**West Seattle and Ballard**
Link Extensions

# Level 1 Alternatives Development and Screening

**July 2018**

# Summary

## Introduction

The *Level 1 Alternatives Development and Screening Technical Memorandum* describes the initial alternatives developed for the West Seattle and Ballard Link Extension (WSBLE) Project and documents the findings and recommendations of the Level 1 Screening process.

## Preliminary Purpose and Need

The purpose of the WSBLE Project is to expand the Link light rail system from downtown Seattle to West Seattle and Ballard and to increase capacity and connectivity for regional connections.

## Alternatives Development Process

The development, evaluation and screening of the Level 1 alternatives were conducted through a collaborative process in accordance with the *Alternatives Evaluation Framework and Methodology Technical Memorandum* (Sound Transit 2018a). As part of this collaboration, Sound Transit conducted an early scoping period between February 2 and March 5, 2018 to provide agencies, tribes, and the public an opportunity to comment on the WSBLE Project. The ST3 Representative Project served as the starting point for this dialogue, and stakeholders were invited to offer their suggestions on possible alternatives. The alternatives defined in the Level 1 Screening were a direct result of the input received during the early scoping period.

## Level 1 Alternatives Evaluation and Findings

Level 1 relied on readily available information, with a high-level assessment of a wide range of alternatives within each study segment—West Seattle/Duwamish, South of Downtown (SODO), Downtown and Interbay/Ballard. A total of 24 alternatives were studied in Level 1 at a segment level, with four additional alternatives for the International District/Chinatown Station in the Downtown Segment. The ST3 Representative Project served as the baseline alternative against which alternatives were compared during the Level 1 Screening. The Level 1 evaluation applied primarily qualitative criteria to measure the potential benefits and impacts and highlight differentiating characteristics among the alternatives relative to the ST3 Representative Project. The Level 1 Screening was structured to identify those alternatives that demonstrated the most promise, and to screen out those alternatives that had limited potential to meet the WSBLE Project's preliminary Purpose and Need and/or were deemed not practical.

## Summary of Level 1 Screening Recommendations

**Table S-1** (Summary of Elected Leadership Group Level 1 Screening Recommendations) lists the alternatives that the Elected Leadership Group (ELG) recommended be carried forward into the Level 2 Screening, as well as the alternatives not carried forward into Level 2. On May 17, 2018, the ELG recommended to carry forward 16 of the Level 1 alternatives into Level 2. On July 19, 2018, the ELG recommended to advance four additional alternatives into Level 2 for the SODO Segment and Chinatown/International District Station in the Downtown Segment.

## Next Steps

As a next step, the Level 2 Screening will develop and evaluate in greater detail the 20 alternatives carried forward from the Level 1 Screening. However, the Level 2 evaluation will employ a larger set of criteria and more use of quantitative measures. Like Level 1, the Level 2 Screening will be conducted at the segment level.

**Table S-1 Summary of Elected Leadership Group Level 1 Screening Recommendations**

| Segment / Level 1 Alternative | Carry Forward into Level 2 | Do Not Carry Forward into Level 2 |
|---|---|---|
| **West Seattle/Duwamish Segment** | | |
| ST3 Representative Project (South of West Seattle Bridge) | ✓ | |
| Pigeon Ridge/West Seattle Tunnel | ✓ | |
| West Seattle Bridge/Fauntleroy | | ✓ |
| Yancy Street/West Seattle Tunnel | | ✓ |
| Oregon Street/Alaska Junction | ✓ | |
| West Seattle Golf Course/Alaska Junction | ✓ | |
| **SODO Segment** | | |
| ST3 Representative Project (Elevated E-3) | ✓ | |
| Massachusetts Tunnel Portal | ✓ | |
| Surface E-3 | ✓ | |
| Occidental Avenue | ✓ | |
| 6th Avenue | | ✓ |
| **Downtown Segment and International District/Chinatown Station** | | |
| ST3 Representative Project (5th/6th/Republican) | ✓ | |
| 5th/Harrison | ✓ | |
| 5th/Mercer | | ✓ |
| 6th/Boren/Roy | ✓ | |
| 8th/6th/Republican | | ✓ |
| 5th/Roy/Consolidated SLU Station (1) | | ✓ |
| 5th Avenue Bored Tunnel/Mined Station | ✓ | |
| 4th Avenue Cut-and-Cover Tunnel/Station | ✓ | |
| 4th Avenue Bored Tunnel/Mined Station | ✓ | |
| Union Station Bored Tunnel/Mined Station | | ✓ |
| **Interbay/Ballard Segment** | | |
| ST3 Representative Project (Elliott/15th/Movable Bridge) | ✓ | |
| Elliott/15th/16th/Fixed Bridge | ✓ | |
| West of BNSF/20th/17th/Fixed Bridge (2) | ✓ | |
| West of BNSF/20th/17th/Tunnel | ✓ | |
| East of BNSF/14th/Movable Bridge | ✓ | |
| Elliott/Armory Way/14th/Tunnel | ✓ | |
| West of BNSF/20th/Tunnel | | ✓ |

NOTES: (1) SLU = South Lake Union; (2) BNSF = Burlington Northern Santa Fe

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# Acronyms and Abbreviations

| | |
|---|---|
| BNSF | Burlington Northern Santa Fe |
| BRT | Bus Rapid Transit |
| CBD | Central Business District |
| CSO | Combined Sewer Overflow |
| DAHP | Department of Archaeology and Historic Preservation |
| DSTT | Downtown Seattle Transit Tunnel |
| ECA | Environmentally Critical Area |
| EIS | Environmental Impact Statement |
| ELG | Elected Leadership Group |
| FTA | Federal Transit Administration |
| HCT | High-Capacity Transit |
| IAG | Interagency Group |
| INS | Immigration and Naturalization Service |
| KCM | King County Metro Transit |
| LRT | Light Rail Transit |
| MIC | Manufacturing and Industrial Center |
| NRHP | National Register of Historic Places |
| NWSA | Northwest Seaport Alliance |
| OMF | Operations and Maintenance Facility |
| PSRC | Puget Sound Regional Council |
| ROW | Right-of-Way |
| SAG | Stakeholder Advisory Group |
| SCL | Seattle City Light |
| SLU | South Lake Union |
| SODO | South of Downtown |
| SR | State Route |
| ST3 | Sound Transit 3 |
| UPRR | Union Pacific Railroad |
| WSBLE | West Seattle and Ballard Link Extensions |
| WSDOT | Washington State Department of Transportation |

# 1 INTRODUCTION

## 1.1 Overview

Sound Transit is advancing the West Seattle and Ballard Link Extensions (WSBLE) Project through the Alternatives Development phase. During Alternatives Development, Sound Transit is assessing the "representative project" included in the Sound Transit 3 (ST3) Plan, as well as other alternatives developed from refining the ST3 Representative Project route, station locations and other project elements based on additional public engagement and technical analysis. The ST3 Representative Project itself is the result of extensive, yearslong planning and public involvement work, including high-capacity transit (HCT) studies, the process to update the agency's long-range plan, and the work that developed the *ST3 Plan* that voters approved financing for in 2016. Sound Transit is engaging the public and agencies in an intensive external engagement process that will lead to the Sound Transit Board identifying a Preferred Alternative, as well as other alternatives to evaluate in an Environmental Impact Statement (EIS).

The WSBLE Project would provide fast, reliable light rail connections to dense residential and job centers throughout the region and add a new downtown Seattle light rail tunnel to provide efficient operating capacity for the entire regional system. It would consist of two separate Link extensions: one to West Seattle and the other to Ballard. The extension to West Seattle would operate from downtown Seattle to West Seattle's Alaska Junction neighborhood. The Ballard extension would operate from downtown Seattle to Ballard's Market Street area and include a new rail-only tunnel from the Chinatown/ International District to South Lake Union and Seattle Center/Uptown.

The alternatives and analysis conducted during the Alternatives Development phase are generally focused within a 0.5-mile study area boundary around the ST3 Representative Project. A map of the study area for the WSBLE Project is shown on **Figure 1-1** (West Seattle and Ballard Link Extensions Study Area).

## 1.2 Purpose of Report

The *Level 1 Alternatives Development and Screening Technical Memorandum* describes the initial alternatives developed for the WSBLE Project and documents the findings of the Level 1 Screening process. This memorandum presents the evaluation criteria, measures and methods used to analyze the Level 1 alternatives, summarizes each alternative's performance relative to the evaluation criteria and measures, and provides conclusions about the alternative's relative performance. The memorandum concludes with identifying the alternatives that the Elected Leadership Group (ELG) recommended to be evaluated further in the Level 2 Screening and those alternatives not carried forward for further study.


**Figure 1-1 West Seattle and Ballard Link Extensions Study Area**

## 1.3 Report Organization

The *Level 1 Alternatives Development and Screening Technical Memorandum* is organized into the following sections:

- **Section 1 (Introduction):** Provides an overview of the WSBLE process and project, as well as purpose of this report.
- **Section 2 (Preliminary Purpose and Need):** Outlines the preliminary Purpose and Need for the WSBLE Project.
- **Section 3 (Alternatives Development Process):** Describes an overview of the process to develop, evaluate and screen alternatives, including the agency and community engagement efforts.
- **Section 4 (Level 1 Alternatives Evaluation and Findings):** Defines the alternatives within each study segment and highlights the results and findings for each alternative's performance relative to the evaluation criteria and measures.
- **Section 5 (Summary of Level 1 Screening Recommendations):** Summarizes the alternatives to be evaluated in greater detail in the Level 2 Screening, and those alternatives not carried forward for further study.
- **Section 6 (Next Steps):** Addresses the next steps for the Level 2 Screening.
- **Section 7 (References):** Lists the references cited in this report.

# 2 PRELIMINARY PURPOSE AND NEED

Sound Transit developed the preliminary Purpose and Need Statement for the WSBLE Project with input from stakeholders during the early scoping period between February 2 and March 5, 2018. The preliminary Purpose and Need Statement provides the foundation for the alternatives defined in Level 1, as well as the evaluation criteria, measures and methods used for the Level 1 evaluation and screening.

## 2.1 Project Purpose

The purpose of the WSBLE Project is to expand the Link light rail system from downtown Seattle to West Seattle and Ballard and to increase capacity and connectivity for regional connections to:

- Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit (LRT) service to communities in the project corridors as defined in ST3.
- Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet the projected transit demand.
- Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and *Sound Transit's Regional Transit Long-Range Plan* (RTLP) (2014).
- Implement a system that is consistent with the *ST3 Plan* (Sound Transit 2016) that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain.
- Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations.
- Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies.
- Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices.

## 2.2 Need for Proposed Action

The WSBLE Project is needed because:

- Increasing roadway congestion on transit routes between downtown Seattle, West Seattle, and Ballard will continue to degrade transit performance and reliability.
- Regional population and employment growth will increase operational demands on the Downtown Seattle Transit Tunnel (DSTT).
- Regional and local plans call for HCT in the corridor consistent with the Puget Sound Regional Council's (PSRC) *VISION 2040* (2009) and Sound Transit's RTLP (2014).
- The region's citizens and communities, including travel-disadvantaged residents and low-income and minority populations, need long-term regional mobility and multimodal connectivity.
- Regional and local plans call for increased residential and/or employment density at and around HCT stations, and increased options for multimodal access.
- Environmental and sustainability goals of the state and region include reducing total vehicles miles traveled and greenhouse gas emissions.

To help organize the content of this report, the Purpose statements were distilled into short themes that reflect the primary focus of the full statement. Accompanying these brief themes are symbols that generally match the spirit of the summarized Purpose statement, as shown in **Table 2-1** (Level 1 Screening Themes and Symbols). The report uses these themes and symbols to denote these Purpose statements throughout.

**Table 2-1 Level 1 Screening Themes and Symbols**

| Purpose Statement | Theme | Symbol |
|---|---|---|
| Provide high quality rapid, reliable, and efficient peak and off-peak LRT service to communities in the project corridors as defined in ST3. | Service performance and reliability in project corridor |  |
| Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet the projected transit demand. | Improve downtown capacity for regional connectivity |   |
| Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and Sound Transit's RTLP. | Connect regional centers |  |
| Implement a system that is consistent with the *ST3 Plan* that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain. | Technically feasible and financially sustainable |  |
| Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations. | Expand mobility for all |  |
| Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies. | Encourage equitable and sustainable urban growth |  |
| Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices. | Promoting a healthy built, natural and social environment |  |

# 3 ALTERNATIVES DEVELOPMENT PROCESS

The alternatives evaluation framework for the WSBLE Project is structured as a series of sequential evaluation levels, where increasingly detailed and comprehensive evaluation measures are applied to a decreasing number of alternatives at each level. The screening process initially reviews a wide range of alternatives during the first screening level, evaluated against a select set of measures to identify fatal flaws or major deficiencies. As the evaluation process progresses, the most suitable alternatives will emerge and be subject to more rigorous and detailed analysis, with more quantitative evaluation criteria applied. The screening process has been designed to provide insight into how the alternatives may be refined or modified to improve their effectiveness in satisfying the preliminary Purpose and Need. Eventually, a Preferred Alternative will be identified by the Sound Transit Board for advancement into the environmental review phase, along with other alternatives to evaluate in an EIS.

The three levels of analysis for the WSBLE Project are depicted on **Figure 3-1** (Alternatives Development Process). More detailed information on the overall Alternatives Development process can be found in the *Alternatives Evaluation Framework and Methodology Technical Memorandum* (Sound Transit 2018a).

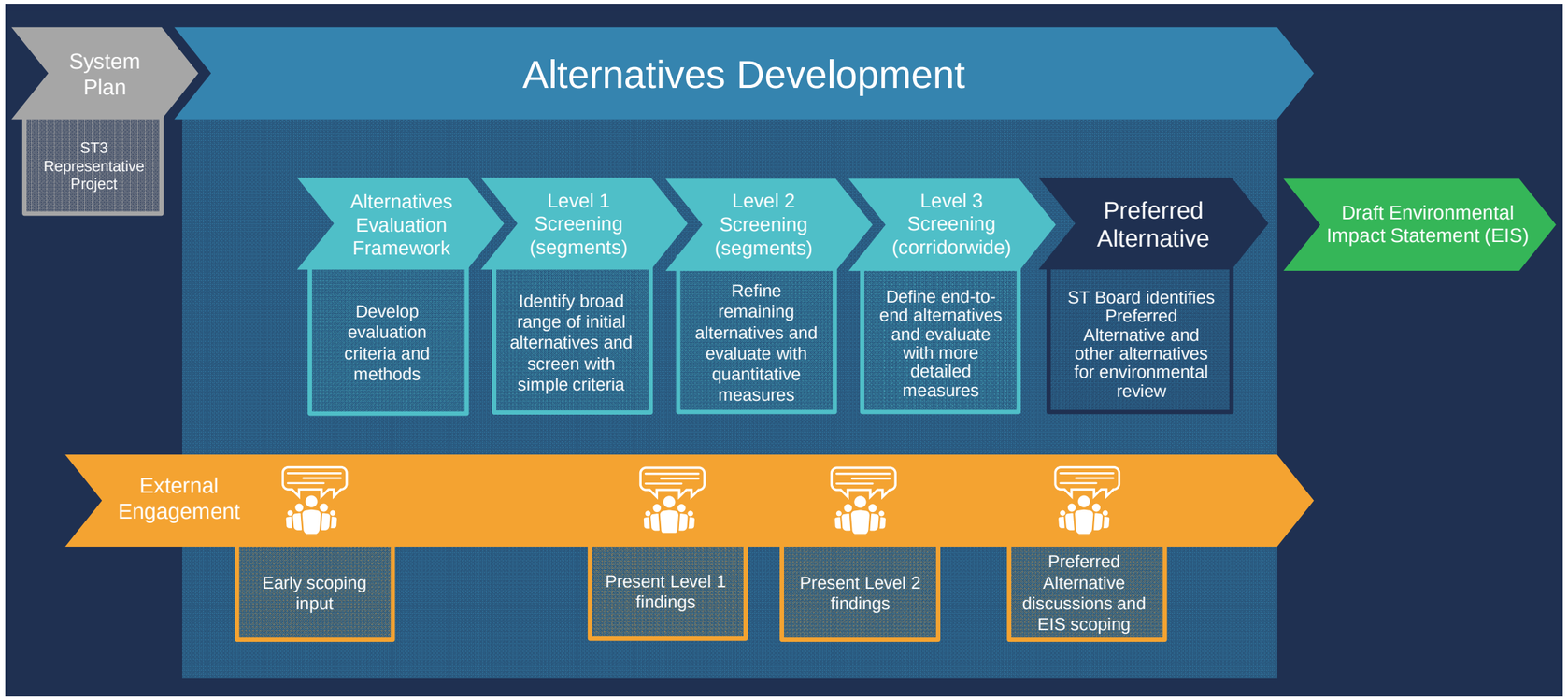



**Figure 3-1 Alternatives Development Process**

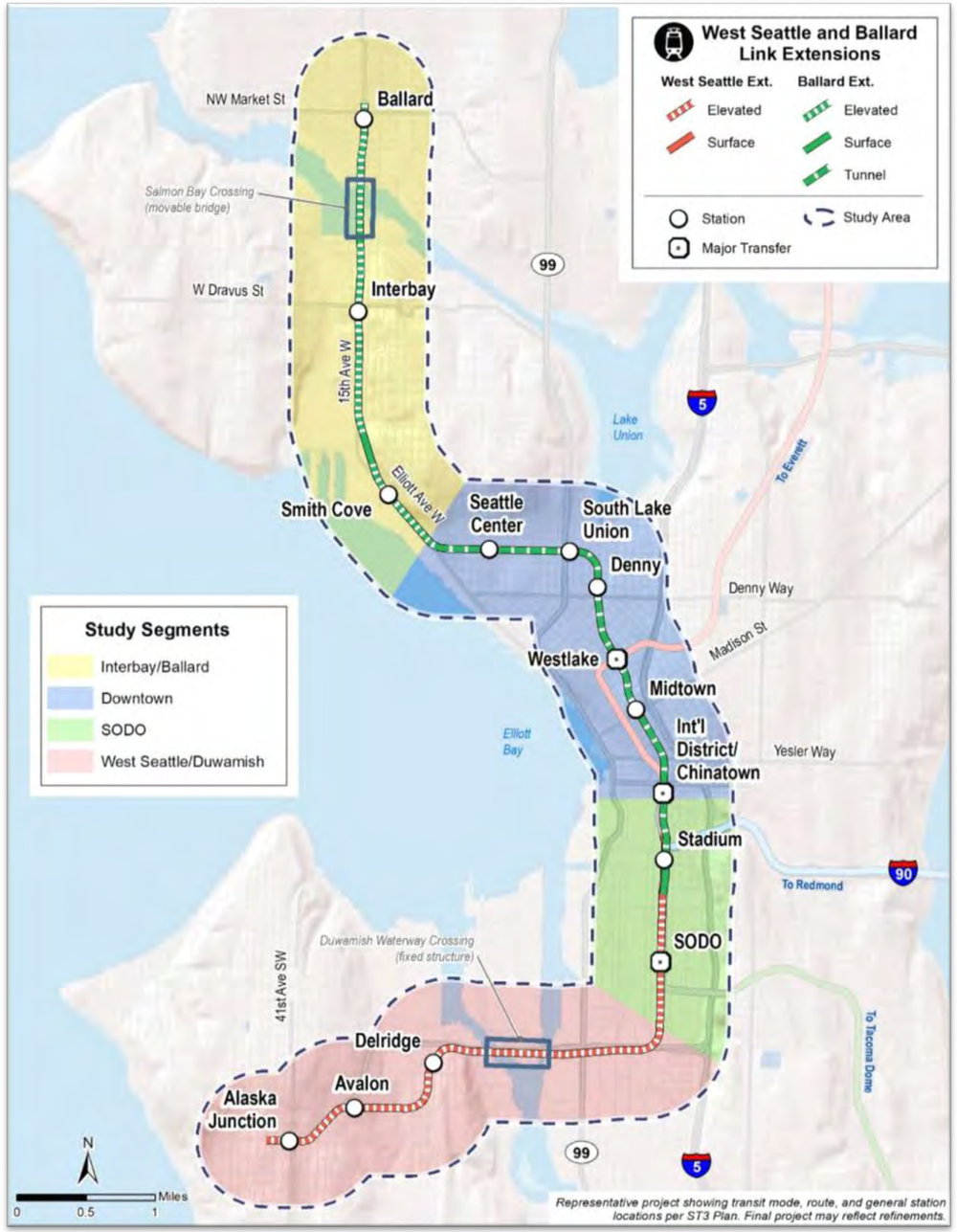



**Figure 3-2 Study Segments for Alternatives Development Phase**

## 3.1 Study Segments

Due to the unique characteristics of the study area for the WSBLE Project, the corridor was subdivided into four study segments for evaluation purposes in the Alternatives Development phase. Each study segment is oriented around the ST3 Representative Project and was geographically determined to provide logical end points and interfaces with the adjoining segments. These study segments allow for more detailed evaluation and analysis of specific planning, engineering or other issues. Following are the four study segments, as delineated on **Figure 3-2** (Study Segments for Alternatives Development Phase):

- West Seattle/Duwamish
- South of Downtown (SODO)
- Downtown
- Interbay/Ballard

The first two screening levels will be conducted within each of these study segments. After the alternatives are evaluated and screened down at a segment level, they will then be pieced together to define logical end-to-end alternatives from West Seattle to Ballard. **Figure 3-3** (Alternatives Screening Process) illustrates the alternatives screening process. The process is designed to help the Sound Transit Board identify a Preferred Alternative and other alternatives that are advanced to the environmental review phase.

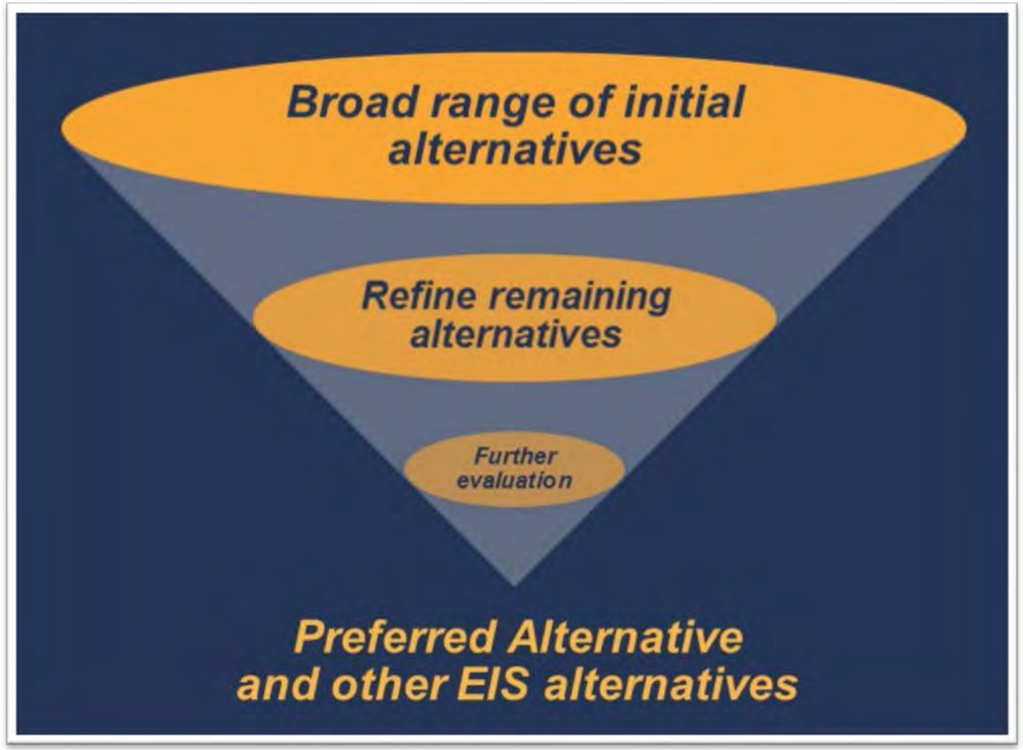



**Figure 3-3 Alternatives Screening Process**

## 3.2 Level 1 Screening Process

With a multi-tiered evaluation approach, each level of the screening analysis conforms to a level of detail necessary to make informed decisions about the alternatives considered. In this regard, different and increasingly detailed sets of evaluation criteria, measures and methods are used at each screening level. This approach allows alternatives to be narrowed from a wide range down to a select set of alternatives.

