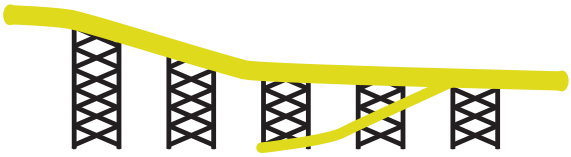


No impact to access to housing due to modest improvement in travel time.

There will likely be no impact to access to housing that is affordable to workers in the study area from the Ballard Bridge replacement alternatives. Both ends of the Ballard Bridge are near a large quantity of relatively affordable housing, by Seattle market standards, and access to the bridge will not suffer based on current traffic analysis.

Magnolia Bridge

IN-KIND REPLACEMENT



No impact to access to housing due to minimal change in travel time.

ARMORY WAY BRIDGE

Could increase commute time for some workers in the Magnolia area traveling from the western terminus of the existing bridge.

The Armory Way Bridge would increase the average commute time per vehicle per day for housing located near the western terminus of the Magnolia Bridge. Lower-priced housing is located well north of the Magnolia Bridge western terminus. Those households would experience less travel time impact due to a more direct and shorter route to the Armory Way Bridge. Access to jobs in the area is not likely to be affected by changes in travel time. For jobs located close to the current eastern terminus of the bridge, commutes from most housing north of the bridge will fall within acceptable commute times (i.e., 20 to 25 minutes during AM and PM peaks).

Market Desirability

How will each bridge alternative affect home and real estate values in the study area?

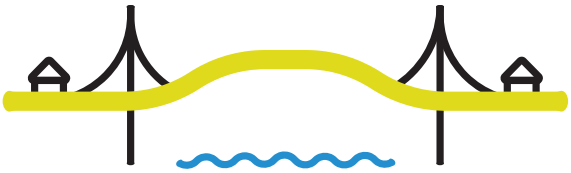
Many residents in the study area have concerns about the impact of the bridge alternatives on home real estate values and the real estate market in general. These concerns were raised during the public outreach process for this project and other planning studies in the area.

Businesses and industry in the area have monitored the alternatives closely but have not expressed a perception of negative impacts on their operations. Based on employer interviews, a top-ranking concern of businesses in the corridor, however, is access to workforce housing. The bridge alternatives do not impair access to businesses in the area from residential areas (and thus this concern is not analyzed in detail). A Magnolia Bridge Planning Study intercept survey found that just 11 percent of respondents in Magnolia Village were visitors who neither lived or worked in Magnolia.

Ballard Bridge

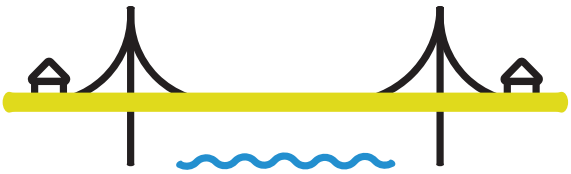
The Ballard Bridge alternatives are expected to have minimal impact on travel time, with an overall net reduction in traveler delay. The 2 Ballard Bridge alternatives improve multimodal connectivity in general and offer relatively minimal difference in how non-motorized and motorized bridge users connect to the surface transportation systems. The areas most affected by the Ballard Bridge alternatives are areas that rely on the new access points. The alternatives are not expected to significantly increase the time to access the bridge, therefore no change in market interest is expected.

BALLARD BRIDGE MID-LEVEL



No change

BALLARD BRIDGE LOW-LEVEL



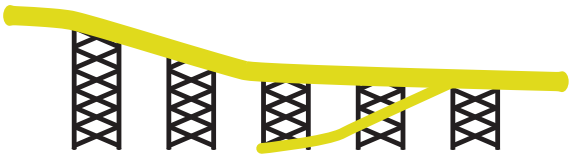
No change

Magnolia Bridge

The long-term growth of the region combined with the comparative advantages of the Magnolia neighborhood are expected to sustain demand for housing. Even with increased travel times to Downtown Seattle, the Magnolia neighborhood's views, limited single-family housing supply, and proximity to Magnolia Village are likely to keep market desirability stable over time. The long-term demand will include market segments for whom the travel time to Downtown ranks relatively lower for their interests.

The Armory Way Bridge is forecasted to add 13 minutes on average per vehicle for trips connecting points south of the study area with southern and central Magnolia. Travel time impacts for travelers connecting north are much less. However, only a portion of the 20,000 vehicles that are forecasted to cross the bridge traveling from the southern portion of the Magnolia neighborhood will experience this level of change in travel time; southern Magnolia may experience some negative travel time impacts and northern Magnolia may may experience neutral or positive impacts. The increase in travel time most affects residents of households who must travel through Thorndyke Ave W and W Galer St. Other households, particularly the multifamily housing north of the current terminus along Thorndyke Ave W, will experience a lesser travel time impact.

IN-KIND REPLACEMENT



No change in market desirability foreseen due to continued market demand for the study area.

ARMORY WAY BRIDGE

Insufficient evidence to suggest that the change in travel time would correlate with an impact on market desirability for the Magnolia neighborhood.

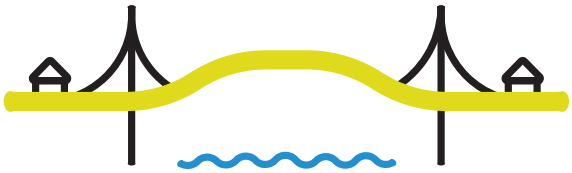
Bridge Costs

How much will each bridge alternative cost?

Cost estimates were sourced from existing bridge planning studies. Planning level estimates for the Ballard Bridge include construction, maintenance and operations, and right-of-way acquisition. The planning level cost estimates for the Magnolia Bridge also include contingency costs and soft costs.

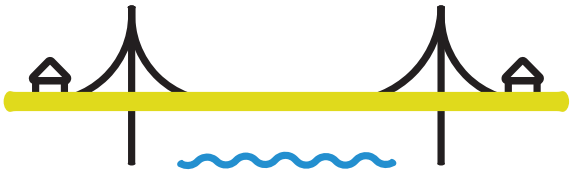
Ballard Bridge

BALLARD BRIDGE MID-LEVEL



Planning level cost estimates are **$680 to $1,460 million**[2] (in 2019 dollars)

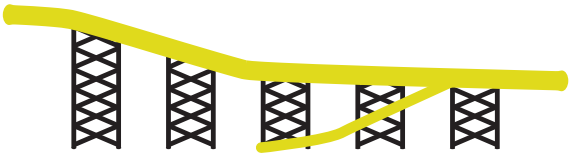
BALLARD BRIDGE LOW-LEVEL



Planning level cost estimates are **$330 to $710 million** (in 2019 dollars)

Magnolia Bridge

IN-KIND REPLACEMENT



Planning level cost estimates are **$340 to $420 million** (in 2018 dollars)[3]

ARMORY WAY BRIDGE

Planning level cost estimates are **$200 to $350 million** (in 2018 dollars)

2 Seattle Department of Transportation (2020). Ballard Bridge Planning Study.

3 The Magnolia Bridge Planning Study (2019) used the cost-estimate basis from an earlier planning study, factoring costs up for inflation. It is important to recognize that all cost estimates used in this report are developed at a rough-order of magnitude level. The significant cost range is reflective of a high level of contingency for unknown cost factors. Those factors could represent costs increases or savings.

CONSTRUCTION IMPACTS

There is insufficient data and information on detour routes, traffic volumes diverted, or the impact on travel times to quantify the effects from construction of bridge alternatives. Construction impacts from current bridge studies are summarized in this section.

Ballard Bridge

The Ballard Bridge Planning Study (2020) did not evaluate traffic conditions during construction.

- The Ballard Bridge Low-Level alternative would require single lane shutdowns as needed across the bridge during construction, with no need for a detour. This alternative has the shortest construction duration of the 3 alternatives considered in the Ballard Bridge Planning Study. More study is needed to determine how the Modified Single-Point Urban Interchange to replace the existing interchange at the W Nickerson St/W Emerson St/15th Ave W intersection could be constructed while maintaining through traffic on 15th Ave W as well as all connections to W Nickerson St and W Emerson St.
- The Ballard Bridge Mid-Level alternative would require complete closure of the existing Ballard Bridge during construction, and a temporary bridge and detour route. The Fremont and Aurora Bridges do not have enough capacity to accommodate diverted traffic. Further traffic and design analysis is required to determine configuration and location of a temporary crossing. Industrial areas along the north shore of the Ship Canal would find this disruption costly and burdensome, and by necessity would use the alternative routes for freight and distribution.

Magnolia Bridge

Existing planning studies for the Magnolia Bridge provide some information on the change in traffic patterns for the No Build scenario.

- The Magnolia Bridge Traffic Maintenance During Bridge Closure (2017) study evaluated the impact to traffic during a potential closure of the existing bridge, either because of a catastrophic event or because of the need to detour traffic during construction of a permanent facility. The study assumes traffic would divert to either W Dravus St or W Emerson St based on existing travel patterns. These alternate routes are expected to become congested, especially at W Dravus St /15th Ave W ramp intersections, W Dravus St /20th Ave W, W Emerson Pl /Gilman Ave W, and W Emerson St /W Nickerson St. Transit would need to be rerouted using the currently designated snow route or other alternative route.
- The Magnolia Bridge Planning Study (2019) estimates that the Magnolia Bridge alternatives will have a similar construction duration, yet the construction impacts of the In-Kind Replacement alternative are expected to last almost twice as long. The Armory Way Bridge will take 29 months to complete, compared to 31 months for the In-Kind Replacement. Within that time-frame, however, the construction impacts for the In-Kind Replacement are expected to last 27 months compared to 14 months for the Armory Way alternative. The difference in duration relates to the required deconstruction of the existing Magnolia Bridge.


REMOTE
2279
2279
REMOTE CONTROL EQUIPMENT
GP38-2
SPILL PREVENTION KIT

CHAPTER 6: POTENTIAL TRANSPORTATION INVESTMENTS

INTRODUCTION

This chapter presents potential projects and investments that will keep people and goods moving through Ballard-Interbay. The range of investments includes packages of corridor-level projects and management strategies, location-specific projects, and programmatic, lower-cost projects, such as signal optimization at key intersections or wayfinding. Top investments result from an extensive goals-based evaluation (see Chapter 4) and the input of members of the public, stakeholders, and agency partners.

The project team evaluated more than 80 projects identified through public engagement, collaboration with stakeholders and agency partners, recommendations from previous planning efforts, scenario analysis, and analysis of Ballard-Interbay's existing and anticipated future (2042) mobility needs. Modeling of future mobility needs was conducted for multiple land use scenarios, including those that envision more transit-oriented development near light rail stations and dense mixed-use character for major redevelopment sites such as the Armory property. This was done to test system function and resilience should future rezoning occur to accommodate more intensive uses.

BIRT proposes a series of multimodal investments that complement the future replacement of the Magnolia Bridge and the Ballard Bridge and support the introduction of light rail transit to the study area. Because there are a number of stakeholders interested in the BIRT study outcomes, including those interested in specific neighborhoods, specific corridors, and certain modal systems, this chapter has been organized to describe proposed investments in multiple ways. They are as follows:

- **Bridge replacement alternatives:** While BIRT does not recommend a single replacement alternative for the Ballard or Magnolia bridges, it does narrow both to two options and describe key tradeoffs between the two most likely options.
- **Key investments:** These are the most beneficial multimodal projects that will support community goals and keep people and goods moving for decades to come. Figure 6-1 illustrates these projects.
- **Modal priorities:** Each modal system has specific needs, and a set of priority projects are identified and mapped for each. These priorities are described in the Modal Networks section.
- **Corridor improvements:** A few key arterial corridors carry most of the travel to and through the BIRT study area. Coordinated improvements are needed in each of these corridors. The Corridor Improvements section of this chapter highlights how capital and operational improvements come together to ensure reliable travel.
- **Small, low cost projects:** BIRT is a 20-year plan, but investments are needed sooner. This section identifies small, low cost projects that can be implemented independent of bridge replacement or rehabilitation.

The organization of this chapter means that some projects are discussed in multiple sections. Each project has a unique project number that is carried throughout.

What makes a priority project?

The BIRT study goals were introduced in Chapter 1. The graphic below includes the desired outcomes and the evaluation criteria associated with each goal that were used to score projects and identify priorities across the full list of potential projects. A complete list of projects and their associated scores for each evaluation criteria is included in Appendix G.

Improve mobility for people and freight: The BIRT evaluation framework elevates projects that most improve mobility for people and freight as measured by a project's ability to:

- Increase the capacity of the transportation system for more person trips
- Reduce or maintain freight travel times on key corridors and add available freight paths
- Increase the geographic area of those who can conveniently walk and bike to key destinations
- Increase the number of high-quality travel choices in the area through comfortable, connected options

Advance projects that meet the needs of communities of color and those of all incomes, abilities, and ages: High-ranking projects improve mobility for those that rely on multimodal travel options the most, including:

- Workers of color and low-income workers
- Residents of color and low-income residents
- People with disabilities

Provide a system that safely accommodates all travelers: High-ranking projects make it safer and more convenient to walk, roll, ride a bicycle, and take transit to and through Ballard-Interbay. These projects:

- Include safety countermeasures at locations with a history of collisions and locations with crash risk factors
- Limit conflicts between modes
- Provide facilities and roadway features that improve mobility for trucks and deliveries

Support timely and coordinated implementation: High-ranking projects are feasible, fundable, supported by agency partners, and address urgent needs. The BIRT evaluation framework elevated projects that:

- Minimize environmental, economic, and construction impacts
- Leverage coordination opportunities to deliver maximum value

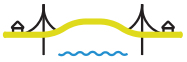
BRIDGE ALTERNATIVES

The Ballard Bridge and Magnolia Bridge alternatives discussed in Chapter 4 were included in the multimodal evaluation. Each bridge alternative was evaluated in conjunction with a range of land use scenarios. The BIRT study does not recommend a specific bridge alternative, but the analysis recognizes key tradeoffs associated with priority modes for moving people and goods. The Seattle City Council and the Mayor will ultimately decide which specific bridge alternatives to advance.

Many of the potential projects described in this chapter are applicable regardless of the bridge alternatives. However, some projects and corridor management strategies are dependent upon individual bridge alternatives. Applicable bridge alternatives per project are denoted in the following sections.

Each of the bridge alternatives is paired with improvements for pedestrians, bicyclists, transit, and freight. Table 6-1 and Table 6-2 summarize the modal elements included in each bridge alternative.

TABLE 6-1: MODE-SPECIFIC IMPROVEMENTS IN EACH BALLARD BRIDGE ALTERNATIVE

Bridge Alternative	Pedestrian and Bicycle	Transit	Freight[1]
 **Ballard Bridge Mid-Level** *Included in Scenario 1*	• 14′ shared-use path on the west side of bridge • New shared-use path access ramp from the north at 17th Ave NW/NW Leary Way	• New southbound on-ramp from 17th Ave NW/NW Leary Way serving transit along NW Leary Way • Northbound off-ramp at NW 49th St enhances potential transit connections to the future Ballard Link station • Single Point Urban Interchange (SPUI) on the southern end of the bridge at W Nickerson St/W Emerson St that could include enhanced bicyclist and pedestrian access to RapidRide D Line stations • SPUI could improve travel reliability for transit routes traveling through the interchange at W Nickerson St/15th Ave W	• Northbound off-ramp at NW 49th St • Southbound on-ramp at 17th Ave NW/NW Leary Way • Longer on-/off-ramps from 15th Ave W at south end of bridge • SPUI at W Nickerson St/W Emerson St will improve travel reliability for trucks at a key interchange used by trucks entering and exiting Fishermen's Terminal and other parts of the BINMIC
 **Ballard Bridge Low-Level** *Included in Scenario 2*	• Widened shared-use paths on both east and west sides of bridge for people walking and bicycling • Enhanced bicycle and pedestrian access at southern end via modified SPUI	• SPUI at W Nickerson St/W Emerson St, including enhanced bicyclist and pedestrian access to RapidRide D Line stations • SPUI could improve travel reliability for transit routes traveling through the interchange at W Nickerson St/15th Ave W	• SPUI at W Nickerson St/W Emerson St will improve travel reliability for trucks at a key interchange used by trucks entering and exiting Fishermen's Terminal and other parts of the BINMIC

1 For the purpose of this study, freight refers to the movement of goods by truck on city streets with connections to rail and maritime.

