

# APPENDIX M

## **Summary of Alternatives Development and Initial Assessment Process**

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# 1 INTRODUCTION

Sound Transit evaluated alternatives based on the alternative's ability to satisfy the West Seattle and Ballard Link Extensions (WSBLE) Project's preliminary purpose and need and how well it performs relative to other alternatives. Evaluation criteria, measures, and methods were used to assess the performance of the alternatives considered in a three-level screening process (Levels 1, 2, and 3). After each screening analysis was complete, the results were presented to the Stakeholder Advisory Group for discussion and recommendations to the Elected Leadership Group of what alternatives to carry forward to the next level of screening. The Stakeholder Advisory Group includes transit riders, residents, businesses, major institutional organizations, key stakeholders, and members of the public. The Elected Leadership Group includes elected officials who represent the project corridor and/or Sound Transit Board of Directors. The Elected Leadership Group then made recommendations on which alternatives to study in the next screening level.

Following the public scoping period for the Draft Environmental Impact Statement, the Sound Transit Board of Directors (the Board) reviewed the comments received and the results of the three-level alternatives development process. In May 2019, the Board approved Motion M2019-51 (Sound Transit Board of Directors 2019a), which identified preferred alternatives, preferred alternatives with third-party funding, and other alternatives to study in the Draft Environmental Impact Statement. The Board also directed Sound Transit project staff to conduct an initial assessment of additional alternatives suggested during the scoping period to establish whether further detailed study in the Draft Environmental Impact Statement was appropriate.

Following completion of the initial assessment, the Board reviewed the assessment findings and public input and in October 2019 approved Motion M2019-104 (Sound Transit Board of Directors 2019b), which identified additional alternatives to study in the Draft Environmental Impact Statement.

A summary of the alternatives considered in each screening level and the initial assessment and the outcome of each is provided in the following sections. A summary of the alternatives suggested during public scoping and not carried forward into the Draft Environmental Impact Statement is also provided.

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## 2 LEVEL 1 ALTERNATIVES SCREENING

Due to the unique characteristics of the project corridor, the corridor was subdivided into four geographically based study segments for evaluation purposes in the Level 1 and Level 2 screenings. The Level 1 screening evaluated 28 alternatives in the four study segments as described below and shown on Figures 2-1 through 2-5. The figures are excerpted from the *Scoping Information Report* (Sound Transit 2019a). The alternatives are as follows:

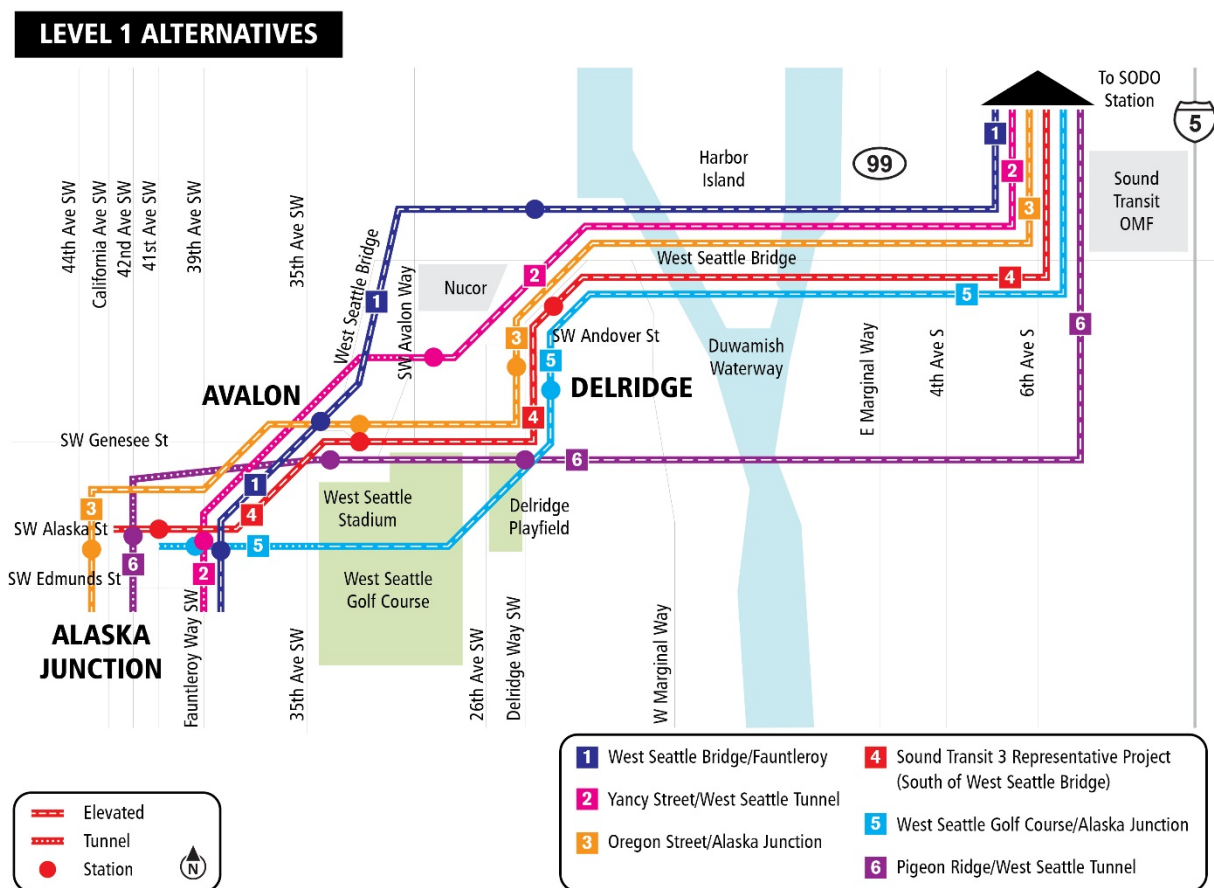
- West Seattle/Duwamish Segment Alternatives:
  - Sound Transit 3 Representative Project (South of West Seattle Bridge).
  - Pigeon Ridge/West Seattle Tunnel.
  - West Seattle Bridge/Fauntleroy.
  - Yancy Street/West Seattle Tunnel.
  - Oregon Street/Alaska Junction.
  - West Seattle Golf Course/Alaska Junction.
- SODO Segment Alternatives:
  - Sound Transit 3 Representative Project (Elevated E-3).<sup>1</sup>
  - Massachusetts Tunnel Portal.
  - Surface E-3.
  - Occidental Avenue.
  - 6th Avenue.
- Downtown Segment (includes International District/Chinatown Station Alternatives):
  - Sound Transit 3 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 Station.
  - 5th Avenue Cut-and-Cover Tunnel/Station (Sound Transit 3 Representative Project at International District/Chinatown Station).
  - 5th Avenue Bored Tunnel/Mined Station (Massachusetts Tunnel Portal, but with mined station at International District/Chinatown Station).
  - 4th Avenue Cut-and-Cover Tunnel/Station at International District/Chinatown Station.
  - 4th Avenue Bored Tunnel/Mined Station at International District/Chinatown Station.
  - Union Station Bored Tunnel/Mined Station at International District/Chinatown Station.

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<sup>1</sup> “E-3” refers to the SODO Busway, which runs north-south in SODO parallel to the existing Link light rail line.

- Interbay/Ballard Segment Alternatives:
  - Sound Transit 3 Representative Project (Elliott/15th/Moveable Bridge).
  - Elliott/15th/16th/Fixed Bridge.
  - West of BNSF/20th/17th/Fixed Bridge.
  - West of BNSF/20th/17th/Tunnel.
  - East of BNSF/14th/Moveable Bridge.
  - Elliott/Armory Way/14th/Tunnel.
  - West of BNSF/20th/Tunnel.