### 3.2.1 Evaluation Criteria, Measures and Methods

The Level 1 Screening relied on a set of simple evaluation criteria and measures that provided a consistent means of analysis among the study segments. The initial evaluation criteria and measures were chosen to facilitate early elimination of those alternatives that have minimal ability to achieve the WSBLE Project's preliminary Purpose and Need and/or have substantial challenges from a feasibility or regulatory standpoint. The ST3 Representative Project was used as a basis for comparison in the Level 1 Screening.

For the Level 1 Screening, Sound Transit developed evaluation criteria based on the Project's preliminary Purpose and Need. Supporting measures were identified under each criterion. Qualitative and/or quantitative evaluation methods were then specified for each measure. These evaluation criteria, measures and methods were used to assess the performance of each alternative relative to the ST3 Representative Project. **Figure 3-4** (Development of Evaluation Criteria, Measures and Methods) illustrates the relationship between the preliminary Purpose and Need statement and the evaluation criteria, measures and methods.


**Figure 3-4 Development of Evaluation Criteria, Measures and Methods**

**Table 3-2** (Level 1 Screening Evaluation Criteria, Measures and Methods [by segment]) lists the detailed evaluation criteria, measures and methods used to evaluate the alternatives in Level 1. Each criterion has one or more quantitative or qualitative measures to differentiate between alternatives in terms of project performance and potential impacts. These criteria, measures and methods will evolve for each level of screening and incorporate stakeholder input.

The Level 1 Screening process results in alternatives recommended by the ELG to be carried forward for further evaluation in a subsequent Level 2 Screening. In cases where there is not sufficient information to dismiss alternatives from further consideration, the ELG may recommend those alternatives be carried forward into the later screening phases.

### 3.2.2 Evaluation Rating Thresholds

To identify alternatives likely to perform well versus those that may have fatal flaws or major deficiencies, the alternatives were rated against each evaluation criterion and supporting measure in **Table 3-2**. Ratings were based on each alternative's ability to satisfy the evaluation criteria and measures relative to the ST3 Representative Project. Three rating levels were established:

- **Higher Performance**: Rating level given when an alternative shows *higher performance* in comparison to the ST3 Representative Project.
- **Comparable Performance**: Rating level given when an alternative shows *comparable performance* to the ST3 Representative Project.
- **Lower Performance**: Rating Level given when an alternative shows *lower performance* in comparison to the ST3 Representative Project.

To summarize the performance ratings for each alternative relative to the ST3 Representative Project, rating symbols are used similar to Consumer Reports. **Table 3-1** (Performance Rating Symbols) displays the performance ratings and their corresponding symbols.

**Table 3-1 Performance Rating Symbols**

| Performance Rating | Symbol |
|---|---|
| Higher Performance | ● |
| Comparable Performance | ◑ |
| Lower Performance | ○ |

The performance ratings for each alternative relative to the evaluation criteria are accompanied by an explanation (or rationale) for the rating given. While the Level 1 Screening is primarily designed as a qualitative screening of alternatives, some quantitative information and data are incorporated to measure potential benefits and/or impacts of the WSBLE Project. Additional quantitative measures, information, and data will be incorporated during the future Level 2 and Level 3 Screening phases.

## Table 3-2 Level 1 Screening Evaluation Criteria, Measures and Methods (by segment)

| Purpose and Need [1] | Evaluation Criteria [2] | Measure [3] | Quantitative or Qualitative [4] | Methods [5] |
|---|---|---|---|---|
| Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit service to communities in the project corridors defined in ST3. | Reliable Service | Potential service interruptions and recoverability | Qualitative | Number of service interruptions during peak and off-peak travel periods (e.g., number of movable bridge openings, at-grade crossings, etc.) and redundancy and ability to re-route service |
| | Travel Times | LRT travel times | Quantitative | Estimated travel time for segment based on route characteristics |
| Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet projected transit demand | Regional Connectivity | Network integration and operational flexibility to meet future demand | Qualitative | Ability to accommodate spine segmentation for regional LRT system connectivity and operational flexibility to meet future demand |
| | Transit Capacity | Passenger carrying capacity in downtown | Qualitative | Combined carrying capacity of downtown transit tunnels |
| | Projected Transit Demand | Ridership potential | Quantitative | Future 2040 total population and employment within 0.5-mile buffer of WSBLE Project stations |
| Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and *Sound Transit's Regional Transit Long-Range Plan.* | Regional Centers Served | Station proximity to PSRC-designated regional centers | Quantitative | Number of PSRC-designated regional growth centers and manufacturing/industrial centers served by stations |
| | Sound Transit Long-Range Plan Consistency | Accommodates future LRT extension beyond ST3 | Qualitative | Ability to accommodate expansion potential of future LRT extensions identified in *Sound Transit's Regional Transit Long-Range Plan* |
| Implement a system that is consistent with the *ST3 Plan* that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain. | ST3 Consistency | Mode, route and general station locations per ST3 | Qualitative | Consistency of mode, route and general station locations per ST3 |
| | | Potential ST3 operating plan effects | Qualitative | Integration of WSBLE Project into existing LRT spine and overall system (e.g., special trackwork, movable bridge implications, etc.) |
| | Technical Feasibility | Engineering constraints | Qualitative | Compliance with *Sound Transit Design Criteria Manual*, design criteria from agencies with jurisdiction and federal regulations |
| | | Constructability issues | Qualitative | Major constructability issues based on potential conflicts and technical challenges (e.g., utility conflicts, existing infrastructure, geotechnical, tunnel portals, etc.) |
| | | Operational constraints | Qualitative | Consideration of operational constraints (e.g., access to maintenance facility, movable bridge, etc.) |
| | Financial Sustainability | Qualitative capital cost comparison | Qualitative | ST3 cost consistency based on identification of major capital cost drivers (e.g., route miles, route configuration, bridge type, etc.) |
| Expand mobility for the corridor and region's residents, which include transit dependent, low income, and minority populations. | Historically Underserved Populations | Opportunities for historically underserved populations | Qualitative | Assessment of improved access to opportunities (i.e., employment, housing and transit) for historically underserved populations (i.e., environmental justice populations) within station areas, as well as along the frequent transit network that would serve the station |
| Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies. | Station Area Land Use Plan Consistency | General station locations consistent with local land use plans | Qualitative | Compatibility and consistency of station locations with local land use plans |
| | | Station proximity to Seattle-designated Urban Centers and Villages | Qualitative | Proximity of station locations to centroid of defined urban centers and villages as identified in *City of Seattle Comprehensive Plan* |
| | Modal Integration | Bus/rail and rail/rail integration | Qualitative | Potential ability to integrate with bus and rail service and ease of transfers for transit customers |
| | | Bicycle, pedestrian and persons with limited mobility connectivity | Qualitative | Accessibility of station locations to major existing and planned bicycle and pedestrian facilities and identification of major physical barriers to walking and biking within general station areas for bicyclists and pedestrians, including persons with limited mobility |
| | Station Area Development Opportunities | Development potential | Qualitative | Likelihood of land potentially available for future development within station areas based on zoning composition |
| Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices. | Environmental Effects | Protected natural resources | Qualitative | Impacts to known natural resources (e.g., waterbodies, wetlands, etc.) |
| | | Protected built and social environment | Qualitative | Impacts to known built and social resources (e.g., parks, historic properties/districts, Section 4(f)/6(f), construction impacts, etc.) and potential for residential and business displacements |
| | | Burden on historically underserved populations | Qualitative | Assessment of how potential acquisitions and displacements would affect historically underserved populations (i.e., environmental justice populations) relative to other communities and displacement risk from station area redevelopment |
| | Traffic Operations | Traffic circulation and access | Qualitative | Effects on traffic and transit (i.e., bus and streetcar) operations, including potential lane restrictions, turn restrictions, and parking |
| | Economic Effects | Freight movement and access on land and water | Qualitative | Effects on freight mobility and future freight capacity expansion opportunities, including both on land and water |
| | | Business and commerce effects | Qualitative | Effects on local businesses, as well as commercial and industrial areas |

NOTES:
(1) Based on preliminary Purpose and Need Statement (dated January 24, 2018), with revisions incorporated from feedback received during early scoping.
(2) Criteria are subject to change as alternatives are refined and screened at each level, as well as to incorporate stakeholder input.
(3) Screening criteria and associated measures get progressively more detailed and quantitative as the alternatives are screened through Level 1, Level 2 and Level 3.
(4) Measures ranked from high to low based on comparison to ST3 Representative Project; "High" = higher performance, "Comparable" = comparable performance, "Low" = lower performance.
(5) Agency and stakeholder input will be considered in the overall alternatives evaluation and screening process.

## 3.3 Agency and Community Engagement

There are a variety of stakeholders engaged in the WSBLE Project, and their input will influence the decision-making process as the WSBLE Project advances during the Alternatives Development phase. The agency and external engagement process actively seek inputs and involvement from stakeholders through the following groups and forums:

- **Sound Transit Board:** Oversees implementation of WSBLE Project
- **Elected Leadership Group (ELG):** Elected officials who represent the project corridor and Sound Transit Board
- **Stakeholder Advisory Group (SAG):** Transit riders, residents, businesses, major institutional organizations, stakeholders, and members of the public
- **Interagency Group (IAG):** Senior staff from Sound Transit, city of Seattle and other partner agencies such as Port of Seattle, King County, Washington State Department of Transportation (WSDOT) and Federal Transit Administration (FTA)
- **Neighborhood Forums:** Community members interested in delving more deeply into issues specific to their neighborhood
- **Public:** People who live, work and commute in, through and around the Puget Sound region

These groups and forums supplement public engagement and outreach techniques already used by Sound Transit and offer opportunities for greater collaboration early in project development. This external engagement process is shown on **Figure 3-5** (Community Engagement and Collaboration Process).

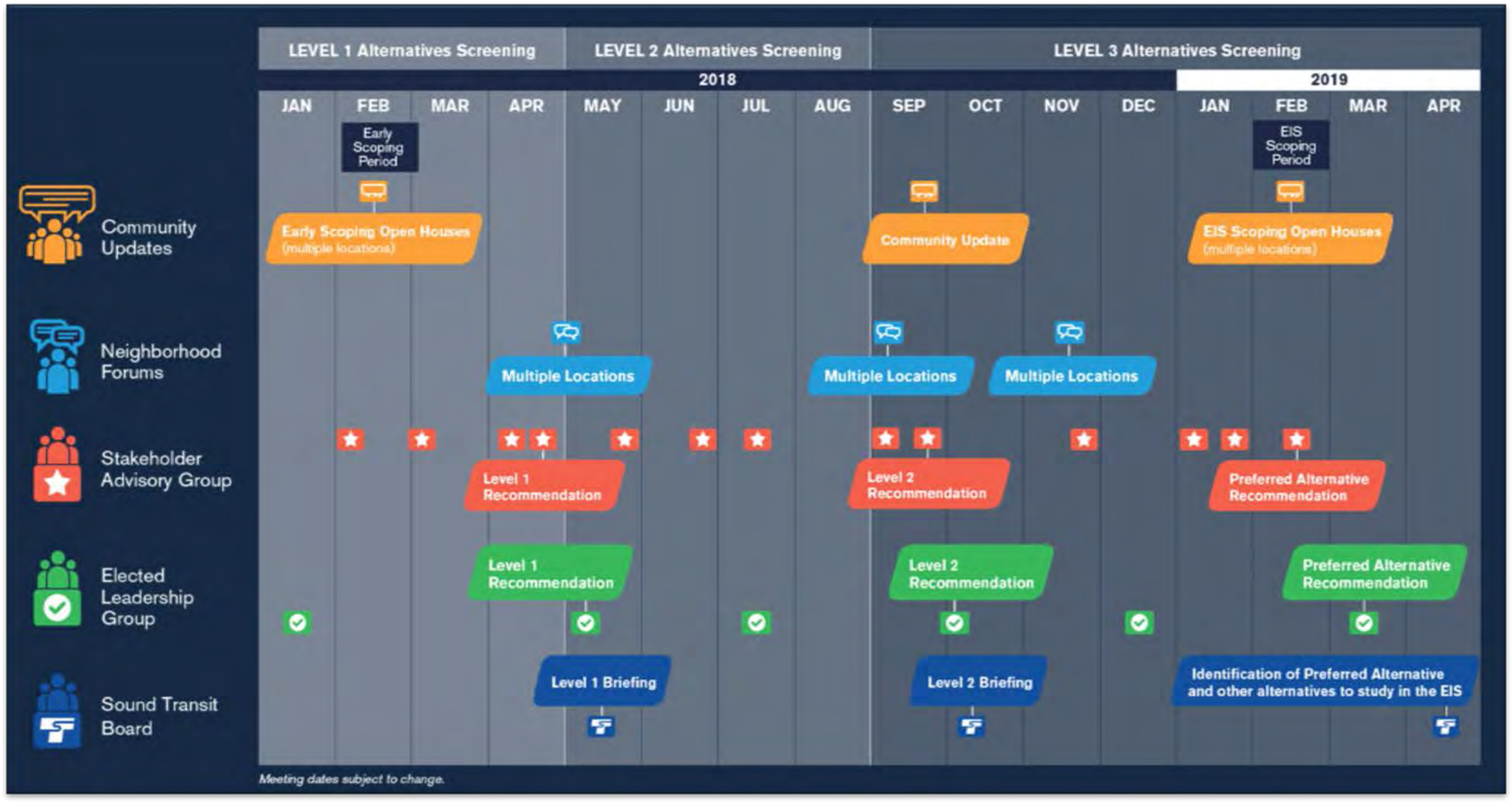



**Figure 3-5 Community Engagement and Collaboration Process**

### 3.3.1 Sound Transit Board

The Sound Transit Board oversees the implementation and delivery of the WSBLE Project, will identify the Preferred Alternative and other alternatives for the EIS and will make other major project decisions. The Board will consider recommendations and feedback from the ELG, SAG and public when making decisions.

### 3.3.2 Elected Leadership Group

The WSBLE Project's ELG is a group of elected officials that represent the service corridor and the Sound Transit Board. The purpose of this group is to reach consensus around key decisions and work through project issues as needed. The ELG:

- Appoints SAG members
- Works with project staff to understand and evaluate trade-offs
- Represents the communities they serve and shares community priorities
- Recommends a Preferred Alternative for the EIS to the Sound Transit Board based on the recommendations from the SAG, public input and the *ST3 Plan* project scope, schedule and budget

### 3.3.3 Stakeholder Advisory Group

The SAG provides a forum for community members to inform the development of alternatives for the project. Meetings are open to the public. The SAG:

- Highlights potential issues and considers trade-offs in the corridor
- Makes recommendations on a Preferred Alternative for the EIS to the ELG

### 3.3.4 Interagency Group

The IAG is composed of senior staff from Sound Transit and partner city, county, and transit agencies empowered with technical decision-making authority. The IAG:

- Examines technical aspects and resolves issues at a staff level wherever possible
- Identifies issues to bring before the ELG and SAG
- Recommends subjects to address within partnering and permitting agreements

### 3.3.5 Neighborhood Forums

Neighborhood forum events provide an opportunity for community members to connect with their neighbors, follow the project's progress, delve more deeply into issues specific to their neighborhood, and voice their opinions at major decision points. At neighborhood forums, participants work together to:

- Examine and discuss area- and community-specific issues and concerns associated with the proposed alternatives
- Provide detailed feedback to inform alternatives development and decision-making, which is shared with the IAG, SAG, ELG and the Sound Transit Board of Directors

### 3.3.6 Public

A variety of other public engagement activities complement all the engagement groups and forums including, but not limited to, open houses (in person and online), community briefings and meetings, e-newsletters, and attendance at fairs and festivals. The role of members of the public is to communicate ideas, concerns and questions about the project through a variety of communications channels to:

- Learn about the project and ask questions
- Provide feedback on topics and issues of interest
- Communicate to Sound Transit how the public wants to be engaged
- Share information and discuss the project with the community

## 3.4 Early Scoping Feedback

Sound Transit conducted an early scoping period between February 2 and March 5, 2018 to provide agencies, tribes, and the public an opportunity to comment on the WSBLE Project. The ST3 Representative Project served as the starting point for this dialogue, and stakeholders were invited to offer their suggestions on possible alternatives. The alternatives defined in the Level 1 Screening were a direct result of the input received during the early scoping period. Stakeholders were also asked for their input on the preliminary Purpose and Need for the WSBLE Project, as well as potential community benefits and impacts, which provided feedback into the evaluation criteria, measures and methods used in the Level 1 Screening.

Opportunities for public comment during the early scoping period included an agency meeting, three public open houses, and an online open house. Comments could be submitted at the early scoping meetings, as well as by email and mail. The *Early Scoping Summary Report* (Sound Transit 2018b) lists all comments received during early scoping.

Over 700 people attended the three public open houses, and seven agencies attended the agency early scoping meeting. Sound Transit received over 2,800 individual comments in various formats. Most comments focused on elevated routes in West Seattle and Interbay/Ballard, with many suggesting a variety of alternatives to these elevated routes.

Feedback from the early scoping process was used to update the preliminary Purpose and Need, develop Level 1 alternatives, and identify criteria for evaluating the alternatives. Some early scoping suggestions were not carried forward for further review in Level 1 because they were not identified or analyzed in the *ST3 Plan,* technically infeasible and/or deemed not practical.



# 4 LEVEL 1 ALTERNATIVES EVALUATION AND FINDINGS

The development, evaluation and screening of the Level 1 alternatives were conducted through a collaborative process in accordance with the *Alternatives Evaluation Framework and Methodology Technical Memorandum* (Sound Transit 2018a). This section defines the Level 1 alternatives, provides the evaluation findings, and presents the ELG's recommendations carried forward into Level 2. The section is organized by study segment—West Seattle/Duwamish, SODO, Downtown and Interbay/Ballard.

The Level 1 alternatives were developed within each of the four study segments. The ST3 Representative Project was the starting point for the alternatives development process. A range of 20 other alternatives to be studied in Level 1 was then identified to compare against the ST3 Representative Project, resulting in a total of 24 Level 1 alternatives distributed among the four study segments. Four additional alternatives were also studied for the International District/Chinatown Station under the Downtown Segment. The Level 1 alternatives were based on information from prior studies, technical analysis and considerations, and early scoping input from the agencies, public and stakeholders.

**Figure 4-1** (Level 1 Alternatives by Study Segment) shows the study segments and lists the alternatives within each segment. Hereafter, each alternative within the four study segments is defined independently, with a map of the alternative illustrating the route, basic characteristics and station locations. The evaluation of the alternative is then summarized based on the criteria under each Purpose statement, with the detailed evaluation matrices for each alternative and segment found in the appendices. The ST3 Representative Project serves as the baseline against which the Level 1 alternatives are compared.

Summary tables of the Level 1 alternatives are also provided at the end of each study segment, along with other early scoping suggestions deemed not practical. Finally, the ELG recommendations regarding whether the alternatives should be carried forward for further study in Level 2 Screening are listed.



**Figure 4-1 Level 1 Alternatives by Study Segment**

## 4.1 West Seattle/Duwamish Segment Alternatives Evaluation

The West Seattle/Duwamish Segment included the following six alternatives during the Level 1 Screening:

- ST3 Representative Project (South of West Seattle Bridge)
- Pigeon Ridge/West Seattle Tunnel
- West Seattle Bridge/Fauntleroy
- Yancy Street/West Seattle Tunnel
- Oregon Street/Alaska Junction
- West Seattle Golf Course/Alaska Junction

These alternatives are delineated on **Figure 4-2** (West Seattle/Duwamish Segment—Level 1 Alternatives), with individual descriptions and evaluation of each alternative in the pages that follow. Refer to **Appendix A** (West Seattle/Duwamish Segment Level 1 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

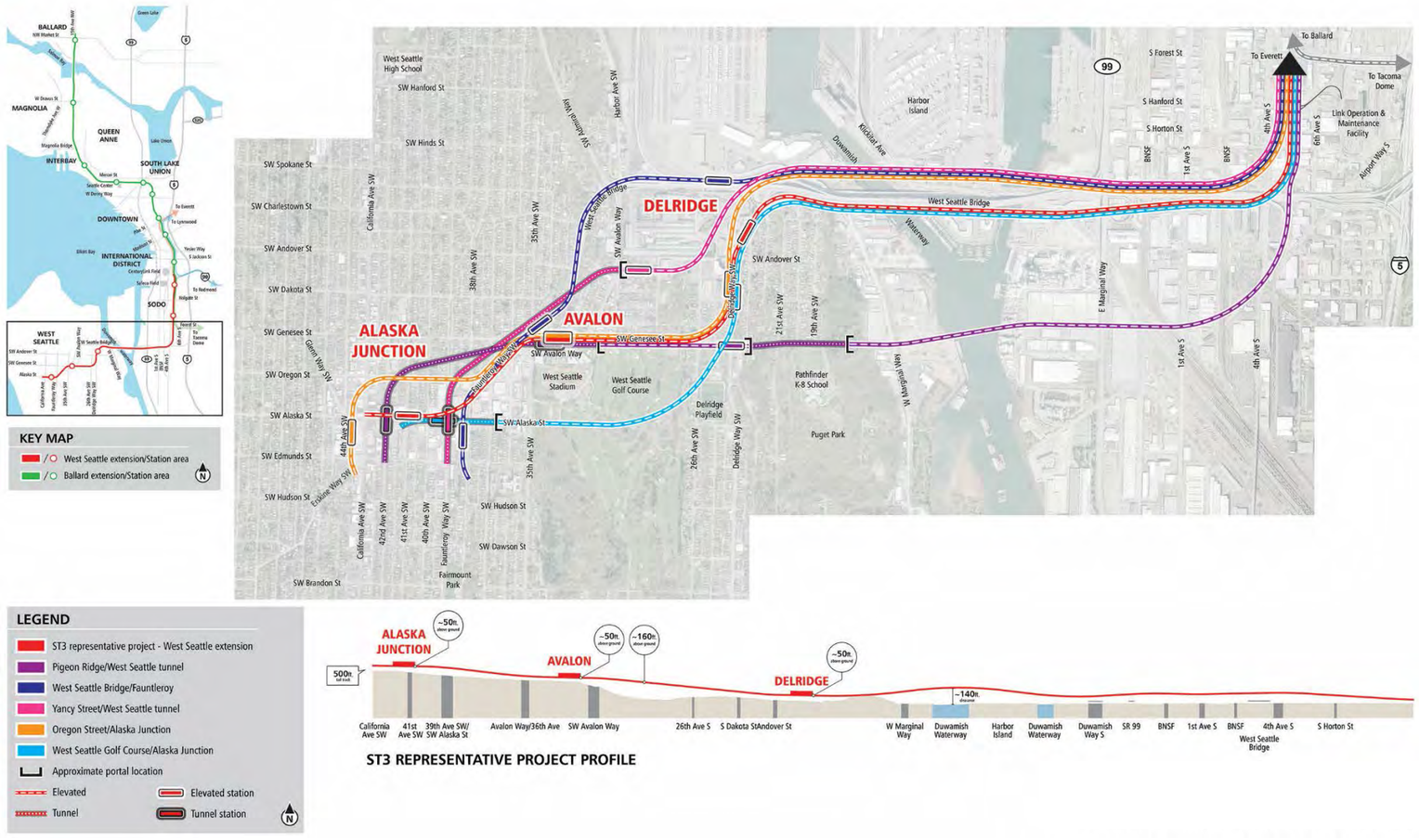
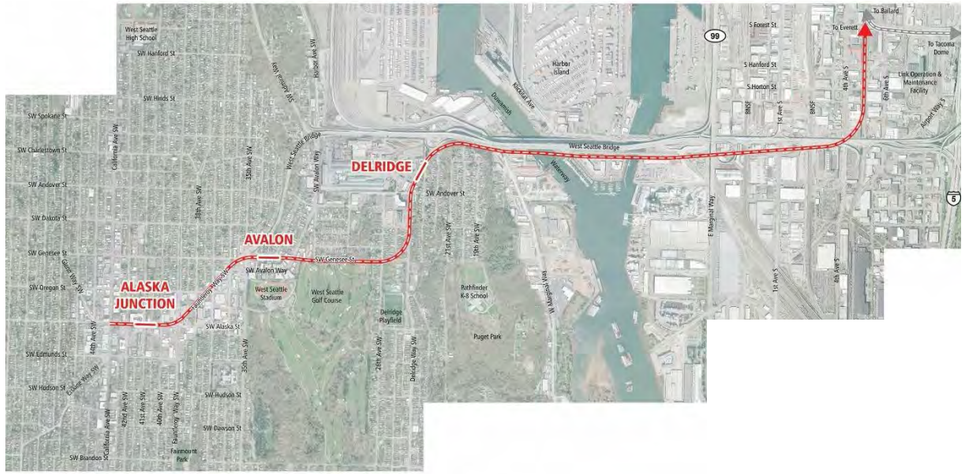




**Figure 4-2 West Seattle/Duwamish Segment—Level 1 Alternatives**

## ST3 REPRESENTATIVE PROJECT

*ALTERNATIVE*

*SEGMENT*
**WEST SEATTLE / DUWAMISH**




### ROUTE DESCRIPTION

The ST3 Representative Project would begin in SODO, running along the E3 busway in an elevated structure. The route would then cross over the West Seattle Bridge and head west on an elevated structure over E Marginal Way. It would then continue onto a new high-level bridge spanning the Duwamish River on the south side of the existing West Seattle Bridge. After crossing the river, the elevated route would round Pigeon Ridge, follow Delridge Way SW and run west along SW Genesee Street north of the West Seattle Golf Course. Continuing toward Alaska Junction, the elevated route would turn southwest on Fauntleroy Way SW, west on SW Alaska Street, and terminate at California Avenue SW.