TABLE 6-2: MODE-SPECIFIC IMPROVEMENTS IN EACH MAGNOLIA BRIDGE ALTERNATIVE

Bridge Alternative	Pedestrian and Bicycle	Transit	Freight
 **Magnolia Bridge In-Kind Replacement** *Included in Scenario 1*	• 10' multi-use path on the south side of the new Magnolia Bridge for people walking and bicycling	• Transit would operate much as it does today	• The Magnolia Bridge is a first-/last-mile connector, so an In-Kind Replacement would operate much as it does today
 **New Armory Way Bridge** *Included in Scenario 2*	• Multi-use path on the south side of the Armory Way bridge for people walking and bicycling • Provide a route that is less steep for people biking between Interbay and Magnolia • New elevated connection across the BNSF railroad tracks at W Armory Way	• Potential joint-use freight and transit (FAT Lanes) on the Armory Way Bridge to support transit re-routing to the Armory Way Bridge and Thorndyke Ave W to serve southern part of Magnolia • Transit signal priority at key intersections including 15th Ave W/W Armory Way and W Armory Way/Thorndyke Ave W	• Intersection improvements at 15th Ave W/W Armory Way, including elevated northbound-left movement • At-grade local access along W Armory Way • West Uplands Perimeter Rd improvements • W Galer St overpass and flyover improvements

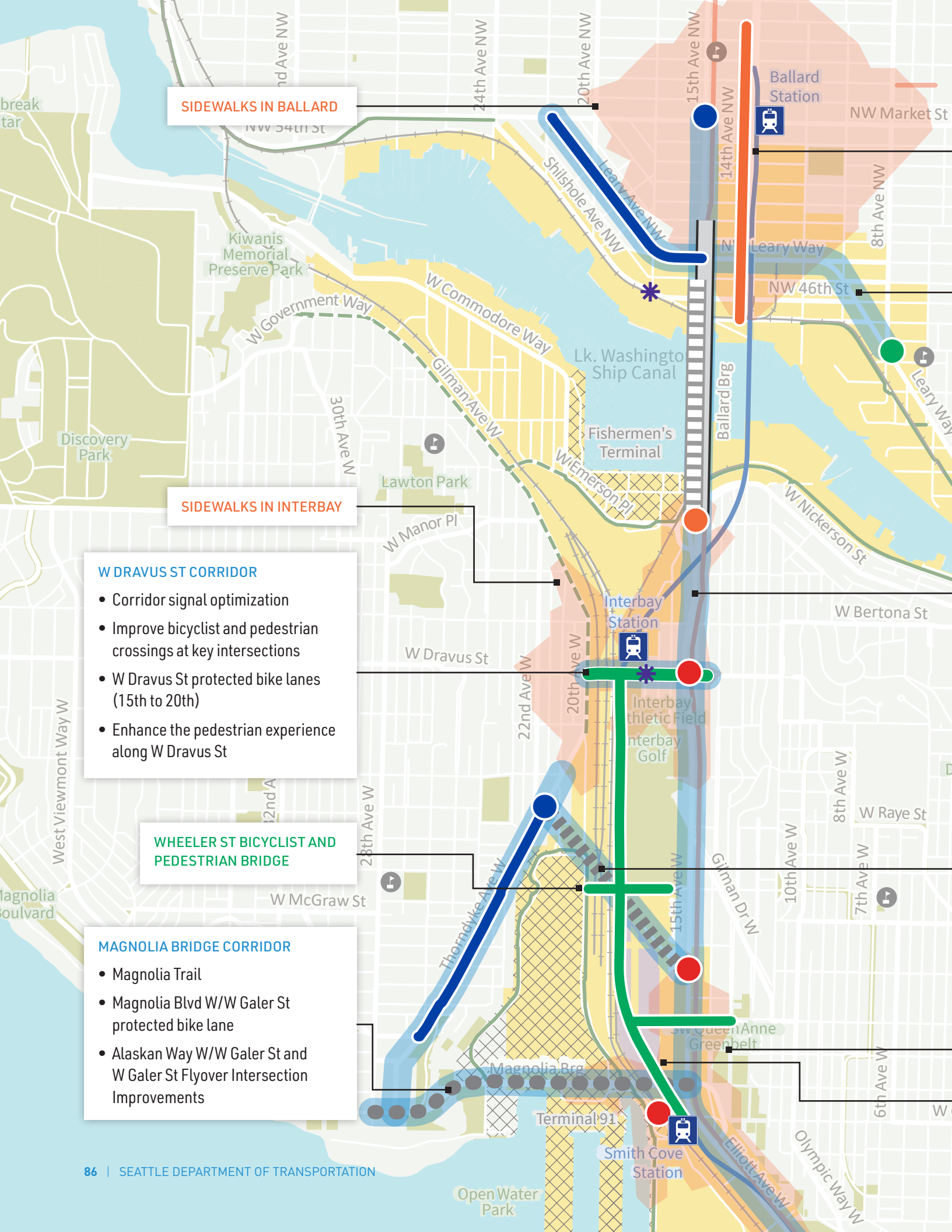
KEY INVESTMENTS

Figure 6-1 summarizes the highest-ranking transportation system improvements to keep people and freight moving safely and efficiently to and through the Ballard-Interbay study area. Projects generally assume 2042 transportation networks and travel demand, though many projects are warranted based upon existing conditions at the time of this study. Potential investments are summarized by corridor and are presented in 3 ways:

1. Figure 6-1 on the following page presents the **top tier** of projects identified in the study
2. The Modal Networks section describes how potential projects help to complete key **modal networks** and/or address identified gaps
3. The Corridor Improvements section focuses on synchronized improvements that can improve multimodal travel in the area's most **critical mobility corridors**

Because BIRT is a technical transportation study commissioned by the Washington State Legislature, funding and implementation of the projects identified will require further coordination among agency partners along with further local decision making and prioritization through SDOT's capital improvement process. Strong funding support from state and agency partners will be necessary for the City of Seattle to advance bridge replacement and system investments. More detail about timeline and funding strategies is provided in Chapter 7.

15th Ave W is a critical mobility corridor in Ballard-Interbay


SIDEWALKS IN BALLARD
SIDEWALKS IN INTERBAY
W DRAVUS ST CORRIDOR
• Corridor signal optimization
• Improve bicyclist and pedestrian crossings at key intersections
• W Dravus St protected bike lanes (15th to 20th)
• Enhance the pedestrian experience along W Dravus St
WHEELER ST BICYCLIST AND PEDESTRIAN BRIDGE
MAGNOLIA BRIDGE CORRIDOR
• Magnolia Trail
• Magnolia Blvd W/W Galer St protected bike lane
• Alaskan Way W/W Galer St and W Galer St Flyover Intersection Improvements
Ballard Station
Interbay Station
Smith Cove Station
Fishermen's Terminal
Lk. Washington Ship Canal
Ballard Brg
Magnolia Brg
Terminal 91
Kiwanis Memorial Preserve Park
Discovery Park
Lawton Park
Interbay Athletic Field
Interbay Golf
Open Water Park
W Government Way
W Commodore Way
Gilman Ave W
Shilshole Ave NW
Leary Ave NW
W Emerson Pl
W Manor Pl
W Dravus St
W McGraw St
W Raye St
W Bertona St
W Nickerson St
NW Market St
NW 46th St
Leary Way
W Queen Anne Greenbelt
Elliott Ave W
Olympic Way W
Gilman Dr W
Thorndyke Ave W
West Viewmont Way W
14th Ave NW
15th Ave NW
20th Ave NW
24th Ave NW
30th Ave W
28th Ave W
22nd Ave W
20th Ave W
15th Ave W
10th Ave W
8th Ave W
7th Ave W
6th Ave W
8th Ave NW

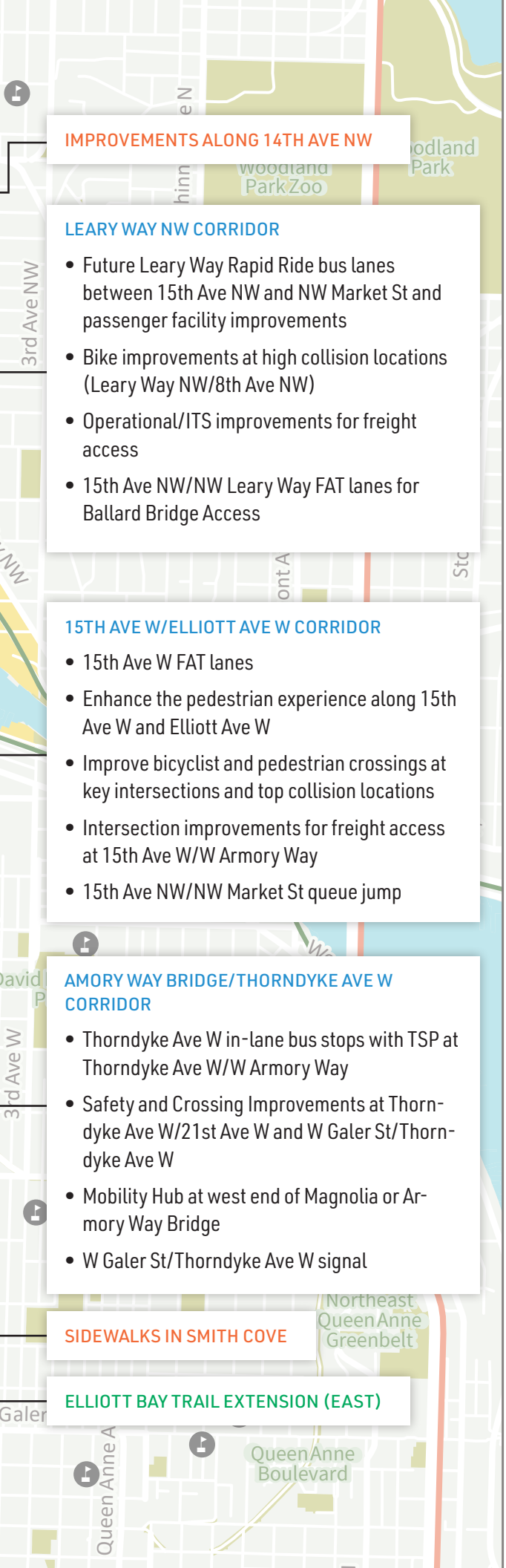


FIGURE 6-1: KEY INVESTMENTS

Modal Projects

- Pedestrian
- Bike and Pedestrian
- Transit
- Freight

Key Corridors

- Key Corridor

Multimodal Projects

- Intersection Improvement
- Ballard Bridge Mid-Level Alternative
- Ballard Bridge Low-Level Alternative
- Magnolia Bridge In-Kind Replacement
- Armory Way Alternative
- School
- Station Location*
- Light Rail Alignment*
- RapidRide
- Multi-use Trail
- Protected Bike Lanes
- Railroad
- Terminal
- Ballard-Interbay Northend MIC
- Armory

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

BALLARD-INTERBAY MODAL NETWORKS

This section presents potential investments in the context of each travel mode and includes the projects needed to create complete, safe, and well-used networks for people and goods. Projects are presented with unique identification numbers. Several projects benefit multiple travel modes or apply to multiple corridors, and therefore may appear on more than one list.

People biking on 20th Ave W toward the Elliott Bay Trail (top left), the sidewalk on the Dravus St Bridge over 15th Ave (top right), a RapidRide bus and freight truck on 15th Ave W (left)

Priority Pedestrian and Bicyclist Projects

Priority bicyclist and pedestrian improvements detailed in Table 6-3 and Figure 6-2 fill network gaps, overcome physical barriers, and create a more enjoyable, safe, and comfortable experience for people walking and bicycling in Ballard-Interbay.

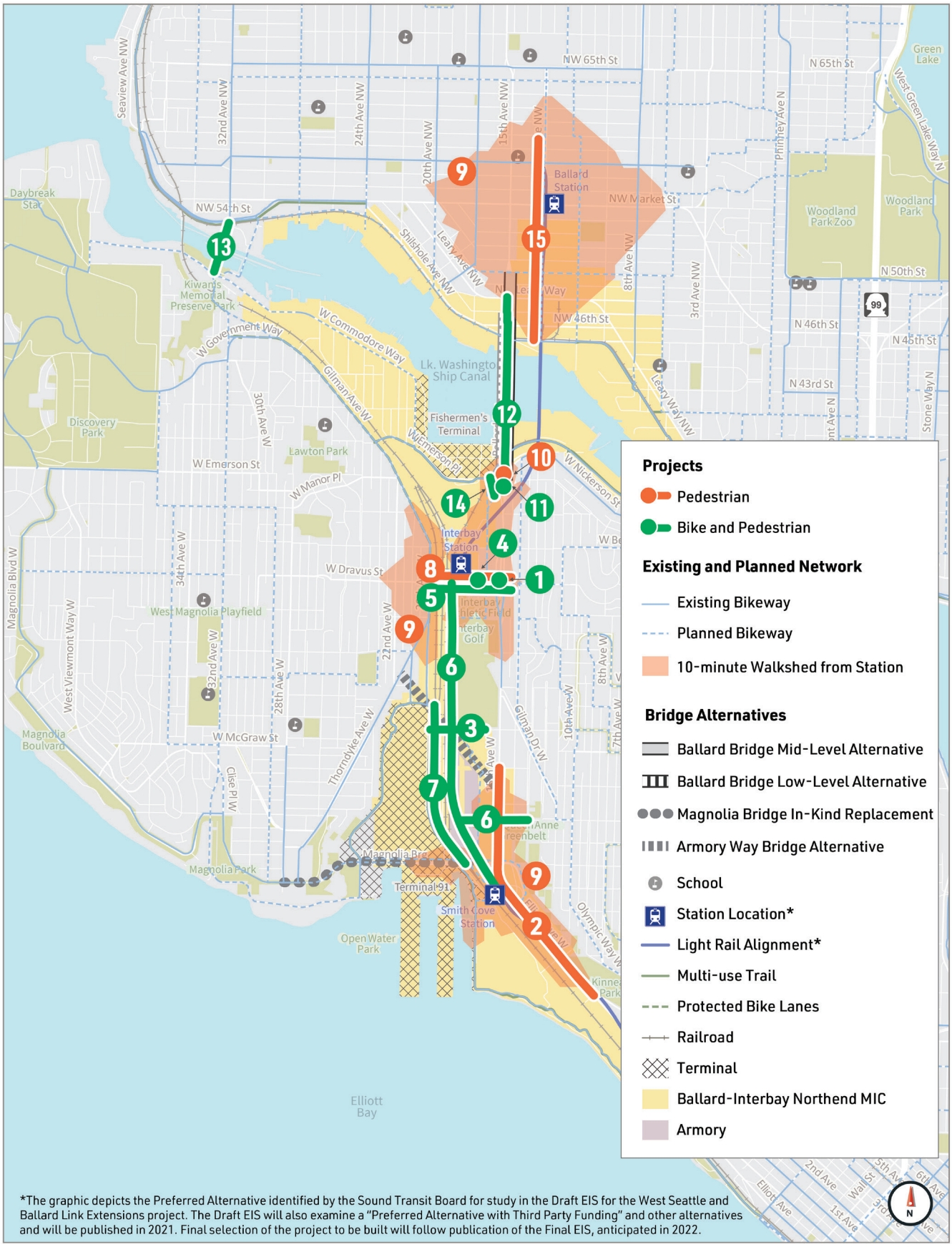
TABLE 6-3: PRIORITY PEDESTRIAN AND BICYCLIST PROJECTS

ID	Project Name	Project Description	Scenario	Scale
1	Dravus Bridge Replacements	Replace the W Dravus St bridges over the BNSF railroad tracks and 15th Ave W, including widened sidewalks with buffers from traffic, improved lighting, protected bike lanes, and intersection improvements *Related project: W Dravus St Protected Bike Lanes (Project 5)*	1, 2	Transformative
2	Improvements Along Elliott Ave W/15th Ave W	Enhance the pedestrian experience along Elliott Ave W and 15th Ave W from W Boston St to W Mercer Pl by widening sidewalks and adding landscaped buffer, ADA curb ramps, and pedestrian-scale lighting	1, 2	Small
3	Wheeler St Pedestrian Bridge	Connect W Wheeler St (east) across the BNSF tracks with the Elliott Bay Trail/20th Ave W via a new pedestrian and bicyclist bridge *Applicable only to the Magnolia Bridge In-Kind Replacement*	1	Transformative
4	W Dravus St/17th Ave Intersection Improvements	Evaluate existing right-of-way allocation at W Dravus St/17th Ave W to improve mobility for northbound and southbound vehicles, and make space for protected bike lanes. Options may include roadway rechannelization or expanding the Dravus St bridge west of the intersection. *Related project: W Dravus St Protected Bike Lanes (Project 5); Dravus Bridge Replacements (Project 1)*	1, 2	Transformative
5	W Dravus St Protected Bike Lanes	Implement protected bicycle lanes (PBLs) on W Dravus St between 20th Ave W and the Elliott Bay Trail Extension (East) with a future long-term connection to 14th Ave W (requires redesign of the 15th Ave W bridge and ramp intersections)	1, 2	Transformative
6	Elliott Bay Trail Extension (East)	Create a parallel multi-use trail along the east side of the BNSF railroad tracks connecting people in the surrounding area to and from the future Smith Cove Link station at W Galer St and the future Interbay Link station at W Dravus St. Provide east-west connections at W Wheeler St, W Howe St, and W Garfield St	1, 2	Transformative
7	Elliott Bay Trail Upgrades	Widen the narrow northern segment of the Elliott Bay Trail between the Magnolia Bridge and 20th Ave W to allow shared-use travel in both directions	1, 2	Transformative