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



**Figure 2-2. Level 1 SODO Segment Alternatives**

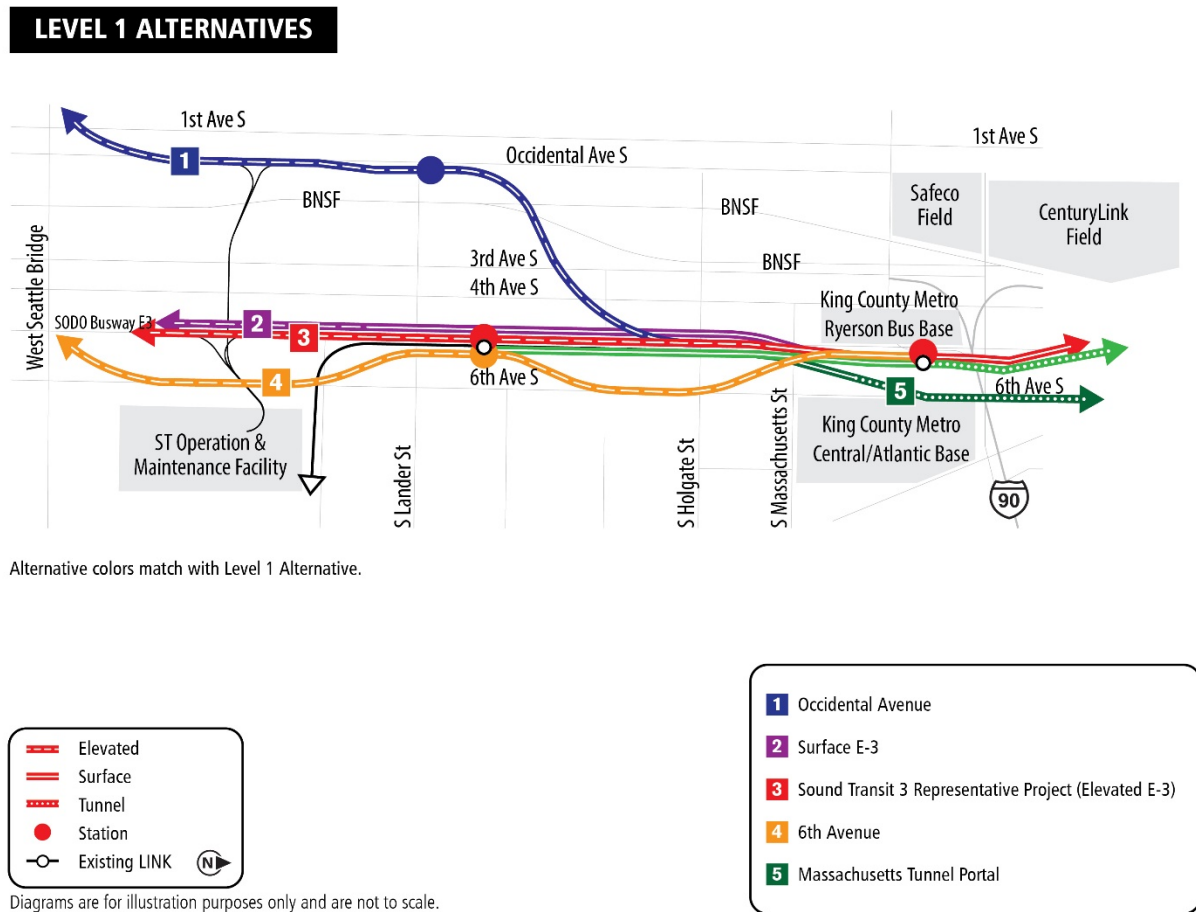


Figure 2-3. Level 1 International District/Chinatown Station Alternatives

LEVEL 1 ALTERNATIVES

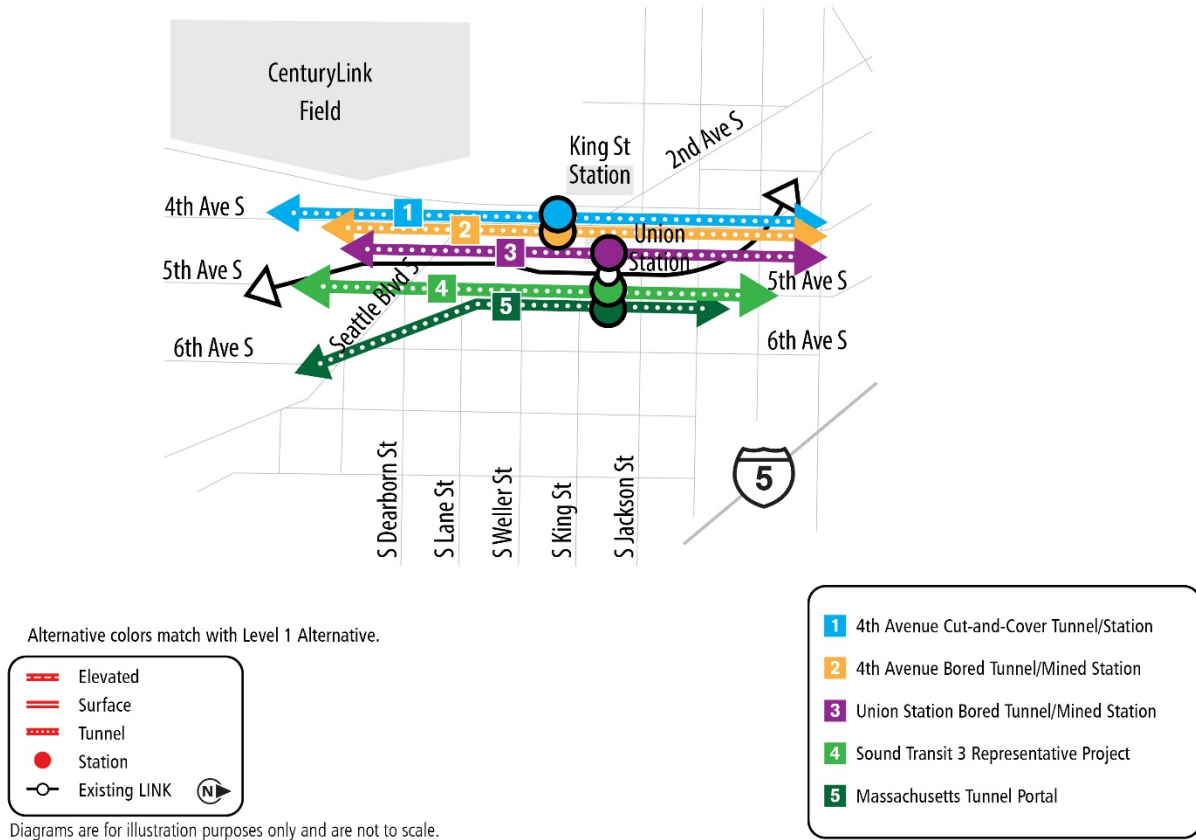
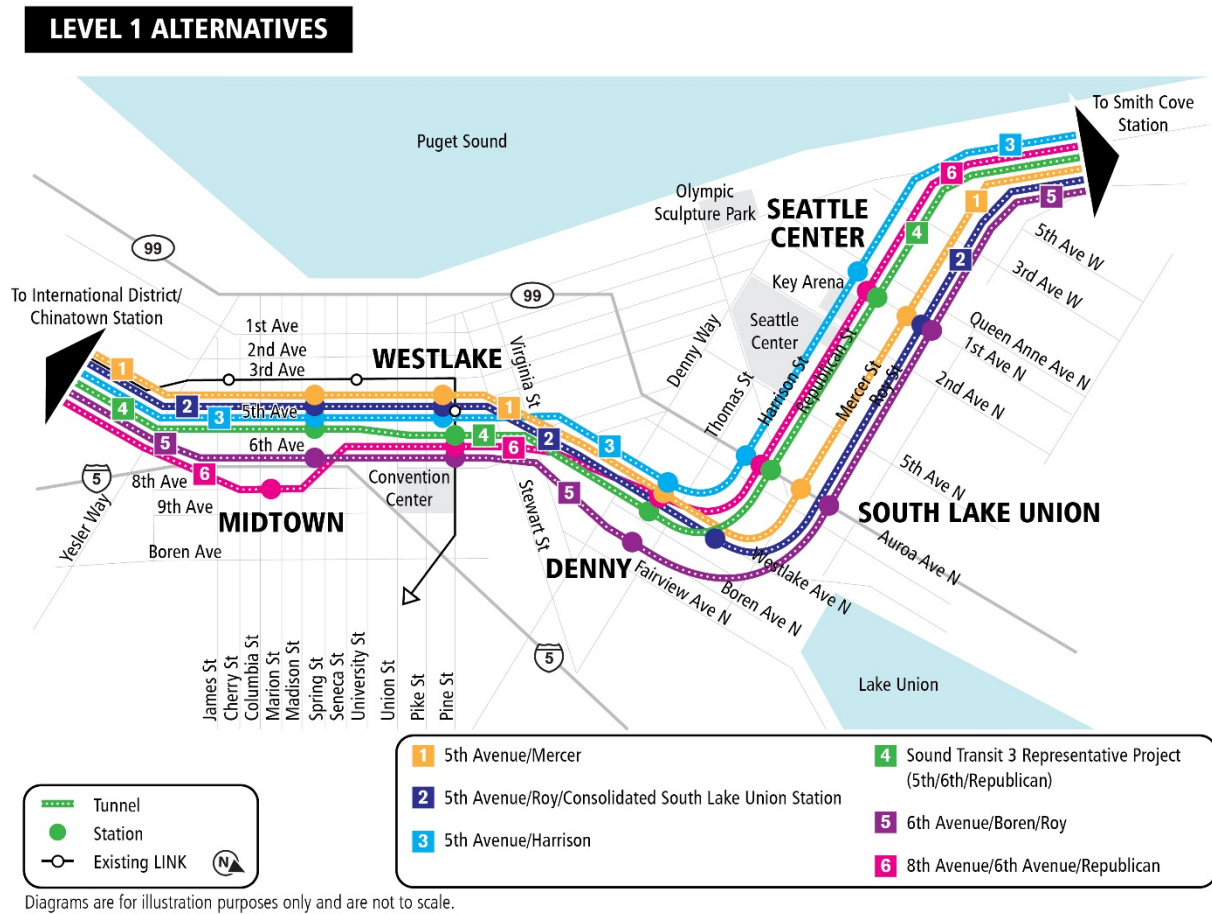
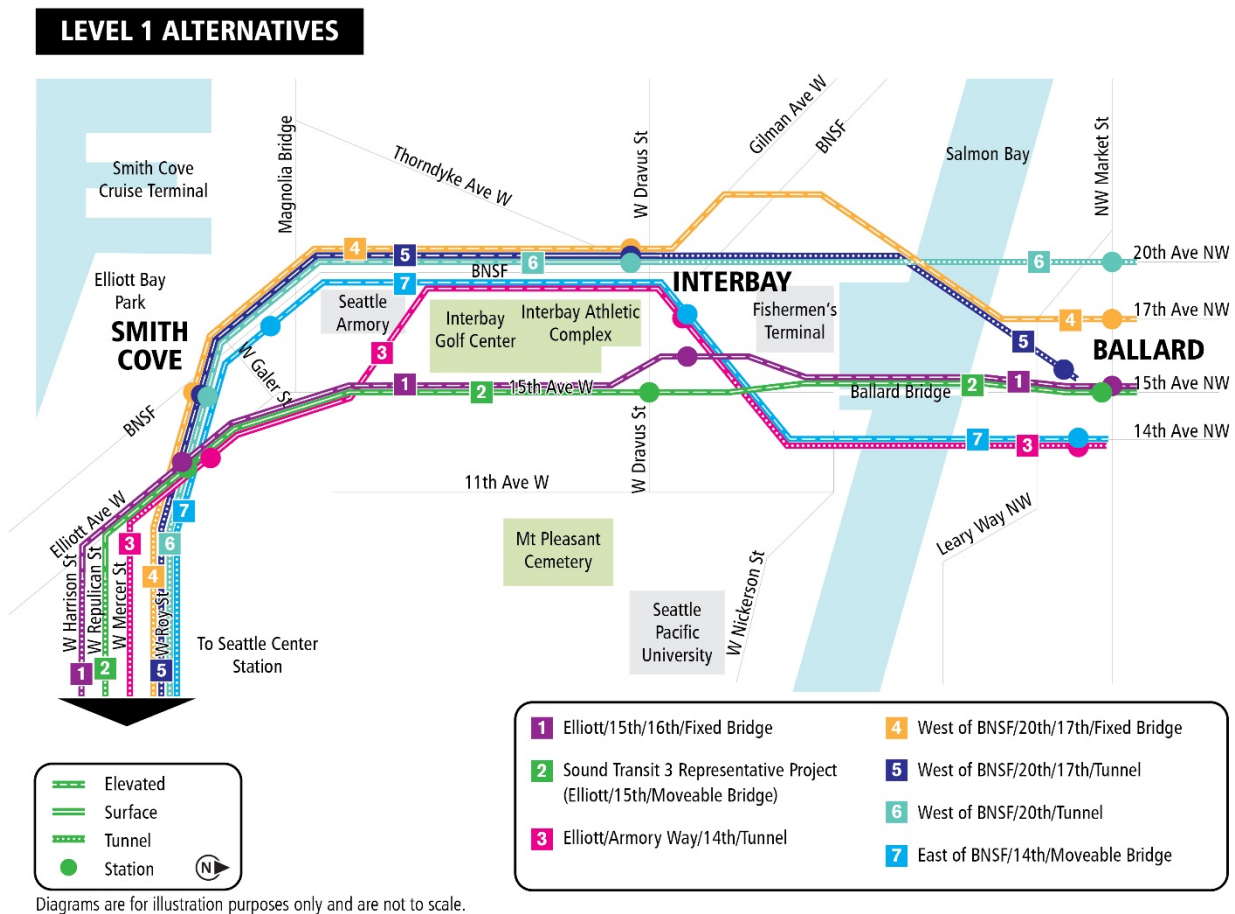


Figure 2-4. Level 1 Downtown Segment Alternatives



**Figure 2-5. Level 1 Interbay/Ballard Segment Alternatives**



After considering the evaluation and recommendations from the Stakeholder Advisory Group, on May 17, 2018, the Elected Leadership Group recommended carrying 16 of the Level 1 alternatives forward into Level 2. Subsequently, on July 17, 2018, the Elected Leadership Group recommended advancing four additional alternatives into Level 2 in SODO and Chinatown-International District. Table 2-1 lists the 20 Level 1 alternatives that the Elected Leadership Group recommended be carried forward into the Level 2 Screening process. Table 2-2 lists the Level 1 alternatives that the Elected Leadership Group recommended not be carried forward into Level 2. The information in these tables is from the *Level 1 Alternatives Development and Screening* report (Sound Transit 2018a). 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 a limited ability to achieve the preliminary purpose and need for the WSBLP Project. In addition, some suggestions were not carried forward for further review because they were not identified or analyzed in the Sound Transit 3 Plan (Sound Transit 2016). Some suggestions were also identified as impractical or technically infeasible due to right-of-way, engineering, and/or operational constraints (Sound Transit 2018a).

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

Segment	Level 1 Alternative	Notes/Comments
West Seattle/ Duwamish Segment	Sound Transit 3 Representative Project	Baseline project (South of West Seattle Bridge).