### STATIONS

| | |
|---|---|
| **Delridge** | Elevated on Delridge Way SW north of SW Andover Street |
| **Avalon** | Elevated on SW Genesee Street between SW Avalon Way and 35th Avenue SW |
| **Alaska Junction** | Elevated on SW Alaska Street between 40th and 42nd avenues SW |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

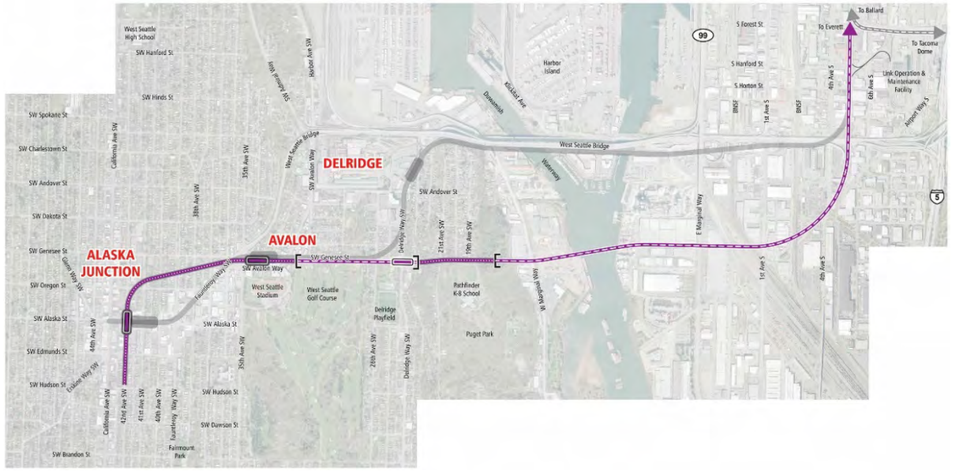
- Serves as baseline project against which Level 1 alternatives were defined and screened
- To be potentially refined and evaluated against remaining alternatives in Level 2 Screening

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated alternative<br>• Initial travel time estimate of 7 minutes between Alaska Junction and SODO stations |
| **Improve Downtown capacity for regional connectivity** | • Facilitates regional connectivity |
| **Connect regional centers** | • Directly serves Duwamish Manufacturing and Industrial Center (MIC)<br>• Difficult to extend south for future expansion |
| **Technically feasible and financially sustainable** | • Mode, route and general station locations consistent with *ST3 Plan*<br>• Long-curved span over S Spokane Street requires a more specialized bridge type<br>• Difficult construction at Pigeon Point |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Local land use plans are supportive of all proposed stations<br>• Alaska Junction and Avalon stations would serve the recently rezoned West Seattle Triangle area<br>• Difficult to accommodate bus bays and layovers at Delridge and Alaska Junction stations |
| **Promote a healthy built, natural, and social environment** | • Potential impacts on wetlands and Longfellow Creek<br>• Steep slopes and habitat on Pigeon Point affected<br>• High residential displacements in Delridge and Avalon neighborhoods<br>• Potential impacts to businesses and access at Terminal 102 on Harbor Island<br>• Business displacements likely in Alaska Junction area |

## PIGEON RIDGE/WEST SEATTLE TUNNEL

*ALTERNATIVE*

*SEGMENT*
**WEST SEATTLE / DUWAMISH**




### ROUTE DESCRIPTION

This alternative would also start in SODO on an elevated structure running along the E3 busway, but it would continue further south after crossing over the West Seattle Bridge. The elevated route would then turn west over 4th Avenue S, 1st Avenue S, the Union Pacific Railroad (UPRR) yard, and E Marginal Way. It would then cross the Duwamish River via a new high-level bridge, transition into a tunnel beneath Pigeon Ridge, and then emerge back onto an elevated structure paralleling SW Genesee Street. Approaching SW Avalon Way, the route would again transition into a tunnel to 42nd Avenue SW and then terminate in a tunnel near 42nd Avenue SW and SW Hudson Street.

### STATIONS

| | |
|---|---|
| Delridge | Elevated on SW Genesee Street spanning Delridge Way SW |
| Avalon | Tunnel south side of SW Genesee Street between SW Avalon Way and 35th Avenue SW |
| Alaska Junction | Tunnel under 42nd Avenue SW straddling SW Alaska Street |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

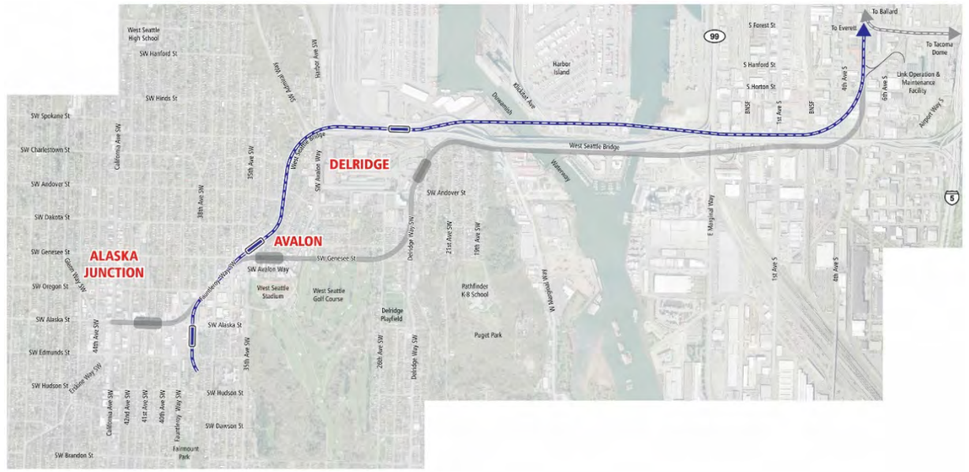
- Tunnels to Alaska Junction
- Tunnels to minimize neighborhood disruption
- Crosses Duwamish further south

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated alternative<br>• Travel time comparable to ST3 Representative Project, although larger curve radius south of West Seattle Bridge allows for faster LRT operating speeds |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility and passenger carrying capacity consistent with ST3 Representative Project<br>• Potential for additional ridership due to location of Delridge Station; larger ridership capture shed with intersecting bus routes |
| **Connect regional centers** | • Tunnel route beneath Alaska Junction accommodates future southern LRT extension<br>• Does not directly serve Duwamish MIC |
| **Technically feasible and financially sustainable** | • Mode, route, and station locations generally consistent with ST3 Representative Project<br>• Two tunnels and longer route; approximately 2,000 linear feet longer than ST3 Representative Project<br>• Better access to operations and maintenance facility (OMF) and requires less right-of-way (ROW) acquisition<br>• Tunnel costs not included in ST3 financial plan or evaluation methodology |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Similar to ST3 Representative Project; all three proposed stations located in areas with supportive land use plans<br>• Alaska Junction and Avalon stations located within West Seattle Hub Urban Village |
| **Promote a healthy built, natural, and social environment** | • Potential impacts on open space, steep slopes, and habitat on West Duwamish Greenbelt and West Seattle Golf Course<br>• Neighborhood impacts along SW Genesee Street in Delridge (visual, noise and construction)<br>• Avoids disruption to freight movement on Harbor Island |

## WEST SEATTLE BRIDGE/FAUNTLEROY

*ALTERNATIVE*

*SEGMENT*
**WEST SEATTLE / DUWAMISH**




### ROUTE DESCRIPTION

This alternative would also run on an elevated structure from SODO, but it would parallel the north side of the existing West Seattle Bridge. The route would cross over the Duwamish River via a new high-level bridge and continue to run adjacent to the existing bridge to Fauntleroy Way SW. Continuing southwest along Fauntleroy Way SW, the elevated route would eventually end west of 38th Avenue SW south of SW Edmunds Street.

### STATIONS

| | |
|---|---|
| Delridge | Elevated north of West Seattle Bridge |
| Avalon | At-grade/elevated on Fauntleroy east of 35th Avenue SW |
| Alaska Junction | Elevated west of 38th Avenue SW near SW Alaska Street |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

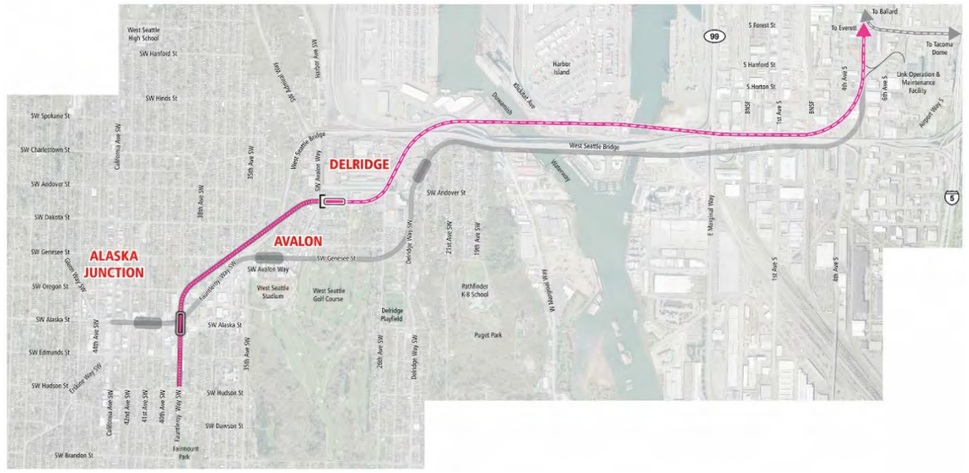
- Avoids Pigeon Ridge critical area; Duwamish crossing north of bridge
- Minimizes neighborhood disruption
- Changes terminal station location and orientation

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated alternative<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility, and passenger carrying capacity consistent with ST3 Representative Project<br>• Potential for lower ridership capture with Delridge Station location |
| **Connect regional centers** | • Directly serves Duwamish MIC<br>• Accommodates future southern LRT extension with ability to turn toward 35th Avenue SW |
| **Technically feasible and financially sustainable** | • Mode, route and station locations generally consistent with ST3 Representative Project<br>• Long span bridge and tall Delridge Station; approximately 4,100 linear feet longer than ST3 Representative Project<br>• Potential less ROW impact in West Seattle but greater Port of Seattle/Northwest Seaport Alliance (NWSA) ROW impact |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Delridge Station less consistent with local plans because Station area not located within North Delridge neighborhood and could affect uses within the MIC and Port of Seattle/NWSA<br>• Less bus route diversion at Avalon Station, but more bus diversion to Delridge Station |
| **Promote a healthy built, natural, and social environment** | • Avoids potential impacts to wetlands and Longfellow Creek along SW Genesee Street and steep slopes and habitat on Pigeon Point<br>• Avoids potential residential displacements in Delridge neighborhood and potentially Avalon neighborhood<br>• Potential impacts to industrial businesses north of West Seattle Bridge |

## YANCY STREET/WEST SEATTLE TUNNEL

*ALTERNATIVE*

*SEGMENT*
**WEST SEATTLE / DUWAMISH**




### ROUTE DESCRIPTION

This alternative would run on an elevated structure along the E3 busway in SODO before heading west north of the existing West Seattle Bridge. The route would then span the Duwamish River on a new high-level bridge. It would then cross over the West Seattle Bridge ramp and pass the Nucor Steel property to SW Yancy Street. Near the intersection of SW Yancy Street and SW Avalon Way, the route would enter a tunnel generally paralleling Fauntleroy Way SW in a southwesterly direction. The route would continue in a tunnel beneath Fauntleroy Way SW and end near SW Hudson Street.

### STATIONS

**Delridge/ Avalon**

At-grade at SW Yancy Street between 28th and 30th avenues; consolidates Delridge and Avalon stations

**Alaska Junction**

Tunnel under 39th Avenue SW, Fauntleroy Way SW and SW Alaska Street

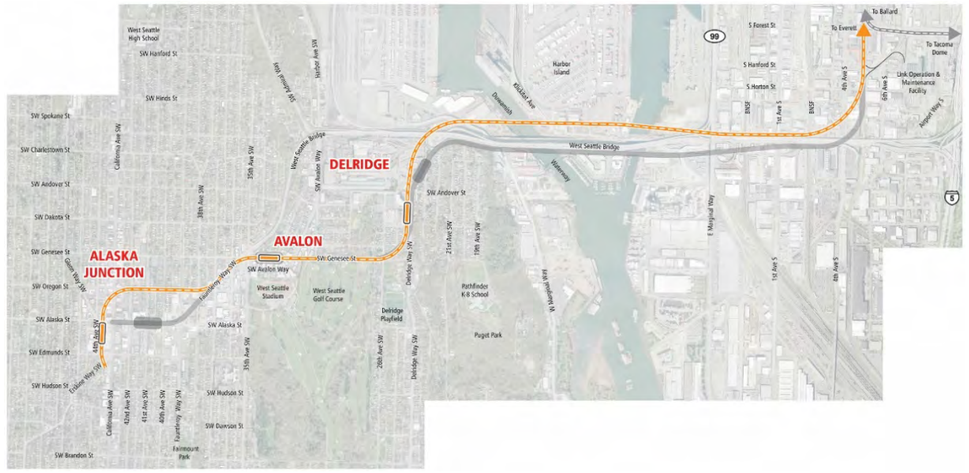
### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Tunnels in West Seattle
- Consolidates stations
- Uses alternate routes in West Seattle
- Uses alternate routes to Duwamish Crossing
- Minimizes neighborhood disruption
- Accommodates future extension
- Orients terminal station north-south

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated alternative<br>• Travel time comparable to ST3 Representative Project, although faster average speed due to one less station |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility, and passenger carrying capacity consistent with ST3 Representative Project<br>• Potential for lower ridership capture with one less station as compared to ST3 Representative Project |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Accommodates future southern LRT extension with ability to turn toward 35th Avenue SW |
| **Technically feasible and financially sustainable** | • Consolidated of stations not identified or analyzed in *ST3 Plan*<br>• Requires Port of Seattle/NWSA property access east of west waterway and easement from Nucor Steel<br>• More long-span bridges; approximately 2,740 linear feet longer than ST3 Representative Project<br>• Approximate 4,800-foot tunnel<br>• Tunnel costs not included in ST3 financial plan or evaluation methodology |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Only one station located in West Seattle Hub Urban Village<br>• Delridge Station located in a valley and adjacent to Nucor Steel<br>• No strong street grid in this area, and many streets do not continue through to arterials |
| **Promote a healthy built, natural, and social environment** | • Lower potential for residential displacements in Delridge and Avalon neighborhoods<br>• Potential impacts to traffic circulation near SW Yancy Street and SW Andover Street<br>• Potential impacts on industrial businesses north of West Seattle Bridge and Nucor Steel |

## OREGON STREET/ALASKA JUNCTION
*ALTERNATIVE*

*SEGMENT*
**WEST SEATTLE / DUWAMISH**




### ROUTE DESCRIPTION

This alternative would also run on an elevated structure along the E3 busway in SODO before heading west north of the existing West Seattle Bridge. The route would then span the Duwamish River on a new high-level, rail only bridge on the north side of the existing West Seattle Bridge. It would then cross over the West Seattle Bridge ramp and follow Delridge Way SW to SW Genesee Street. The elevated route would pass above SW Genesee Street, run southwest along Fauntleroy Way SW, then turn west and follow SW Oregon Street toward California Avenue SW. West of California Avenue SW, the elevated route would turn south and end just beyond SW Edmunds Street.

### STATIONS

**Delridge** — Elevated on Delridge Way SW south of SW Andover Street

**Avalon** — Elevated on SW Genesee Street between SW Avalon Way and 35th Avenue SW

**Alaska Junction** — Elevated east of 44th Avenue SW south of SW Alaska Street

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

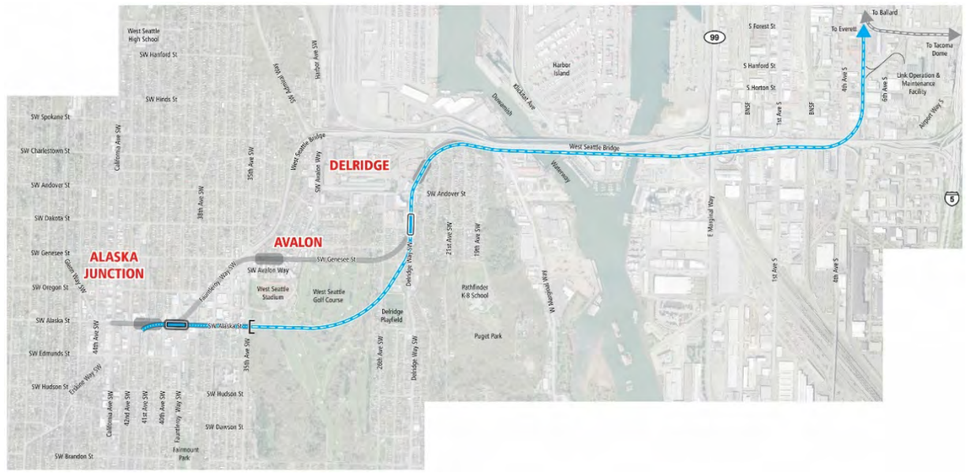
- Avoids SW Alaska Street disruption
- Avoids Pigeon Ridge critical area; Duwamish crossing north of bridge
- Shifts Delridge Station south
- Changes terminal station orientation north-south

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated alternative<br>• Longer route results in slightly longer travel time versus ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility, and passenger carrying capacity consistent with ST3 Representative Project<br>• Potential for additional ridership due to location of Delridge and Alaska Junction stations |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Accommodates future southern LRT extension but further away from 35th Avenue SW, would require elevated structure along California Avenue SW to south |
| **Technically feasible and financially sustainable** | • Mode, route and general station locations consistent with *ST3 Plan*<br>• Requires Port of Seattle property access<br>• More long-span bridges, approximately 1,775 linear feet longer than ST3 Representative Project<br>• More residential ROW impact on West Seattle relative to ST3 Representative Project |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Similar to ST3 Representative Project; all three proposed stations located in areas with supportive land use plans<br>• Alaska Junction and Avalon stations located within West Seattle Hub Urban Village |
| **Promote a healthy built, natural, and social environment** | • Potential for greater residential displacements in Delridge, Avalon and Junction neighborhoods<br>• Potential impacts on industrial businesses north of West Seattle Bridge<br>• Construction could disrupt repackaging operations for maritime/truck shipment on west side of West Waterway<br>• Potential business and industry displacements |

## WEST SEATTLE GOLF COURSE/ALASKA JUNCTION

*ALTERNATIVE*

*SEGMENT*
**WEST SEATTLE / DUWAMISH**




### ROUTE DESCRIPTION

Beginning on an elevated structure along the E3 busway in SODO, this route would then cross over and parallel the south side of the existing West Seattle Bridge. The route would then span the Duwamish River on a new high-level bridge south of the existing bridge. Rounding Pigeon Point, the elevated route would continue south along Delridge Way SW. South of SW Genesee Street, the route would operate on an elevated structure through the West Seattle Golf Course before entering a tunnel beneath SW Alaska Street. The tunnel would then terminate beneath the intersection of SW Alaska Street and 41st Avenue SW.

### STATIONS

**Delridge** — Elevated on Delridge Way SW south of SW Andover Street

**Alaska Junction** — Tunnel beneath SW Alaska Street at Fauntleroy Way SW

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Tunnels to Alaska Junction
- Consolidates stations
- Minimizes neighborhood disruption
- Routes through golf course

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated alternative<br>• Travel time comparable to ST3 Representative Project; faster average speed due to one less station |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility and passenger carrying capacity consistent with ST3 Representative Project<br>• Elimination of Avalon Station reduces ridership capture area and potential |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Oriented east-west in a tunnel at Fauntleroy Way SW, but would require a U-turn to extend south toward 35th Avenue SW in the future |
| **Technically feasible and financially sustainable** | • Consolidating stations not identified or analyzed in *ST3 Plan*<br>• Long curved span over S Spokane Street requires a more specialized bridge type<br>• Difficult construction at Pigeon Point<br>• Tunnel costs not included in ST3 financial plan or evaluation methodology |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Alignment and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Local land use plans supportive of stations at Alaska Junction and Delridge<br>• Only one station located within West Seattle Hub Urban Village<br>• Potential business displacements at SW Alaska Street and Fauntleroy Way SW |
| **Promote a healthy built, natural, and social environment** | • Traverses West Seattle Golf Course (Section 4(f) resource); a greater impact to this Section 4(f) resource<br>• Affects steep slopes and habitat on Pigeon Point<br>• Potential impacts on businesses and access at Terminal 102 on Harbor Island |

### 4.1.1 West Seattle/Duwamish Segment Summary Findings

The extension of LRT to West Seattle has several design and construction challenges, particularly associated with the Duwamish River crossing, along with steep slope/terrain issues in the Delridge and Alaska Junction neighborhoods. The alternatives developed and considered during the Level 1 Screening attempted to address a variety of different challenges, and the evaluation sought to highlight potential benefits or impacts associated with each alternative. The Level 1 Screening also shed light on key themes and issues to consider as the alternatives carried forward into the Level 2 Screening are refined and evaluated. In the West Seattle/Duwamish Segment, existing environmental conditions and construction complexity issues emerged as key themes for future consideration. For the alternatives advanced to the Level 2 Screening, additional design efforts will be conducted to refine those alternatives that remain, and to provide additional detail on potential benefits or impacts of each alternative.