Table continues next page

ID	Project Name	Project Description	Scenario	Scale
8	Improvements Along W Dravus St	Widen sidewalks where feasible along W Dravus St (especially between 20th Ave W and 17th Ave W) and add a landscaped buffer and pedestrian-scale lighting	1, 2	Small
9	Sidewalks within a 10-minute walk of future Link stations	Construct new sidewalks and repair existing sidewalks within the BINMIC, within a 10-minute walk of the future Smith Cove, Interbay, and Ballard light rail stations, and adjacent to RapidRide stations along 15th Ave NW	1, 2	Transformative
10	W Emerson St Pedestrian Bridge and Overpass Stairs	Include a pedestrian bridge across 15th Ave W in the vicinity of W Emerson St with the SPUI design proposed with the Ballard Bridge alternatives. Add stairs and elevators to connect the sidewalks on 15th Ave W to the overpasses for people walking and rolling between the pedestrian bridge, sidewalk, and RapidRide stations along 15th Ave W. *This project is only applicable to Ballard Bridge replacement alternatives. Related project: Interim 15th Ave/Emerson St Improvements (Project 11)*	1, 2	Transformative
11	Interim 15th Ave and W Emerson St Improvements	Improve the intersection of 15th Ave W/W Emerson St with underpass enhancements to address immediate mobility needs, understanding long-term Ballard Bridge replacement will include full intersection redesign *Related Project: W Emerson St Pedestrian Bridge and Overpass Stairs proposes longer-term improvements to this intersection associated with the Ballard Bridge replacement.(Project 10)*	1, 2	Small
12	Interim Ballard Bridge Improvements	Improve the Ballard Bridge to address immediate mobility needs, understanding the Ballard Bridge will be replaced. Interim improvements could include wayfinding; pavement spot improvements; vertical delineation between the travel lanes and sidewalk; or adding wider sidewalks by cantilevering a walkway platform from the existing bridge. *Related projects: Ballard Bridge low-level and mid-level alternatives*	1, 2	Small
13	Ballard Locks Bike Connection	Build a bicycle connection through the Ballard Locks that can be used 24 hours a day, 7 days a week, and does not require bicyclists to dismount. Carefully consider impacts to Locks operations and Maritime Vessel Traffic priorities in design.	1, 2	Transformative
14	Ship Canal to Thorndyke Ave Connection	Add a trail connection between the Ship Canal Trail and Thorndyke Ave W west of 15th Ave W/W Emerson St intersection for a direct connection to the future Interbay light rail station, multi-use trails, and neighborhoods	1, 2	Small
15	Improvements Along 14th Ave NW	Widen or improve sidewalks along 14th Ave NW from NW Leary Way to Gemenskap Park with upgraded ADA curb ramps and pedestrian scale lighting. Enhance walking and biking priority along 14th Ave NW to facilitate access to the future Ballard Link station.	1, 2	Small

FIGURE 6-2: PRIORITY PEDESTRIAN AND BICYCLIST PROJECTS



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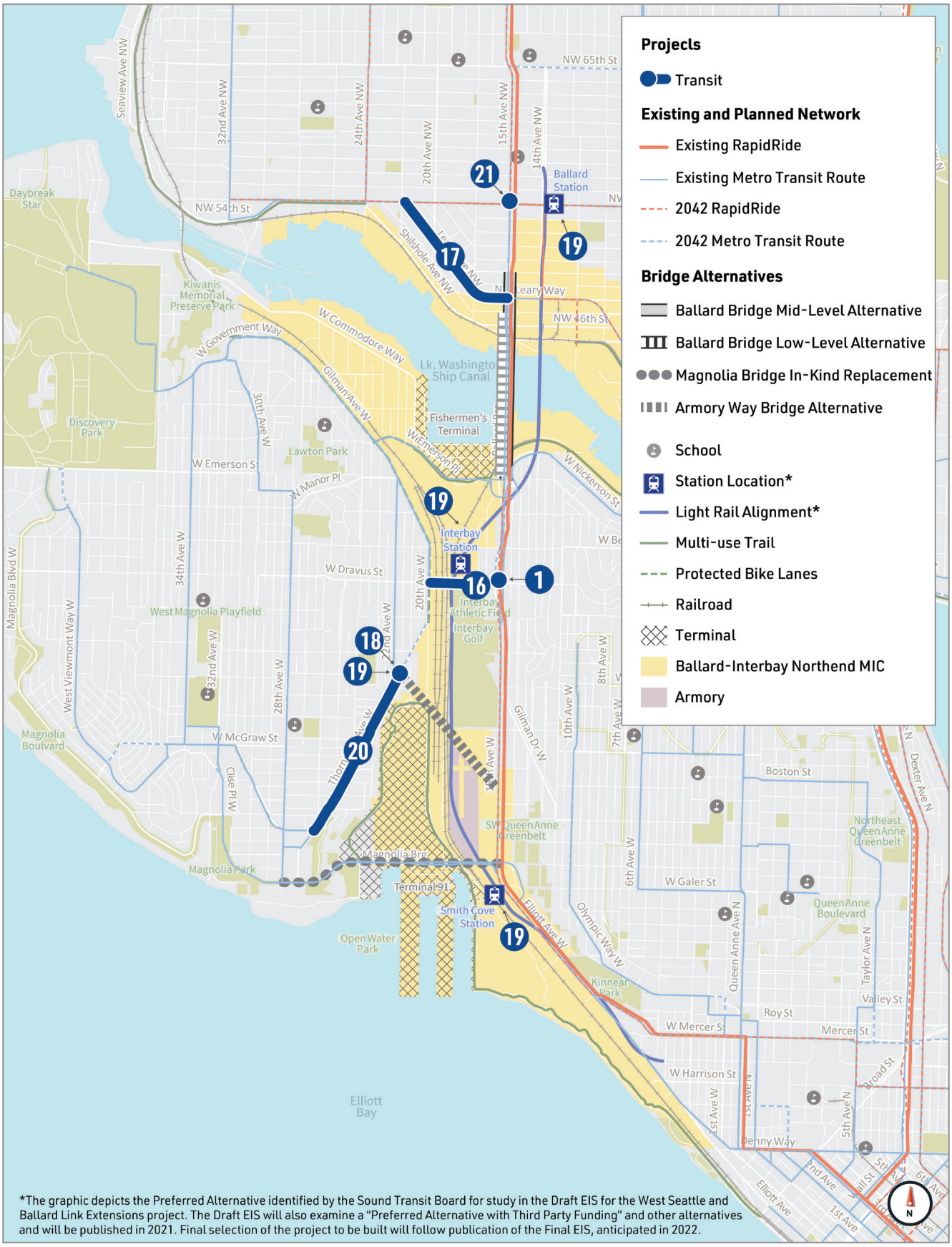
Priority Transit Projects

Transit speed and reliability improvements promote efficient use of limited street space and enhance the transit experience. Table 6-4 and Figure 6-3 present high-priority transit investments. The BIRT evaluation framework elevated improvements to reinforce transit priority along frequent and high-capacity transit corridors serving multiple routes. Passenger facility upgrades will make it safer, more convenient, and more comfortable to take transit in Ballard-Interbay.

TABLE 6-4: PRIORITY TRANSIT PROJECTS

ID	Project Name	Project Description	Scenario	Scale
16	W Dravus St Signal Optimization	Optimize traffic signals on W Dravus St between 15th Ave W and 20th Ave W to ensure transit speed and reliability *Related project: Dravus Bridge Replacements (Project 1)*	1, 2	Small
1	Dravus Bridge Replacements	Replace the Dravus St bridges over the BNSF railroad tracks and 15th Ave W and include roadway upgrades and improved passenger facilities to enhance transit mobility *Related project: W Dravus St Protected Bike Lanes (Project 5)*	1, 2	Transformative
17	Route 40 NW Leary Way Bus Lanes	Rechannelize NW Leary Way to include a bus-only lane in one or both direction(s) between 15th Ave NW and NW Market St. 10% design is complete and partially funded via SDOT's Route 40 Transit Plus Multimodal Corridor (TPMC) project *Related project: Leary Way Corridor Management Strategy (Project 44)*	1, 2	Transformative
18	Transit Signal Priority (TSP) at Thorndyke Ave W/W Armory Way	Add transit signal priority/queue jumps at Thorndyke Ave W and Armory Way Bridge to allow buses to make a southbound left onto the Armory Way Bridge, and westbound to allow buses onto Thorndyke Ave W *Applicable only to the Armory Way bridge alternative. Related project: In-lane bus stops on Thorndyke Ave W (Project 20).*	2	Small
19	Mobility Hubs	Ensure adequate lighting, access to shared use mobility services, bike parking, and high-quality bus stop amenities (e.g., seating, weather protection, and real-time information signs) where multiple future routes will converge at multiple locations. Hubs are recommended at future light rail stations (Ballard, Interbay, and Smith Cove) and the west end of the Armory Way Bridge. *Armory Way Mobility Hub is applicable only to the Armory Way bridge alternative*	1, 2	Small
20	In-Lane Bus Stops on Thorndyke Ave	Install transit islands on Thorndyke Ave W between W Blaine St and Armory Way Bridge to allow for in-lane bus stops and safe interface between buses and people riding in the protected bike lane *Related project: TSP at Thorndyke Ave/W Armory Way (Project 18)*	2	Transformative
21	15th Ave NW/NW Market St Queue Jump	Install a northbound queue jump from the business access and transit (BAT) lane/northbound right turn lane to allow buses to pass ahead of northbound through vehicles	1, 2	Small

FIGURE 6-3: PRIORITY TRANSIT PROJECTS



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Priority Freight Projects

As Ballard-Interbay continues to grow and land use evolves, more street uses and travel modes demand space on Ballard-Interbay streets. The elimination and prevention of conflicts between trucks, buses, and people walking and bicycling are critical to a safe, multimodal system. Freight access to the BINMIC, along with dedicated curb space for freight and delivery vehicles, will support reliable and efficient industrial and maritime operations. Consistent with Seattle's Freight Master Plan, the priority projects listed in Table 6-5 focus improvements along designated truck streets and connectors.

TABLE 6-5: PRIORITY FREIGHT PROJECTS

ID	Project Name	Project Description	Scenario	Scale
22	15th Ave W/NW FAT Lanes	Allow for joint-use of bus-only lanes by transit and freight vehicles on 15th Ave W/NW from Denny Way to Market St NW during off-peak times. Freight can operate in bus-only lanes to bypass congestion, and benefits from transit priority treatments on the corridor such as queue jumps. *Note: Pending policy review*	1, 2	Small
16	W Dravus St Signal Optimization	Optimize traffic signals along W Dravus St between 15th Ave W and 20th Ave W to support freight reliability with increased north gate traffic to and from Terminal 91 *Related project: Dravus Bridge Replacements (Project 1)*	1, 2	Small
1	Dravus Bridge Replacements	Replace the W Dravus St bridges over the BNSF railroad tracks and 15th Ave W and include roadway upgrades *Related project: W Dravus St Protected Bike Lanes (Project 5)*	1, 2	Transformative
4	W Dravus St/17th Ave Intersection Improvements	Evaluate existing right-of-way allocation at W Dravus St/17th Ave W to improve mobility for northbound and southbound vehicles, and make space for protected bike lanes. Options may include roadway rechannelization or expanding the Dravus St bridge west of the intersection. *Related projects: W Dravus St Protected Bike Lanes (Project 5); Dravus Bridge Replacements (Project 1)*	1, 2	Transformative
23	15th Ave/W Dravus St Truck Turning and Signalization Improvements	Improve turn radii for trucks and enhanced multimodal operations at 15th Ave W and W Dravus St ramps, including pavement improvements to the bridge surface. Upgrade signal timing and hardware at ramp terminals to ensure vehicle queues on the bridge clear to allow trucks adequate space to turn at intersection. *Related projects: Dravus St Signal Optimization (Project 16); Dravus Corridor Management Strategy (Project 39)*	1, 2	Transformative
24	15th Ave W/W Armory Way Intersection Improvements	Refine intersection operations at 15th Ave W/W Armory Way to improve pedestrian crossings, and accommodate frequent freight turning movements and freight access on at-grade roadways along W Armory Way	2	Small
25	Alaskan Way W/W Galer St and W Galer St Flyover Intersection Improvements	Improve intersection operations at Alaskan Way W/W Galer St, and at Alaskan Way W/W Galer St Flyover	1, 2	Small

FIGURE 6-4: PRIORITY FREIGHT PROJECTS

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

What's a Freight and Transit (FAT) lane?

Joint-use freight and transit lanes, also known as FAT lanes, allow freight trucks to operate in bus-only lanes during designated times. This allows freight to avoid traffic congestion in general purpose travel lanes but may subject freight to stops and delays at transit stops and stations, particularly during peak travel periods. FAT lanes are a relatively new concept. New York City launched a Truck and Transit priority lane on 14th St in Manhattan in 2019, and Portland, Oregon, is launching pilot Transit, Truck, and Turn lanes on SE Grand Ave and SE Martin Luther King Jr Blvd.

Freight truck leaving Terminal 91 on West Galer St Flyover; this street is freight's only entry point to Terminal 91

CORRIDOR IMPROVEMENTS

Five key transportation corridors connect people and freight through the Ballard and Interbay neighborhoods. Under future Scenario 2, a new Armory Way Bridge would create another key corridor. Given the constraints of water bodies, railroad corridors, and topography, people and goods traveling to or through the study area don't have nearby street alternatives, and rely heavily on these corridors. The corridors include:

- **15th Ave NW/W and Elliott Ave W:** NW Market St to W Mercer Pl
- **Magnolia Bridge:** 23rd Ave NW to Terminal 91 (Scenario 1)
- **Armory Way Bridge and Thorndyke Ave W:** to 15th Ave W via Armory Way Bridge (Scenario 2)
- **W Dravus St:** 20th Ave NE to 14th Ave NW
- **W Emerson St and W Nickerson St:** Gilman Ave W to 13th Ave NW2
- **NW Leary Way:** 17th Ave NW to 14th Ave NW

The BIRT team conducted transportation modeling in each of these corridors to identify corridor-wide management strategies to improve reliability for transit and freight vehicles. Corridor-wide management strategies include operational improvements such as traffic signal upgrades or timing improvements, use of technology to improve travel reliability or customer information, reallocation of lane space, and access management for areas where vehicles enter and exit the corridor.

These corridor-wide improvements complement key capital projects identified in the BIRT study. Strategies for each corridor are provided in more detail in Appendix F.

In some corridors, there is insufficient right-of-way to accommodate all modal priorities and projects. Determining priorities may require further study and conceptual engineering to affirm feasibility. For example, in the 15th Ave W corridor, there is strong public interest in providing a protected bicycle facility to connect to destinations east of the BNSF tracks. This corridor is also critical for bus transit and freight, and will be served by future Sound Transit Link light rail, which will lead to more people accessing destinations by transit. In this case, BIRT recommends a north-south oriented protected bicycle facility east of the BNSF tracks, but recognizes that it could be located along 15th Ave W or constructed as an off-street path in the light rail right-of-way.

FIGURE 6-5: MAP OF KEY CORRIDORS

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

15th Ave NW/W and Elliott Ave W Corridor

The 15th Ave NW/W and Elliott Ave W corridor is the most significant travel pathway serving Ballard-Interbay. It carries more people and freight than any other study area corridor. A major truck route and high-capacity transit corridor with dedicated bus lanes, the 15th Ave NW/W and Elliott Ave W corridor currently experiences southbound congestion in the AM peak and northbound congestion in the PM peak. Primary needs identified through the traffic operations analysis include:

- Improve accessibility and the experience of walking along 15th Ave NW/W and Elliott Ave W and provide a parallel bike facility to connect to the future Smith Cove and Interbay Link stations
- Improve transit and freight reliability with roadway design and operations measures to avoid impacts of traffic congestion, specifically southbound congestion in the AM peak and northbound congestion in the PM peak
- Reduce bottlenecks southbound through at all intersections during the AM peak and northbound through at all intersections during PM peak that cause more than 10 minutes of cumulative delay for freight and transit
- Corridor management strategies to address the primary needs along the 15th Ave W/NW and Elliott Ave W corridor include installation of adaptive signal systems and a suite of Intelligent Transportation System (ITS) strategies, conversion of bus-only lanes to freight and transit (FAT lanes), and consolidation of pedestrian crossings to reduce freight and transit delay at intersections

Key improvements along the 15th Ave W/NW and Elliott Ave W corridor include improvements to the 15th Ave W/W Emerson St intersection at the southern end of the Ballard Bridge, joint-use freight and transit lanes along 15th Ave W/NW to improve freight mobility, and extension of the Elliott Bay Trail east of the BNSF railroad tracks connecting the future Smith Cove and Interbay Link stations. Table 6-6 and Figure 6-6 present the 15th Ave W/NW and Elliott Ave W corridor management strategy paired with the potential improvements along the corridor, which will enhance the performance of each modal system.