West Seattle/ Duwamish Segment	Pigeon Ridge/West Seattle Tunnel	Lessens effects to Port of Seattle, Alaska Junction, Delridge. Better orientation for future southern extension. Requires two tunnels; tunnel costs not included in the Sound Transit 3 financial plan or evaluation methodology and may require funding partnerships.
West Seattle/ Duwamish Segment	Oregon Street/Alaska Junction	Avoids Fauntleroy and Alaska. Better orientation for future southern extension. Affects Southwest Oregon Street and 44th Avenue Southwest.
West Seattle/ Duwamish Segment	West Seattle Golf Course/ Alaska Junction <sup>a</sup>	Crosses West Seattle Golf Course (Section 4(f) resource). Lessens effect to Alaska Junction and Delridge. Consolidating station not identified or analyzed in the Sound Transit 3 Plan. Tunnel costs not included in the Sound Transit 3 financial plan or evaluation methodology and may require funding partnerships.
SODO Segment	Sound Transit 3 Representative Project	Baseline project (Elevated E-3).
SODO Segment	Massachusetts Tunnel Portal	Reduces cut-and-cover tunnel construction on 5th Avenue South in Chinatown-International District. Less service disruption during construction. Eliminates existing grade crossing at Holgate. Requires longer tunnel, with more property acquisitions.
SODO Segment	Surface E-3	Less service disruption during construction. Accommodates Stadium Station on both lines. Eliminates existing grade crossings at Lander and Holgate. Closes South Royal Brougham Way between 4th Avenue South and 6th Avenue South.
SODO Segment	Occidental Avenue	Long-span elevated crossing over BNSF tracks. Traffic and freight access effects on Occidental Avenue South. Property impacts of alignment crossing from Occidental Avenue South to Stadium Station. Long track connection to operations and maintenance facility; no track connections between lines.
Downtown Segment	Sound Transit 3 Representative Project	Baseline project (5th/6th/Republican).
Downtown Segment	5th Avenue/Harrison	Avoids utility conflicts on Republican and station under State Route 99 off-ramp. Decreased station coverage; consider moving Denny Station south.