**Table 4-1** (West Seattle/Duwamish Segment ELG Screening Recommendations) identifies the alternatives recommended by the ELG to be carried forward for additional design and evaluation as part of the Level 2 Screening. Additional evaluation information and results for the West Seattle/Duwamish alternatives may be found in **Appendix A** (West Seattle/Duwamish Segment Level 1 Evaluation Matrices).

**Table 4-1 West Seattle/Duwamish Segment ELG Screening Recommendations**

| Level 1 Alternative | Notes/Comments | Carry Forward into Level 2? |
|---|---|---|
| ST3 Representative Project | • Baseline project | Yes |
| Oregon Street/Alaska Junction | • Avoids Fauntleroy and Alaska<br>• Better orientation for future southern extension<br>• Affects SW Oregon Street and 44th Avenue SW | Yes |
| West Seattle Bridge/Fauntleroy | • Lessens effects to Alaska Junction and Delridge<br>• Better orientation for future southern extension<br>• Creates isolated Delridge Station | No |
| Pigeon Ridge/West Seattle Tunnel | • Lessens effects to Port of Seattle, Alaska Junction, Delridge<br>• Better orientation for future southern extension<br>• Requires two tunnels; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships | Yes |
| Yancy Street/West Seattle Tunnel | • Lessens effects to Alaska Junction and Delridge<br>• Better orientation for future southern extension<br>• Consolidating stations not identified or analyzed in *ST3 Plan*<br>• Requires tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships | No |
| West Seattle Golf Course/Alaska Junction (Tunnel) | • Crosses West Seattle Golf Course (Section 4(f) resource)<br>• Lessens effect to Alaska Junction and Delridge<br>• Consolidating stations not identified or analyzed in *ST3 Plan*<br>• Requires tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships | Yes |
| Duwamish Tunnel | • Impractical tunnel depth and length | No |
| West Seattle Bridge | • Existing structure not built to accommodate LRT<br>• Constructability issues | No |
| Gondola/ rail/bus bridge (1) | • Mode not identified or analyzed in *ST3 Plan* | No |
| Extensions to Alki, Admiral, etc. | • Extensions not identified or analyzed in *ST3 Plan* | No |

NOTES:
(1) Bridge alternatives do not preclude pedestrian/bicycle paths.

## 4.2 SODO Segment Alternatives Evaluation

The SODO Segment included the following five alternatives during the Level 1 Screening:

- ST3 Representative Project (Elevated E-3)
- Massachusetts Tunnel Portal
- Surface E-3
- Occidental Avenue
- 6th Avenue

These alternatives are delineated on **Figure 4-3** (SODO Segment—Level 1 Alternatives), with individual descriptions and evaluation of each alternative in the pages that follow. Refer to **Appendix B** (SODO Segment Level 1 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

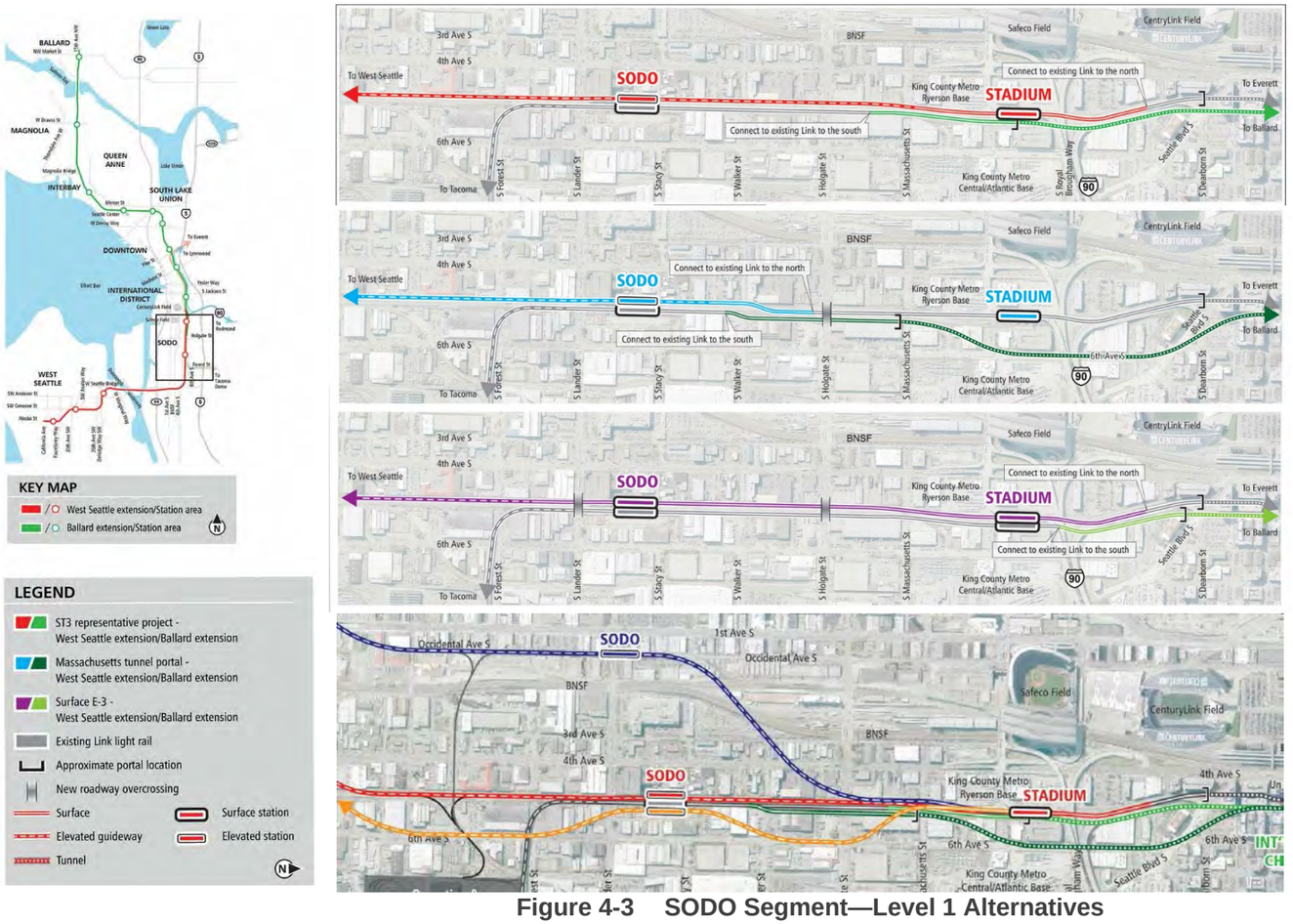
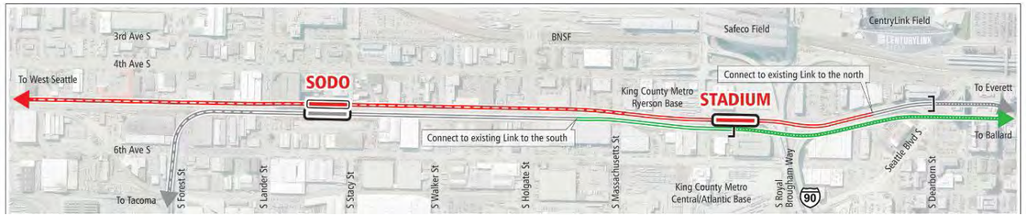



**Figure 4-3 SODO Segment—Level 1 Alternatives**

## ST3 REPRESENTATIVE PROJECT

*ALTERNATIVE*

*SEGMENT*
**SODO**




### ROUTE DESCRIPTION

After crossing over the Spokane Street Viaduct, this alternative would run on an elevated guideway along the E3 busway to a new elevated SODO Station adjacent to the existing at-grade SODO Station. The route would continue north along the E3 busway in an elevated configuration. At approximately S Massachusetts Street, the route would transition down to existing grade, then continue to a rebuilt, at-grade Stadium Station, which would serve the West Seattle to Everett line. The route would then continue at-grade across S Royal Brougham Way and tie into the existing light rail line and DSTT.

At approximately the location of the existing Stadium Station, the existing light rail line from Tacoma would transition into a new cut-and-cover tunnel that would continue under S Royal Brougham Way. The existing Stadium Station would be demolished and rebuilt to accommodate the new tunnel portal. The tunnel route would continue north along the east side of the D-2 ramps carrying the East Link light rail line into a new International District/ Chinatown tunnel station.

### STATIONS

**SODO** — Elevated immediately west of existing SODO Station

**Stadium (existing)** — Existing at-grade rebuilt and relocated on West Seattle line only

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

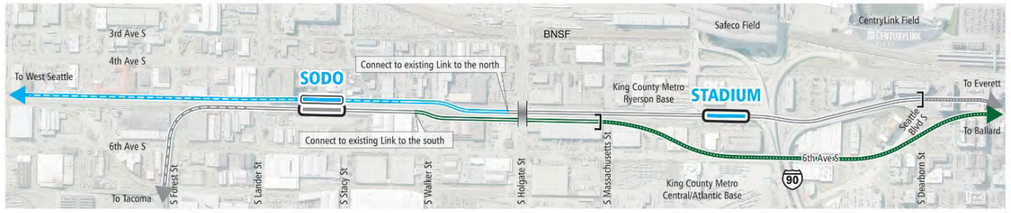
- Serves as baseline project against which Level 1 alternatives were defined and screened
- To be potentially refined and evaluated against remaining alternatives in Level 2 Screening

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Initial travel time estimate of 3 minutes between SODO and International District/Chinatown stations |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes portal for new light rail tunnel beneath downtown |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Facilitates special trackwork and system reliability<br>• "S" development encroachment and ROW needs<br>• Route requires WSDOT/East Link structure modifications<br>• Limited area for construction staging may result in increased service disruption<br>• Overhead transmission line greatest impact |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Station locations, development potential, and operability with buses and non-motorized transportation modes similar to ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • No identified potential impacts to protected natural resources<br>• Located in critical area for liquefaction prone soils (Seattle Environmentally Critical Areas [ECA])<br>• Potential impacts to National Register of Historic Places (NRHP) listed Immigration and Naturalization Service (INS) Building<br>• Potential business/freight impacts during construction |

## MASSACHUSETTS TUNNEL PORTAL

*ALTERNATIVE*

*SEGMENT*
**SODO**




### ROUTE DESCRIPTION

Once across the Spokane Street Viaduct via an elevated guideway, this route would reach the new elevated SODO Station adjacent to the existing at-grade SODO Station. Heading north, the route would transition down to grade, then tie into the existing light rail line at S Holgate Street.

North of the existing SODO Station, the existing light rail line from Tacoma would transition to a new line to the east. The route would transition into a retained cut configuration and then into a cut-and-cover tunnel. The tunnel portal for the new downtown transit tunnel would be located near SW Massachusetts Street, between the SODO busway and 6th Avenue S. The route would then continue north beneath 6th Avenue S, then transition to 5th Avenue S into a new International District/Chinatown tunnel station.

### STATIONS

**SODO** — Elevated immediately west of existing SODO Station

**Stadium (existing)** — Existing at-grade remains on West Seattle line only

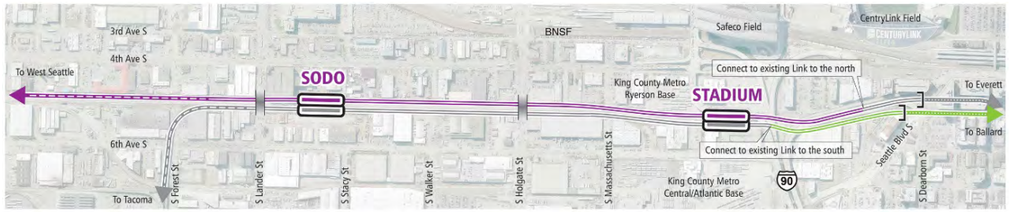
### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Grade separates S Holgate Street
- Minimizes potential cut-and-cover construction impacts on 5th Avenue S

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility, and passenger carrying capacity consistent with ST3 Representative Project<br>• Potential ridership consistent with ST3 Representative Project |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Proximity issue to foundations of WSDOT/East Link structures<br>• Design of bored tunnel and portal in poor soils and high-water table<br>• Greater ROW needs than ST3 Representative Project<br>• Longer tunnel length; approximately 800 feet longer |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Station locations, development potential, and operability with buses and non-motorized transportation modes similar to ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • Located in critical area for liquefaction prone soils (Seattle ECA)<br>• Removal of at-grade crossing at Holgate would benefit freight mobility<br>• Avoids potential traffic impacts to S Royal Brougham Way<br>• Low potential for business displacements |

# SURFACE E3
*ALTERNATIVE*

*SEGMENT*
**SODO**




## ROUTE DESCRIPTION

Once across the Spokane Street Viaduct via an elevated guideway, this route would travel along the E3 busway to S Forest Street and then transition to grade south of S Lander Street. It would then enter a new at-grade SODO Station and continue north to a new Stadium Station serving the West Seattle to Everett line. The route would continue at-grade across S Royal Brougham Way and tie into the existing light rail line and DSTT.

The existing Stadium Station would remain to serve the Ballard to Tacoma line. North of the Stadium Station, the Tacoma line would transition to a new at-grade line across S Royal Brougham Way and along the east side of the D-2 ramps carrying the East Link light rail line. The route would then enter a cut-and-cover tunnel portal located south of Seattle Boulevard S into a new International District/Chinatown tunnel station.

## STATIONS

**SODO** — At-grade immediately west of existing SODO Station

**Stadium (existing)** — Existing at-grade remains on Ballard line

**Stadium (new)** — New at-grade for West Seattle line

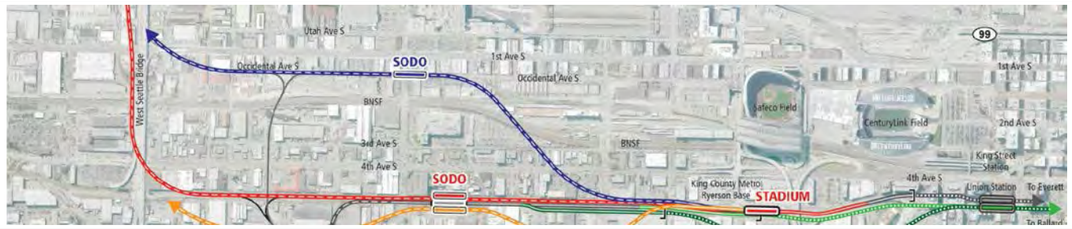
## CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Grade separates S Lander Street
- Grade separates S Holgate Street
- Places Stadium Station on both lines
- Places light rail at grade

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Requires full or partial closure of S Royal Brougham Way<br>• Full grade separation of Holgate and Lander; improves reliability of existing light rail line<br>• Travel time similar to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility, and passenger carrying capacity consistent with ST3 Representative Project<br>• Two Stadium Stations allows for greater regional connectivity |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Roadway grade separations facilities special trackwork for connection between West Seattle and Ballard lines<br>• Minimizes potential impacts to WSDOT/East Link structures<br>• Reduced length of cut-and-cover tunnel<br>• Roadway overcrossings in poor soils; increased infrastructure for grade separated roadways<br>• "S" Development ROW needs |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk |
| **Encourage equitable and sustainable urban growth** | • Station locations, development potential, and operability with buses and non-motorized transportation modes similar to ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • No identified potential impacts to protected natural resources (area heavily urbanized already)<br>• Located in critical area for liquefaction prone soils (Seattle ECA)<br>• Potential impacts on NRHP-listed INS Building |

## OCCIDENTAL AVENUE
*ALTERNATIVE*

*SEGMENT*
**SODO**




### ROUTE DESCRIPTION

This alternative would cross over the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge) near 1st Avenue S and then head north along the east side of Occidental Avenue S on an elevated structure. A new elevated SODO Station would be located just east of Occidental Avenue S, straddling S Lander Street. The route would then turn northeast over the Burlington Northern Santa Fe (BNSF) Railway tracks and 4th Avenue S before merging into the SODO E3 busway. It would then transition to existing grade along the SODO E3 busway north of S Holgate Street and continue to a new Stadium Station serving the West Seattle to Everett line. The route would continue at-grade across S Royal Brougham Way and tie into the existing light rail line to Everett and DSTT.

The existing Stadium Station would remain to serve the Ballard to Tacoma line. North of the Stadium Station, the Ballard to Tacoma line would transition to a new at-grade line across S Royal Brougham Way and along the east side of the D-2 ramps carrying the East Link light rail line. The route would then enter a cut-and-cover tunnel portal located south of Seattle Boulevard S into a new International District/Chinatown tunnel station under 5th Avenue S, which would be constructed via cut-and-cover methods.

### STATIONS

**SODO** — New elevated at Occidental Avenue S and S Lander Street for West Seattle line

**Stadium (existing)** — Existing at-grade remains on Ballard line

**Stadium (new)** — New at-grade immediately west of existing station for West Seattle line

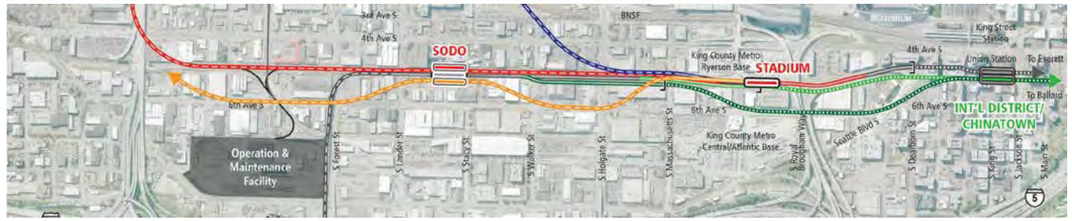
### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Runs on long elevated structure along Occidental Avenue S and across BNSF tracks
- Avoids running along E3 busway
- Places Stadium Station on both lines

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Reduces network integration and connectivity with location of new SODO Station on Occidental Avenue S<br>• Passenger carrying capacity consistent with ST3 Representative Project<br>• Total 2040 population and employment within 0.5-mile buffer of stations approximately 3% higher than ST3 Representative Project (approximately 24,400) |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Difficult to provide interconnection between West Seattle and Ballard lines and pocket tracks<br>• Engineering challenges due to increased long-span elevated guideway structures over BNSF tracks, light rail mainline, and OMF connection; degraded connection to OMF<br>• Limited ROW on Occidental Avenue S that includes large underground utilities<br>• Reduces interference to E3 busway and overhead transmission lines<br>• Additional property impacts for crossing from Spokane Street S to Occidental Avenue S and from Occidental Avenue S to the E3 busway |
| **Expand mobility for all** | • Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Increases access to SODO employment area for historically underserved population in other parts of region |
| **Encourage equitable and sustainable urban growth** | • Reduced connectivity between existing and new SODO stations<br>• Better access to regional bicycle facilities<br>• New SODO station located in more pedestrian-friendly environment compared with ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • No identified potential impacts to protected natural resources (area heavily urbanized already)<br>• Located in critical area for liquefaction prone soils (Seattle ECA)<br>• Potential impacts on NRHP-listed INS Building<br>• Potential temporary and permanent traffic and business/freight impacts due to elevated guideway in street ROW |

## 6TH AVENUE
*ALTERNATIVE*

*SEGMENT*
**SODO**




### ROUTE DESCRIPTION

After crossing over the Spokane Street Viaduct, this alternative would run on an elevated guideway along 6th Avenue S, transitioning to a new elevated SODO Station adjacent to the existing at-grade SODO Station along the E3 busway. The route would then turn back to 6th Avenue S and continue north on an elevated guideway. At approximately S Holgate Street, the route would curve back to the E3 busway and transition down to existing grade. It would then continue to a rebuilt, at-grade Stadium Station, which would serve the West Seattle to Everett line. The route would then continue at grade across S Royal Brougham Way and tie into the existing light rail line and DSTT.

At approximately the location of the existing Stadium Station, the existing light rail line from Tacoma would transition into a new cut-and-cover tunnel that would continue under S Royal Brougham Way. The existing Stadium Station would be demolished and rebuilt to accommodate the new tunnel portal. The tunnel route would continue north along the east side of the D-2 ramps carrying the East Link light rail line into a new International District/Chinatown tunnel station.

### STATIONS

**SODO** — Elevated immediately east of existing SODO Station

**Stadium (existing)** — Existing at-grade rebuilt and relocated on West Seattle line only

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Avoids running along the E3 busway

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Network integration, operational flexibility, and passenger carrying capacity consistent with ST3 Representative Project |
| **Connect regional centers** | • Serves Duwamish MIC<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • No interconnection between West Seattle and Ballard lines and pocket tracks<br>• Engineering challenges due to difficult connection to OMF, high elevated guideway over existing elevated light rail line at S Forest Street and braiding lines near Stadium Station<br>• Reduces interference to E3 busway and overhead transmission lines<br>• Increases traffic and property impacts along 6th Avenue S and with transitions to SODO Station |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city |
| **Encourage equitable and sustainable urban growth** | • Station locations, development potential, and operability with buses and non-motorized transportation modes similar to ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • No identified potential impacts to protected natural resources (area heavily urbanized already)<br>• Located in critical area for liquefaction prone soils (Seattle ECA)<br>• Potential impacts on NRHP-listed INS Building<br>• Potential temporary and permanent traffic and business/freight impacts due to elevated guideway in street ROW |

### 4.2.1 SODO Segment Summary Findings

The SODO Segment has several unique transit operational challenges for both bus and rail services that directly influence the design of the WSBLE Project. These operational challenges include how the WSBLE Project would connect with Sound Transit's OMF, the convergence of the current Link LRT line, the addition of the future East Link LRT line, and the switching requirements (referred to as spine segmentation) that will enable the West Seattle line to operate north to Everett, and the Ballard line to run south to Tacoma. Furthermore, while the new downtown transit tunnel is constructed, the SODO Station is a potential interim terminus for the LRT line to West Seattle, until the new tunnel is completed to enable the Ballard-Tacoma line to become operational. In addition to the existing and future light rail lines, King County Metro Transit's (KCM) E3 busway is an important operational component for the region's bus network, particularly bus routes serving southern King County. The strategic importance of the E3 busway as a north-south transit spine is further emphasized by the connection to KCM's Ryerson Base.

Utilities also present several challenges in the SODO Segment. Seattle City Light (SCL), the primary electrical power provider to the region, has high-voltage transmission lines and transmission substations in the SODO Segment. The SCL South Service Center on 4th Avenue S is immediately south of the West Seattle Bridge/Spokane Street Viaduct. In addition to electrical transmission, several high-pressure gas mains, consolidated sewers, and water mains are found throughout the SODO region to service the Port of Seattle and auxiliary businesses and services.

Finally, the SODO Segment has experienced rapid land use change over the past two decades, with the expansion of the stadium district and growth of commercial enterprises converting manufacturing, industrial, and warehouse buildings into mixed-use development. The City of Seattle has enacted zoning classifications and special districts (most notably the MICs) to preserve and protect industrial lands in SODO and Interbay. The SODO Segment continues to see a heavy volume of daily freight traffic, both multiaxle trucks and freight railroad activity, serving the Port of Seattle. Maintaining freight movement and commerce activities during and after construction of the WSBLE Project will be an important consideration in the refinement of alternatives during the Level 2 Screening.

**Table 4-2** (SODO Segment ELG Screening Recommendations) identifies the alternatives recommended by the ELG to be carried forward for additional design and evaluation as part of the Level 2 Screening. Additional evaluation information and results for the SODO alternatives may be found in **Appendix B** (SODO Segment Level 1 Evaluation Matrices).