TABLE 6-6: 15TH AVE W/NW AND ELLIOTT AVE W POTENTIAL INVESTMENTS

ID	Project Name	Project Detail	Scenario	Scale
A	Ballard Bridge Low-Level Alternative	The low-level Ballard Bridge alternative will be similar to the existing bridge but will include improved access for all modes at the south landing. Key elements of the Ballard Bridge low-level alternative include shared use paths on the east and west sides of the bridge, and a Modified Single Point Urban Exchange (SPUI) on the southern end of the bridge.	2	Transformative
B	Ballard Bridge Mid-Level Alternative	The mid-level Ballard Bridge alternative replaces the existing bridge with a new movable bridge that provides 60'-70' vertical clearance, a 14' shared use-path on the west side of bridge, new vehicle and shared-use path access ramp at 17th Ave NW/Leary Way NW, a vehicle ramp at NW 49th St/15th Ave NW, and a modified SPUI consistent with the low-level bridge alternative	1	Transformative
6	Elliott Bay Trail Extension (East)	Create a parallel multi-use trail along the east side of the BNSF railroad tracks connecting people in the surrounding area to and from the future Smith Cove Link station at W Galer St and the future Interbay Link station at W Dravus St. Provide east-west connections at W Wheeler St, W Howe St, and W Garfield St.	1, 2	Transformative
22	15th Ave W/NW FAT Lanes	Allow for joint use of bus-only lanes by transit and freight vehicles on 15th Ave from Denny Way to Market St NW during off-peak times. Freight can operate in bus-only lanes to bypass congestion, and benefits from transit priority treatments on the corridor such as queue jumps. *Note: Pending policy review*	1, 2	Small
21	15th Ave NW/ Market St Queue Jump	Install a northbound queue jump from the business access and transit (BAT)/northbound right turn lane to allow buses to pass ahead of northbound through vehicles	1, 2	Small
2	Improvements Along Elliott Ave W/15th Ave W	Enhance the pedestrian experience along Elliott Ave W and 15th Ave W from W Boston St to W Mercer Pl by widening sidewalks and adding landscaped buffer, ADA curb ramps, and pedestrian scale lighting	1, 2	Small
26	Crossing Improvements at High Priority Signalized Intersections	Improve crossings for people walking and bicycling at priority signalized intersections: 15th Ave NW/NW Market St, 15th Ave W/W Dravus St, 15th Ave W/W Wheeler St, 15th Ave W/W Garfield St, Elliott Ave W/W Galer St Flyover, Elliott Ave W/W Galer St, and Elliott Ave W/W Mercer Pl *Related project: Dravus St/17th Ave Intersection Improvements (Project 4)*	1, 2	Small

Table continues next page

ID	Project Name	Project Detail	Scenario	Scale
27	Safety and Crossing Enhancements at High Priority Unsignalized Locations	Evaluate the potential for signalized crossings and enhancements to existing crosswalks at unsignalized intersections and mid-block locations: 15th Ave W/W Bertona St, Elliott Ave W/W Lee St, and 15th Ave W between W Armory Way and W Wheeler St	1, 2	Small
28	Pedestrian Improvements at Top Collision Locations	Make improvements at locations with a history of collisions involving people walking (15th Ave NW near Leary Way NW) and locations with crash risk factors as defined in SDOT's Bike and Pedestrian Safety Analysis	1, 2	Small
24	15th Ave W/W Armory Way Intersection Improvements	Refine intersection operations at 15th Ave W/W Armory Way to improve pedestrian crossings, and accommodate frequent freight turning movements and freight access on at-grade roadways along W Armory Way	1, 2	Transformative
29	15th Ave W/ Gilman Dr W Intersection Improvements	Improve intersection operations at 15th Ave W/Gilman Dr W	1, 2	Transformative
30	15th Ave W/W Howe St Intersection Improvements	Improve intersection operations at 15th Ave W/W Howe St	1, 2	Transformative
31	15th Ave W/ NW and Elliott Ave W Signal Optimization	Install adaptive signal system and a suite of ITS strategies	1, 2	Transformative

FIGURE 6-6: 15TH AVE W/NW AND ELLIOTT AVE W POTENTIAL INVESTMENTS

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

Magnolia Bridge Corridor

If the Magnolia Bridge were to be replaced in-kind, the Magnolia Bridge corridor would continue to serve as a critical network connection for residents and workers traveling between the southern end of Magnolia and the 15th Ave W/NW and Elliott Ave W corridor and Interbay. The Magnolia Bridge is a minor arterial that carries over 20,000 vehicles per day and serves 3 transit routes. Primary needs for the Magnolia Bridge corridor identified through the traffic operations analysis include:

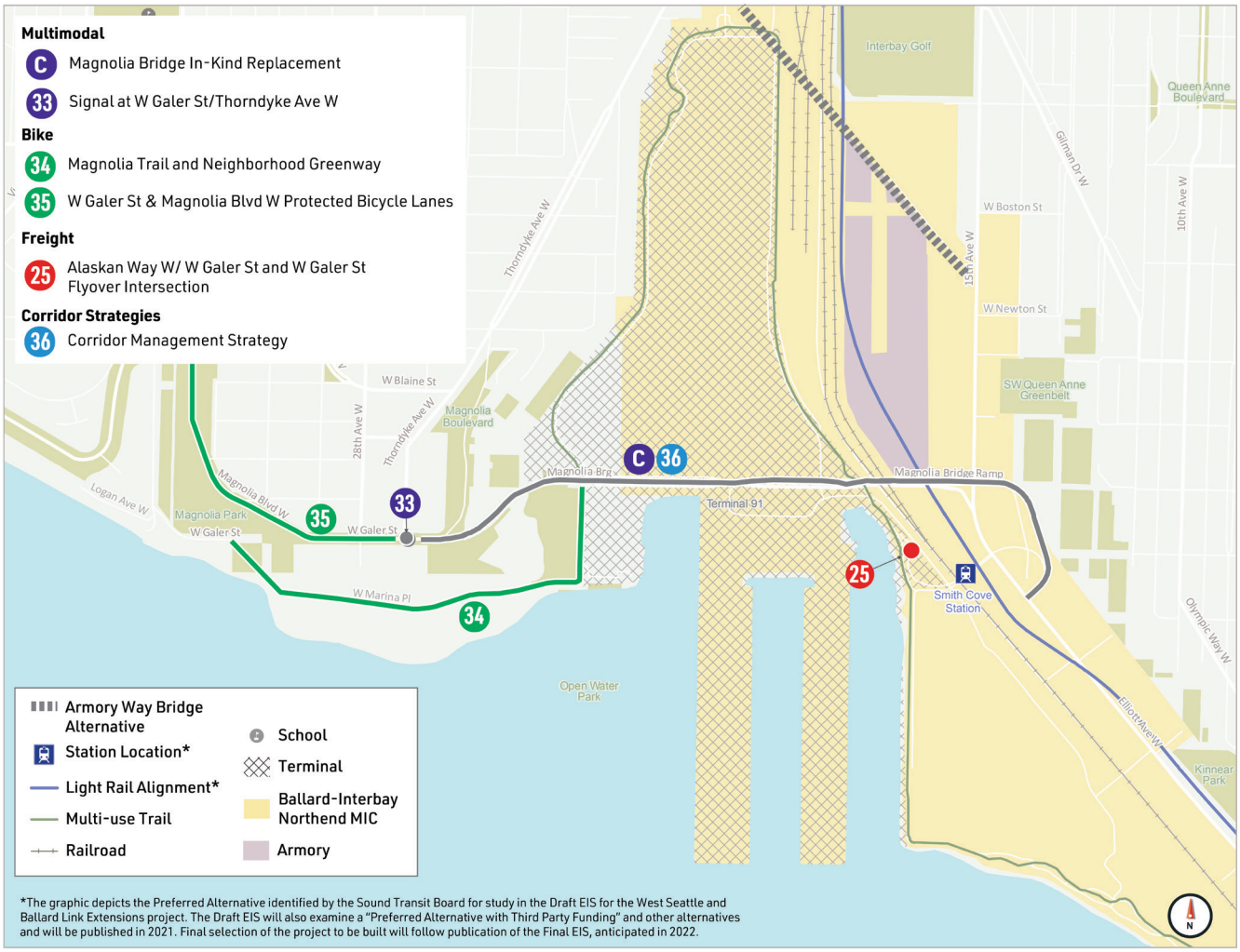
- Improve transit and freight reliability with roadway design and operations measures to avoid impacts of traffic congestion
- Provide clear intersection control at 23rd Ave NW/Magnolia Bridge eastbound on-ramp, and at Terminal 91 and the westbound off-ramp

Corridor management strategies to address the primary needs along the Magnolia Bridge corridor include updates to roadway channelization and striping to provide clearer intersection control at key intersections. Joint-use freight and transit (FAT) lanes could be implemented but may not be merited given projected transit volumes. Table 6-7 and Figure 6-7 present the Magnolia Bridge corridor management strategies along with the recommended improvements along the corridor, which will enhance the performance of each modal system.

TABLE 6-7: MAGNOLIA BRIDGE POTENTIAL INVESTMENTS

ID	Project Name	Project Description	Scenario	Scale
C	Magnolia Bridge In-Kind Replacement	One-to-one replacement of the existing bridge. Improvements include a 10'-wide multi-use path on the south side for pedestrians and bicyclists.	1	Transformative
25	Alaskan Way W/W Galer St and W Galer St Flyover Intersection Improvements	Improve intersection operations at Alaskan Way W/W Galer St, and at Alaskan Way W/W Galer St Flyover	1, 2	Small
33	Signal at W Galer St/ Thorndyke Ave W	Signalize W Galer St /Thorndyke Ave W to enhance transit mobility	1	Transformative
34	Magnolia Trail and Neighborhood Greenway	Build a bicyclist and pedestrian connection in Magnolia that connects W Galer St to W Marina Pl along the waterfront to facilitate accessing the Elliott Bay Trail. Install a neighborhood greenway on 32nd Ave W, W Galer St, and W Marina Pl to connect the new trail to the Elliott Bay Trail	1, 2	Small
35	W Galer St and Magnolia Blvd Protected Bike Lane	Install protected bicycle lanes (PBLs) on W Galer St and Magnolia Blvd W from the Magnolia Bridge to W Howe St per the Bicycle Master Plan	1, 2	Small
36	Magnolia Bridge Corridor Management Strategies	Incorporate channelization/roadway and capital improvements to efficiently move motorized vehicles through the corridor between W Galer Flyover and Thorndyke Ave W	1	Small

FIGURE 6-7: MAGNOLIA BRIDGE CORRIDOR POTENTIAL INVESTMENTS




WHOLE FOODS
MARKET

Armory Way Bridge and Thorndyke Ave W Corridor

The Amory Way Bridge and Thorndyke Ave W corridor will play a significant role in mobility for both Magnolia and Interbay if the Armory Way Bridge alternative for Magnolia Bridge replacement is implemented. If constructed, it will create a new connection across the BNSF railroad tracks along the W Armory Way alignment, and transit serving the southern portion of Magnolia would be re-routed along the new Armory Way Bridge. Primary needs for the Armory Way Bridge and Thorndyke Ave W corridor identified through the traffic operations analysis include:

- Implement transit priority features at Thorndyke Ave W/W Armory Way along with operational changes on 15th Ave W to address freight and transit congestion and mitigate future congestion as mobility patterns shift from the current Magnolia Bridge
- Modify roadway channelization and striping to remove geometric constraints for large vehicles
- Reduce bottlenecks at eastbound W Blaine St/Thorndyke Ave W in both peak hours, southbound W Galer St left turn in AM peak, and westbound W Armory Way left turn in AM peak. Mitigate similar bottlenecks along 15th Ave W from W Amory Way along shared corridor segment connecting to the W Galer St flyover.

Table 6-8 and Figure 6-8 present the Armory Way Bridge and Thorndyke Ave W corridor management strategies along with the recommended improvements along the corridor, which will enhance the performance of each modal system.

TABLE 6-8: ARMORY WAY BRIDGE AND THORNDYKE AVE W POTENTIAL INVESTMENTS

ID	Project Name	Project Description	Scenario	Scale
D	Armory Way Bridge (Magnolia Bridge replacement)	This bridge alternative constructs a new street connection along W Armory Way with a bridge and a new Magnolia Bridge segment to Alaskan Way with new West Uplands Perimeter Road and improvements to 20th Ave W. The bridge alternative as proposed includes a multi-use path on the south side for pedestrians and bicyclists. Joint-use freight and transit (FAT) lanes could be implemented but may not be merited given projected transit volumes.	2	Transformative
37	FAT Lanes: Thorndyke Ave W/W Blaine St	Add joint-use bus/freight lanes on Thorndyke Ave W and W Blaine St *Note: Pending policy review. Related project: In-lane bus stops on Thorndyke Ave (Project 20)*	2	Transformative
33	Signal at W Galer St/ Thorndyke Ave W	Signalize W Galer St/Thorndyke Ave W to enhance transit mobility	1	Transformative
18	Transit Signal Priority (TSP) at Thorndyke Ave/W Armory Way	Add transit signal priority/queue jumps at Thorndyke Ave W/ Armory Way Bridge to allow buses to make a southbound left onto the Armory Way Bridge, and westbound to allow buses onto Thorndyke Ave W *Related project: In-lane bus stops on Thorndyke Ave W (Project 20)*	2	Small
19	Mobility Hubs	Ensure adequate lighting, access to shared use mobility services, bike parking, and high-quality bus stop amenities (e.g., seating, weather protection, and real-time information signs) where multiple future routes will converge at multiple locations. Hubs are recommended at future light rail stations (Ballard, Interbay, and Smith Cove) and the west end of the Armory Way Bridge.	1, 2	Small
20	In-Lane Bus Stops on Thorndyke Ave	Install transit islands on Thorndyke Ave W between W Blaine St and the Armory Way Bridge to allow for in-lane bus stops and safe interface between buses and people riding in the protected bike lane *Related projects: TSP at Thorndyke Ave/Armory Way (Project 18)*	2	Transformative
27	Safety and Crossing Enhancements at High Priority Unsignalized Locations	Evaluate the potential for signalized crossings and enhancements to existing crosswalks at unsignalized intersections and mid-block locations: Thorndyke Ave W/21st Ave W/W Armory Way	1, 2	Small
38	Armory Way Bridge Corridor Management Strategy	Incorporate signal operations improvements, traffic control, roadway striping/channelization, and capital improvement enhancements to efficiently move motorized vehicles on the Armory Way Bridge and Thorndyke Ave W between W Galer St and W Dravus St	2	Transformative

FIGURE 6-8: ARMORY WAY BRIDGE/THORNDYKE AVE W POTENTIAL INVESTMENTS

W Dravus St Corridor

W Dravus St is a principal arterial that connects Magnolia, Interbay, and Queen Anne spanning both the BNSF railroad tracks and 15th Ave W with 2 bridges. Bicyclists, pedestrians, transit, and freight all converge and compete for space on this crucial east/west corridor. Primary needs identified through the traffic operations analysis include:

- Replace W Dravus St bridges to improve bicycle and pedestrian facilities. Current facilities are insufficient and right-of-way constraints imposed by the bridges make it challenging to improve these facilities without significant tradeoffs to transit and freight reliability.
- Modify roadway channelization and striping to remove geometric constraints for large trucks, which are often unable to make turning maneuvers in lane at intersections with 15th Ave W ramps.
- Reduce bottlenecks at W Dravus St/20th Ave W and the 15th Ave W ramps coinciding with AM peak hour travel toward Downtown and PM peak travel away from Downtown
- Improve transit and freight reliability with roadway design and operations measures to avoid impacts of traffic congestion during both the AM and PM peaks
- Implement access management strategies at frequent and busy driveway access points to improve corridor reliability

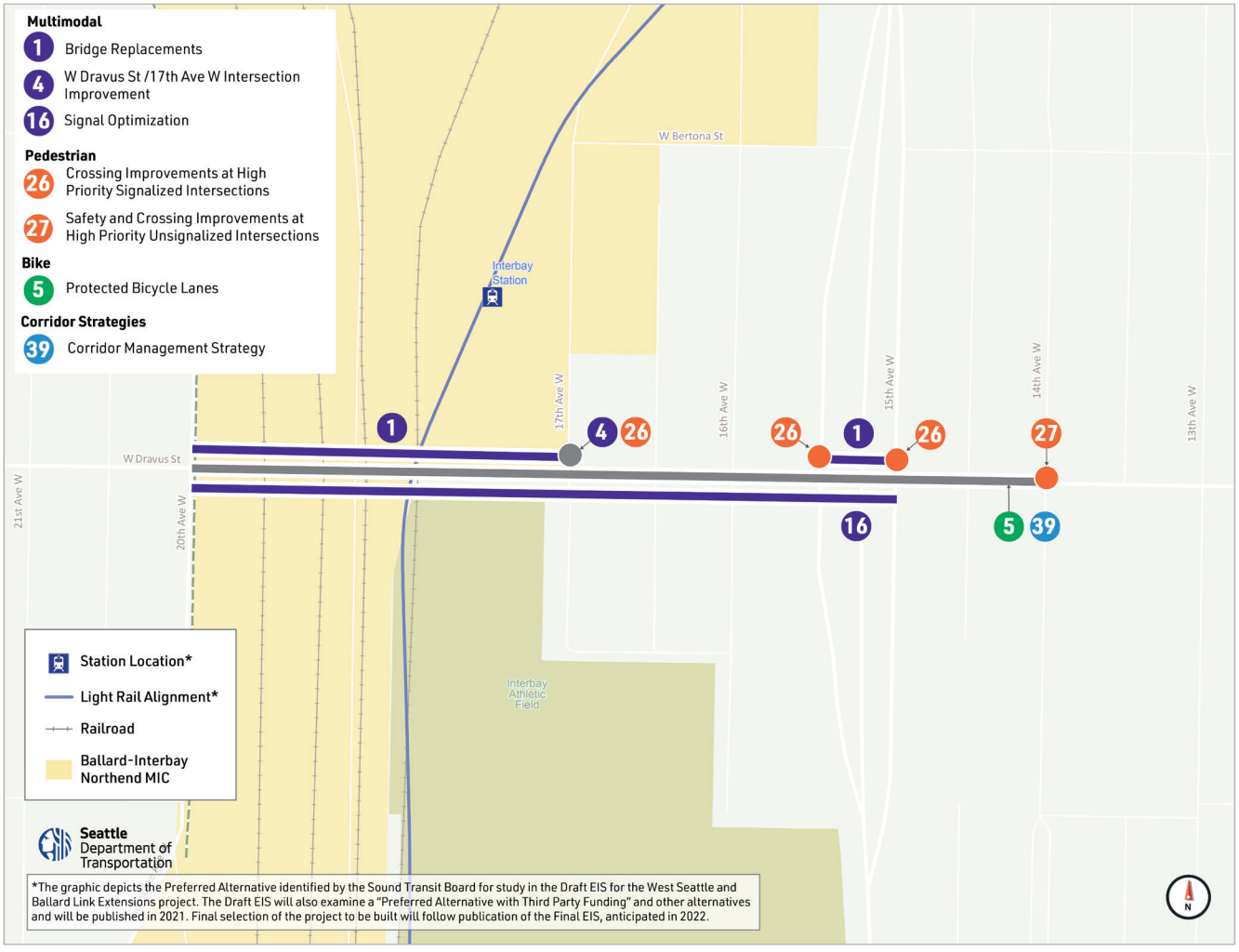
BIRT recommends a suite of projects to address these operational issues and improve corridor use for all travelers. Table 6-9 and Figure 6-9 present the W Dravus St corridor management strategy along with the recommended improvements along the corridor, which will enhance the performance of each modal system.