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Segment	Level 1 Alternative	Notes/Comments
Downtown Segment	6th Avenue/Boren/Roy	Avoids utility conflicts on Republican and station under State Route 99 off-ramp. Increases construction risk due to Interstate 5 walls along 6th Avenue but avoids tie-backs on 5th Avenue.
Downtown Segment	5th Avenue Bored Tunnel/ Mined Station <sup>b</sup>	Reduces extent of cut-and-cover construction impacts. Deep mined station construction technically challenging (platform 100 to 120 feet deep).
Downtown Segment	4th Avenue Cut-and-Cover Tunnel/Station <sup>b</sup>	4th Avenue South viaduct rebuild; potential major traffic, freight, and transit mobility impacts. Construction detours could impact neighborhood streets. 4th Avenue South viaduct rebuild; requires funding partnerships. Light rail service disruptions during construction over existing tunnel. Constructability challenge of tunneling under I-90 ramps.
Downtown Segment	4th Avenue Bored Tunnel/ Mined Station <sup>b</sup>	4th Avenue South viaduct rebuild (at station); potential traffic, freight, and transit mobility impacts. Construction detours could impact neighborhood streets. Deep mined station construction under 4th Avenue South (platform 150 to 200 feet deep). Property impacts of tunnel boring machine portal site in E-3 Busway.
Interbay/Ballard Segment	Sound Transit 3 Representative Project	Baseline project (Elliott/15th/Moveable Bridge).
Interbay/Ballard Segment	Elliott/15th/16th/Fixed Bridge	Avoids 15th Avenue West and West Dravus Street interchange. Supports more reliable service; no bridge openings.
Interbay/Ballard Segment	West of BNSF/20th/17th/Fixed Bridge	Avoids Elliott Avenue West, 15th Avenue West, and Fishermen's Terminal. Supports more reliable service; no bridge openings.
Interbay/Ballard Segment	West of BNSF/20th/17th/ Tunnel	Avoids Elliott Avenue West, 15th Avenue West, Fishermen's Terminal, and Salmon Bay. Requires tunnel; tunnel costs not included in the Sound Transit 3 financial plan or evaluation methodology and may require funding partnerships.
Interbay/Ballard Segment	East of BNSF/14th/Moveable Bridge	Avoids Elliott Avenue West, 15th Avenue West, and Fishermen's Terminal. Locates station on 14th Avenue Northwest within industrial area.
Interbay/Ballard Segment	Elliott/Armory Way/14th/Tunnel	Avoids Elliott Avenue West, 15th Avenue West, Fishermen's Terminal, and Salmon Bay. Locates station on 14th Avenue Northwest within industrial area. Requires tunnel; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and may require funding partnerships.

Note: Bridge alternatives do not preclude pedestrian/bicycle paths.

<sup>a</sup> The Stakeholder Advisory Group recommended that this alternative be screened out because of impacts through the middle of the golf course, a Section 4(f) resource. The Elected Leadership Group recommended that instead of screening out the alternative, it should be refined to avoid or minimize impacts to the Section 4(f) resource. Therefore, this alternative was carried forward to Level 2 with the Elected Leadership Group's recommended refinements.

<sup>b</sup> The Level 1 Alternatives at International District/Chinatown Station were part of the Downtown Segment in Level 1. In Level 2 they were studied in combination with the SODO Segment rather than the Downtown Segment.

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

Segment	Level 1 Alternative or Other Suggestion	Notes/Comments	Stakeholder Advisory Group and Elected Leadership Group Screening Reasoning
West Seattle/Duwamish Segment	West Seattle Bridge/Fauntleroy	Lessens effects to Alaska Junction and Delridge. Better orientation for future southern extension. Creates isolated Delridge Station.	Delridge Station location does not provide easy access to neighborhood centers and is lower performing for bicycle and pedestrian connectivity. Potentially greater right-of-way impacts to Port of Seattle/Northwest Seaport Alliance and other industrial businesses.
West Seattle/Duwamish Segment	Yancy Street/West Seattle Tunnel	Lessens effects to Alaska Junction and Delridge Way. Better orientation for future southern extension. Consolidating stations not identified or analyzed in Sound Transit 3 Plan. Requires tunnel; tunnel costs not included in Sound Transit 3 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 Sound Transit 3 Plan; support for three stations to serve walksheds and transit-oriented development and provide strong bus and rail integration.
West Seattle/Duwamish Segment	Duwamish Tunnel	Impractical tunnel depth and length.	Technical feasibility issues.
West Seattle/Duwamish Segment	West Seattle Bridge	Existing structure not built to accommodate light rail. Constructability issues.	Technical feasibility issues.
West Seattle/Duwamish Segment	Gondola and Rail/Bus Bridge <sup>a</sup>	Mode not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.
West Seattle/Duwamish Segment	Extensions to Alki, Admiral, etc.	Extensions not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.
SODO Segment	6th Avenue	Operations and maintenance facility connection technically challenging. Property impacts to locate SODO Station adjacent to existing station. Braiding lines could have major construction challenges and service disruptions.	Large amount of property impacts.
SODO Segment	Maintain Buses on E-3	Not practical due to right-of-way constraints.	Concerns about right-of-way constraints and technical feasibility.
SODO Segment	First Avenue Route	Route and station locations not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.

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Segment	Level 1 Alternative or Other Suggestion	Notes/Comments	Stakeholder Advisory Group and Elected Leadership Group Screening Reasoning
SODO Segment	Design for Potential Extension South to Georgetown	Not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.
SODO Segment	Track interlining	Requires grade-separated junctions; does not accommodate buses on E-3 Busway. Creates bottleneck, impacts service reliability, and limits system capacity.	Creates a potential bottleneck in the system.
SODO Segment	Extended Ballard Line	Rebuild of South Forest Street junction requires disruption of existing light rail service. Deep mined International District/Chinatown Station; constructability challenges. Additional guideway length; no track connections.	Technical challenges and disruption to existing light rail service.
Downtown Segment	5th Avenue/Mercer	Avoids utility conflicts on Republican Street and station under State Route 99 off-ramp. Increases construction risk due to large sewer beneath Mercer Street.	Constructability issues with the International District/Chinatown Station, Columbia Tower tie-backs, and utilities beneath Mercer Street. Concerns about potential construction effects to traffic and freight on Mercer Street, a high-volume roadway.
Downtown Segment	8th Avenue/6th Avenue/Republican	Increases construction risk due to two crossings under Interstate 5. First Hill Station not identified or analyzed in Sound Transit 3 Plan.	Stakeholder Advisory Group recommended this alternative be carried forward; however, members recognized the potential constructability/engineering issues of crossing under Interstate 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.  Elected Leadership Group recommended this alternative not be carried forward because it crosses under Interstate 5 twice, the First Hill Station is not identified or analyzed in the Sound Transit 3 Plan, and existing transit investments already serve First Hill (Seattle Streetcar).
Downtown Segment	5th/Roy/Consolidated South Lake Union Station	Avoids utility conflicts on Republican and station under State Route 99 off-ramp. Consolidating stations not identified or analyzed in Sound Transit 3 Plan.	Did not support consolidating the Denny and South Lake Union stations.