**Table 4-2 SODO Segment ELG Screening Recommendations**

| Level 1 Alternative | Notes/Comments | Carry Forward into Level 2? |
|---|---|---|
| ST3 Representative Project | • Baseline project | Yes |
| Surface E-3 | • Less service disruption during construction<br>• Accommodates Stadium Station on both lines<br>• Eliminates existing grade crossings at Lander and Holgate<br>• Closes S Royal Brougham Way between 4th Avenue S and 6th Avenue S | Yes |
| Massachusetts Tunnel Portal | • Reduces cut-and-cover construction on 5th Avenue S in International District/Chinatown<br>• Less service disruption during construction<br>• Eliminates existing grade crossing at Holgate<br>• Requires longer tunnel, with more property acquisitions | Yes |
| Occidental Avenue | • Long-span elevated crossing over BNSF tracks<br>• Traffic and freight access effects on Occidental Avenue S<br>• Property impacts of alignment crossing from Occidental Avenue S to Stadium Station<br>• Long track connection to OMF; no track connections between lines | Yes |
| 6th Avenue | • OMF connection technically challenging<br>• Property impacts to locate SODO Station adjacent to existing station<br>• Braiding lines could have major construction challenges and service disruptions | No |
| Maintain buses on E3 | • Not practical due to ROW constraints | No |
| First Avenue route | • Route and station locations not identified or analyzed in *ST3 Plan* | No |
| Design for potential extension south to Georgetown | • Extension not identified or analyzed in *ST3 Plan* | No |
| Track interlining | • Requires grade-separated junctions; does not accommodate buses on E3 busway<br>• Creates bottleneck; impacts service reliability and limits system capacity | No |
| Extended Ballard Line | • Rebuild of S Forest Street junction requires disruption of existing LRT service<br>• Deep mined International District/Chinatown Station; constructability challenges<br>• Additional guideway length; no track connections | No |

## 4.3 Downtown Segment Alternatives Evaluation

The Downtown Segment contained the following six alternatives during the Level 1 Screening:

- ST3 Representative Project (5th/6th/Republican)
- 5th Avenue/Harrison
- 5th Avenue/Mercer
- 6th Avenue/Boren/Roy
- 8th Avenue/6th Avenue/Republican
- 5th Avenue/Roy/Consolidated South Lake Union (SLU) Station

These alternatives are delineated on **Figure 4-4** (Downtown Segment—Level 1 Alternatives), with individual descriptions and evaluation of each alternative in the pages that follow. Refer to **Appendix C** (Downtown Segment and International District/Chinatown Station Level 1 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

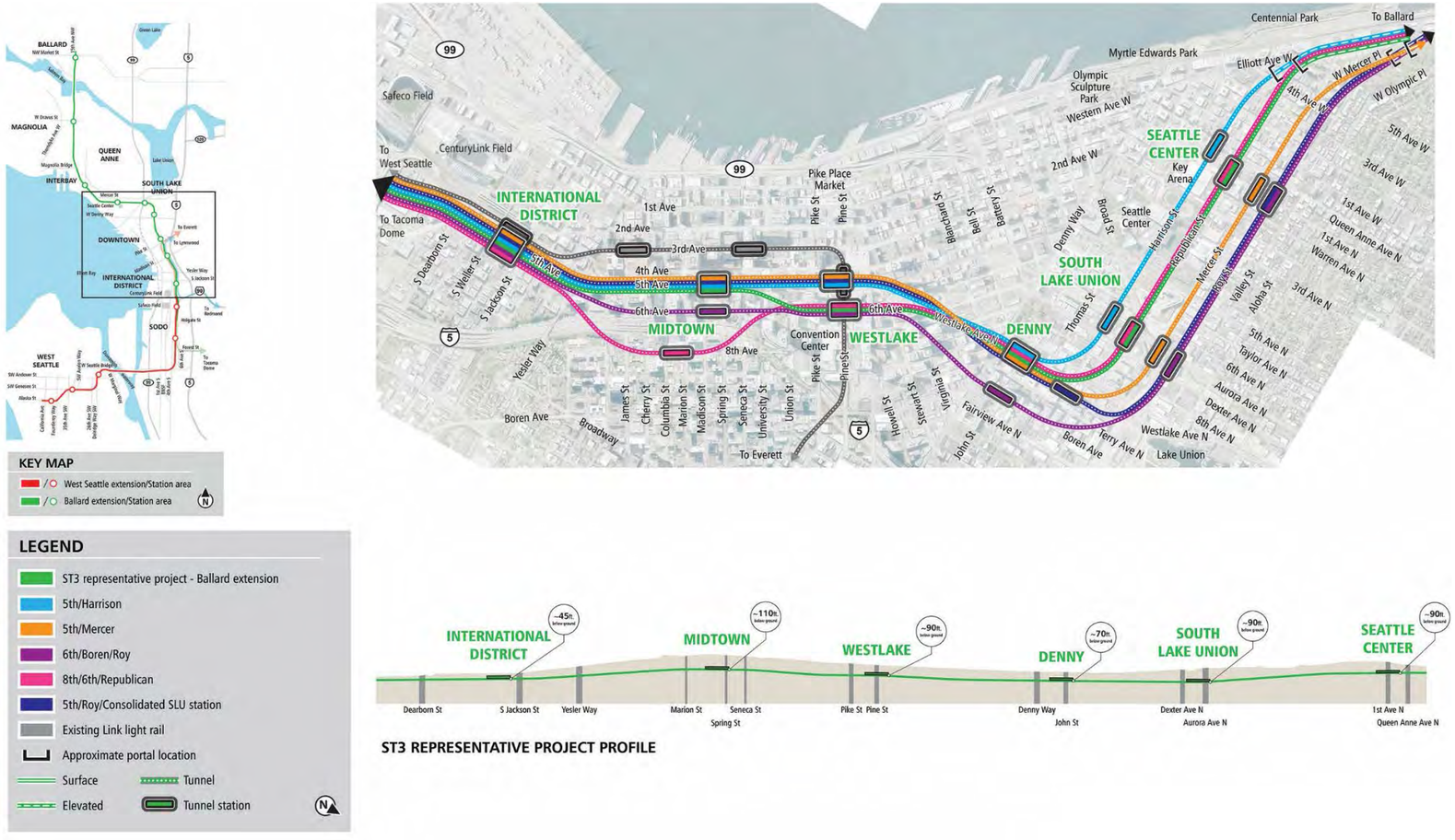
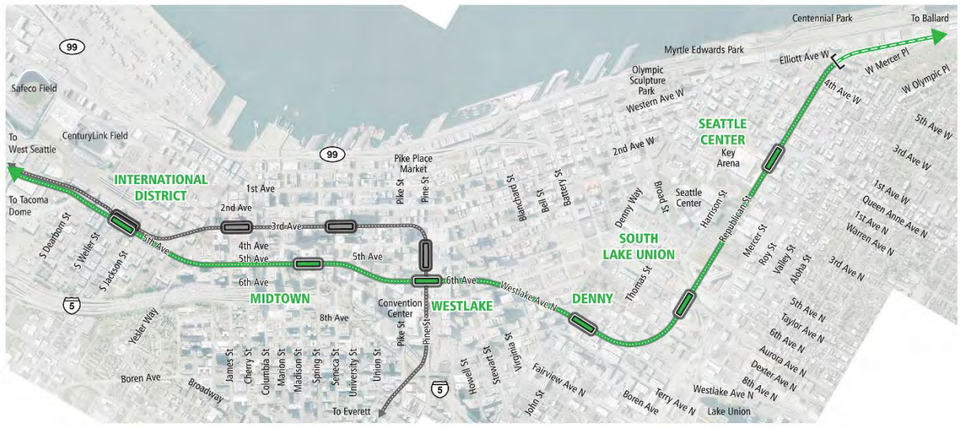




**Figure 4-4 Downtown Segment—Level 1 Alternatives**

## ST3 REPRESENTATIVE PROJECT

*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**




### ROUTE DESCRIPTION

The ST3 Representative Project would operate in a new rail-only tunnel from the International District/ Chinatown to Lower Queen Anne in downtown Seattle. The tunnel route would travel beneath 5th Avenue to Seneca Street, transition to 6th Avenue at University Street, and then turn under Westlake Avenue to John Street. From there, the tunnel route would turn west under Republican Street to Elliott Avenue W. The north tunnel portal would be located near Republican Street and Elliott Avenue W.

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Serves as baseline project against which Level 1 alternatives were defined and screened
- To be potentially refined and evaluated against remaining alternatives in Level 2 Screening

### STATIONS

| | |
|---|---|
| International District/ Chinatown | Tunnel adjacent to existing station under 5th Avenue S for Ballard line |
| Midtown | Tunnel beneath 5th Avenue between Madison and Spring streets |
| Westlake | Tunnel beneath 6th Avenue connecting with existing Westlake Station at Pine Street |
| Denny | Tunnel beneath Westlake Avenue N and John Street |
| South Lake Union | Tunnel beneath Republican Street between Dexter and Aurora avenues |
| Seattle Center | Tunnel beneath Republican Street at 1st Avenue N |

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Initial travel time estimate of between 7 and 8 minutes for route between International District/Chinatown and Smith Cove stations |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes new light rail tunnel through downtown |
| **Connect regional centers** | • Serves three regional growth centers (Seattle Central Business District [CBD], South Lake Union, Uptown)<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Constraints include ROW, major utilities and traffic operations<br>• Requires relocation of a major stretch of 72-inch sewer<br>• South Lake Union Station located under State Route (SR) 99 off-ramp<br>• Tunnel portal near International District/Chinatown Station and mining through tie-backs create constructability issues<br>• Tunnel route approximately 16,000 feet long |
| **Expand mobility for all** | • All stations located in areas of high access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk<br>• Potential impacts to International District/Chinatown neighborhood during construction |
| **Encourage equitable and sustainable urban growth** | • All six stations located in areas with supportive local land use plans<br>• Minimal bus interaction at International District/Chinatown, Midtown, and Westlake stations<br>• Limited South Lake Union Station bus access to SR 99<br>• Steep grades east and west of Midtown and Westlake stations |
| **Promote a healthy built, natural, and social environment** | • No identified potential impacts to protected natural resources<br>• Potential residential displacements, neighborhood impacts, and impacts to historic properties and a historic district from station and tunnel portal<br>• Traffic and freight could be affected by changes in traffic patterns during construction<br>• Approximately 1,650 acres for development opportunities |

## 5TH AVENUE/HARRISON
*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**


### ROUTE DESCRIPTION

This alternative would also operate in a new rail-only tunnel from the International District/ Chinatown to Lower Queen Anne in downtown Seattle. The tunnel route would run north under 5th Avenue to Westlake Avenue. From there, it would head north along Westlake Avenue to John Street and then turn west beneath Harrison Street to Elliott Avenue W. The north tunnel portal would be located near Harrison Street and Elliott Avenue W.

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Connects to renovated arena

### STATIONS

| | |
|---|---|
| International District/ Chinatown | Tunnel adjacent to existing station under 5th Avenue S for Ballard line |
| Midtown | Tunnel beneath 5th Avenue between Madison and Spring streets |
| Westlake | Tunnel beneath 5th Avenue connecting with existing Westlake Station between Pike and Pine streets |
| Denny | Tunnel beneath Westlake Avenue N between Denny Way and John Street |
| South Lake Union | Tunnel beneath Harrison Street between Dexter and Aurora avenues |
| Seattle Center | Tunnel beneath Harrison Street between 1st and Queen Anne avenues |

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes new light rail tunnel beneath downtown<br>• Potential ridership similar to ST3 Representative Project |
| **Connect regional centers** | • Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown)<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Mode, route and general station locations consistent with *ST3 Plan*<br>• Constraints include ROW and traffic operations<br>• Conflicts with 72-inch sewer crossing<br>• Route goes under Key Arena; adds construction complexity with arena expansion/modification<br>• Shorter tunnel route |
| **Expand mobility for all** | • All stations located in areas of high access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk<br>• Potential impacts to International District/Chinatown neighborhood during construction |
| **Encourage equitable and sustainable urban growth** | • All six stations located in areas with supportive local land use plans<br>• All six stations located within Urban Centers and/or Villages<br>• Minimal bus interaction at International District/Chinatown, Midtown, and Westlake stations<br>• Better access to SR 99 buses at South Lake Union Station as compared to ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • No identified potential impacts to protected natural resources<br>• Potential residential displacements, neighborhood impacts, and impacts to historic properties and a historic district from station and tunnel portal<br>• Traffic and freight could be affected by changes in traffic patterns during construction<br>• Approximately 1,650 acres for development opportunities |

# 5TH AVENUE/MERCER
*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**


## ROUTE DESCRIPTION

This alternative would also operate in a new rail-only tunnel from the International District/ Chinatown to Lower Queen Anne in downtown Seattle. The tunnel route would run under 5th Avenue to Westlake Avenue, turn north and continue along Westlake Avenue to John Street. It would then turn west beneath Mercer Street to Elliott Avenue W. The north tunnel portal would be in Kinnear Park near Elliott Avenue W.

## CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Shifts stations farther apart

## STATIONS

**International District/ Chinatown** — Tunnel adjacent to existing station under 5th Avenue S for Ballard line

**Midtown** — Tunnel beneath 5th Avenue between Madison and Spring streets

**Westlake** — Tunnel beneath 5th Avenue connecting with existing Westlake Station between Pike and Pine streets

**Denny** — Tunnel beneath Westlake Avenue N between Denny Way and John Street

**South Lake Union** — Tunnel beneath Mercer Street between Dexter and Aurora avenues

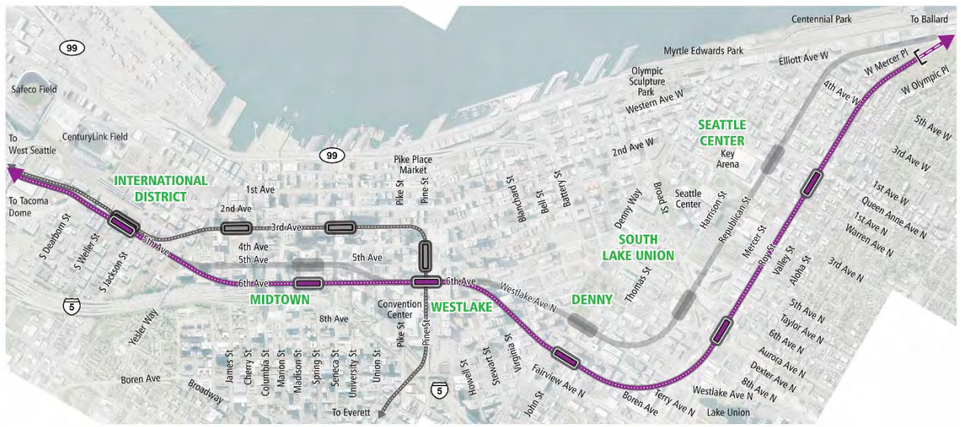
**Seattle Center** — Tunnel beneath Mercer Street between 1st and Queen Anne avenues

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes new light rail tunnel beneath downtown<br>• Potential ridership similar to ST3 Representative Project |
| **Connect regional centers** | • Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown)<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Mercer Street traffic volumes high with connection to I-5<br>• Major utility constraints to sewer line beneath Mercer and crossing sewer lines at South Lake Union Station<br>• Tunnel portal at International District/Chinatown Station challenging and mining through Columbia Tower tiebacks creates constructability issues<br>• New Westlake Station difficult to construct<br>• Longer tunnel; approximately 1,800 feet longer than ST3 Representative Project |
| **Expand mobility for all** | • All stations located in areas of high access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk<br>• Potential impacts to International District/Chinatown neighborhood during construction |
| **Encourage equitable and sustainable urban growth** | • All six stations located within Urban Centers and/or Villages<br>• Minimal bus interaction at International District/Chinatown, Midtown, and Westlake stations<br>• Limited South Lake Union Station bus access to SR 99 |
| **Promote a healthy built, natural, and social environment** | • Potential impact to steep slopes and wildlife habitat in Kinnear Park (Section 4(f) resource)<br>• Potential residential displacements from station and tunnel portals<br>• Traffic and freight could be affected by changes in traffic patterns during construction<br>• Potential for some business displacements |

# 6TH AVENUE/BOREN/ROY

*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**




## ROUTE DESCRIPTION

This alternative would also operate in a new rail-only tunnel from the International District/Chinatown to Lower Queen Anne in downtown Seattle. The tunnel route would run under 5th Avenue and transition to 6th Avenue at Yesler Way. It would then continue north under 6th Avenue to Pine Street. The tunnel route would transition to Boren Avenue to John Street and then turn west and follow Roy Street to Elliott Avenue W. The north tunnel portal would be in Kinnear Park near Elliott Avenue W.

## CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Shifts Denny Station east
- Shifts stations farther apart

## STATIONS

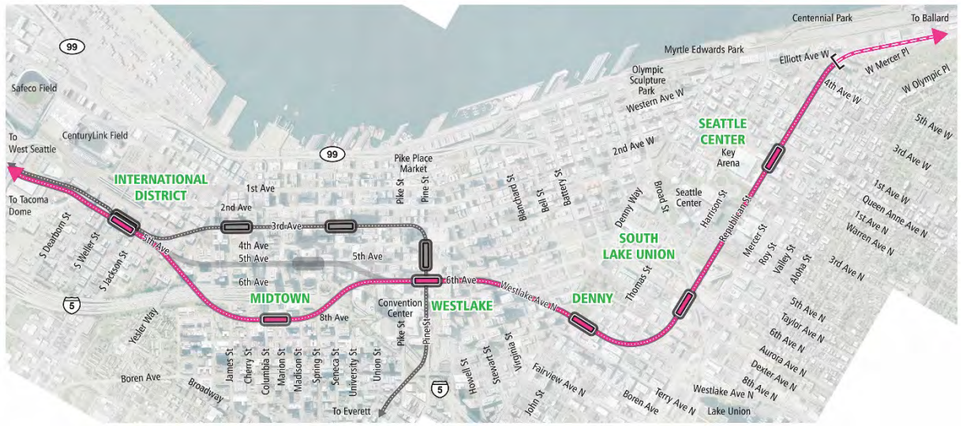
| | |
|---|---|
| International District/ Chinatown | Tunnel adjacent to existing station under 5th Avenue S for Ballard line |
| Midtown | Tunnel beneath 6th Avenue between Madison and Spring streets |
| Westlake | Tunnel beneath 6th Avenue connecting with existing Westlake Station at Pine Street |
| Denny | Tunnel beneath Boren Avenue at John Street |
| South Lake Union | Tunnel beneath Roy Street between Dexter and Aurora avenues |
| Seattle Center | Tunnel beneath Roy Street between 1st and Queen Anne avenues |

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes new light rail tunnel beneath downtown<br>• Decreased overlap in station areas served slightly increases ridership potential |
| **Connect regional centers** | • Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown)<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Potential relocation of 72-inch sewer crossing and requires protection of 84-inch, 48-inch and 176-inch sewers<br>• No need to mine through tie-backs at Columbia Tower but need to construct under WSDOT walls along I-5<br>• Longer tunnel route; an approximate 2,000-linear foot increase in comparison to ST3 Representative Project |
| **Expand mobility for all** | • All stations located in areas of high access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk<br>• Potential impacts to the International District/Chinatown neighborhood during construction |
| **Encourage equitable and sustainable urban growth** | • All six stations located in areas with supportive local land use plans<br>• Five stations located within Urban Centers and/or Villages; one located on border (Seattle Center Station at Roy Street)<br>• Reduced access to buses/streetcar on Westlake, but better access to buses on SR 99 at South Lake Union Station |
| **Promote a healthy built, natural, and social environment** | • Potential impact to steep slopes and wildlife habitat in Kinnear Park (Section 4(f) resource)<br>• Potential residential displacements, neighborhood impacts, and impacts to historic properties and a historic district from Station and tunnel portal<br>• Traffic and freight could be affected by changes in traffic patterns during construction |

# 8TH AVENUE/6TH AVENUE/REPUBLICAN

*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**




## ROUTE DESCRIPTION

This alternative would operate in a new rail-only tunnel from the International District/Chinatown to First Hill to Lower Queen Anne in downtown Seattle. From the International District/Chinatown, the tunnel route would run under 5th Avenue, turn northeast under I-5 past Yesler Way, head north under 8th Avenue in First Hill, and then turn back northwest under I-5 to 6th Avenue. It would then head north under 6th Avenue to Westlake Avenue to John Street and then turn west along Republican Street to Elliott Avenue W. The north tunnel portal would be near Republican Street and Elliott Avenue W.

## CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Shifts Midtown Station to First Hill

## STATIONS

| | |
|---|---|
| International District/ Chinatown | Tunnel adjacent to existing station under 5th Avenue S for Ballard line |
| Midtown | Tunnel beneath 8th Avenue in First Hill between Columbia and Marion streets |
| Westlake | Tunnel beneath 6th Avenue connecting with existing Westlake Station at Pine Street |
| Denny | Tunnel beneath Westlake Avenue N at John Street |
| South Lake Union | Tunnel beneath Republican Street between Dexter and Aurora avenues |
| Seattle Center | Tunnel beneath Republican Street between 1st and Queen Anne avenues |

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes new light rail tunnel beneath downtown<br>• Creates additional passenger loads at International District/Chinatown and Westlake stations, which affects distribution of passengers between two downtown tunnels and spine segmentation<br>• Slight increase in ridership capture area |
| **Connect regional centers** | • Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown)<br>• First Hill Station not identified or analyzed in *ST3 Plan*<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Two under-crossings of I-5 present high-risk and construction considerations<br>• Deep tunnel station; approximately 160 feet deep<br>• Tighter curves reduce design speed but operationally comparable to ST3 Representative Project<br>• Unknown soil conditions under I-5 and east of I-5 |
| **Expand mobility for all** | • All stations located in areas of high access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk<br>• Potential impacts to the International District/Chinatown neighborhood during construction |
| **Encourage equitable and sustainable urban growth** | • Five stations within Urban Centers and/or Villages<br>• Midtown Station located in different Urban Center/Village than designated or analyzed in *ST3 Plan*<br>• First Hill poor connections to north/south bus routes but good connections with Madison bus rapid transit (BRT) |
| **Promote a healthy built, natural, and social environment** | • No identified potential impacts to protected natural resources<br>• Potential residential displacements, neighborhood impacts, and impacts to historic properties and a historic district from station and tunnel portal<br>• Traffic and freight could be affected by changes in traffic patterns during construction |

## 5TH AVENUE/ROY/CONSOLIDATED SLU STATION

*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**


### ROUTE DESCRIPTION

This alternative would operate in a new rail-only tunnel from the International District/Chinatown to Lower Queen Anne in downtown Seattle. The tunnel route would run north under 5th Avenue to Westlake Avenue. From there, it would continue under Westlake Avenue and turn west along Roy Street to Elliott Avenue W. The north tunnel portal would be in Kinnear Park near Elliott Avenue W.