TABLE 6-9: W DRAVUS ST CORRIDOR POTENTIAL INVESTMENTS

ID	Project Name	Project Description	Scenario	Scale
1	Dravus Bridge Replacements	Replace the W Dravus St bridges over the BNSF railroad tracks and 15th Ave W, including widened sidewalks with buffers from traffic, improved lighting, protected bike lanes, intersection improvements, improved passenger facilities and roadway upgrades to enhance transit and freight mobility *Related project: W Dravus St Protected Bike Lanes (Project 5)*	1, 2	Transformative
4	W Dravus St/17th Ave Intersection Improvements	Evaluate existing right-of-way allocation at W Dravus St/17th Ave W to improve mobility for northbound and southbound vehicles, and make space for protected bike lanes. Options may include roadway rechannelization or expanding the Dravus St bridge west of the intersection. *Related project: W Dravus St Protected Bike Lanes (Project 5)*	1, 2	Transformative
16	W Dravus St Signal Optimization	Optimize traffic signals along W Dravus St between 15th Ave W and 20th Ave W to ensure transit speed and reliability and support freight reliability if traffic to and from Terminal 91 increases *Related project: Dravus Bridge Replacements (Project 1)*	1, 2	Small
26	Crossing Improvements at High Priority Signalized Intersections	Improve crossings for people walking and bicycling at priority signalized intersections: W Dravus St/17th Ave W and W Dravus St/15th Ave W *Related project: W Dravus St/17th Ave Intersection Improvements (Project 4)*	1, 2	Small

ID	Project Name	Project Description	Scenario	Scale
27	Safety and Crossing Enhancements at High Priority Unsignalized Locations	Evaluate the potential for signalized crossings and enhancements to existing crosswalks at unsignalized intersections and mid-block locations along W Dravus St and 14th Ave W	1, 2	Small
5	W Dravus St Protected Bike Lanes	Implement protected bicycle lanes (PBL) on W Dravus St between 20th Ave W and the Elliott Bay Trail Extension (East) with a future long-term connection to 14th Ave W (requires redesign of the 15th Ave W bridge and ramp intersections)	1, 2	Transformative
39	W Dravus St Corridor Management Strategy	Incorporate signal operations improvements, ITS strategies, roadway striping/channelization, and access management enhancements to efficiently move motorized vehicles through the corridor between 14th Ave W and 20th Ave W *Corridor management strategies are not dependent upon Magnolia and Ballard bridge replacement alternatives*	1, 2	Small

FIGURE 6-9: W DRAVUS ST CORRIDOR POTENTIAL INVESTMENTS



Leary Way NW Corridor

Leary Way NW is an important travel pathway connecting Ballard and Fremont and providing access to the industrial and maritime uses along the north side of the Ship Canal and Salmon Bay. King County Metro plans to upgrade the existing Route 40 to RapidRide by 2027 in coordination with SDOT's Transit-Plus Multimodal Corridor (TPMC) improvements. As a principal arterial carrying over 21,000 vehicles per day, the primary need for the Leary Way NW corridor is to increase mobility for people and goods through closely spaced, signalized, high-access locations. Specific needs include:

- Improve safety for bicyclists at locations with collision history (Leary Way NW/8th Ave NW)
- Reduce corridor delay for drivers on Leary Way between 17th Ave NW and 14th Ave NW during peak hours
- Improve transit and freight reliability with roadway design and operations measures to avoid impacts of traffic congestion

Table 6-10 and Figure 6-10 present the Leary Way NW corridor management strategy along with the recommended improvements along the corridor, which will enhance the performance of each modal system.

TABLE 6-10: LEARY WAY NW CORRIDOR POTENTIAL INVESTMENTS

ID	Project Name	Project Description	Scenario	Scale
17	Route 40 TPMC NW Leary Way Bus Lanes	Rechannelize NW Leary Way to include a bus-only lane in one or both directions between 15th Ave NW and NW Market St. 10% design is complete and partially funded via SDOT's Route 40 Transit Plus Multimodal Corridor (TPMC) project. *Related project: Leary Way Corridor Management Strategy (Project 44)*	1, 2	Transformative
40	15th Ave NW and NW Leary Way Rechannelization	Rechannelize southbound 15th Ave W to include a FAT lane for efficient bus and freight access across Leary Way NW and for buses to merge onto the Ballard Bridge after serving southbound RapidRide/express stop *Related project: 15th Ave W/NW FAT Lanes (Project 22)*	1	Small
41	RapidRide Leary Way NW: Passenger Facilities	Enhance passenger facilities in support of future RapidRide implementation on Leary Way NW. This generally includes upgrading existing Route 40 stops to RapidRide stations and their related amenities.	1, 2	Transformative
42	Leary Way NW Corridor Freight Master Plan (FMP) Improvements	Reconstruct and make operational/ITS improvements to the Leary Way NW and N 36th St corridor to better facilitate freight per the Freight Master Plan	1, 2	Small
43	Bicycle Improvements at Top Collision Locations	Make improvements at locations with a history of collisions involving people biking (Leary Way NW/8th Ave NW) and locations with crash risk factors as defined in SDOT's Bike and Pedestrian Safety Analysis.	1, 2	Small
44	Leary Way NW Corridor Management Strategy	Incorporate signal operations improvements, ITS strategies, roadway striping/channelization, access management, and capital improvements to efficiently move motorized vehicles through the corridor between 14th Ave NW and NW Market St.	1, 2	Small

FIGURE 6-10: LEARY WAY NW CORRIDOR POTENTIAL INVESTMENTS

SMALL, LOW COST PROJECTS

As is described in Chapter 7, it could take over a decade to complete the replacement of the Ballard and Magnolia bridges once the City decides on a preferred bridge alternative and determines to pursue funding opportunities. SDOT is entering a period of major fiscal constraint caused by reduced revenues resulting from the COVID-19 pandemic. While some BIRT priority projects are tied to the bridge replacements or will require extensive funding to implement, others are lower cost and could be implemented with other planned investments.

Table 6-11 and Figure 6-11 present projects that are generally lower-cost, simpler to implement, and offer important improvements to safety, efficiency, or reliability. Some of the projects in this list are also included in the project lists above; some are projects that were not selected as Key Investments or top modal network priorities.

People walk across NW Market St in Ballard

TABLE 6-11: SMALL, LOW COST PROJECTS

ID	Project Name	Project Description
26	Crossing Improvements at High Priority Signalized Intersections	Improve pedestrian and bicyclist crossings at priority signalized intersections
27	Safety and Crossing Enhancements at High Priority Unsignalized Locations	Evaluate the potential for signalized crossings and enhancements to existing cross-walks at unsignalized intersections and mid-block locations
28	Pedestrian Improvements at Top Collision Locations	Make improvements at locations with a history of collisions involving people walking and locations with crash risk factors as defined in SDOT's Bike and Pedestrian Safety Analysis
43	Bicycle Improvements at Top Collision Locations	Make improvements at locations with a history of collisions involving people biking and locations with crash risk factors as defined in SDOT's Bike and Pedestrian Safety Analysis
46	Stay Healthy Streets in Ballard, Interbay, Queen Anne, and Magnolia	Build permanent Stay Healthy Streets along planned neighborhood greenways and potentially along other roadways with high pedestrian activity and outdoor dining, such as Ballard Ave NW
47	Wayfinding to WSBLE stations	Add wayfinding to the future light rail stations for people walking and bicycling along multi-use trails, Ballard Bridge, Magnolia Bridge, W Galer St Flyover, Terminal 91, and Queen Anne hill climbs
48	20th Ave W Protected Bike Lanes	Convert the sharrows on 20th Ave W to two-way, all ages and abilities bike lanes on the east side of the road between the Elliott Bay Trail and Thorndyke Ave W
45	21st Ave W/W Emerson Pl Intersection Improvements	Reconstruct the 21st Ave W/W Emerson Pl intersection to improve safety for people walking and bicycling, and improve truck access (e.g. modify curb radii, design a new trail crossing consistent with upgraded curb ramps, change push button placement, and evaluate pedestrian crossing time)
22	15th Ave W/NW FAT Lanes	Allow for joint use of bus-only lanes by transit and freight vehicles on 15th Ave W/NW from Denny Way to Market St NW during off-peak times. Freight can operate in bus-only lanes to bypass congestion, and benefits from transit priority treatments on the corridor such as queue jumps. *Note: Pending policy review.*
49	W Emerson St-W Nickerson St Corridor Management Strategy	Incorporate signal operations improvements, ITS strategies, and traffic control for more efficient motorized travel between Gilman Ave W and 13th Ave W *Some corridor management strategies are only applicable to certain Ballard Bridge alternatives while some are not dependent on bridge replacement alternatives*

FIGURE 6-11: SMALL, LOW COST PROJECTS

*The graphic depicts the Preferred Alternative identified by the Sound Transit Board for study in the Draft EIS for the West Seattle and Ballard Link Extensions project. The Draft EIS will also examine a "Preferred Alternative with Third Party Funding" and other alternatives and will be published in 2021. Final selection of the project to be built will follow publication of the Final EIS, anticipated in 2022.

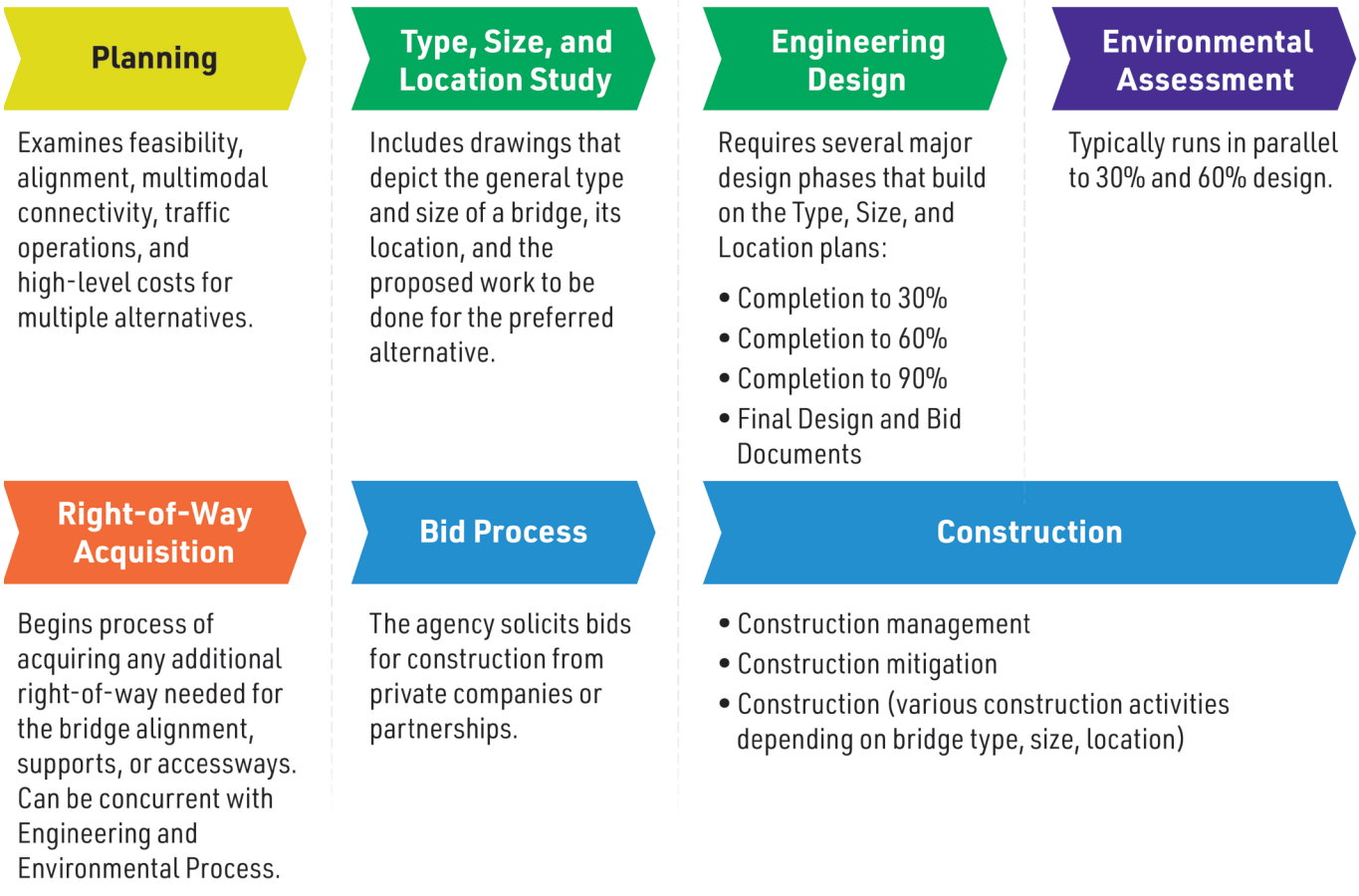
CHAPTER 7: TIMELINE, COSTS, AND FUNDING STRATEGY

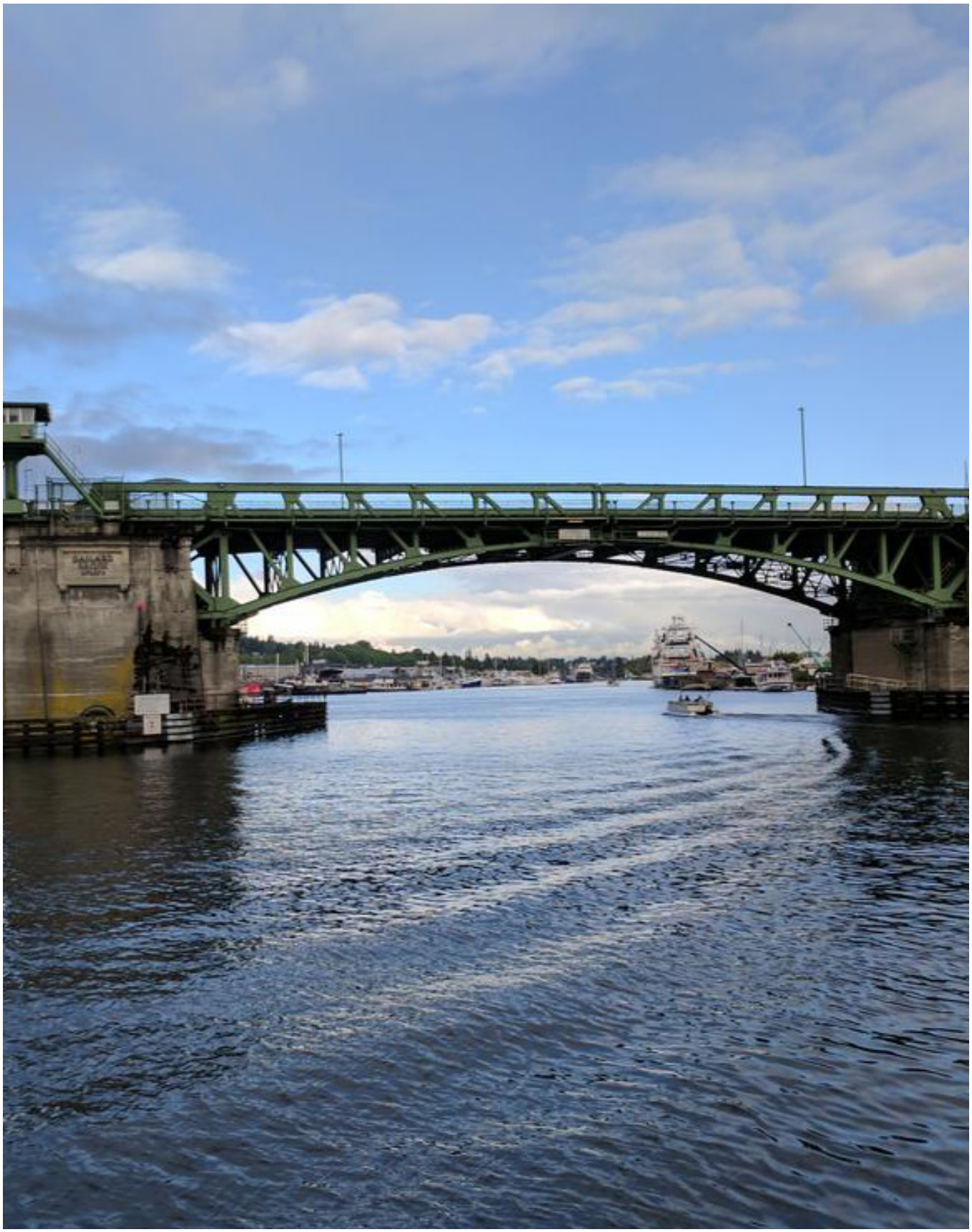
This chapter provides a timeline for replacing or rehabilitating the Magnolia and Ballard bridges. The timeline aligns funding needs for various phases of planning, design, and construction. SDOT's ability to replace or rehabilitate the 2 bridges is reliant on acquisition of funds from multiple sources, including state and federal partners, to complete the various stages of design and construction. Recommendations for procuring funding and guidance for the level of funding required to advance each stage of project development and construction are also covered in this chapter.

BRIDGE REPLACEMENT TIMELINE

The opening of a replacement bridge, or bridge that has undergone major rehabilitation, is preceded by a lengthy and complex process to plan, design, and construct it. That process requires several major project development stages, each of which has many sub-components. Since it can take years to acquire the funding for a full bridge replacement or rehabilitation, each major element may be funded individually, ensuring continued progress while SDOT seeks fundingfor the next step in the process or for full construction. Figure 7-1 describes these key steps.