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Segment	Level 1 Alternative or Other Suggestion	Notes/Comments	Stakeholder Advisory Group and Elected Leadership Group Screening Reasoning
Downtown Segment	Union Station Bored Tunnel/Mined Station <sup>b</sup>	Deep piles under Union Station, existing International District/Chinatown Station, and adjacent buildings require deep mined station (platform 150 to 200 feet deep). Deep station precludes easy pedestrian connections to International District/Chinatown and King Street stations. Risk of settlement damage to landmark Union Station building. Lacks construction staging and access shaft sites.	Technical feasibility issues.
Downtown Segment	Use Existing Downtown Seattle Transit Tunnel	Existing Downtown Seattle Transit Tunnel has capacity constraints.	Technical feasibility issues.
Downtown Segment	Design for Potential Extensions to North and/or East	Extensions to north and/or east not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.
Interbay/Ballard Segment	West of BNSF/20th/Tunnel	Avoids Elliott Avenue West, 15th Avenue West, Fishermen's Terminal, and Salmon Bay. Requires longer tunnel; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and may require funding partnerships. Requires construction and displacement within Ballard core.	Stakeholder Advisory Group recommended carrying this alternative forward because of community interest in a station farther west in Ballard and an interest in carrying forward multiple tunnel options. Elected Leadership Group recommended this alternative not be carried forward due to anticipated constructability issues and higher costs associated with the longer tunnel.
Interbay/Ballard Segment	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.
Interbay/Ballard Segment	Extensions to 65th, 85th, Northgate	Extensions not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.
Interbay/Ballard Segment	Multi-modal Salmon Bay Bridge	Multi-modal bridge not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.
Interbay/Ballard Segment	Eliminate or Add Stations	Eliminating, consolidating, or adding stations not identified or analyzed in Sound Transit 3 Plan.	Not identified or analyzed in the Sound Transit 3 Plan.

<sup>a</sup> Bridge alternatives do not preclude pedestrian/bicycle paths.

<sup>b</sup> The Level 1 Alternatives at International District/Chinatown Station were part of the Downtown Segment in Level 1. In Level 2 they were studied in combination with the SODO Segment rather than the Downtown Segment.

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### 3 LEVEL 2 ALTERNATIVES SCREENING

The 20 alternatives carried forward from Level 1 were refined and optimized, leading to a total of 24 alternatives studied in Level 2. Based on input from the community and because there were important differences among alternatives within Chinatown-International District, for Level 2, the Chinatown-International District alternatives were studied in combination with the SODO Segment rather than the Downtown Segment. The 24 alternatives considered in the Level 2 evaluation (by study segment) are described below and shown on Figures 3-1 through 3-4. The figures are excerpted from the *Scoping Information Report* (Sound Transit 2019a). The alternatives are as follows:

- West Seattle/Duwamish Segment Alternatives:
  - Sound Transit 3 Representative Project.
  - Pigeon Ridge/West Seattle Tunnel.
  - Oregon Street/Alaska Junction/Elevated.
  - Golf Course/Alaska Junction/Tunnel.
  - Oregon Street/Alaska Junction/Tunnel.
- SODO and Chinatown-International District Segment Alternatives:
  - Sound Transit 3 Representative Project.
  - Massachusetts Tunnel Portal.
  - Surface E-3.
  - 4th Avenue Cut-and-Cover Tunnel/Station.
  - 4th Avenue Bored Tunnel/Mined Station.
  - 5th Avenue Bored Tunnel/Mined Station.
  - Occidental Avenue.
- Downtown Segment Alternatives:
  - Sound Transit 3 Representative Project.
  - 5th/Harrison.
  - 5th/Terry/Roy/Mercer.
  - 6th/Boren/Roy.
- Interbay/Ballard Segment Alternatives:
  - Sound Transit 3 Representative Project.
  - 15th/Fixed Bridge/15th.
  - 20th/Fixed Bridge/17th.
  - 20th/Tunnel/15th.
  - Central Interbay/Moveable Bridge/14th.
  - Armory Way/Tunnel/14th.
  - Central Interbay/Fixed Bridge/14th.
  - Central Interbay/Tunnel/15th.

Figure 3-1. Level 2 West Seattle/Duwamish Alternatives

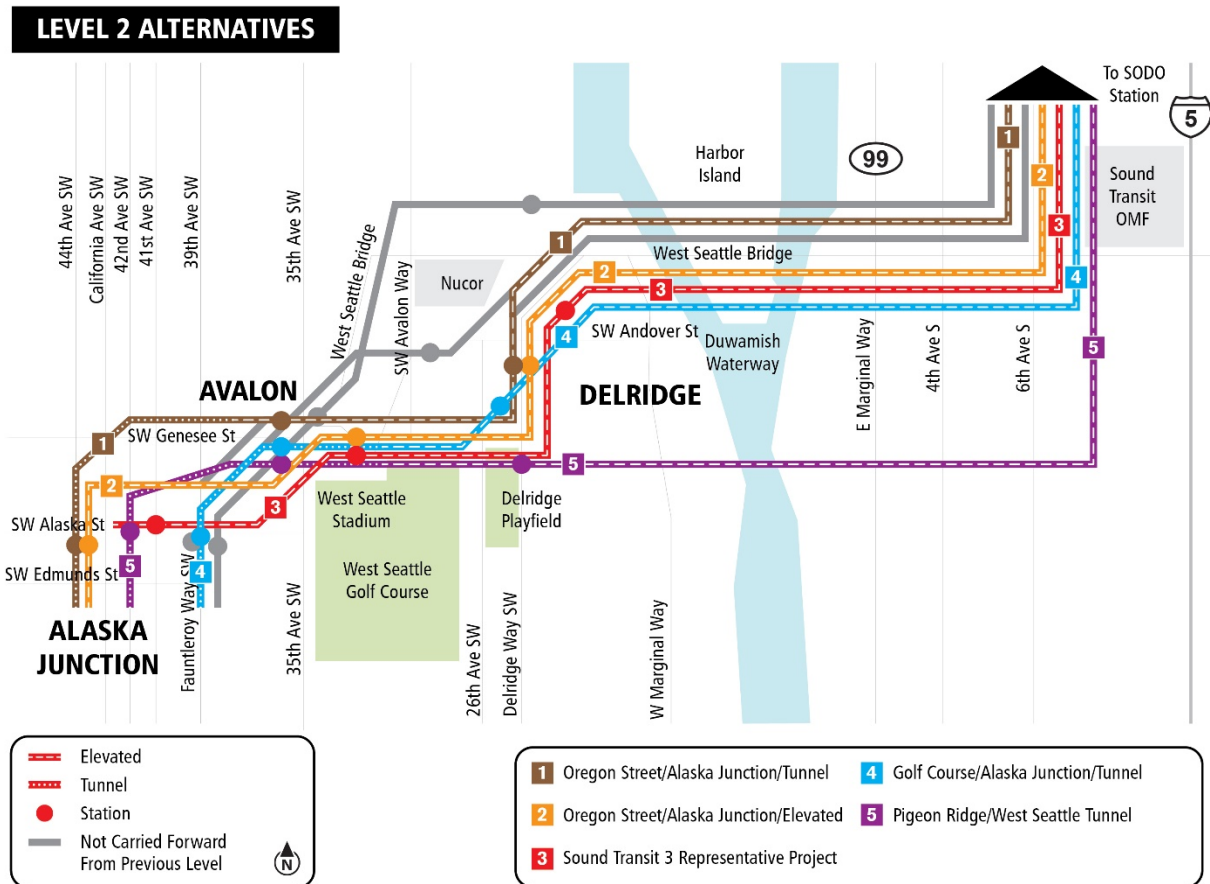
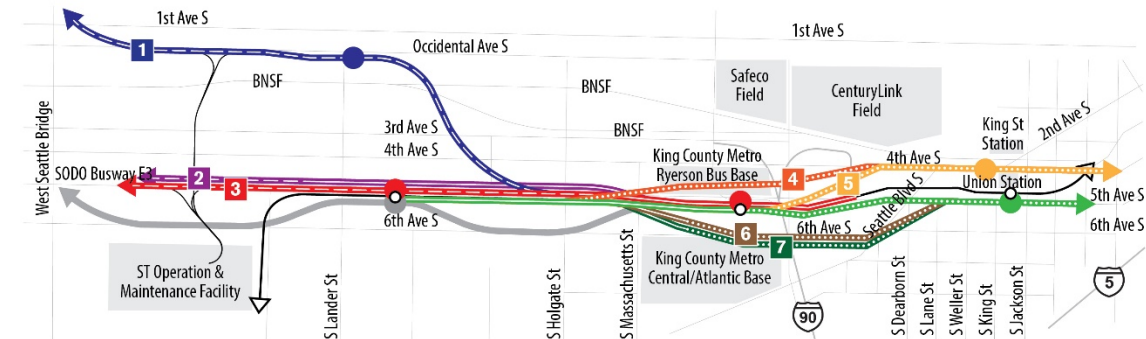
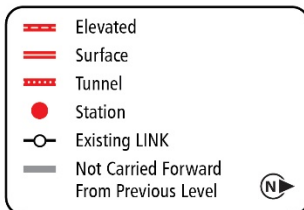