### STATIONS

**International District/ Chinatown**
Tunnel adjacent to existing station under 5th Avenue S for Ballard line

**Midtown**
Tunnel beneath 5th Avenue between Madison and Spring streets

**Westlake**
Tunnel beneath 5th Avenue connecting with existing Westlake Station between Pike and Pine streets

**Denny / South Lake Union**
Tunnel beneath Westlake Avenue N; consolidates Denny and SLU stations

**South Lake Union**
Tunnel beneath Roy Street between 1st and Queen Anne avenues

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Consolidates stations

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project; faster average speed due to one less station |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes new light rail tunnel beneath downtown<br>• Consolidation of two stations into one slightly reduces ridership capture area |
| **Connect regional centers** | • Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown)<br>• Compatibility with future extensions consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Consolidating stations not identified or analyzed in *ST3 Plan*<br>• New Westlake Station on 5th Avenue directly under existing Westlake Station, making it more challenging to construct; however, removing a station results in less construction issues<br>• Potential relocation of 72-inch sewer crossing and requires protection of 84-inch, 48-inch and 176-inch sewers<br>• Operationally comparable to ST3 Representative Project |
| **Expand mobility for all** | • All stations located in areas of high access to opportunity<br>• Route and stations located in areas with similar low-income and minority populations as rest of the city<br>• Stations located in areas of low to moderate displacement risk<br>• Potential impacts to the International District/Chinatown neighborhood during construction |
| **Encourage equitable and sustainable urban growth** | • All five stations located in areas with supportive local land use plans<br>• Four stations within Urban Center and/or Villages; one on border (Seattle Center Station at Roy Street)<br>• Consolidated station not as convenient to buses on Denny, Dexter, or SR 99, but bus service can be rerouted |
| **Promote a healthy built, natural, and social environment** | • Potential impact to steep slopes and wildlife habitat in Kinnear Park (Section 4(f) resource)<br>• Potential residential displacements, neighborhood impacts, and impacts to historic properties and a historic district from station and tunnel portal<br>• Traffic and freight could be affected by changes in traffic patterns during construction |

### 4.3.1 International District/Chinatown Station Evaluation

At the meeting in May 2018, the ELG requested additional study of options for the International District/Chinatown Station. As such, the following Level 1 alternatives were evaluated for the International District/Chinatown Station:

- 5th Avenue Cut-and-Cover Tunnel/Station (ST3 Representative Project)
- 5th Avenue Bored Tunnel/Cut-and-Cover Station (Massachusetts Tunnel Portal)
- 5th Avenue Bored Tunnel/Mined Station (Massachusetts Tunnel Portal, but with mined station)
- 4th Avenue Cut-and-Cover Tunnel/Station
- 4th Avenue Bored Tunnel/Mined Station
- Union Station Bored Tunnel/Mined Station

These alternatives are delineated on **Figure 4-5** (International District/Chinatown Station in Downtown Segment—Level 1 Alternatives), with individual descriptions and evaluation of each alternative in the pages that follow. Refer to **Appendix C** (Downtown Segment and International District/Chinatown Station Level 1 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

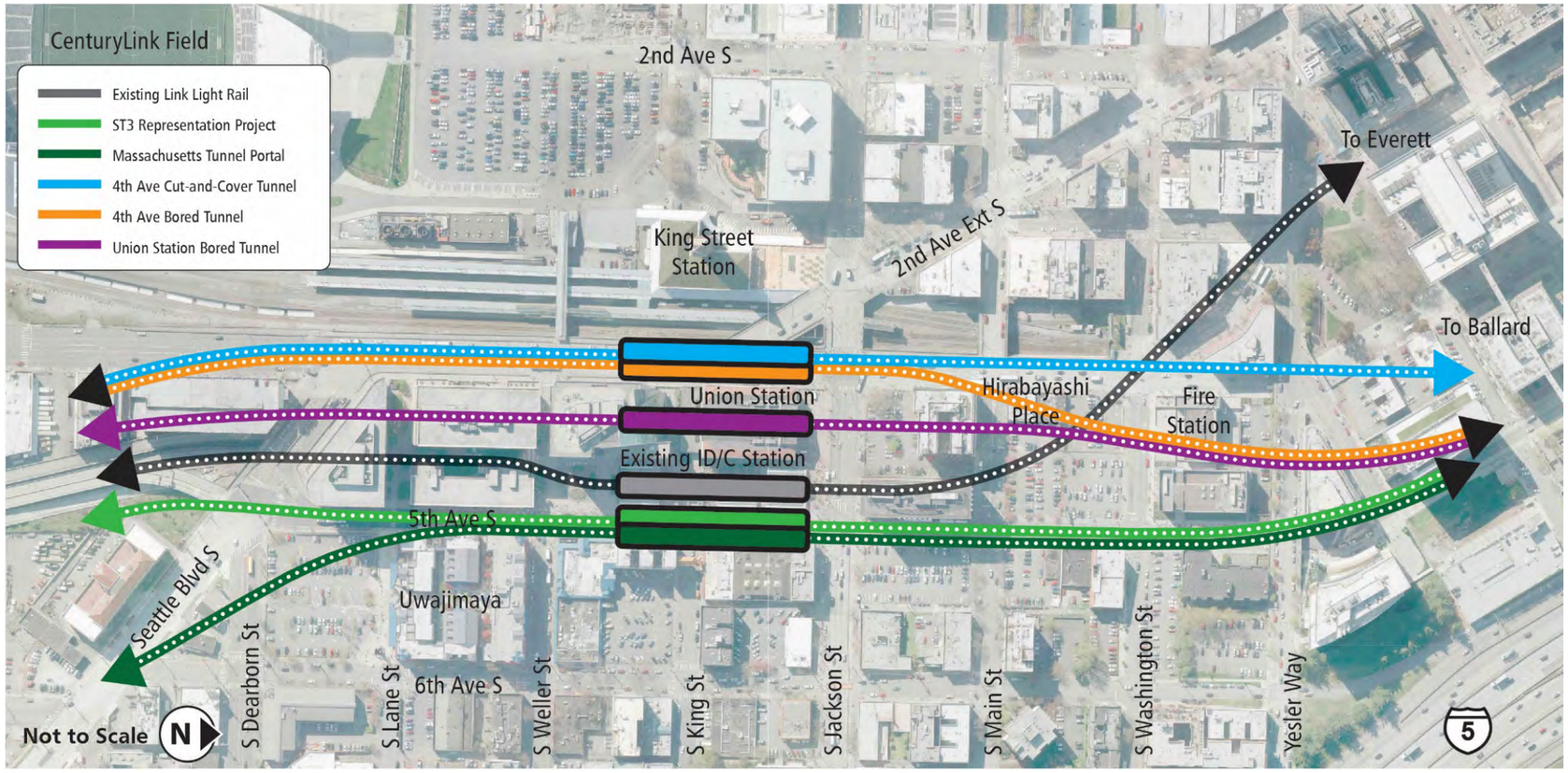



**Figure 4-5 International District Chinatown Station in Downtown Segment—Level 1 Alternatives**

## 5TH AVENUE CUT-AND-COVER TUNNEL/STATION

*ALTERNATIVE (ST3 Representative Project)*

*SEGMENT*
**DOWNTOWN**


**ROUTE DESCRIPTION**

With the ST3 Representative Project, the existing light rail line from Tacoma would transition into a new cut-and-cover tunnel just south of S Royal Brougham Way and travel along the east side of the D-2 ramps carrying the East Link light rail line into a new cut-and-cover station at International District/Chinatown under 5th Avenue S.

**STATION**

| | |
|---|---|
| International District/ Chinatown | New cut-and-cover tunnel station adjacent to existing station under 5th Avenue S for Ballard line |

**CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS**

- Serves as baseline project against which Level 1 alternatives were defined and screened
- To be potentially refined and evaluated against remaining alternatives in Level 2 Screening

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated |
| **Improve Downtown capacity for regional connectivity** | • Facilitates spine segmentation<br>• Includes new light rail tunnel through downtown<br>• Total 2040 population and employment within 0.5-mile buffer of stations approximately 51,300 |
| **Connect regional centers** | • One regional growth center served (Seattle CBD)<br>• Consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Cut-and-cover tunnel and station design in limited street ROW<br>• Cut-and-cover tunnel in street from Seattle Boulevard S to S Main Street; tunnel boring machine (TBM) portal at S Main Street<br>• Design of connections to existing International District/Chinatown Station with existing pile foundations |
| **Expand mobility for all** | • Station located in area of high access to opportunity |
| **Encourage equitable and sustainable urban growth** | • Station located in area with supportive local land use plans and Urban Center<br>• Good rail-to-rail integration with existing International District/Chinatown Station |
| **Promote a healthy built, natural, and social environment** | • Potential impacts to Chinatown/International District neighborhood during construction<br>• Potential impacts to traffic and truck freight during station construction<br>• Potential for some business displacements and business disruption during construction around station area |

## 5TH AVENUE BORED TUNNEL/CUT-AND-COVER STATION

*ALTERNATIVE (Massachusetts Tunnel Portal)*

*SEGMENT*
**DOWNTOWN**


**OUTE DESCRIPTION**

With the Massachusetts Tunnel Portal Alternative, the existing light rail line from Tacoma would transition into a new bored tunnel just north of S Massachusetts Street and travel beneath 6th Avenue S to Seattle Boulevard S where it would transition into a new cut-and-cover tunnel station at International District/Chinatown under 5th Avenue S.

**STATION**

| | |
|---|---|
| International District/ Chinatown | New cut-and-cover tunnel station adjacent to existing station under 5th Avenue S for Ballard line |

**CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS**

- Uses bored tunnel along 6th Avenue S
- Minimizes potential cut-and-cover construction impacts on 5th Avenue S

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Total 2040 population and employment within 0.5-mile buffer of stations similar to ST3 Representative Project at approximately 51,300 |
| **Connect regional centers** | • One regional growth center served (Seattle CBD)<br>• Consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Bored and cut-and-cover tunnel and station design in limited street ROW<br>• Design of connections to existing International District/Chinatown Station with existing pile foundations<br>• Pile supported 5th Avenue S retaining wall may require extending cut-and-cover to S Main Street or advance removal of retaining wall |
| **Expand mobility for all** | • Station located in area of high access to opportunity |
| **Encourage equitable and sustainable urban growth** | • Station located in area with supportive local land use plans and Urban Center<br>• Good rail-to-rail integration with existing International District/Chinatown Station |
| **Promote a healthy built, natural, and social environment** | • Reduced impacts to Chinatown/International District neighborhood during construction due to bored tunnel<br>• Potential impacts to traffic and truck freight during station construction<br>• Potential for some business displacements and business disruption during construction around station area |

## 5TH AVENUE BORED TUNNEL/MINED STATION

*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**


**ROUTE DESCRIPTION**

The same as the Massachusetts Tunnel Portal Alternative, the existing light rail line from Tacoma would transition into a new bored tunnel just north of S Massachusetts Street and travel beneath 6th Avenue S to Seattle Boulevard S where it would transition to 5th Avenue S. It would then continue in a bored tunnel to a new mined tunnel station at International District/ Chinatown under 5th Avenue S.

**STATION**

| | |
|---|---|
| International District/ Chinatown | New mined tunnel station adjacent to existing station under 5th Avenue S for Ballard line |

**CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS**

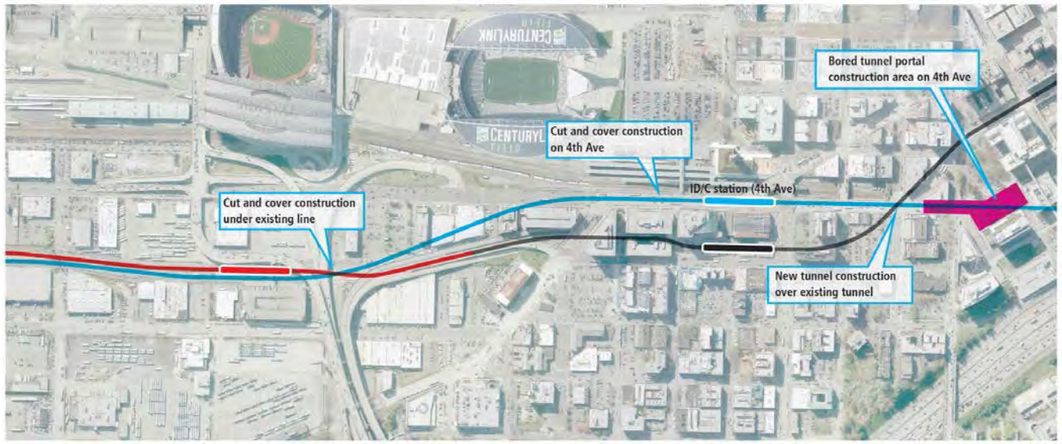
- Uses bored tunnel along 6th Avenue S and transitions to bored tunnel along 5th Avenue S
- Mined tunnel International District/Chinatown Station on 5th Avenue S

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Total 2040 population and employment within 0.5-mile buffer of stations similar to ST3 Representative Project at approximately 51,300 |
| **Connect regional centers** | • One regional growth center served (Seattle CBD)<br>• Consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • More challenging engineering issues for deep bored tunnel and mined station<br>• More challenging to design connections from deep mined station to existing International District/Chinatown Station with existing pile foundations<br>• Higher cost due to deep mined station and long vertical access elements |
| **Expand mobility for all** | • Station located in area of high access to opportunity |
| **Encourage equitable and sustainable urban growth** | • Station located in area with supportive local land use plans and Urban Center<br>• Good rail-to-rail integration with existing International District/Chinatown Station |
| **Promote a healthy built, natural, and social environment** | • Reduced impacts to Chinatown/International District neighborhood during construction due to bored tunnel and mined station<br>• Potential impacts to traffic and truck freight during station construction<br>• Potential for some business displacements and business disruption during construction around station area |

## 4TH AVENUE CUT-AND-COVER TUNNEL/STATION

*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**




### ROUTE DESCRIPTION

With this alternative, the existing light rail line from Tacoma would transition into a new cut-and-cover tunnel at approximately S Royal Brougham Way and travel northwest under the West Seattle line and then head north under 4th Avenue S. A new cut-and-cover tunnel station at International District/Chinatown would be constructed under 4th Avenue S. The tunnel would then continue in a cut-and-cover configuration along 4th Avenue S, crossing back over the existing DSTT, and transition to 5th Avenue near James Street.

### STATION

| | |
|---|---|
| International District/ Chinatown | New cut-and-cover tunnel station west of existing station under 4th Avenue S for Ballard line |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

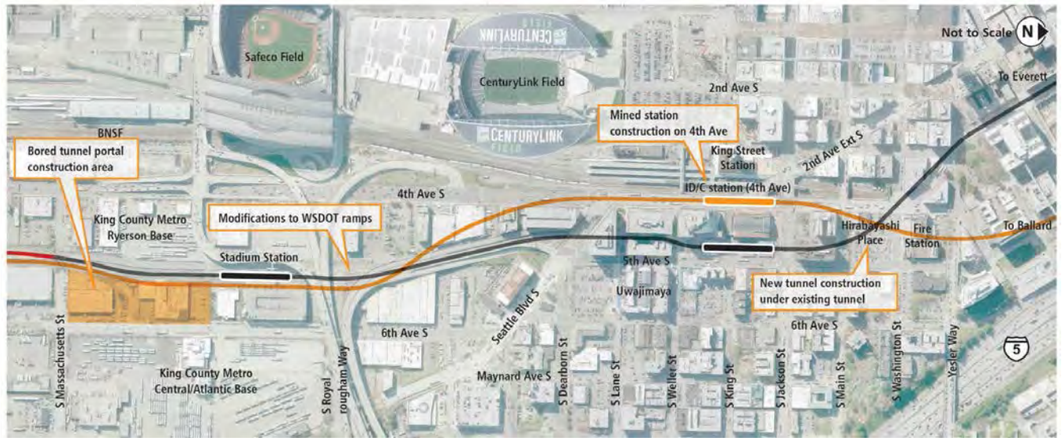
- Uses cut-and-cover tunnel along 4th Avenue S
- Requires reconstruction of existing 4th Avenue S viaduct
- New International District/Chinatown Station would be along 4th Avenue S between Union Station and BNSF tracks

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Total 2040 population and employment within 0.5-mile buffer of stations 4% lower than ST3 Representative Project (approximately 49,000) |
| **Connect regional centers** | • One regional growth center served (Seattle CBD)<br>• Consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • More challenging and higher cost due to 4th Avenue S viaduct rebuild<br>• More challenging due to new tunnel crossing existing light rail guideway twice<br>• Longer in-street cut-and-cover tunnel on heavily traveled arterial<br>• Includes modifications to I-90 ramps<br>• Challenging to design connections from new station to King Street Station and International District/Chinatown Station with existing pile foundations under Union Station |
| **Expand mobility for all** | • Station located in area of high access to opportunity<br>• Potential improvement to rail-to-rail integration with commuter rail, but potentially degraded integration with International District/Chinatown Station |
| **Encourage equitable and sustainable urban growth** | • Station located in area with supportive local land use plans and Urban Center<br>• Good rail-to-rail integration with existing International District/Chinatown Station |
| **Promote a healthy built, natural, and social environment** | • Reduced impacts to Chinatown/International District neighborhood during construction offset by increased traffic due to re-routed 4th Avenue S traffic<br>• Increased truck freight mobility impacts during construction due to re-routed 4th Avenue S<br>• Degraded access to businesses during construction due to re-routed 4th Avenue S |

## 4TH AVENUE BORED TUNNEL/MINED STATION

*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**




### ROUTE DESCRIPTION

With this alternative, the existing light rail line from Tacoma would transition into a new bored tunnel at approximately S Massachusetts Street and travel under S Royal Brougham Way, requiring modification to the existing WSDOT ramps. It would then travel to the northwest under the West Seattle line and then head north under 4th Avenue S. A new mined tunnel station at International District/Chinatown would be constructed under 4th Avenue S. The bored tunnel would then continue along 4th Avenue S, crossing back under the existing DSTT and transition to 5th Avenue near James Street.

### STATION

| | |
|---|---|
| International District/ Chinatown | New mined tunnel station west of existing station under 4th Avenue S for Ballard line |

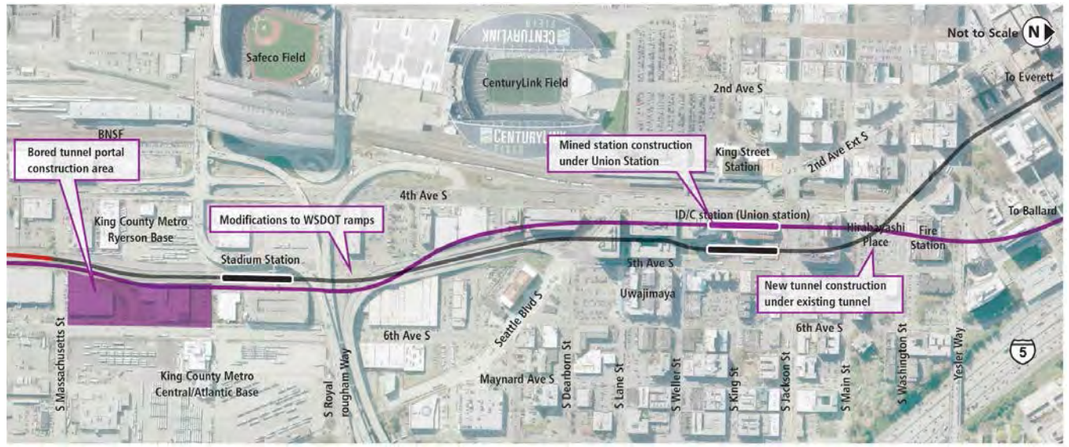
### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Uses bored tunnel along 4th Avenue S
- Requires reconstruction of existing 4th Avenue S viaduct
- New International District/Chinatown Station would be along 4th Avenue S between Union Station and BNSF tracks

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Total 2040 population and employment within 0.5-mile buffer of stations 4% lower than ST3 Representative Project (approximately 49,000) |
| **Connect regional centers** | • One regional growth center served (Seattle CBD)<br>• Consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • More challenging and higher cost due to 4th Avenue S viaduct rebuild and longer bored tunnel<br>• More challenging due to new tunnel crossing existing light rail guideway twice<br>• Includes modifications to I-90 ramps<br>• Challenging to design connections from new station to King Street Station and International District/Chinatown Station with existing pile foundations under Union Station |
| **Expand mobility for all** | • Station located in area of high access to opportunity |
| **Encourage equitable and sustainable urban growth** | • Station located in area with supportive local land use plans and Urban Center<br>• Potential improvement to rail-to-rail integration with commuter rail, but potentially degraded integration with International District/Chinatown Station |
| **Promote a healthy built, natural, and social environment** | • Reduced impacts to Chinatown/International District neighborhood during construction offset by increased traffic due to re-routed 4th Avenue S traffic<br>• Increased truck freight mobility impacts during construction due to re-routed 4th Avenue S<br>• Degraded access to businesses during construction due to re-routed 4th Avenue S |

## UNION STATION BORED TUNNEL/MINED STATION
*ALTERNATIVE*

*SEGMENT*
**DOWNTOWN**




### ROUTE DESCRIPTION

With this alternative, the existing light rail line from Tacoma would transition into a new bored tunnel at approximately S Massachusetts Street and travel under S Royal Brougham Way, requiring modification to the existing WSDOT ramps. It would then travel to the northwest under the West Seattle line and then head north under Union Station. A new mined tunnel station at International District/Chinatown would be constructed under Union Station. The bored tunnel would then cross back under the existing DSTT and transition to 5th Avenue near James Street.

### STATION

| | |
|---|---|
| International District/ Chinatown | New mined tunnel station under existing Union Station for Ballard line |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Uses bored tunnel between 4th Avenue S and 5th Avenue S, under Union Station
- New International District/Chinatown Station would be under Union Station

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Total 2040 population and employment within 0.5-mile buffer of stations 3% lower than ST3 Representative Project (approximately 49,900) |
| **Connect regional centers** | • One regional growth center served (Seattle CBD)<br>• Consistent with Sound Transit's RTLP |
| **Technically feasible and financially sustainable** | • Feasibility issues with design of deep mined station under Union Station and protection of landmark historic structure<br>• More challenging due to new tunnel crossing existing light rail guideway twice<br>• Includes modifications to I-90 ramps<br>• Feasibility issue with design of connections from new station to King Street Station and International District/Chinatown Station with existing pile foundations under Union Station |
| **Expand mobility for all** | • Station located in area of high access to opportunity |
| **Encourage equitable and sustainable urban growth** | • Station located in area with supportive local land use plans and Urban Center<br>• Potential improvement to rail-to-rail integration with commuter rail, but potentially degraded integration with International District/Chinatown Station |
| **Promote a healthy built, natural, and social environment** | • Reduced impacts to Chinatown/International District neighborhood during construction<br>• Reduced impacts to traffic and truck freight during station construction than with the 4th Avenue S alternatives<br>• Potential for some business displacements and business disruption during construction around station area |

### 4.3.2 Downtown Segment Summary Findings

Constructability, construction complexity, and transit capacity are three key themes that emerged from the Level 1 Screening. The construction of any new transit project beneath downtown Seattle presents substantial challenges given the dense development patterns and land use intensities. Different tunnel types, structural elements of existing buildings (particularly high-rise office buildings but also retaining walls and building tie-backs), soil conditions, buried utilities, anticipated transit passenger volumes, and maintaining accessibility to downtown during construction of the Project are difficult challenges for any alternative. These and other challenges will be evaluated further during the Level 2 Screening.

**Table 4-3** (Downtown Segment ELG Screening Recommendations) identifies the alternatives recommended by the ELG to be carried forward for additional design and screened as part of the Level 2 Screening. **Table 4-4** (International District/Chinatown Station ELG Screening Recommendations) lists the ELG's screening recommendations for the International District/Chinatown Station alternatives. Additional evaluation information and results for the Downtown alternatives may be found in **Appendix C** (Downtown Segment and International District/Chinatown Station Level 1 Evaluation Matrices), including the additional International District/Chinatown Station alternatives.