FIGURE 7-1: KEY STAGES OF A BRIDGE PROJECT





Looking east toward the 218-foot opening span of the Ballard Bridge, which was constructed in 1917

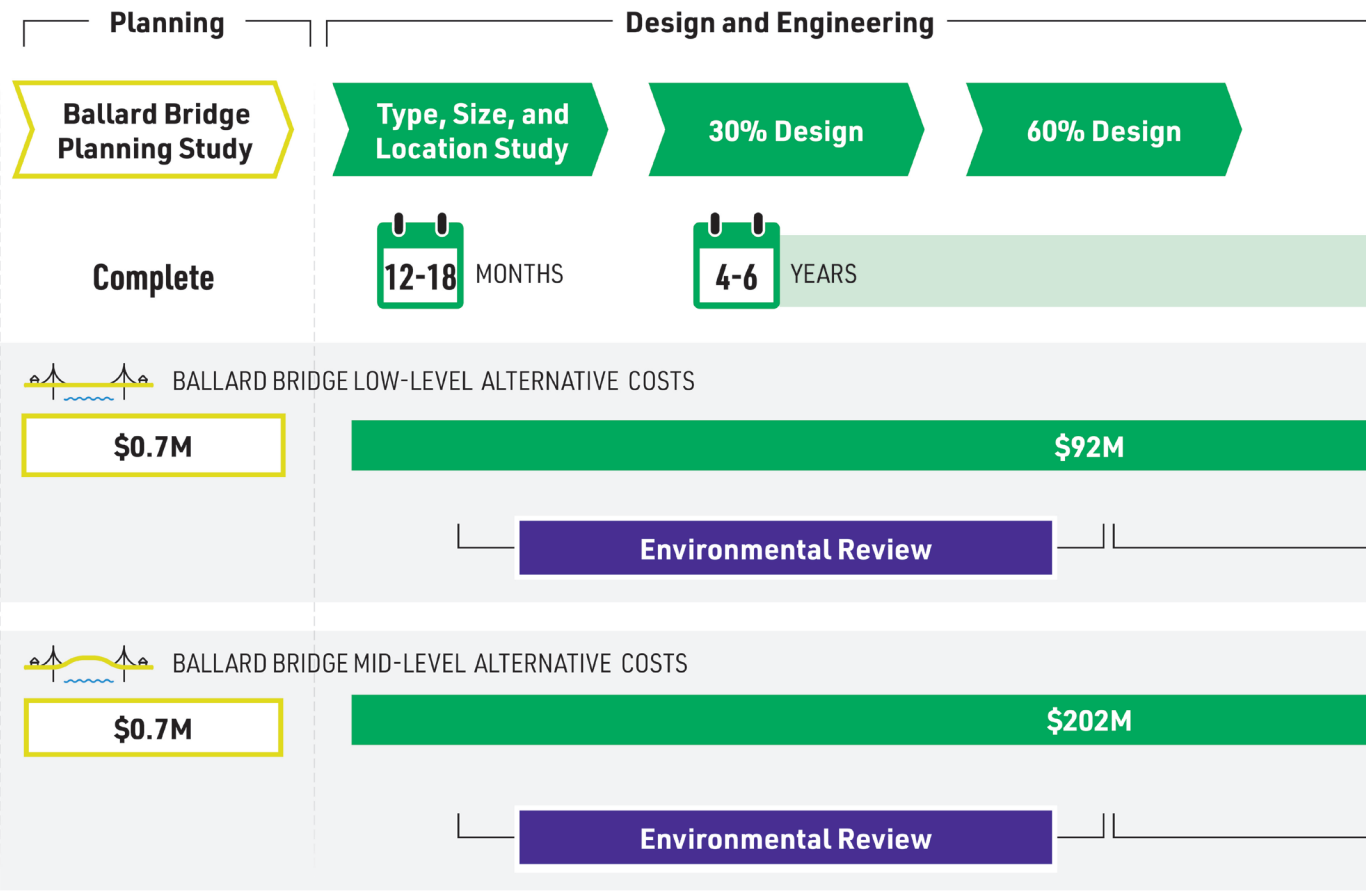
Ballard Bridge Conceptual Costs and Replacement Timeline

As described in Chapters 1-3, the Ballard Bridge is an older structure with a "fair" condition rating, and is the only connection across the Lake Washington Ship Canal along the 15th Ave north-south corridor. SDOT completed the Ballard Bridge Planning Study (BBPS) in the Fall of 2020. This study is a first step in a bridge replacement process that could take as long as 12 years to complete. The estimated timeframe of 8 to 12 years from inception to completion relies on funding being available for the next step of design or construction as the previous phase is completed. Based on this timeline, the Ballard Bridge would be approximately 110 to 115 years old at the time of replacement or rehabilitation. Currently, no funding has been identified to advance bridge design, an indication that the replacement timeline may be extended to match funding availability.

The BBPS developed bridge replacement and rehabilitation options with planning-level cost assumptions assigned to each alternative. Presented in 2020 dollars, the 2 leading alternatives from the BBPS include: (1) a low-level rehabilitation costing between $330 million and $710 million and (2) a mid-level replacement costing between $680 million and $1,460 million.

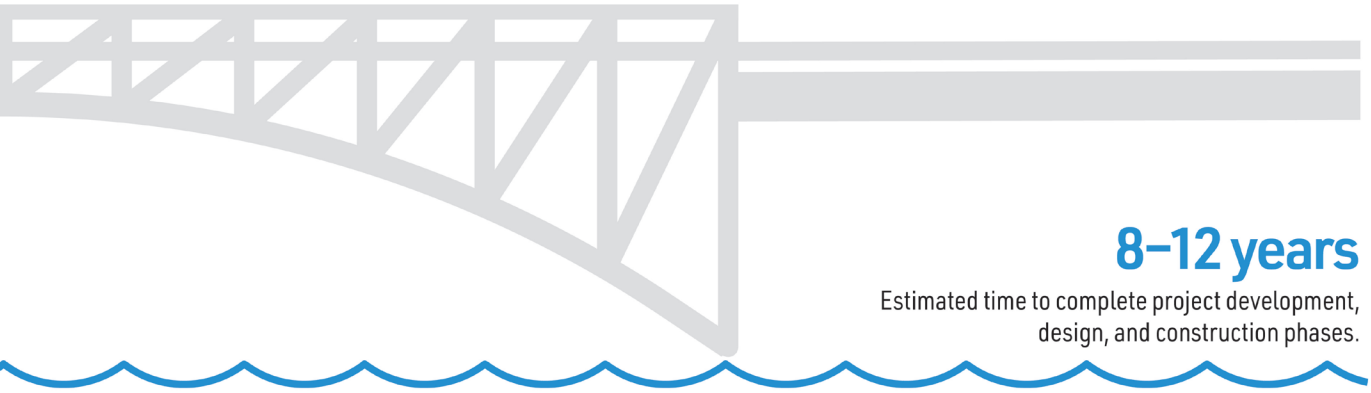
FIGURE 7-2: CONCEPTUAL COSTS AND TIMELINE FOR BALLARD BRIDGE PLANNING, DESIGN, AND CONSTRUCTION

This graphic illustrates the key phases required to prepare for and construct the bridge repair/replacement. The actual timing of replacement will be based on continued assessment by the facility owner (SDOT). The delivery method selected may influence this timeline.



Funding availability key to timely advancement

Each key planning, typing, and design phase can be funded incrementally, but cannot proceed without full funding for that phase. A full construction funding/financing package will need to be secured prior to bid release, contractor selection, and initiation of construction activities. Grant cycles for funds to support engineering activities may operate on multi-year cycles, meaning SDOT needs to plan ahead to avoid delay between design phases. Failure to secure funding for the next phase of design or construction can lead to delay.



8–12 years

Estimated time to complete project development, design, and construction phases.

Design and Engineering		Construction	Total Range
90% Design	Final Design & Bid Documents	Construction (incl. Contingency Costs)	
		3-6 YEARS	8-12 YEARS
BALLARD BRIDGE LOW-LEVEL ALTERNATIVE COSTS			
		$298M	$330 - **$471M** - $710
Right-of-Way Acquisition $81M			
BALLARD BRIDGE MID-LEVEL ALTERNATIVE COSTS			
		$655M	$680 - **$971M** - $1,460
Right-of-Way Acquisition $114M			

It is typical for planning-level costs estimates to use a wide range, representing potential unknown costs or savings that may arise during design and construction.

Construction timeline detail

Bridge construction is a multi-phase process. Given the lack of detail about bridge type and design requirements, this study categorizes costs into 2 buckets:

- Construction – includes labor, materials, and various professional services required to construct the bridge
- Contingency and Additional Soft Costs – unplanned costs engineers use to ensure early estimates are able to accommodate future increases in material, labor, right-of-way, or other costs

Contractor Selection → Construction

- All costs are order of magnitude planning costs and are not based on design plans
- All time frames reflect the time to complete the work and do not account for funding acquisition
- Rough order of magnitude costs are based on the Ballard Bridge Planning Study and the Magnolia Bridge Planning Study

A truck crosses the Magnolia Bridge

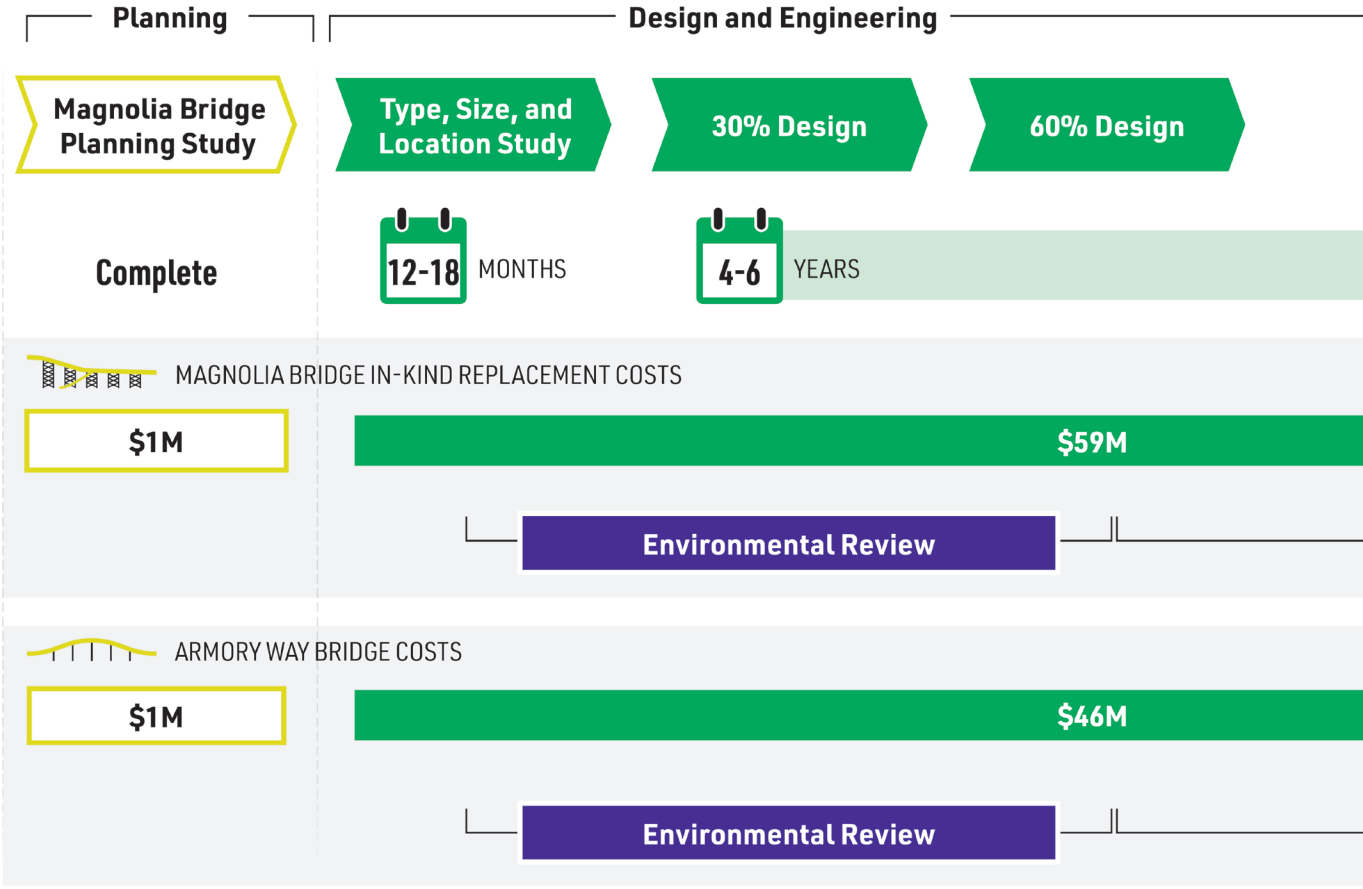
Magnolia Bridge Replacement Timeline

The Magnolia Bridge has been in need of rehabilitation or replacement since the 2001 Nisqually earthquake, and is 1 of 5 vehicle bridges SDOT owns that is rated in "poor" condition. SDOT completed the Magnolia Bridge Planning Study (MBPS) in the Fall of 2019. Completion of the planning study is the first step in a bridge replacement process that could take as long as 12 years to complete. The estimated timeframe of 8 to 12 years from inception to completion relies on having funding available for the next step of design or construction as the previous phase is completed. Built in 1930, the Magnolia Bridge would be approximately 98 to 102 years old at time of replacement. As with the Ballard Bridge, no funding is currently available to advance bridge design, an indication that the replacement timeline may be extended to match funding availability.

The MBPS developed bridge replacement and rehabilitation options with planning-level cost assumptions assigned to each alternative. Presented in 2020 dollars, the 2 leading alternatives from the MBPS include: (1) an in-kind replacement costing between $340 million and $420 million and (2) an Armory Way replacement costing between $200 million and $350 million. It is notable that planning-level costs from the MBPS were developed at different times. The Armory Way Alternative costs were developed during the MBPS study, whereas the Magnolia Bridge In-Kind Replacement costs are adjusted from an earlier study.

FIGURE 7-3: CONCEPTUAL TIMELINE AND COSTS FOR MAGNOLIA BRIDGE PLANNING, DESIGN, AND CONSTRUCTION

This graphic illustrates the key phases required to prepare for and construct the bridge repair/replacement. The actual timing of replacement will be based on continued assessment by the facility owner (SDOT). The delivery method selected may influence this timeline.



Funding availability key to timely advancement

Each key planning, typing, and design phase can be funded incrementally, but cannot proceed without full funding for that phase. A full construction funding/financing package will need to be secured prior to bid release, contractor selection, and initiation of construction activities. Grant cycles for funds to support engineering activities may operate on multi-year cycles, meaning SDOT needs to plan ahead to avoid delay between design phases. Failure to secure funding for the next phase of design or construction can lead to delay.

Secure Funding → Design Phase

8–12 years

Estimated time to complete project development, design, and construction phases.

Design and Engineering		Construction	Total Range
90% Design	Final Design & Bid Documents	Construction (incl. Contingency Costs)	
		3-6 YEARS	8-12 YEARS
MAGNOLIA BRIDGE IN-KIND REPLACEMENT COSTS			
		$350M	$340 - **$398M** - $420
Right-of-Way Acquisition $49M			
ARMORY WAY BRIDGE COSTS			
		$175M	$200 - **$266M** - $350
Right-of-Way Acquisition $45M			

It is typical for planning-level costs estimates to use a wide range, representing potential unknown costs or savings that may arise during design and construction.

Construction timeline detail

Bridge construction is a multi-phase process. Given the lack of detail about bridge type and design requirements, this study categorizes costs into 2 buckets:

- Construction – includes labor, materials, and various professional services required to construct the bridge
- Contingency and Additional Soft Costs – unplanned costs engineers use to ensure early estimates are able to accommodate future increases in material, labor, right-of-way, or other costs

Contractor Selection → **Construction**

- All costs are order of magnitude planning costs and are not based on design plans
- All time frames reflect the time to complete the work and do not account for funding acquisition
- Rough order of magnitude costs are based on the Ballard Bridge Planning Study and the Magnolia Bridge Planning Study

BRIDGE DELIVERY METHODS

Building a bridge is a complex undertaking requiring considerable planning, knowledge, and a variety of professional expertise. Several variables, including engineering constraints, funding sources and amounts, staff capacity, and bridge type, come into play when determining which delivery method to use. Standard bridge delivery methods include:

- **Traditional:** Agency develops design plans (likely using a design consultant) and releases a bid to which private construction companies make proposals. The agency then selects a company or partnership to complete the construction.
- **Design-Build:** In this approach, the bidding stage comes first, and the design and build (construction) stages are combined. As such, the winning bidder conducts the design and completes the construction project. This approach can reduce burden on the agency to manage design and speed up the delivery of the project.
- **Design-Bid-Build:** Under this approach, the agency hires independent consultants, designers and engineers to complete a set of design documents that best reflects the intent of the developing agency. This is followed by the public solicitation and bidding of the documents to determine the lowest price for the documented scope of work.

The timelines presented in Figures 7-2 and 7-3 assume a *traditional* delivery method, which is also typically the longest duration. Use of *design-build* or *design-bid-build* alternatives could reduce the time required to design and construct either the Magnolia or Ballard bridges. It should be noted that speeding delivery through alternative delivery methods such as design-build can present risk, as they cede responsibility to a private contractor.