Figure 3-2. Level 2 SODO and Chinatown-International District Segment Alternatives

LEVEL 2 ALTERNATIVES



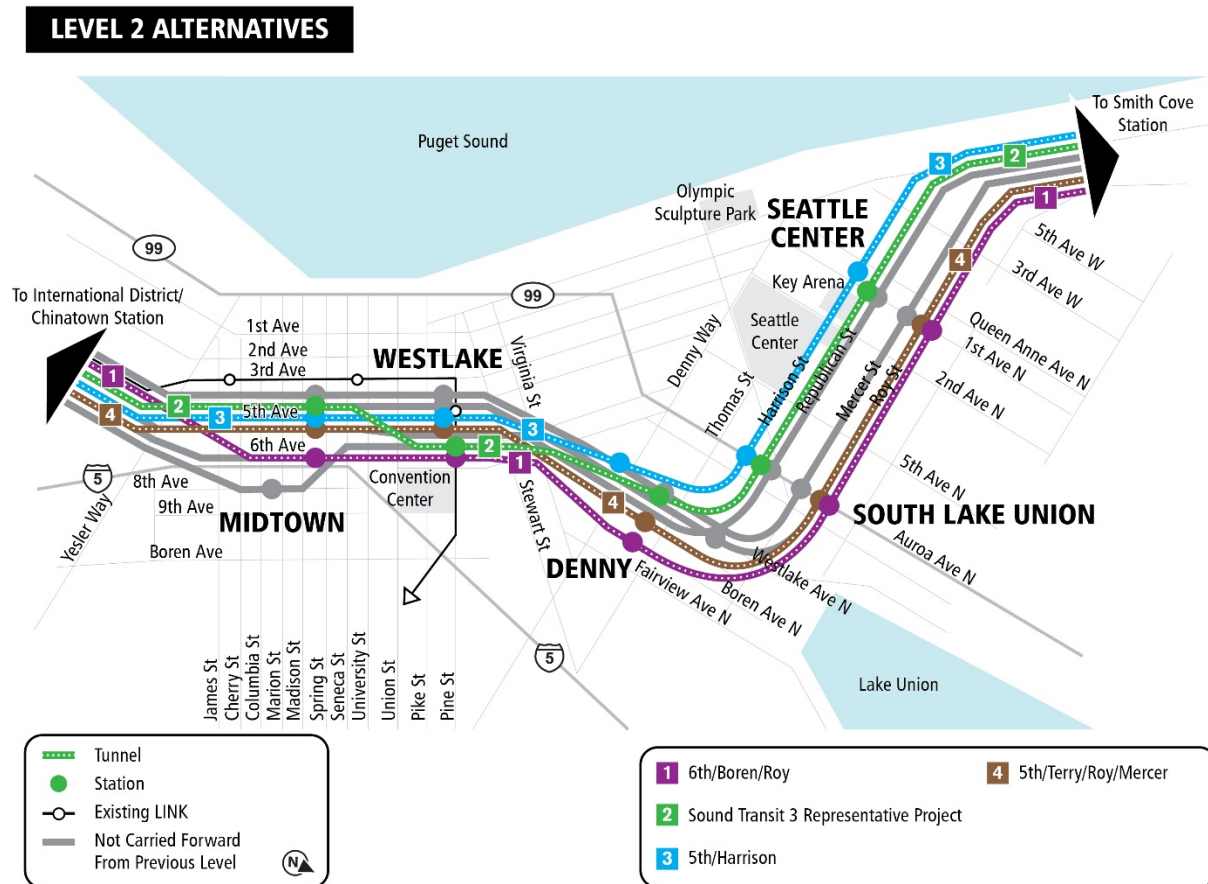
Alternative colors match with Level 1 Alternative.



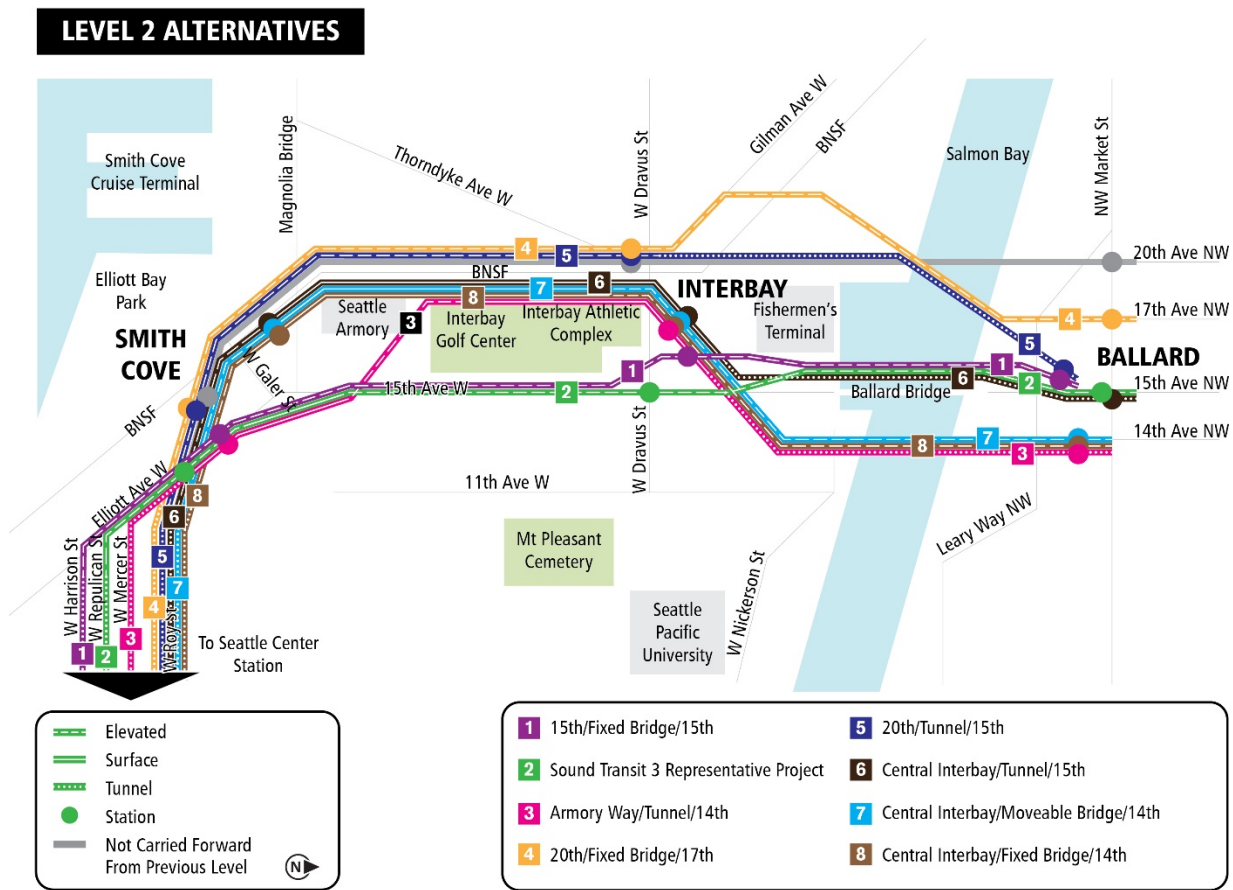
- 1** Occidental Avenue
- 2** Surface E-3
- 3** Sound Transit 3 Representative Project
- 4** 4th Avenue Bored Tunnel/Mined Station
- 5** 4th Avenue Cut-and-Cover Tunnel/Station
- 6** Massachusetts Tunnel Portal
- 7** 5th Avenue Bored Tunnel/Mined Station

Diagrams are for illustration purposes only and are not to scale.

Figure 3-3. Level 2 Downtown Segment Alternatives



**Figure 3-4. Level 2 Interbay/Ballard Segment Alternatives**



Diagrams are for illustration purposes only and are not to scale.