**Table 4-3 Downtown Segment ELG Screening Recommendations**

| Level 1 Alternative | Notes/Comments | Carry Forward into Level 2? |
|---|---|---|
| ST3 Representative Project | • Baseline project | Yes |
| 5th/Harrison | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Decreased station coverage; consider moving Denny Station south | Yes |
| 6th/Boren/Roy | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Increases construction risk due to I-5 walls along 6th Avenue, but avoids tie-backs on 5th Avenue | Yes |
| 5th/Mercer | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Increases construction risk due to large sewer beneath Mercer | No |
| 5th/Roy/Consolidated SLU Station | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Consolidating stations not identified or analyzed in *ST3 Plan* | No |
| 8th/6th/Republican | • Increases construction risk due to two crossings under I-5<br>• First Hill Station not identified or analyzed in *ST3 Plan* | No |
| Use existing DSTT | • Existing DSTT has capacity constraints | No |
| Design for potential extensions to north and/or east | • Extensions to north and/or east not identified or analyzed in *ST3 Plan* | No |
| Track interlining | • Requires grade-separated junctions; does not accommodate buses on E3 busway<br>• Creates bottleneck; impacts service reliability and limits system capacity | No |
| Extended Ballard line | • Rebuild of S Forest Street junction requires disruption of existing LRT service<br>• Deep mined International District/Chinatown Station; constructability challenges<br>• Additional guideway length; no track connections | No |

**Table 4-4 International District/Chinatown Station ELG Screening Recommendations**

| Level 1 Alternative | Notes/Comments | Carry Forward into Level 2? |
|---|---|---|
| 5th Avenue Cut-and-Cover Tunnel/Station (ST3 Representative Project) | • Same as ST3 Representative Project<br>• Baseline for comparison | Yes |
| 5th Avenue Bored Tunnel/Cut-and-Cover Station (Massachusetts Tunnel Portal) | • Same as Massachusetts Tunnel Portal<br>• Reduces extent of cut-and-cover construction impacts | Yes |
| 5th Avenue Bored Tunnel/Mined Station | • Reduces extent of cut-and-cover construction impacts<br>• Deep mined station construction technically challenging (platform 100 to 120 feet deep) | Yes |
| 4th Avenue Cut-and-Cover Tunnel/Station | • 4th Avenue S viaduct rebuild; potential major traffic, freight, and transit mobility impacts<br>• Construction detours could impact neighborhood streets<br>• 4th Avenue S viaduct rebuild; requires funding partnerships<br>• LRT service disruptions during construction over existing tunnel<br>• Constructability challenge of tunneling under I-90 ramps | Yes |
| 4th Avenue Bored Tunnel/Mined Station | • 4th Avenue S viaduct rebuild (at station); potential traffic, freight, and transit mobility impacts<br>• Construction detours could impact neighborhood streets<br>• Deep mined station construction under 4th Ave (platform 150 to 200 feet deep)<br>• Property impacts of TBM portal site in E3 busway | Yes |
| Union Station Bored Tunnel/Mined Station | • Deep piles under Union Station, existing International District/Chinatown Station and adjacent buildings require deep mined station (platform 150 to 200 feet deep)<br>• Deep station precludes easy pedestrian connections to International District/Chinatown and King Street stations<br>• Risk of settlement damage to landmark US building<br>• Lacks construction staging and access shaft sites | No |

## 4.4 Interbay/Ballard Segment Alternatives Evaluation

The Interbay/Ballard Segment contained the following seven alternatives during the Level 1 Screening:

- ST3 Representative Project (Elliott/15th/Movable Bridge)
- Elliott/15th/16th/Fixed Bridge
- West of BNSF/20th/17th/Fixed Bridge
- West of BNSF/20th/17th/Tunnel
- East of BNSF/14th/Movable Bridge
- Elliott/Armory Way/14th/Tunnel
- West of BNSF/20th/Tunnel

These alternatives are delineated on **Figure 4-6** (Interbay/Ballard Segment—Level 1 Alternatives), with individual descriptions and evaluation of each alternative in the pages that follow. Refer to **Appendix D** (Interbay/Ballard Segment Level 1 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

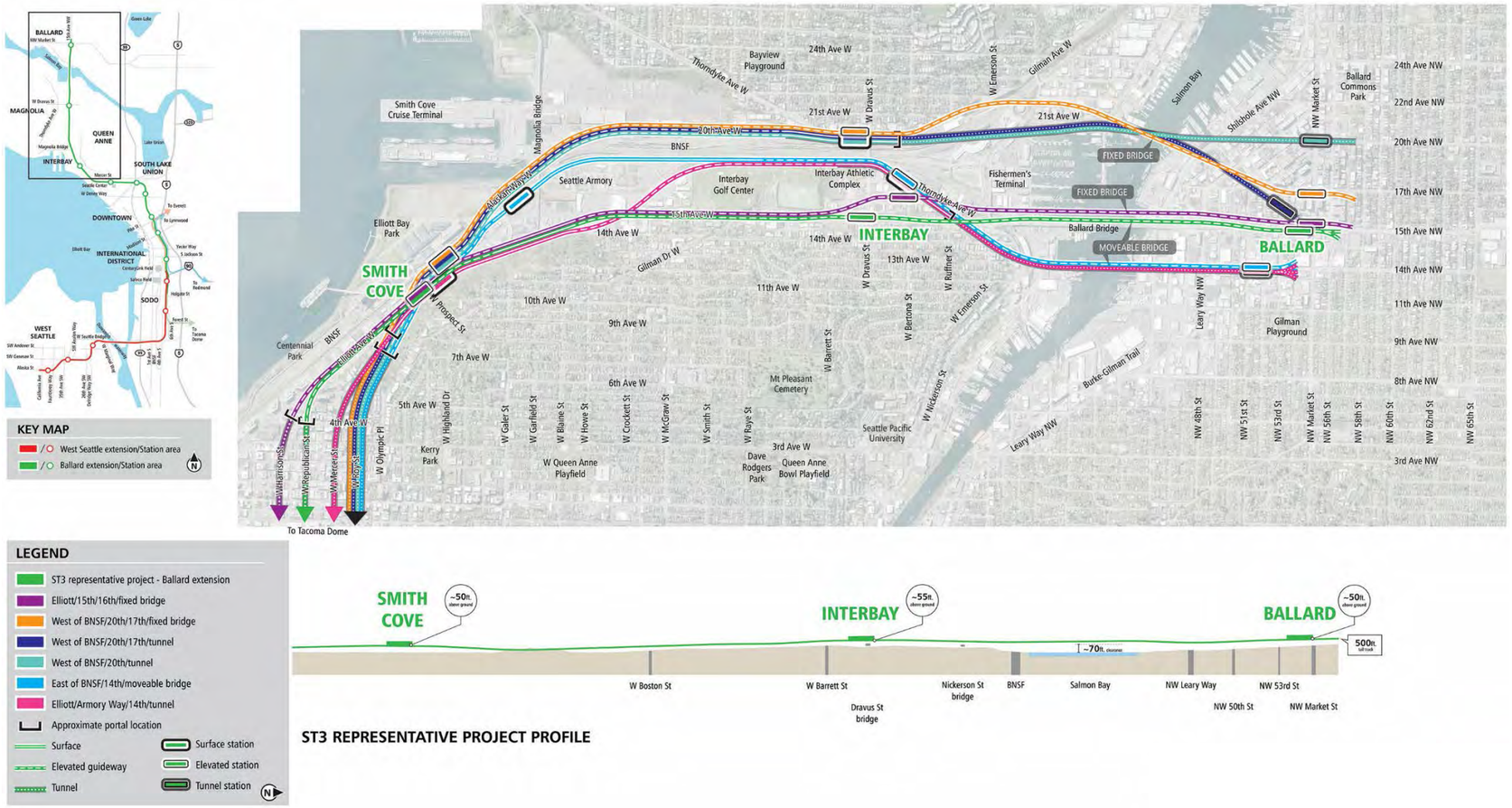



**Figure 4-6 Interbay/Ballard Segment—Level 1 Alternatives**

## ST3 REPRESENTATIVE PROJECT

*ALTERNATIVE*

*SEGMENT*
**INTERBAY/BALLARD**


### ROUTE DESCRIPTION

The ST3 Representative Project would emerge from the downtown tunnel at W Republican Street in an elevated structure. The elevated route would then transition to an at-grade guideway between the Queen Anne hillside and Elliott Avenue W, to 15th Avenue W at W Armory Way. North of W Armory Way, it would transition to an elevated structure, travel down 15th Avenue W and cross over Salmon Bay via a movable bridge west of the existing Ballard Bridge. Once across Salmon Bay, the elevated route would follow 15th Avenue NW and end near 15th Avenue NW and NW Market Street.

### STATIONS

| | |
|---|---|
| **Smith Cove** | Elevated on Elliott Avenue W |
| **Interbay** | Elevated on 15th Avenue W straddling Dravus Street Bridge |
| **Ballard** | Elevated on 15th Avenue NW south of NW Market Street |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Serves as baseline project against which Level 1 alternatives were defined and screened
- To be potentially refined and evaluated against remaining alternatives in Level 2 Screening

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated<br>• Initial travel time estimate of 5 minutes for route between Smith Cove and Ballard stations |
| **Improve Downtown capacity for regional connectivity** | • Facilitates regional connectivity |
| **Connect regional centers** | • Serves Ballard-Interbay MIC<br>• Elevated station on a north-south route at NW Market Street; a connected eastward extension per Sound Transit's RTLP could involve greater surface disruption, while an independent extension could cause more modest disruption |
| **Technically feasible and financially sustainable** | • Engineering constraints such as overhead distribution power poles, column construction in roadway median<br>• Constrained construction of movable bridge would be in close proximity to existing bridge<br>• Movable bridge clearance assumed at approximately 70 feet with majority of vessels passing without bridge opening; however, bridge opening would impact system-wide operations<br>• Deep drilled shaft foundations at south bank of Salmon Bay in liquefiable soils |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Interbay Station located near Census block groups with slightly above average low-income populations (possibly because of proximity to Seattle Pacific University) |
| **Encourage equitable and sustainable urban growth** | • Recent planning efforts at Ballard Station include Urban Design and Transportation Framework and multimodal transportation plan (Move Ballard), both developed in anticipation of light rail<br>• Ballard and Smith Cove stations border Urban Villages/Centers; Interbay Station is not with an Urban Village/Center |
| **Promote a healthy built, natural, and social environment** | • Piers in Salmon Bay would require permits and mitigation for potential impacts to waters of the United States, fish habitat, commercial fishing, subsistence fishing, and tribal treaty fishing<br>• Within 1,000-foot methane buffer for Interbay abandoned landfill (Seattle ECA)<br>• Crosses over Ship Canal Trail<br>• Piers in Salmon Bay could require changes in navigation |

## ELLIOTT/15TH/16TH/FIXED BRIDGE

*ALTERNATIVE*

*SEGMENT*
**INTERBAY/BALLARD**


### ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at W Harrison Street on an elevated structure and transition to an at-grade guideway between the Queen Anne hillside and Elliott Avenue W. North of W Armory Way, the route would continue on an elevated structure down 15th Avenue W to W Barrett Street. From there, it would turn west over W Dravus Street and 16th Avenue W and then span Salmon Bay on a fixed bridge west of the existing Ballard Bridge. North of Salmon Bay, the elevated route would parallel 15th Avenue NW and end near 15th Avenue NW and NW Market Street.

### STATIONS

| | |
|---|---|
| **Smith Cove** | Elevated on Elliott Avenue W |
| **Interbay** | Elevated on 16th Avenue W south of W Bertona Street |
| **Ballard** | Elevated west of 15th Avenue NW straddling NW Market Street |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Shifts farther from existing Ballard Bridge
- Avoids 15th Avenue W

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated with no movable bridge<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Reliability of fixed bridge supports carrying capacity in downtown |
| **Connect regional centers** | • Serves Ballard-Interbay MIC<br>• Mode, route and general station locations consistent with *ST3 Plan* |
| **Technically feasible and financially sustainable** | • Engineering constraints similar to ST3 Representative Project<br>• Location of elevated waterway crossing farther away from existing Ballard Bridge<br>• Less construction complexity of guideway north of Salmon Bay outside of 15th Avenue NW |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Interbay Station located near Census block groups with slightly above average low-income populations (possibly because of proximity to Seattle Pacific University) |
| **Encourage equitable and sustainable urban growth** | • Recent planning efforts at Ballard Station include Urban Design and Transportation Framework and multimodal transportation plan (Move Ballard), both developed in anticipation of light rail<br>• Ballard and Smith Cove stations border Urban Villages/Centers; Interbay Station is not with an Urban Village/Center<br>• Provides potentially better bus/rail integration at Interbay Station but requires route diversion |
| **Promote a healthy built, natural, and social environment** | • Piers in Salmon Bay would require permits and mitigation for potential impacts to waters of the United States, fish habitat, commercial fishing, subsistence fishing, and tribal treaty fishing<br>• Potential for use of Interbay Athletic Complex (Section 4(f) resource)<br>• Crosses over Ship Canal Trail |

## WEST OF BNSF/20TH/17TH/FIXED BRIDGE

*ALTERNATIVE*

*SEGMENT*
**INTERBAY/BALLARD**


### ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel on an elevated guideway at W Roy Street and then span over Elliott Avenue W. It would continue north, crossing over to the west side of the BNSF tracks and above Magnolia Bridge. Paralleling 20th and Gilman avenues W, the elevated route would eventually turn northeast and cross over the BNSF railroad tracks near 22nd Avenue W. South of Salmon Bay, the elevated route would transition to a fixed bridge near NW Dock Place. Once across Salmon Bay, the elevated route would end near 17th Avenue NW and NW Market Street.

### STATIONS

**Smith Cove** — Elevated immediately northeast of BNSF railroad tracks

**Interbay** — Elevated on 20th Avenue W south of W Dravus Street

**Ballard** — Elevated on 17th Avenue NW straddling NW Market Street

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Avoids Elliott Avenue W and 15th Avenue W
- Uses 20th Avenue W

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated with no movable bridge<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Reliability of fixed bridge supports carrying capacity in downtown |
| **Connect regional centers** | • Serves Ballard-Interbay MIC |
| **Technically feasible and financially sustainable** | • Avoids Elliott Avenue W and 15th Avenue W/NW<br>• Constrained width between BNSF railroad and properties along west side of Elliott Avenue W<br>• Long span crossings of BNSF railroad<br>• Elevated structure with deep shafts in liquefiable soils near Magnolia Bridge<br>• Potentially greater property takes |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Interbay Station located farther from Census block groups with slightly above average low-income populations (possibly because of proximity to Seattle Pacific University) |
| **Encourage equitable and sustainable urban growth** | • Ballard Station more centrally located within Ballard Hub Urban Village than ST3 Representative Project<br>• Bus/rail integration at Smith Cove and Ballard stations similar to ST3 Representative Project<br>• Pedestrian and bicycle access opportunities at Interbay Station similar to ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • Piers in Salmon Bay would require permits and mitigation for potential impacts to waters of the United States, fish habitat, commercial fishing, subsistence fishing, and tribal treaty fishing<br>• Crosses over Ship Canal Trail<br>• Majority of route within potential liquefaction area (Seattle ECA)<br>• Avoids West Queen Anne greenbelt habitat and steep slopes |

## WEST OF BNSF/20TH/17TH/TUNNEL

*ALTERNATIVE*

*SEGMENT*
**INTERBAY/BALLARD**


### ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at W Roy Street and then transition to an elevated structure. The elevated route would cross Elliott Avenue W and run west of the BNSF railroad tracks. It would then cross over Magnolia Bridge and continue adjacent to 20th Avenue W. North of W Dravus Street, the route would transition into a tunnel under Salmon Bay. The tunnel route would head east on the north shoreline of the bay and end near 15th Avenue NW and NW Market Street.

### STATIONS

**Smith Cove** — Elevated immediately northeast of BNSF railroad tracks

**Interbay** — Retained cut (trench) on 20th Avenue W south of W Dravus Street

**Ballard** — Tunnel east of 17th Avenue NW south of NW Market Street

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Avoids Elliott Avenue W and 15th Avenue W
- Uses 20th Avenue W
- Crosses Salmon Bay in a tunnel
- Places Ballard Station below ground at 15th/17th avenues NW

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated with no movable bridge<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Reliability of tunnel supports carrying capacity in downtown |
| **Connect regional centers** | • Serves Ballard-Interbay MIC<br>• Station location and northeasterly orientation reduces length of a connected or independent extension |
| **Technically feasible and financially sustainable** | • Tunnel facilitates reliable system operations; requires less special trackwork<br>• Constrained width of ROW between Port of Seattle and BNSF railroad properties north of Magnolia Bridge<br>• Large diameter combined sewer overflow (CSO) in Shilshole Avenue NW<br>• Elevated structure with deep shafts in liquefiable soils near Magnolia Bridge<br>• Tunnel costs not included in ST3 financial plan or evaluation methodology |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Interbay Station located farther from Census block groups with slightly above average low-income populations (possibly because of proximity to Seattle Pacific University) |
| **Encourage equitable and sustainable urban growth** | • Ballard Station more centrally located within Ballard Hub Urban Village than ST3 Representative Project<br>• Bus/rail integration at Smith Cove and Ballard stations similar to ST3 Representative Project; potentially limited bus/rail integration at Interbay Station<br>• Pedestrian/bicycle access opportunities at Interbay Station similar to ST3 Representative Project |
| **Promote a healthy built, natural, and social environment** | • Avoids in water work and associated permits<br>• Majority of route within potential liquefaction area (Seattle ECA)<br>• Avoids crossing over Section 4(f)/6(f) resources<br>• Potential for contamination along most of corridor (historic industrial uses both on land and in water)<br>• Fewer potential business displacements in Ballard |

## EAST OF BNSF/14TH/MOVABLE BRIDGE

*ALTERNATIVE*

*SEGMENT*
**INTERBAY/BALLARD**


### ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at W Roy Street and then cross Elliott Avenue W via an elevated structure. The route would transition to grade, traveling under the W Galer and Magnolia bridges, eventually heading north to the east side of the BNSF railroad tracks. The route would again transition to an elevated structure passing above W Dravus Street. It would continue north, cross over the 15th Avenue W and W Emerson Street intersection and align with 14th Avenue NW to span Salmon Bay via a movable bridge. North of Salmon Bay, the elevated route would continue along 14th Avenue NW, ending south of NW Market Street.

### STATIONS

**Smith Cove** — At-grade immediately northeast of BNSF railroad tracks south of Magnolia Bridge

**Interbay** — Elevated on Thorndyke Avenue W north of W Dravus Street

**Ballard** — Elevated on 14th Avenue NW south of NW Market Street between NW 51st and NW 53rd streets

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

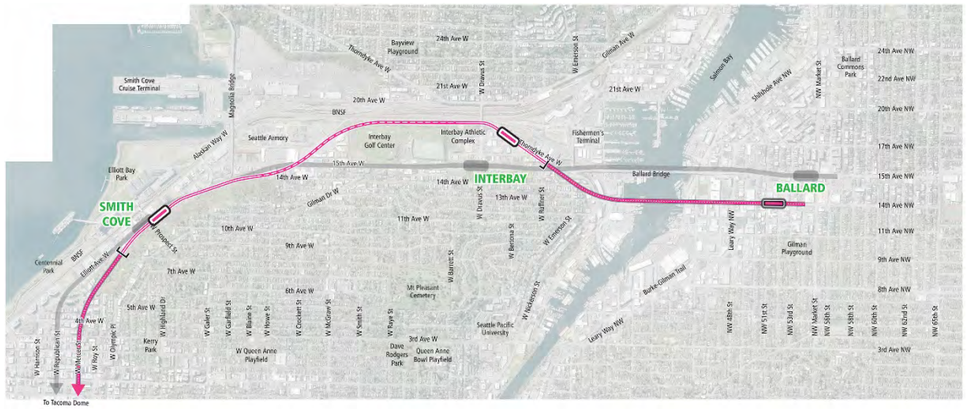
- Avoids Elliott Avenue W and 15th Avenue W
- Uses area east of BNSF railroad tracks
- Avoids Fishermen's Terminal
- Uses 14th Avenue NW, which has wide right-of-way

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated with movable bridge<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Comparable to ST3 Representative Project with movable bridge |
| **Connect regional centers** | • Serves Ballard-Interbay MIC<br>• Ballard Station location results in less surface impact and reduces length of an elevated extension compared to ST3 Representative Project; however, an independent extension could require more surface disruption than ST3 Representative Project to co-locate stations |
| **Technically feasible and financially sustainable** | • Movable bridge would affect system operations; requires special trackwork for movable bridge<br>• Engineering constraints include existing Interbay pump station and large diameter CSO; BNSF railroad and landfill<br>• Ground improvements for liquefiable soils in Interbay<br>• Guideway under Magnolia Bridge could require partial bridge reconstruction |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Interbay Station located farther from Census block groups with slightly above average low-income populations (possibly because of proximity to Seattle Pacific University) |
| **Encourage equitable and sustainable urban growth** | • Stations located outside of designated Urban Centers/Villages<br>• Pedestrian and bicycle access more limited than ST3 Representative Project at Interbay Station<br>• More land zoned Manufacturing/Industrial (over 250 acres more than ST3 Representative Project) |
| **Promote a healthy built, natural, and social environment** | • Piers in Salmon Bay would require permits and mitigation for potential impacts to waters of the United States, fish habitat, commercial fishing, subsistence fishing, and tribal treaty fishing<br>• Crosses over Ship Canal Trail<br>• Crosses over 14th Avenue NW Boat Ramp (Section 4(f)/6(f) resources)<br>• Potential disturbance of old Interbay landfill |

## ELLIOTT/ARMORY WAY/14TH/TUNNEL

*ALTERNATIVE*

*SEGMENT*
**INTERBAY/BALLARD**




### ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at W Mercer Street, paralleling Elliott Avenue W. The route would transition to an elevated structure along the Queen Anne hillside to 15th Avenue W and W Armory Way, crossing over the intersection. It would then run on the east side of the BNSF railroad tracks, pass under W Dravus Street and then curve east between the railroad tracks and 15th Avenue W. The route would then descend into a tunnel beneath Salmon Bay and continue to a terminus near 14th Avenue NW and NW Market Street.

### STATIONS

**Smith Cove** — At-grade east of Elliott Avenue W

**Interbay** — Retained cut (trench) on Thorndyke Avenue W north of W Dravus Street

**Ballard** — Tunnel under 14th Avenue NW south of NW Market Street between NW 51st and NW 53rd streets

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

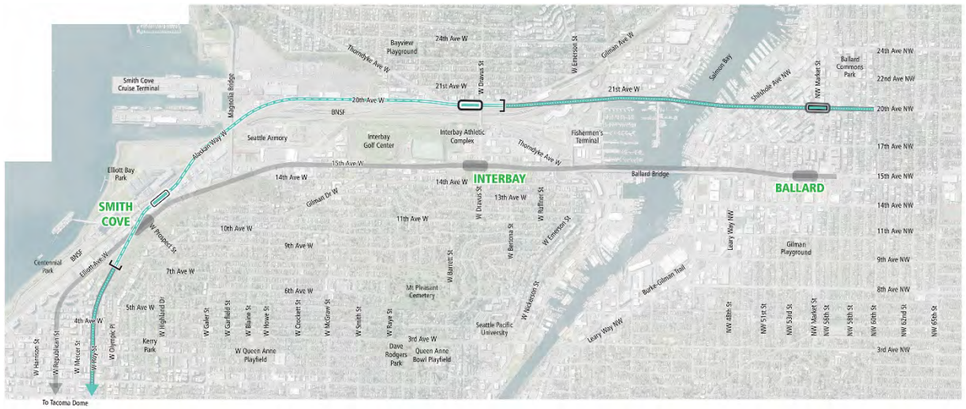
- Avoids Elliott Avenue W and 15th Avenue W
- Uses W Armory Way
- Runs east of existing tracks
- Avoids Fishermen's Terminal
- Crosses Salmon Bay in a tunnel
- Uses 14th Avenue NW, which has wide right-of-way
- Places Ballard Station below ground

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated with no movable bridge<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Reliability of tunnel supports carrying capacity in downtown |
| **Connect regional centers** | • Serves Ballard-Interbay MIC<br>• Ballard Station location reduces length of a connected extension; logistics of an independent extension similar to ST3 Representative Project |
| **Technically feasible and financially sustainable** | • Tunnel facilitates reliable system operations; requires less special trackwork<br>• Route constrained between BNSF railroad tracks and large diameter sewer<br>• Ground improvements for liquefiable soils in Interbay<br>• Tunnel crossing avoids in-water work<br>• Total length of route approximately 1,600 linear feet shorter than ST3 Representative Project<br>• Tunnel costs not included in ST3 financial plan or evaluation methodology |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Interbay Station located farther from Census block groups with slightly above average low-income populations (possibly because of proximity to Seattle Pacific University) |
| **Encourage equitable and sustainable urban growth** | • Stations located outside of designated Urban Centers/Villages<br>• Provides potentially better bus/rail integration at Interbay station but requires route diversion<br>• More land zoned Manufacturing/Industrial (over 100 acres more than ST3 Representative Project) |
| **Promote a healthy built, natural, and social environment** | • Potential disturbance of old Interbay landfill<br>• Avoids crossing over Section 4(f)/6(f) resources<br>• Avoids potential impacts to 15th Avenue W and 15th Avenue NW<br>• Avoids potential impacts to freight vessels<br>• Avoids potential direct impacts on Fishermen's Terminal |

## WEST OF BNSF/20TH/TUNNEL

*ALTERNATIVE*

*SEGMENT*
**INTERBAY/BALLARD**




### ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at W Roy Street and then transition to an elevated structure. It would cross over Elliott Avenue W and run west of the BNSF railroad tracks. The elevated route would cross over Magnolia Bridge and continue adjacent to 20th Avenue W. Immediately north of W Dravus Street, the route would transition into a tunnel under Salmon Bay. North of Salmon Bay, the route would continue in a tunnel beneath 20th Avenue NW, with the tail tracks terminating near NW 60th Street.