FUNDING STRATEGY

Background

The BIRT study is being completed during a highly disruptive time, with national, state, and local transportation agencies facing major budget challenges due to the COVID-19 pandemic. Even as this report is finalized, the long-term economic impacts will not be fully realized. We also face an unprecedented decline in the condition of our road and bridge infrastructure, leading to financial need that is staggering even in a strong economy. As SDOT and our local, regional, state, and federal partners consider the funding required to rebuild or rehabilitate the Magnolia and Ballard bridges, several priorities emerge:

- **What is best for the communities served by the Ballard and Magnolia bridges, as well as the City of Seattle more broadly, will drive the final bridge alternative and cost of replacement or rehabilitation.**
- **Projects at the scale of the Magnolia Bridge and Ballard Bridge rehabilitation or repair require multiple funding sources.** Considering all funding options (local, regional, state, and federal) will be essential given the very high costs of these projects, the City's overall bridge maintenance and capital funding backlog, and the very limited local funding currently available. This is true even if economic conditions dramatically improve from 2020 conditions, meaning the City will need to develop and gain support for new local funding sources, and partner with regional, state, and federal entities to identify and secure additional grant sources. Future funding support from the Washington State Legislature could be essential to maintaining the critical transportation connectivity provided by these bridges.
- **Like every major city in the United States, Seattle is stepping up to the challenge of maintaining our aging infrastructure in the face of notably insufficient funding support from the federal government.** Federal infrastructure investment in relation to gross domestic product has fallen by half over the last 35 years, leaving a disproportionate bulk of this financial burden to state and local governments to deal with a $123 billion national backlog of unfunded bridge rehabilitation needs.[1] Despite these challenges, SDOT continues to prioritize the safety and resiliency of transportation infrastructure while simultaneously making the new investments necessary to keep our city moving as our population grows at unprecedented rates.
- **Local funding for the Ballard and Magnolia bridges will be limited by emergency requirements to repair or replace the West Seattle High Bridge (WSHB).** At the time of this study, SDOT does not have a cost estimate for the repair or replace options. The current cost estimate range is between $159M and $225M. City Council has approved $190M in local funding (Real Estate Excise Tax) for 2020-2021 costs to advance planning and design work to determine a repair or replacement option and support the Reconnect West Seattle transportation mitigation program. A program cost estimate will be provided after the mayor makes a decision in November 2020. Key local partners, such as the Port of Seattle, King County, and WSDOT, are also focused on working toward a fix for the WSHB, which is a critical link to Seattle's largest manufacturing and industrial area in the Duwamish.

1 American Society of Civil Engineers (2017). 2017 Infrastructure Report Card. Available at: https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Bridges-Final.pdf

Strategy

SDOT will need local, state, regional, and federal funding partnerships to deliver bridge replacements and incrementally fund project development phases. As of November 2020, the City of Seattle's greatest infrastructure priority is to fund and replace or repair the West Seattle High Bridge. The City has declared the closure of this bridge, which previously carried over 84,000 buses, trucks, and cars daily, a state of emergency and is deploying unprecedented resources to respond. This could limit resources available to advance other bridge replacement projects until WSHB replacement or rehabilitation funding is secured and connectivity is restored to West Seattle.

Key actions to advance planning, design, and construction of the Ballard and Magnolia bridge replacement projects, include:

- Finalize the decision for bridge alternative replacement based on the Ballard Bridge and Magnolia Bridge planning studies and continued work to identify project funding. In both cases, a lower cost replacement option would enhance the viability of developing a funding package and advancing construction of a seismically sound bridge. Seattle City Council approval is needed to finalize preferred alternative replacement options for both bridges.[2]
- Establish priority of the Ballard and Magnolia bridge replacements in relation to other critical Seattle bridge infrastructure needs. Based on a September 2020 audit of SDOT's bridge maintenance and operations, the department is committed to developing an analysis and detailed plan for 77 of the City's bridge assets, which will help determine future investment.
- Develop a plan for coordinated grant procurement to align with type, size, and location (TS&L) study and design plans, environmental, and early design phases (30% design) for the Ballard Bridge. Attempt to procure funding in a manner that allows sequential advancement through design phases.
- Include initial phases of project development for Ballard and Magnolia bridges in a future transportation funding measure to replace the Levy to Move Seattle, which expires in 2024. The Levy to Move Seattle, approved by voters in 2015, provides roughly a third of the City's transportation budget. It includes funding to maintain and repair existing infrastructure—such as bridges—among other investments to keep people and goods moving in our growing city.
- Evaluate facility tolling options for both bridges, building on the findings of the West Seattle High Bridge Traffic and Revenue Study currently underway. This option could impact bridge timelines.
- Consider options for packaging multiple BIRT projects for funding, particularly for larger grant sources such as BUILD or INFRA that focus on broader economic development initiatives, productive reuse, and access improvements for ports and industrial areas (BINMIC and Port of Seattle). Potential packaging concepts could include:
  - Ballard Bridge replacement/rehabilitation packaged with 15th Ave W corridor projects and W Dravus St corridor improvements.
  - Projects in Sound Transit's West Seattle and Ballard Light Rail Extensions (WSBLE) station areas could be packaged with either the Ballard or Armory Way Bridge alternatives and include important north-south trail connectivity options such as the proposed Elliott Bay Trail Extension Project that would run east of the railroad tracks.

2 If the In-Kind Replacement alternative is selected for the Magnolia Bridge, a reassessment of the design may be required.

- The Armory Way Bridge alternative could be packaged with improvements on 15th Ave W, local Sound Transit station access projects for the Smith Cove Station, and projects that improve connectivity to the Armory redevelopment site.

- Explore innovative funding and delivery methods, such as public-private partnerships (P3), that could expedite replacement of the Ballard and Magnolia bridges and potentially support delivery of other recommended BIRT projects. Given the significant bridge funding shortage at all levels of government and the need for bridge repair and replacement, the City could consider a P3 structure that delivers improvement or replacement of multiple bridges. This approach has precedent at the state department of transportation level in Pennsylvania. PennDOT used a multi-asset, multi-location P3 to rapidly replace and repair many structurally deficient bridges.
- Continue to coordinate with the Mayor's Maritime & Industrial (M & I) Strategy. This process is engaging industrial and maritime stakeholders to guide development of strategies to ensure a strong industrial and maritime sector now and in the future. BIRT has coordinated closely and aligned recommendations with land use scenarios being developed through this process, but it is notable that the M&I scenario development was mid-process as the BIRT study was being developed. A full strategy is scheduled for delivery in 2021.
- Continue to work with agency project partners including the Port of Seattle, WSDOT, and King County Metro to develop funding partnerships. In particular, the Port of Seattle has a strong economic interest in regional access to its facilities and reliable movement of freight to and from the study area. The Port has a history of sharing in joint funding strategies with the City of Seattle, particularly where there are demonstrable benefits accruing to the Port from acceleration of delivery.
- Conduct further research in collaboration with the Port of Seattle, King County, the Washington State Military Department, the Department of Commerce, and WSDOT on how redevelopment of the Port property and the Armory site could fund direct public benefits, potentially including bridge replacement and other projects identified in the BIRT study. The Interbay Public Development Advisory Board Committee (Interbay Project) proposal to establish a public development authority would be a step toward establishing a connection between potential property redevelopment and funding of transportation projects.

Bridge replacement will require a suite of funding sources, and current economic realities mean that funding for major infrastructure projects is limited.

Potential Bridge Funding and Financing Options

The Ballard and Magnolia bridges are 2 of 77 vehicular bridges managed by SDOT, many in need of major maintenance and rehabilitation. With 2021 funding declines, SDOT is being required to pause several bridge planning and design efforts funded by the Levy to Move Seattle. Dedicated revenue for the planning, environmental, engineering, and construction work required to maintain this backlog is very limited. SDOT has no dedicated funding source for bridge replacement; even bridge maintenance backlogs are significantly underfunded. A 2020 audit identified that SDOT should dedicate annual funding to bridge maintenance and operations;[3] in recent years it has spent $6.6 million per annum. Based on an audit recommendation, SDOT has committed to develop a strategic bridge asset management plan by 2023.

In considering how to pay for 2 major bridge replacements, the City of Seattle and its local, state, and federal partners will need to look at options that include direct funding and forms of financing.

- **Funding** includes direct sources of funding to pay for project development and construction. This could include direct funding sources such as local revenues (property tax and/or other), one-time grants from state or federal sources, and partnerships with other agencies.
- **Financing** includes mechanisms such as loans or bonding to provide up-front funding to cover project costs that will need to be paid back over time. This approach requires a dedicated revenue stream that can be used to repay the loan or bond over time.

Major capital projects, such as large bridge replacements, typically require multiple sources of funding and financing approaches. As illustrated in the conceptual timelines presented in Figures 7-2 and 7-3, funding can be and often is sourced incrementally, with the agency acquiring sufficient funds to advance through one project development step at a time. Funding for the next step can be acquired as work on the previous is complete. It is preferable to have a full funding/financing package at inception, as it allows the agency to move more rapidly and to convey greater certainty about the project timeline including the construction period and estimated year of opening.

SDOT will need to pursue local, regional, state, and federal funding and financing sources to pay for the replacement of each bridge. The City of Seattle's ability to raise local funding is limited by law, demanding a broad funding partnership to complete capital projects at this scale. The following section describes potential sources of funding at the local, regional, state, and federal levels for project development and construction.

Local Funding and Financing Options

This section covers potential funding and financing sources that could be viable for the City of Seattle to cover some portion of bridge replacement costs. Of these options, the renewal or replacement of the 2015 Levy to Move Seattle, which provides capital funds for road and bridge projects, could be an important local source. The 9-year levy will be up for renewal in 2024, and its renewal could provide funding for interim bridge design phases or partial construction funding for one or both bridges. The 2015 levy provided $930 million in funding; however, SDOT could explore a different mix of funding sources to add financial flexibility, including the ability to bond, or possibly a larger measure pending voter support. SDOT will likely need to consider bridge projects other than Magnolia and Ballard in a levy renewal package. Required voter approval mandates the City also demonstrate a commitment of funding to other elements of Seattle's multimodal transportation system.

There are several innovative and speculative funding and financing options available to

3 Seattle Department of Transportation: Strategic Approach to Vehicle Bridge Maintenance is Warranted, Seattle Office of the City Auditor, September 11, 2020.

the City of Seattle. Equitable road pricing is a concept that can generate revenue for any local transportation project but would require significant local process and action to institute. Under Mayor Durkan's leadership, the City of Seattle has begun to explore the opportunities and challenges associated with various forms of equitable road pricing, but study is still at an early phase. Facility-specific tolling may present a more direct and immediate opportunity for bridge replacement funding. There is recent precedent for facility tolling on the state freeway system—both the SR 520 Bridge Replacement and the SR 99 Tunnel used facility tolling to back finance packages. It is notable that facility tolling has not historically been used on City-owned transportation infrastructure in Seattle.

Both tolling and equitable road pricing will require detailed study of traffic and revenue modeling to understand the potential for toll rates and impacts on travel. Both would also require detailed equity analyses to identify who would benefit and who pays, based on social demographics including income, race and ethnicity, and what types of businesses are impacted. SDOT is undertaking a Traffic and Revenue Analysis for the West Seattle High Bridge that will answer some of these questions for the Duwamish crossing, and it could also be beneficial for the City in considering tolling for future facilities.

The City of Seattle has several options for bonding against general fund revenues. Given the City's significant citywide funding gap for bridge replacement, leaders could consider the possibility of seeking a 60% majority bond measure that would fund a package of citywide bridge replacement and repair projects. This approach could generate a significant source of funds over time and be meaningful for multiple projects.

Table 7-1 includes a comprehensive list of potential local funding and financing options the City of Seattle could consider.

TABLE 7-1: POTENTIAL LOCAL FUNDING AND FINANCING OPTIONS

Program or Source	Description
Renewal or Replacement of the Move Seattle Levy	A 2024 renewal could include funding for bridge project development and construction. This is a property tax-based source, and the tax levy could be increased to generate more revenue for bridge replacement or other types of projects. **Potentially significant but there are many demands for funds from a levy renewal.**
Revenue Backed Bonds	Revenue backed bonds don't always rely on municipal tax-free instruments and usually are for higher cost projects. Seattle was assigned AAA ratings by Moody's for its latest general obligation improvement bond offering in 2019. **Potentially significant but requires funding source to back bonds.**
Limited Tax General Obligation Bonds (LGTO) and Unlimited Tax General Obligation Bonds (UTGO)	LTGO (councilmanic) debt can be leveraged by Seattle City Council within existing property tax base capacity, or by a majority public vote for a temporary lid lift beyond existing capacity, backed by an increase in property tax for up to 9 years (as with Move Seattle Levy). UTGO bonds can be leveraged for capital projects backed by a longer-term property tax increase (30 years is typical) but requires approval by a 60% super-majority from 40%+ voter turnout (e.g., Seawall replacement in 2012). **Potentially significant source, but requires voter approval.**
Facility Tolling	Facility tolling could provide a dedicated source of funding to support bonding of financing (facility tolling has been used in the Seattle area for the SR 520 Bridge and SR 99 Tunnel). Tolling on state facilities requires approval from the Washington State Transportation Commission. **Potentially significant source, but politically challenging with high costs to establish.**
Equitable Road Pricing	The City of Seattle has conducted early phase studies to explore equitable road pricing. This early phase study identifies potential approaches to equitable road pricing and evaluates how Seattle could implement equitable road pricing in a manner that centers outcomes on equity and climate. Future phase studies could explore how much revenue might be generated by equitable road pricing and potential use of revenue. **Potentially significant source, but politically challenging with high costs to establish.**
Public-Private Partnership (P3)	Alternative method for funding and delivery of a project. Up-front financing is borne by a private investor or consortium, and public agency partners leverage private resources and expertise through the transfer of risk. The private entity would need to benefit financially from the arrangement, which would require them to toll the facility or capture value from property. A P3 could be developed for a single or multiple bridge(s). This is not an approach that the City of Seattle has used for major infrastructure projects. Key aspects of a project that will help determine the suitability for a P3 include opportunities for available revenue streams, risk transfer scalability, proper statutory authority, public vs. private cost of financing, and the long-term performance strategy for asset owners. Washington passed enabling legislation for infrastructure P3s in 2005 (Wash. Rev. Code Ann. §§47.29.010 to 290). Legislative approval is required. **Potentially significant source, but unprecedented in Seattle.**

Type	Phases	Potential Value	Viability/ Fit
City of Seattle property tax	P E D C	◒	●
Locally backed finance option		●	●
Locally backed finance option		●	○ to ◒
Ongoing revenue to back financing	D C	●	◒
Ongoing revenue to back financing	P E D C	◒	○
Alternative delivery, financing, and ownership model	D C	○ to ◒	○

Funding and Financing Options Legend

PHASES OF PROJECT DEVELOPMENT

- P Planning/Concept Design
- E Environmental
- D Design
- C Construction

ESTIMATED LEVEL OF POTENTIAL FUNDING FROM SOURCE

- ● One-time allocation of >$25M or bondable revenue equivalent
- ◒ One-time allocation of >$5M and <$25M or bondable revenue equivalent
- ○ One-time allocation of <$5M

Financing options do not generate new revenue but rather allow the City to leverage regularly collected streams of revenue to pay larger capital costs upfront.

VIABILITY OR FIT OF PROJECT TO SOURCE

- ● Funds are highly appropriate and generally available for bridge replacement/rehabilitation
- ◒ Funds are occasionally allocated to bridge replacement/rehabilitation; bridge project is reasonably competitive given other uses
- ○ Funds are rarely allocated to or a poor fit for bridge replacement/ rehabilitation, but there is no prohibition

Program or Source	Description
Value Capture	Value capture is a practice by which governments capture some of the increased value of land that results from building a new piece of infrastructure. Typically, the money the government "captures" is used to help fund the project. This may be challenging for both the Ballard and Magnolia bridges due to relatively limited redevelopment potential around the bridgeheads and the fact that existing facilities are in place, meaning the capital project may not drive a significant change in value to adjacent property. **Likely politically challenging.**
Local Improvement District (LID)	A Local Improvement District (LID) is a form of value capture that uses a special assessment district where a portion of value from increased property values is dedicated to a capital project. LIDs are traditionally used to allocate capital costs to benefitting properties. **Has substantial property owner acceptance requirements. Value capture in Washington State is very limited by state law and might require special legislative authority.**
Regional Transportation Investment District (RTID)	King, Pierce, and Snohomish Counties, or each county individually, can form a special district to plan and finance certain highway improvements, subject to voter approval. Up to 0.1% in sales tax or $100 in vehicle licensing fees, special fuel tax, parking tax, etc. could be implemented. **No RTID currently exists in the Puget Sound region.**
Transportation Benefit District (TBD)	A city, county, or even multiple jurisdictions jointly may form a Transportation Benefit District (TBD) to generate revenue for transportation projects; revenue typically comes from a sales tax or vehicle license fee. In October 2020, the Washington State Supreme Court overturned statewide Initiative 976, which would have lowered vehicle registration renewals to $30 per year. Seattle currently collects an $80 car license fee and 0.10% sales tax as part of a city TBD, $60 of which expires at the end of 2020. A referendum to raise the 0.10% sales tax to 0.15% through 2026 is on the November 2020 ballot. The existing TBD has primarily funded bus service expansions in and around the city, with more limited funding for transit corridor improvement projects, transit pass subsidies, street maintenance, and bicycle/pedestrian improvements. **Limited due to existing priority for transit funding.**
Public Development Authority (PDA)	Work conducted by the Department of Commerce for the Armory site identified a PDA as a potential option for funding the significant transportation and public improvements needed to support new development on the site. In Washington, PDAs are authorized under RCW 35.21.730-.759. PDAs are often used to limit liability or administer funds for a larger development or redevelopment project and to manage ongoing operations of a site or development. Like a city, PDAs can generate revenue from multiple sources. **Dependent on significant future development.**
External or Partner Agency Contributions	Direct contributions from outside agencies such as the Port of Seattle, King County, or others to fund portions of the bridges. Contributions would come with underlying terms and conditions that may change. **No current guideline for contribution amount.**

Type	Phases	Potential Value	Viability/ Fit
Transfer of value/ assessment	D C	◒	○
Assessment based on property value increase	D C	◒	○
Financing mechanism supported by regional sales tax, fuel tax, parking tax, etc.	P E D C	◒	◒
Financing mechanism supported by local sales tax, fuel tax, parking tax, etc.	P E D C	◒	◒
Geographically constrained structure for managing funds	P E D C	◒	◒
Discretionary funding	P E D C	◒	◒

Funding and Financing Options Legend

PHASES OF PROJECT DEVELOPMENT

- P Planning/Concept Design
- E Environmental
- D Design
- C Construction

ESTIMATED LEVEL OF POTENTIAL FUNDING FROM SOURCE

- ● One-time allocation of >$25M or bondable revenue equivalent
- ◒ One-time allocation of >$5M and <$25M or bondable revenue equivalent
- ○ One-time allocation of <$5M

Financing options do not generate new revenue but rather allow the City to leverage regularly collected streams of revenue to pay larger capital costs upfront.