On October 5, 2018, the Elected Leadership Group recommended carrying forward 14 of the Level 2 alternatives into Level 3. Table 3-1 shows the Level 2 alternatives recommended to be carried forward into Level 3. Table 3-2 shows the 10 Level 2 alternatives that the Elected Leadership Group recommended not be carried forward into Level 3. The information in these tables is from the Level 2 Alternatives Development and Screening report (Sound Transit 2018b). Many of these alternatives did not adequately serve the community in comparison to the other alternatives and/or were anticipated to have greater potential impacts to the community and environment (Sound Transit 2018b). In addition, some alternatives were not carried forward because of major engineering constraints and constructability issues.

**Table 3-1. Summary of Level 2 Alternatives Carried Forward into Level 3**

Segment	Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Suggested Refinements for Level 3
West Seattle/Duwamish Segment	Sound Transit 3 Representative Project	Carried forward into Level 3 as Sound Transit 3 Representative Project.	Explore moving Delridge Station farther south. Explore Alaska Junction Station farther east and oriented north-south.	Shift Delridge Station farther south. Shift Alaska Junction Station farther east and oriented north-south.
West Seattle/Duwamish Segment	Golf Course/Alaska Junction/Tunnel	Fewer residential and business effects at Alaska Junction. Low guideway along Southwest Genesee Street. Costs approximately \$700 million more than Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships. Increases schedule risk compared to Sound Transit 3 Representative Project.	General support for this alternative, with development opportunities at Delridge Station location to serve neighborhood. Support for lower guideway along Southwest Genesee Street. Explore Alaska Junction Station location at 41st and 42nd avenues Northwest. Explore north crossing of Duwamish Waterway.	Shift Alaska Junction Station locations to 41st and 42nd avenues Northwest. North crossing of Duwamish Waterway.
SODO and Chinatown-International District Segment	Sound Transit 3 Representative Project	Carried forward into Level 3 as Sound Transit 3 Representative Project.	Concern about cut-and-cover tunnel construction effects.	None.

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Segment	Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Suggested Refinements for Level 3
SODO and Chinatown-International District Segment	Massachusetts Tunnel Portal	<p>Shallow cut-and-cover tunnel station under 5th Avenue with easy rider access/transfers.</p> <p>Construction effects and parking lane closures on 5th Avenue in station area.</p> <p>Costs approximately \$200 million less than Sound Transit 3 Representative Project.</p> <p>New at-grade SODO Station on E-3 Busway at Lander.</p> <p>Transfer at existing SODO Station.</p> <p>Bus operations on E-3 Busway displaced.</p> <p>New grade-separated roadway crossings (Lander, Holgate) improve existing rail/traffic/freight operations.</p> <p>Property effects at tunnel portal site.</p> <p>Avoids impacts to Ryerson Bus Base.</p>	<p>General support for surface alignment.</p> <p>Support for new roadway overpasses at Lander and Holgate.</p> <p>Explore shifting existing and new SODO stations closer to Lander.</p> <p>Support for reduced construction effects and shallower station.</p>	Shift existing and new SODO stations closer to Lander.
SODO and Chinatown-International District Segment	Surface E-3	<p>Shallow cut-and-cover tunnel station under 5th Avenue and easy rider access/transfers.</p> <p>Construction effects and parking lane closures on 5th Avenue in station area.</p> <p>Costs approximately \$400 million less than Sound Transit 3 Representative Project.</p> <p>New at-grade SODO Station on E-3 Busway at Lander.</p> <p>Transfer at existing SODO Station.</p> <p>Bus operations on E-3 SODO Busway displaced.</p> <p>New grade-separated roadway crossings (Lander, Holgate) improve existing rail/traffic/freight operations.</p> <p>Avoids impacts to Ryerson Bus Base.</p>	<p>General support for surface alignment.</p> <p>Support for new roadway overpasses at Lander and Holgate.</p> <p>Some support for second Stadium Station.</p> <p>Explore shifting existing and new SODO stations closer to Lander.</p> <p>Concern about cut-and-cover tunnel construction effects.</p>	Shift existing and new SODO stations closer to Lander.

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Segment	Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Suggested Refinements for Level 3
SODO and Chinatown-International District Segment	4th Avenue Cut-and-Cover Tunnel/Station	<p>Shallow cut-and-cover tunnel station under 4th Avenue with easy rider access/transfers.</p> <p>Major engineering/constructability constraints (4th Avenue viaduct demolition/rebuild, active BNSF Railway tracks, existing transit tunnel, etc.).</p> <p>Large property effects (King County Administration Building).</p> <p>Costs approximately \$600 million more than Sound Transit 3 Representative Project; requires funding partnerships for 4th Avenue Viaduct rebuild costs.</p> <p>Increased schedule risk compared to Sound Transit 3 Representative Project.</p>	<p>Support for closer proximity to King Street Station, reduced Chinatown-International District effects along 5th Avenue, and shallower station.</p> <p>Concern about traffic detours.</p>	None.
SODO and Chinatown-International District Segment	4th Avenue Bored Tunnel/Mined Station	<p>Deep mined station (approximately 200 feet) under 4th Avenue with poor rider access/transfers.</p> <p>Major engineering/constructability constraints (4th Avenue Viaduct demolition/rebuild, active BNSF Railway tracks, existing transit tunnel, etc.).</p> <p>Large property effects (Ryerson Bus Base for tunnel portal site).</p> <p>Results in very deep Midtown Station (approximately 250 feet).</p> <p>Costs approximately \$500 million more than Sound Transit 3 Representative Project; requires funding partnerships for 4th Avenue Viaduct rebuild costs.</p> <p>Increased schedule risk compared to Sound Transit 3 Representative Project.</p>	<p>Support for closer proximity to King Street Station and reduced Chinatown-International District Segment effects along 5th Avenue.</p> <p>Concern about traffic detours and access due to deep station.</p>	None.

**Appendix M Summary of Alternatives Development and  
Initial Assessment Process**

Segment	Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Suggested Refinements for Level 3
SODO and Chinatown-International District Segment	5th Avenue Bored Tunnel/ Mined Station	<p>Deep mined station (approximately 200 feet) under 5th Avenue with poor rider access/transfers.</p> <p>Less construction effects, parking closures on 5th Avenue with mined station.</p> <p>Some property effects (for mined station access shaft).</p> <p>Results in very deep Midtown Station(approximately 250 feet).</p> <p>Cost similar to Sound Transit 3 Representative Project.</p> <p>Somewhat higher schedule risk compared to Sound Transit 3 Representative Project.</p>	<p>Support for reduced construction effects.</p> <p>Concern about access due to deep station.</p>	None.
Downtown Segment	Sound Transit 3 Representative Project	Carries forward into Level 3 as Sound Transit 3 Representative Project.	None.	None.
Downtown Segment	5th/Harrison	<p>Better bus/rail integration opportunity at South Lake Union Station on Harrison Street.</p> <p>Higher property effects due to tunnel portal location on Harrison Street west of Seattle Center.</p> <p>Engineering challenges with tunneling under Key Arena (now Climate Pledge Arena).</p> <p>Approximately \$200 million more than Sound Transit 3 Representative Project.</p>	Support for this alternative with Seattle Center Station located at Republican Street.	Seattle Center Station located at Republican Street.
Downtown Segment	5th/Terry/Roy/ Mercer	<p>Avoids State Route 99 portal and large sewer pipes in the vicinity of State Route 99.</p> <p>Seattle Center Station location on Mercer Street is one block from Key Arena (now Climate Pledge Arena).</p> <p>Approximately \$200 million more than Sound Transit 3 Representative Project.</p>	<p>Some support for Denny Station at Terry.</p> <p>Interest in 6th Avenue route through Downtown.</p>	6th Avenue route through Downtown.