### STATIONS

| | |
|---|---|
| **Smith Cove** | Elevated immediately northeast of BNSF railroad tracks |
| **Interbay** | Retained cut (trench) on 20th Avenue W south of W Dravus Street |
| **Ballard** | Tunnel under intersection of 20th Avenue NW and NW Market Street |

### CHANGES TO ST3 REPRESENTATIVE PROJECT BASED ON AGENCY AND PUBLIC COMMENTS

- Avoids Elliott Avenue W and 15th Avenue W
- Uses 20th Avenue W
- Crosses Salmon Bay in a tunnel
- Shifts Ballard Station farther west

| Purpose and Need | Evaluation |
|---|---|
| **Service performance and reliability in project corridor** | • Fully grade separated with no movable bridge<br>• Travel time comparable to ST3 Representative Project |
| **Improve Downtown capacity for regional connectivity** | • Reliability of tunnel supports carrying capacity in downtown |
| **Connect regional centers** | • Serves Ballard-Interbay MIC<br>• Tunnel profile reduces surface impact, but route location could require a longer future extension, potentially adding travel time and complexity |
| **Technically feasible and financially sustainable** | • Tunnel facilitates reliable system operations; requires less special trackwork<br>• Constrained width between BNSF railroad and properties along west side of Elliott Avenue W<br>• Elevated structure with deep shafts in liquefiable soils near Magnolia Bridge<br>• Large diameter CSO in Shilshole Avenue NW and King County Siphon crossing under Salmon Bay<br>• Long span bridge crossing of BNSF railroad<br>• Tunnel costs not included in ST3 financial plan or evaluation methodology |
| **Expand mobility for all** | • All stations located in areas of moderate access to opportunity<br>• Interbay Station located farther from Census block groups with slightly above average low-income populations (possibly because of proximity to Seattle Pacific University) |
| **Encourage equitable and sustainable urban growth** | • Ballard Station more centrally located within Ballard Hub Urban Village than ST3 Representative Project<br>• Pedestrian and bicycle access opportunities at Interbay Station similar to ST3 Representative Project<br>• Potentially limited bus/rail integration at Interbay and Ballard stations |
| **Promote a healthy built, natural, and social environment** | • Avoids West Queen Anne greenbelt habitat and steep slope<br>• Avoids crossing over Section 4(f)/6(f) trails<br>• Avoids potential residential displacements in Ballard<br>• Avoids potential impacts to 15th Avenue W and 15th Avenue NW<br>• Avoids potential changes in navigation in Salmon Bay |

### 4.4.1 Interbay/Ballard Segment Summary Findings

While construction complexity is a unifying theme across each segment, the key themes that emerged from the Level 1 Screening in the Interbay/Ballard Segment also included property acquisition, mobility, and economic effects. Environmental effects, particularly around land uses associated with commercial fishing and the Interbay industrial lands, and tribal treaty fishing in Salmon Bay are also themes for certain alternatives based on their initial locations. As the evaluation of alternatives advances to the Level 2 Screening, additional design work and investigation into these and other themes or specific issues will provide greater detail on the feasibility of each alternative.

**Table 4-5** (Interbay/Ballard Segment ELG Screening Recommendations) identifies the alternatives recommended by the ELG to be carried forward for additional design and screened as part of the Level 2 Screening. Additional evaluation information and results for the Interbay/Ballard alternatives may be found in **Appendix D** (Interbay/Ballard Segment Level 1 Evaluation Matrices).

**Table 4-5 Interbay/Ballard Segment ELG Screening Recommendations**

| Level 1 Alternative | Notes/Comments | Carry Forward into Level 2? |
|---|---|---|
| ST3 Representative Project | • Baseline project | Yes |
| Elliott/15th/16th/Fixed Bridge | • Avoids 15th Avenue W and W Dravus Street interchange<br>• Supports more reliable service; no bridge openings | Yes |
| West of BNSF/ 20th/17th/Fixed Bridge | • Avoids Elliott Avenue W, 15th Avenue W, and Fishermen's Terminal<br>• Supports more reliable service | Yes |
| East of BNSF/ 14th/Movable Bridge | • Avoids Elliott Avenue W, 15th Avenue W, and Fishermen's Terminal<br>• Locates station on 14th Avenue NW within industrial area | Yes |
| West of BNSF/ 20th/17th/Tunnel | • Avoids Elliott Avenue W, 15th Avenue W, Fishermen's Terminal and Salmon Bay<br>• Requires tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships | Yes |
| Elliott/Armory Way/ 14th/Tunnel | • Avoids Elliott Avenue W, 15th Avenue W, Fishermen's Terminal and Salmon Bay<br>• Locates station on 14th Avenue NW within industrial area<br>• Requires tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships | Yes |
| West of BNSF/ 20th/Tunnel | • Avoids Elliott Avenue W, 15th Avenue W, Fishermen's Terminal and Salmon Bay<br>• Requires longer tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships<br>• Requires construction and displacement within Ballard core | No |
| Tunnel through Queen Anne/Interbay | • Depth and length impractical; would affect downtown tunnel depth | No |
| Extensions to 65th, 85th, Northgate | • Extensions not identified or analyzed in *ST3 Plan* | No |
| Multimodal Salmon Bay bridge | • Multimodal bridge not identified or analyzed in *ST3 Plan* | No |
| Eliminate or add stations | • Eliminating, consolidating or adding stations not identified or analyzed in *ST3 Plan* | No |

NOTES:
(1) Bridge alternatives do not preclude pedestrian/bicycle paths.

# 5 SUMMARY OF LEVEL 1 SCREENING RECOMMENDATIONS

In summary, the Level 1 alternatives addressed a variety of different challenges and opportunities, and the evaluation highlighted potential benefits or impacts associated with each alternative. The Level 1 Screening also identified key themes and issues to consider moving forward into Level 2. For the alternatives carried forward into the Level 2 Screening, additional design efforts will be conducted to refine those alternatives that remain, and to provide additional detail on potential benefits or impacts of each alternative.

This technical memorandum presents the Level 1 Screening recommendations that the ELG made on May 17, 2018 and July 19, 2018. The recommendations include the alternatives carried forward into Level 2 for further refinement and evaluation, as well as the Level 1 alternatives not carried forward into Level 2.

## 5.1 Alternatives Carried Forward into Level 2

**Table 5-1** (Summary of Level 1 Alternatives Carried Forward into Level 2) lists the 20 recommended Level 1 alternatives that the ELG recommended be carried forward into the Level 2 Screening process. In all cases, the ST3 Representative Project is carried forward into Level 2, but modifications will be considered to resolve technical challenges and community concerns associated with the ST3 Representative Project. The remaining alternatives in each of the study segments will also be refined to address the comments discussed with the SAG, ELG and other stakeholders, as listed in **Table 5-1**.

**Table 5-1 Summary of Level 1 Alternatives Carried Forward into Level 2**

| Segment / Level 1 Alternative | Notes / Comments |
|---|---|
| **West Seattle/Duwamish Segment** | |
| ST3 Representative Project | • Baseline project (South of West Seattle Bridge) |
| Pigeon Ridge/West Seattle Tunnel | • Lessens effects to Port of Seattle, Alaska Junction, Delridge<br>• Better orientation for future southern extension<br>• Requires two tunnels; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships |
| Oregon Street/Alaska Junction | • Avoids Fauntleroy and Alaska<br>• Better orientation for future southern extension<br>• Affects SW Oregon Street and 44th Avenue SW |
| West Seattle Golf Course/ Alaska Junction (1) | • Crosses West Seattle Golf Course (Section 4(f) resource)<br>• Lessens effect to Alaska Junction and Delridge<br>• Consolidating station not identified or analyzed in *ST3 Plan*<br>• Tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships |
| **SODO Segment** | |
| ST3 Representative Project | • Baseline project (Elevated E-3) |
| Massachusetts Tunnel Portal | • Reduces cut-and-cover construction on 5th Avenue S in International District/ Chinatown<br>• Less service disruption during construction<br>• Eliminates existing grade crossing at Holgate<br>• Requires longer tunnel, with more property acquisitions |
| Surface E-3 | • Less service disruption during construction<br>• Accommodates Stadium Station on both lines<br>• Eliminates existing grade crossings at Lander and Holgate<br>• Closes S Royal Brougham Way between 4th Avenue S and 6th Avenue S |
| Occidental Avenue | • Long-span elevated crossing over BNSF tracks<br>• Traffic and freight access effects on Occidental Avenue S<br>• Property impacts of alignment crossing from Occidental Avenue S to Stadium Station<br>• Long track connection to OMF; no track connections between lines |
| **Downtown Segment** | |
| ST3 Representative Project | • Baseline project (5th/6th/Republican) |
| 5th/Harrison | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Decreased station coverage; consider moving Denny Station south |
| 6th/Boren/Roy | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Increases construction risk due to I-5 walls along 6th Avenue, but avoids tie-backs on 5th Avenue |
| 5th Avenue Bored Tunnel/ Mined Station | • Reduces extent of cut-and-cover construction impacts<br>• Deep mined station construction technically challenging (platform 100 to120 feet deep) |

**Table 5-1 Summary of Level 1 Alternatives Carried Forward into Level 2**

| Segment / Level 1 Alternative | Notes / Comments |
|---|---|
| 4th Avenue Cut-and-Cover Tunnel/Station | • 4th Avenue S viaduct rebuild; potential major traffic, freight, and transit mobility impacts<br>• Construction detours could impact neighborhood streets<br>• 4th Avenue S viaduct rebuild; requires funding partnerships<br>• LRT service disruptions during construction over existing tunnel<br>• Constructability challenge of tunneling under I-90 ramps |
| 4th Avenue Bored Tunnel/ Mined Station | • 4th Avenue S viaduct rebuild (at station); potential traffic, freight and transit mobility impacts<br>• Construction detours could impact neighborhood streets<br>• Deep mined station construction under 4th Avenue S (platform 150 to 200 feet deep)<br>• Property impacts of TBM portal site in E3 busway |
| **Interbay/Ballard Segment** | |
| ST3 Representative Project | • Baseline project (Elliott/15th/Movable Bridge) |
| Elliott/15th/16th/Fixed Bridge | • Avoids 15th Avenue W and W Dravus Street interchange<br>• Supports more reliable service; no bridge openings |
| West of BNSF/20th/17th/ Fixed Bridge | • Avoids Elliott Avenue W, 15th Avenue W, and Fishermen's Terminal<br>• Supports more reliable service; no bridge openings |
| West of BNSF/20th/17th/ Tunnel | • Avoids Elliott Avenue W, 15th Avenue W, Fishermen's Terminal and Salmon Bay<br>• Requires tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships |
| East of BNSF/14th/Movable Bridge | • Avoids Elliott Avenue W, 15th Avenue W, and Fishermen's Terminal<br>• Locates station on 14th Avenue NW within industrial area |
| Elliott/Armory Way/14th/ Tunnel | • Avoids Elliott Avenue W, 15th Avenue W, Fishermen's Terminal and Salmon Bay<br>• Locates station on 14th Avenue NW within industrial area<br>• Requires tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships |

NOTES:
(1) The SAG recommended that this alternative be screened out because of impacts to go through the middle of the golf course (Section 4(f) resource). The ELG recommended instead of screening out the alternative that it be refined to avoid or minimize impacts to the Section 4(f) resource. Therefore, this alternative was carried forward to Level 2 with the ELG's recommended refinements.
(2) Bridge alternatives do not preclude pedestrian/bicycle paths.

## 5.2 Alternatives Not Carried Forward into Level 2

**Table 5-2** (Summary of Level 1 Alternatives Not Carried Forward into Level 2) shows the Level 1 alternatives and other suggestions that the ELG recommended not be carried forward into Level 2. Most of these alternatives did not adequately serve the community and/or were anticipated to have greater potential impacts to the community. As such, they would have limited ability to achieve the preliminary Purpose and Need for the WSBLE Project. In addition, some suggestions were not carried forward for further review in Level 1 because they were not identified or analyzed in the *ST3 Plan* relative to number of stations and/or travel markets served. Some suggestions were also deemed not practical or technically infeasible due to ROW, engineering and/or operational constraints.

**Table 5-2 Summary of Level 1 Alternatives Not Carried Forward into Level 2**

| Segment / Level 1 Alternative or Other Suggestion | Notes / Comments | SAG and ELG Screening Reasoning |
|---|---|---|
| **West Seattle/Duwamish Segment** | | |
| West Seattle Bridge/Fauntleroy | • Lessens effects to Alaska Junction and Delridge<br>• Better orientation for future southern extension<br>• Creates isolated Delridge Station | • Delridge Station location does not provide easy access to neighborhood centers and is lower performing for bicycle and pedestrian connectivity<br>• Potentially greater ROW impacts to Port of Seattle/Northwest Seaport Alliance and other industrial businesses |
| Yancy Street/West Seattle Tunnel | • Lessens effects to Alaska Junction and Delridge<br>• Better orientation for future southern extension<br>• Consolidating stations not identified or analyzed in *ST3 Plan*<br>• Requires tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships | • Potential impacts on industrial businesses and consolidation of the Delridge and Avalon stations not identified or analyzed in the *ST3 Plan*; support for three stations to serve walksheds and transit-oriented development and provide strong bus and rail integration |
| Duwamish Tunnel | • Impractical tunnel depth and length | • Technical feasibility issues |
| West Seattle Bridge | • Existing structure not built to accommodate LRT<br>• Constructability issues | • Technical feasibility issues |
| Gondola and Rail/Bus Bridge (1) | • Mode not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |
| Extensions to Alki, Admiral, etc. | • Extensions not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |
| **SODO Segment** | | |
| 6th Avenue | • OMF connection technically challenging<br>• Property impacts to locate SODO Station adjacent to existing station<br>• Braiding lines could have major construction challenges and service disruptions | • Large amount of property impacts |
| Maintain Buses on E3 | • Not practical due to ROW constraints | • Concerns about ROW constraints and technical feasibility |
| First Avenue Route | • Route and station locations not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |
| Design for Potential Extension South to Georgetown | • Not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |
| Track interlining | • Requires grade-separated junctions; does not accommodate buses on E3 busway<br>• Creates bottleneck; impacts service reliability and limits system capacity | • Creates a potential bottleneck in the system |
| Extended Ballard Line | • Rebuild of S Forest Street junction requires disruption of existing LRT service<br>• Deep mined International District/Chinatown Station; constructability challenges<br>• Additional guideway length; no track connections | • Technical challenges and disruption to existing LRT service |
| **Downtown Segment** | | |
| 5th/Mercer | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Increases construction risk due to large sewer beneath Mercer | • Constructability issues with the International District/Chinatown Station, Columbia Tower tiebacks and utilities beneath Mercer Street<br>• Concerns about potential construction effects to traffic and freight on Mercer Street, a high-volume roadway |

**Table 5-2 Summary of Level 1 Alternatives Not Carried Forward into Level 2**

| Segment / Level 1 Alternative or Other Suggestion | Notes / Comments | SAG and ELG Screening Reasoning |
|---|---|---|
| 8th/6th/Republican | • Increases construction risk due to two crossings under I-5<br>• First Hill Station not identified or analyzed in *ST3 Plan* | • SAG recommended this alternative be carried forward; however, members recognized the potential constructability/engineering issues of crossing under I-5 at two locations, as well as potential inaccessibility for people with disabilities from downtown because of the steep grades west of the Midtown Station location<br>• ELG recommended this alternative not be carried forward because it crosses under I-5 twice, the First Hill Station not identified or analyzed in the *ST3 Plan*, and existing transit investments already serve First Hill (Seattle Streetcar) |
| 5th/Roy/Consolidated SLU Station | • Avoids utility conflicts on Republican and station under SR 99 off-ramp<br>• Consolidating stations not identified or analyzed in *ST3 Plan* | • Did not support consolidating the Denny and South Lake Union stations |
| Union Station Bored Tunnel/Mined Station | • Deep piles under Union Station, existing International District/Chinatown Station and adjacent buildings require deep mined station (platform 150 to 200 feet deep)<br>• Deep station precludes easy pedestrian connections to International District/Chinatown and King Street stations<br>• Risk of settlement damage to landmark US building<br>• Lacks construction staging and access shaft sites | • Technical feasibility issues |
| Use Existing DSTT | • Existing DSTT has capacity constraints | • Technical feasibility issues |
| Design for Potential Extensions to North and/or East | • Extensions to north and/or east not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |
| **Interbay/Ballard Segment** | | |
| West of BNSF/20th/Tunnel | • Avoids Elliott Avenue W, 15th Avenue W, Fishermen's Terminal and Salmon Bay<br>• Requires longer tunnel; tunnel costs not included in ST3 financial plan or evaluation methodology and may require funding partnerships<br>• Requires construction and displacement within Ballard core | • SAG recommended carrying this alternative be carried forward because of community interest in a station farther west in Ballard and an interest in carrying forward multiple tunnel options<br>• ELG recommended this alternative not be carried forward due to anticipated constructability issues and higher costs associated with the longer tunnel |
| Tunnel through Queen Anne/ Interbay | • Depth and length impractical; would affect downtown tunnel depth | • Technical feasibility and anticipated higher costs associated with additional tunnel sections |
| Extensions to 65th, 85th, Northgate | • Extensions not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |
| Multimodal Salmon Bay Bridge | • Multimodal bridge not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |
| Eliminate or Add Stations | • Eliminating, consolidating or adding stations not identified or analyzed in *ST3 Plan* | • Not identified or analyzed in the *ST3 Plan* |

NOTES:
(1) Bridge alternatives do not preclude pedestrian/bicycle paths.

# 6 NEXT STEPS

The Level 2 Screening step will develop and evaluate in greater detail the 20 alternatives carried forward from the Level 1 Screening, as shown on **Figure 6-1** (Next Steps in Alternatives Development Phase). However, the Level 2 evaluation will employ a larger set of criteria and more use of quantitative measures, but still combine qualitative and quantitative assessments. Similar to Level 1, the Level 2 Screening will be conducted at the segment level.

The Level 2 alternatives will be subjected to design refinement, responding to stakeholder and community comments on the alternatives. More detailed technical analyses will include capital and operating cost implications, station area development potential, and effects on the built, natural, and social environments.

For the final Level 3 Screening, a more refined definition of alternatives and evaluation process will be used, with additional engineering, forecasting, environmental, and other information. At this stage, the segment-level alternatives will be pieced together from end-to-end, providing corridorwide alternatives from West Seattle to Ballard. Eventually, a Preferred Alternative will be identified by the Sound Transit Board for advancement into the environmental review phase, along with other alternatives to evaluate in an EIS.

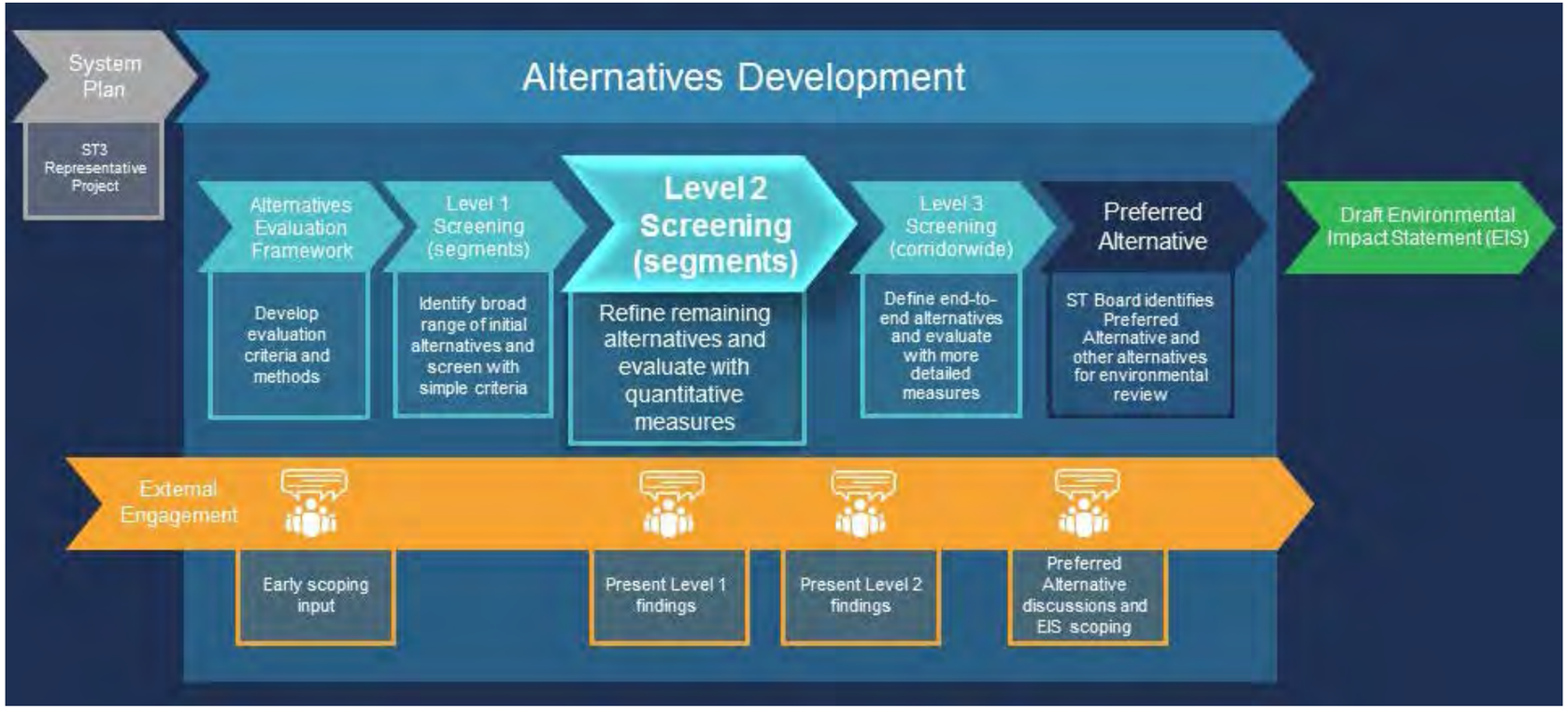



**Figure 6-1 Next Steps in Alternatives Development Phase**

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