VIABILITY OR FIT OF PROJECT TO SOURCE

- ● Funds are highly appropriate and generally available for bridge replacement/rehabilitation
- ◒ Funds are occasionally allocated to bridge replacement/rehabilitation; bridge project is reasonably competitive given other uses
- ○ Funds are rarely allocated to or a poor fit for bridge replacement/ rehabilitation, but there is no prohibition

State Funding and Financing Options

A primary source of funding for statewide transportation projects is Connecting Washington, a funding package passed by Governor Inslee and Washington's State Legislature in 2015. The $16 billion investment package is supported by a 16-year, 11.9-cent gas tax increase. These funds are allocated to projects across the state, including projects in Seattle such as the South Lander St overpass, which opened in October 2020. While funds from the current package are fully allocated to projects around the state, an update to the Connecting Washington legislation could provide funds for priority projects in Seattle. Proposals have been brought forth to develop a Part II of Connecting Washington prior to the 16-year expiration but have not made it through the State Legislature.

More likely, a new legislative package would be needed that would include funding for the Ballard and/or Magnolia bridge replacement project(s). A renewal of the Connecting Washington 11.9-cent gas tax increase would not be viable until 2031, but other revenue sources could be used to back a funding package. According to the 2019 Washington State Transportation Resource Manual, each penny increase in gas tax would generate $69.1 million per biennium in new statewide revenue (uses restricted by the 18th Amendment). These estimates were developed prior to COVID-19 impacts to travel and corresponding gas-tax collections. Over last 20 years, Washington State has leveraged substantial proportions of gas tax increase packages for capital projects. The Magnolia and Ballard bridges should be a high priority for any any gas tax increases in the future.

The Washington State Transportation Improvement Program (STIP) is a 4-year, fiscally constrained, prioritized multimodal transportation program. The STIP is required by the Federal Transportation Act to prioritize federal transportation funds. Projects programmed in the STIP are the highest priority for the available funding to preserve and improve the state's transportation network and achieve the national goals in the Fixing America's Surface Transportation Act (FAST). The current STIP covers projects through 2023.

For each region of the state, the Metropolitan Planning Organization (MPO)is responsible for prioritizing and submitting projects for inclusion in the STIP. For Seattle, projects are submitted to the Puget Sound Regional Council (PSRC) and prioritized in the regional Transportation Improvement Program (TIP) process. Fiscal Year 2019 STIP apportionments were approximately $30.4 billion; the STIP funds include the federal sources listed in the following section as well as others. Federal funds for bridge and highway construction and maintenance are generally categorized as part of either the: (1) Interstate System consisting largely of numbered state and federal highways (e.g., Interstate 5, Interstate 405); and (2) the National Highway System (NHS) more broadly including major arterials and state highways that connect to the Interstate System. The Ballard Bridge and 15th Ave W are part of the NHS. The Magnolia Bridge is not designated as part of the WSDOT Local Agency NHS System Routes in Washington. SDOT should position the Ballard Bridge project development request for the next round of STIP projects.

The focus of the WSDOT Local Bridge Funding Program is to preserve and improve the condition of City- and county-owned bridges that are physically deteriorated or structurally deficient through replacement, rehabilitation, and systematic preventive maintenance. Bridges located on the federal-aid system are eligible for funding under the National Highway Performance Program (NHPP). Bridges that are not located on the federal-aid system are provided a separate set-aside in the Surface Transportation Block Grant (STBG) program. Therefore, WSDOT created a set-aside for a local bridge program that includes funding from the NHPP and STBG for both on- and off-system bridges totaling approximately $45 million/year. King County communities received about $7 million in awards for bridge replacement in 2019. The maximum award in fiscal year 2019 was $6.2 million. Most awards are for smaller bridges in rural areas.

Table 7-2 includes a comprehensive list of potential state funding and financing options the City of Seattle could consider.

TABLE 7-2: POTENTIAL STATE FUNDING AND FINANCING OPTIONS

Program or Source	Description
Legislative Package (Connecting Washington future phase)	Positioning for inclusion in a future legislative package similar to or as a next phase of Connecting Washington (16-year program based on 11.9 cent gas tax increase) should be a priority. **Current gas tax is fully allocated; would require new legislation.**
Washington State Transportation Improvement Program (TIP)	State program for allocating several federal funding programs on a 4-year cycle. Project requests are submitted to the Puget Sound Regional Council (PSRC) for selection and prioritization in the regional TIP.
WSDOT Local Bridge Funding Program	A $45 million/year program for replacement and rehabilitation of locally-owned bridges on and off the Federal Aid System. It allocates National Highway Performance Program & Surface Transportation Block Grant (STBG) program funds listed in the Federal Funding section. **Individual projects generally receive <$9 million.**
Regional Transportation Investment District (RTID)	A newly formed RTID, established as a countywide gas tax authority, could levy up to 10% of state gas tax rate (i.e., 4.94 cents). This would require a countywide vote (36.120.050(e) and 82.80.120). The City could also discuss potential for new or additional regional/local authority from the legislature, such as a local/regional carbon tax or even expanded regional gas tax authority. **Up to $100 M in new annual, bondable revenue.**
New Regional or Local Taxing Authority	The State Legislature has the power to enable a new taxing authority at the local or regional level that could generate bondable revenue from a carbon tax or expansion of regional gas tax authority. **High potential to generate bondable revenue.**
Freight Mobility Strategic Investment Board (FMSIB)	The FMSIB prioritizes and funds improvements on strategic freight corridors, using state allocations as part of the 2-year budget cycle. Program depends on biannual allocation of funds by Washington State. It was influential in securing funding for the Lander St Crossing. **Individual projects typically receive <$5 million; proportionate to project benefits to the freight system.**
Transportation Improvement Board (TIB) Urban Arterial Program (UAP)	The UAP funds projects on a competitive basis annually based on safety, growth and development, physical condition, and mobility criteria. **Individual projects generally receive <$5 million.**

Type	Phases	Potential Value	Viability/ Fit
Direct funding through state gas tax	P E D C	◒ to ●	◒ to ●
Program for allocating federal funds, not a direct source	P E D C	◒	◒
Program for allocating federal funds, not a direct source	P E D C	◒	◒
Countywide gas tax	P E D C	●	○
New taxing authority	P E D C	●	○
Discretion-ary funding	P E D C	○	◒
Formula funds	P E D C	○	○

Funding and Financing Options Legend

PHASES OF PROJECT DEVELOPMENT

- **P** Planning/Concept Design
- **E** Environmental
- **D** Design
- **C** Construction

ESTIMATED LEVEL OF POTENTIAL FUNDING FROM SOURCE

- ● One-time allocation of >$25M or bondable revenue equivalent
- ◒ One-time allocation of >$5M and <$25M or bondable revenue equivalent
- ○ One-time allocation of <$5M

Financing options do not generate new revenue but rather allow the City to leverage regularly collected streams of revenue to pay larger capital costs upfront.

VIABILITY OR FIT OF PROJECT TO SOURCE

- ● Funds are highly appropriate and generally available for bridge replacement/rehabilitation
- ◒ Funds are occasionally allocated to bridge replacement/rehabilitation; bridge project is reasonably competitive given other uses
- ○ Funds are rarely allocated to or a poor fit for bridge replacement/ rehabilitation, but there is no prohibition

Federal Funding and Financing Options

There are several federal funding programs that could help support project development, design, and construction of the Ballard and Magnolia bridges. Most federal funds are administered by WSDOT or PSRC.

The Surface Transportation Act (Fixing America's Surface Transportation Act, or FAST Act) is the federal transportation act under which most road, transit, and bridge funding sources are allocated. This $305 billion, 5-year bill is funded without increasing transportation user fees and was passed in 2015. Recently renewed until September 2021, the FAST Act will likely be reauthorized for an additional year at FY20 funding levels. It remains to be seen which specific funding programs will be included in a future transportation bill and at what level of funding. However, both House and Senate committees have proposed provisions to make it easier for state and local jurisdictions to fund bridge replacement programs, including a Senate Environmental & Public Works Committee proposal for a Bridge Investment Program that would include a competitive multi-year grant program for bridge funding analogous to the Federal Transit Administration's Full Funding Grant Agreement process for high-capacity transit projects.

Major funding sources available to cities for local road and bridge projects include Surface Transportation Block Grant (STBG) Program (formerly known as the Surface Transportation Program) and Congestion Mitigation and Air Quality (CMAQ) programs. Both are administered through PSRC on a competitive basis. These funds are highly competitive and, as such, these sources cannot be expected to cover a significant portion of a major bridge replacement.

There are 3 federal grant programs that offer large one-time grant awards; both are highly competitive. Most regions and states coordinate submittals for these grants as, historically, USDOT has attempted to balance awards across the U.S.

- **INFRA (Infrastructure for Rebuilding America) Grant.** Focused on large projects that show direct economic benefit through building or rebuilding of critical transportation infrastructure. This grant supports National Highway System projects. The Ballard Bridge would be a more competitive candidate than the Magnolia Bridge, as it carries higher truck volumes and provides critical access to the BINMIC.
- **BUILD (Better Utilizing Investments to Leverage Development) Grant.** Like INFRA, this is a highly competitive discretionary program. Projects must demonstrate unique and exceptional economic benefit to gain an award. The regional importance of BINMIC and the Port may make projects in the BIRT study area competitive.
- **BRIC (Building Resilient Infrastructure Communities) Grant.** This competitive discretionary grant program will support communities in building infrastructure projects that reduce the risks they face from disasters and natural hazards. This is a FEMA program. Given some study area lands are situated on lowlands that are susceptible to sea level rise, this may be a viable source for developing resilient infrastructure.[4]

4 City of Seattle (October 2020). Sea Level Rise Susceptibility Map. Available at: http://seattlecitygis.maps.arcgis.com/apps/webappviewer/index.html?id=531658b7209e46acbaed730574214353

Another important funding option for either bridge is the Transportation Infrastructure Financing and Innovation Act (TIFIA), which provides financing debt options (direct loans, loan guarantees, and standby lines of credit) for large projects and public-private partnerships. TIFIA provides credit assistance for qualified projects of regional and national significance. Any highway or transit capital project eligible for federal aid is eligible, including either the Magnolia or Ballard bridges. The program offers low-cost financing and flexibility of repayment terms but is competitive due to high demand. The project must have a dedicated revenue source pledged to secure both the TIFIA and senior debt financing.

The viability of INFRA, BUILD, or TIFIA as grant or financing sources for the Ballard or Magnolia bridges may also depend on whether these sources are leveraged for replacement of the West Seattle High Bridge or are used for other City of Seattle or regional projects during the funding timeframe.

Economic recovery from the COVID-19 pandemic could be aided by a major federal infrastructure investment. While this has been discussed, no progress is likely to be made until after the November 2020 elections.

Table 7-3 includes a comprehensive list of potential federal funding and financing options that could be considered.

TABLE 7-3: POTENTIAL FEDERAL FUNDING AND FINANCING OPTIONS

Program or Source	Description
Surface Transportation Block Grant (STBG) Program [PSRC administered]	STBG funds are distributed by the Federal Highway Administration (FHWA) to states and metropolitan planning organizations (MPOs) using a highway-based funding formula. It is a flexible funding source for a range of transportation projects including roads, bridges, transit, and other capital investments. Generally, it requires a minimum of 13.5% local share for projects related to local roads and bridges. **Individual projects generally receive <$10 million.**
Future Federal Sources/ Bridge Investment Program	Future federal funding programs made available through FAST Act reauthorization. Could include a Bridge Investment Program that would include a completive multi-year grant program for bridge funding analogous to the Federal Transit Administration's Full Funding Grant Agreement process for high capacity transit projects. **Scale of funding TBD.**
Congestion Mitigation and Air Quality (CMAQ) [PSRC administered]	Congestion Mitigation and Air Quality Improvement (CMAQ) funds are federal funds that were created to support transportation projects and related efforts that contribute air quality improvements and provide congestion relief. Funds are flexible to the extent a clear nexus to the fund purpose is established. Typically require 20% local share. **Individual projects generally receive <$2 million.**
Transportation Alternatives Program (TAP) [PSRC administered]	The former TAP was replaced by a series of STBGs encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, and community improvements. Funding would need to be allocated to bicycle or pedestrian elements. **Individual projects generally receive <$2.5 million.**
COVID Relief Funds (US Treasury)	The Coronavirus Aid, Relief, and Economic Security (CARES) Act provided over $131 million to the City of Seattle. It is unlikely that initial rounds of funds will be available for projects in the BIRT plan, and **the probability of a future COVID Relief bill is low.**
INFRA (Infrastructure for Rebuilding America) Grant	Discretionary grant program established as part of FAST; focused on NHS roads and bridges and projects that are within the boundaries of a public or private freight rail, water (including ports), or intermodal facility. Applies to surface transportation infrastructure projects necessary to facilitate direct intermodal interchange, transfer, or access into or out of the facility. Proximity to Port and MIC would strengthen application. WSDOT awarded $73.6 million (about 4% of project cost) to the Puget Sound Gateway Project, including the SR 509 Completion Project, the SR 167 Completion Project, and improvements to I-5. **Individual awards as high as $70 million +**

Type	Phases	Potential Value	Viability/ Fit
Federal formula funds	P E D C	◓	●
TBD	P E D C	◓	○
Federal formula funds	P E D C	○	○
Federal formula funds	P E D C	○	◓
Federal discretion-ary funds	P E D C	○	○
One-time grant	D C	●	◓

Funding and Financing Options Legend

PHASES OF PROJECT DEVELOPMENT

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- **C** Construction

ESTIMATED LEVEL OF POTENTIAL FUNDING FROM SOURCE

- ● One-time allocation of >$25M or bondable revenue equivalent
- ◓ One-time allocation of >$5M and <$25M or bondable revenue equivalent
- ○ One-time allocation of <$5M

Financing options do not generate new revenue but rather allow the City to leverage regularly collected streams of revenue to pay larger capital costs upfront.

VIABILITY OR FIT OF PROJECT TO SOURCE

- ● Funds are highly appropriate and generally available for bridge replacement/rehabilitation
- ◓ Funds are occasionally allocated to bridge replacement/rehabilitation; bridge project is reasonably competitive given other uses
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Program or Source	Description
BUILD (Better Utilizing Investments to Leverage Development) Grant	BUILD, previously called Transportation Investment Generating Economic Recovery (TIGER), is a federal supplemental discretionary grant program. Congress has dedicated nearly $7.9 billion for 11 rounds of National Infrastructure Investments to fund projects that have a significant local or regional impact. The 2019 awards included bridge rehabilitation projects, with BUILD grant awards up to $25 million. **Awards typically <$25 million.**
BRIC (Building Resilient Infrastructure Communities) Grant	This Federal Emergency Management Association (FEMA) competitive discretionary grant program is for infrastructure projects that reduce the risks they face from disasters and natural hazards.
Transportation Infrastructure Financing and Innovation Act (TIFIA)	The TIFIA loan program provides financing debt options (direct loans, loan guarantees, and standby lines of credit) for large projects and public-private partnerships. TIFIA provides credit assistance for qualified projects of regional and national significance. Any highway and transit capital project eligible for federal aid is eligible. The program offers low cost of financing and flexibility of repayment terms but is competitive. The project must have a dedicated revenue source pledged to secure both the TIFIA and senior debt financing. A $300 million TIFIA loan was used to finance the SR 520 Floating Bridge and Eastside Project in Washington State in 2009. **Individual loans of >$100 million.**
Private Activity Bonds (PABs)	The federal Private Loan Program provides favorable financing terms (tax-exempt loans) to private investors such as Private Activity Bonds (PABs). The City of Seattle has local bonding capacity and may be more likely to use that approach. **Financing approach.**
Federal Transit Administration (FTA) Various Programs (CIG, 5307)	There are multiple transit capital funding programs, but all are an unlikely source for either bridge as they require a transit-specific capital investment. Capital Improvement Grant (CIG) funds are for corridor-based projects such as light rail or Bus Rapid Transit (BRT). In this corridor, light rail is to be constructed in a parallel guideway and there is already a RapidRide (BRT) line in operation. **Bridges unlikely to be eligible for FTA capital grant funds.**

Type	Phases	Potential Value	Viability/ Fit
One-time grant	D C	●	○
One-time grant	D C	◒	○
Financing option/low interest govern-ment loans	P E D C	●	◒
Federally backed financing	P E D C	●	◒
One-time grant (CIG) or allocation of formula tax dollars	D C	○	○

Funding and Financing Options Legend

PHASES OF PROJECT DEVELOPMENT

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