**Appendix M Summary of Alternatives Development and  
Initial Assessment Process**

Segment	Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Suggested Refinements for Level 3
Interbay/Ballard Segment	Sound Transit 3 Representative Project	Carries forward into Level 3 as Sound Transit 3 Representative Project.	Concern about poor transit reliability with a moveable bridge. Concern with route on 15th Avenue West due to traffic and business effects.	None.
Interbay/Ballard Segment	Armory Way/Tunnel/14th	Fewer environmental and maritime business/navigation effects; no permanent in-water impacts with tunnel under Salmon Bay. Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue Northwest.  Approximately \$300 million more than Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships.	General support for more cost-effective tunnel crossing. Support for Ballard Station with fewer property effects. Explore Ballard Station access at 15th Avenue Northwest, closer to center of urban village.	Ballard Station access at 15th Avenue Northwest, closer to center of urban village.
Interbay/Ballard Segment	Central Interbay/Fixed Bridge/14th	Maritime business effects, but less than with moveable bridge. Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue Northwest.  Costs approximately \$100 million more than Sound Transit 3 Representative Project.	Some support for fixed bridge and Ballard Station, with fewer property effects.	None.

**Table 3-2. Summary of Level 2 Alternatives Not Carried Forward into Level 3**

Segment	Level 2 Alternative	Key Findings	Stakeholder Advisory Group and Elected Leadership Group Screening Reasoning
West Seattle/ Duwamish Segment	Pigeon Ridge/West Seattle Tunnel	Most engineering constraints and effects on Duwamish Greenbelt. Low guideway along Southwest Genesee Street. Fewer residential and business effects in Delridge. Costs approximately \$1,200 million more than Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships. Increases schedule risk compared to Sound Transit 3 Representative Project.	Stakeholder Advisory Group recommended this alternative be carried forward because of fewer residential and business impacts in Delridge area and lower guideway on Southwest Genesee Street. Elected Leadership Group recommended this alternative not be carried forward due to high cost and engineering constraints.
West Seattle/ Duwamish Segment	Oregon Street/Alaska Junction/Elevated	Increases residential and business effects at Alaska Junction. Complicates a future extension to the south. High guideway along Southwest Genesee Street. Cost would be similar to Sound Transit 3 Representative Project.	Property effects of an elevated guideway along California Avenue Southwest.
West Seattle/ Duwamish Segment	Oregon Street/Alaska Junction/Tunnel	High guideway along Southwest Genesee Street. Fewer engineering constraints. Affects freight and port terminal facilities during construction. Costs approximately \$500 million more than Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships. Increases schedule risk compared to Sound Transit 3 Representative Project.	Concern about Alaska Junction Station location at 44th Avenue Southwest and higher guideway along Southwest Genesee Street.

## Appendix M Summary of Alternatives Development and Initial Assessment Process

Segment	Level 2 Alternative	Key Findings	Stakeholder Advisory Group and Elected Leadership Group Screening Reasoning
SODO and Chinatown-International District Segment	Occidental Avenue	New elevated SODO Station on Occidental Avenue at Lander Street and transfer at existing Stadium Station. Long-span bridges over BNSF tracks and longer track connection to operations and maintenance facility. Bus operations on E-3 Busway partially displaced. Property effects along Occidental, BNSF crossings, and operations and maintenance facility connection. Costs approximately \$200 million more than Sound Transit 3 Representative Project.	Stakeholder Advisory Group recommended this alternative be carried forward due to support for locating a station farther west in SODO area. The Elected Leadership Group recommended this alternative not be carried forward due to concerns about property effects and freight mobility that would result from a long elevated structure over the BNSF railroad.
Downtown Segment	6th Avenue/Boren/Roy	Avoids building tie-backs on 5th Avenue, State Route 99 portal, and large sewer pipes in the vicinity of State Route 99. More constrained Denny Station location on Boren Avenue. Seattle Center Station location on Roy Street is two blocks from Key Arena (now Climate Pledge Arena). Lower bus/rail integration opportunity at Seattle Center Station on Roy Street. Comparable cost to Sound Transit 3 Representative Project.	Steep grade on Denny Way at Boren Avenue and limited support for South Lake Union Station at Roy Street due to access restrictions to east.
Interbay/Ballard Segment	15th/Fixed Bridge/15th	Maritime business effects at Fishermen's Terminal. Elevated guideway along west side of 15th Avenue West affects more residences. Costs approximately \$200 million more than Sound Transit 3 Representative Project.	Concern about effects on Fishermen's Terminal.
Interbay/Ballard Segment	20th/Fixed Bridge/17th	Long-span bridge over the BNSF tracks adds complexity. Ballard terminus/crossing location at 17th Avenue Northwest affects more residences. Costs approximately \$500 million more than Sound Transit 3 Representative Project.	Overall cost and property, construction, and visual effects of the 17th Avenue Northwest Ballard Station location.

## Appendix M Summary of Alternatives Development and Initial Assessment Process

Segment	Level 2 Alternative	Key Findings	Stakeholder Advisory Group and Elected Leadership Group Screening Reasoning
Interbay/Ballard Segment	20th/Tunnel/15th	<p>Long-span bridge over the BNSF tracks, constrained tunnel portal location, and deeper tunnel station at 15th Avenue Northwest add complexity; no permanent in-water impacts with tunnel under Salmon Bay.</p> <p>Tunnel station along west side of 15th Avenue West affects residences.</p> <p>Costs approximately \$700 million more than Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships.</p>	Concern about the high cost relative to other tunnel options and construction complexity associated with major structures.
Interbay/Ballard Segment	Central Interbay/Moveable Bridge/14th	<p>Potential service interruptions due to moveable bridge.</p> <p>Maritime business and potential vessel navigation effects.</p> <p>Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue Northwest.</p> <p>Costs approximately \$200 million more than Sound Transit 3 Representative Project.</p>	Concern about poor transit reliability with a moveable bridge.
Interbay/Ballard Segment	Central Interbay/Tunnel/15th	<p>Fewer environmental and maritime business/navigation effects; no permanent in-water impacts with tunnel under Salmon Bay.</p> <p>Tunnel station along the east side of 15th Avenue West affects businesses.</p> <p>Costs approximately \$500 million more than Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships.</p>	<p>Stakeholder Advisory Group recommended this alternative be carried forward because of desire to locate the Ballard Station at 15th Avenue Northwest.</p> <p>Elected Leadership Group recommended this alternative not be carried forward due to concerns about the high cost relative to other tunnel options and business effects associated with Ballard Station.</p>

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## 4 LEVEL 3 ALTERNATIVES SCREENING

After the Elected Leadership Group made recommendations on which alternatives to carry forward from Level 2, the alternatives within each study segment were pieced together to form end-to-end project alternatives from Downtown to West Seattle and Downtown to Ballard for the Level 3 screening. The Sound Transit 3 Representative Project was carried forward into Level 3 to continue to serve as the baseline alternative from the Sound Transit 3 Plan. The *Alternatives Development Report* documents the Level 3 screening process (Sound Transit 2019b). The Level 3 screening evaluated three alternatives and associated design options as follows:

- Sound Transit 3 Representative Project.
- West Seattle Elevated/C-ID 5th Ave/Downtown 6th Ave/Ballard Elevated Alternative.
  - 5th Ave Cut-and-Cover International District/Chinatown Station Design Option.
  - 5th Ave Mined International District/Chinatown Station Design Option.
- West Seattle Tunnel/C-ID 4th Ave/Downtown 5th Ave/Ballard Tunnel Alternative.
  - 41st Ave Alaska Junction/4th Ave Cut-and-Cover/14th Ave Ballard Design Option.
  - 42nd Ave Alaska Junction Station Design Option.
  - 44th Ave Alaska Junction Station Design Option.
  - 4th Ave Mined International District/Chinatown Station Design Option.
  - 15th Ave Ballard Station Design Option.

The Level 3 alternatives in each study segment are shown on Figures 4-1 through 4-4. The figures are excerpted from the *Scoping Information Report* (Sound Transit 2019a).

All Level 3 evaluation alternatives and design options were carried forward into the scoping process for the Draft Environmental Impact Statement. Following the public scoping period, the Board reviewed the comments received, the alternatives evaluation, and the Elected Leadership Group recommendations. On May 23, 2019, the Board approved Motion M2019-51 (Sound Transit Board of Directors 2019a), which identified preferred alternatives, preferred alternatives with third-party funding, and other alternatives to study in the Draft Environmental Impact Statement. These alternatives are described in Chapter 2 of the Draft Environmental Impact Statement. Table 4-1 shows the Level 3 alternatives not identified for study in the Draft Environmental Impact Statement and the reasons the Elected Leadership Group and Stakeholder Advisory Group recommended that they not be carried forward, which helped inform the Board action.

Figure 4-1. Level 3 Alternatives in the West Seattle/Duwamish Segment

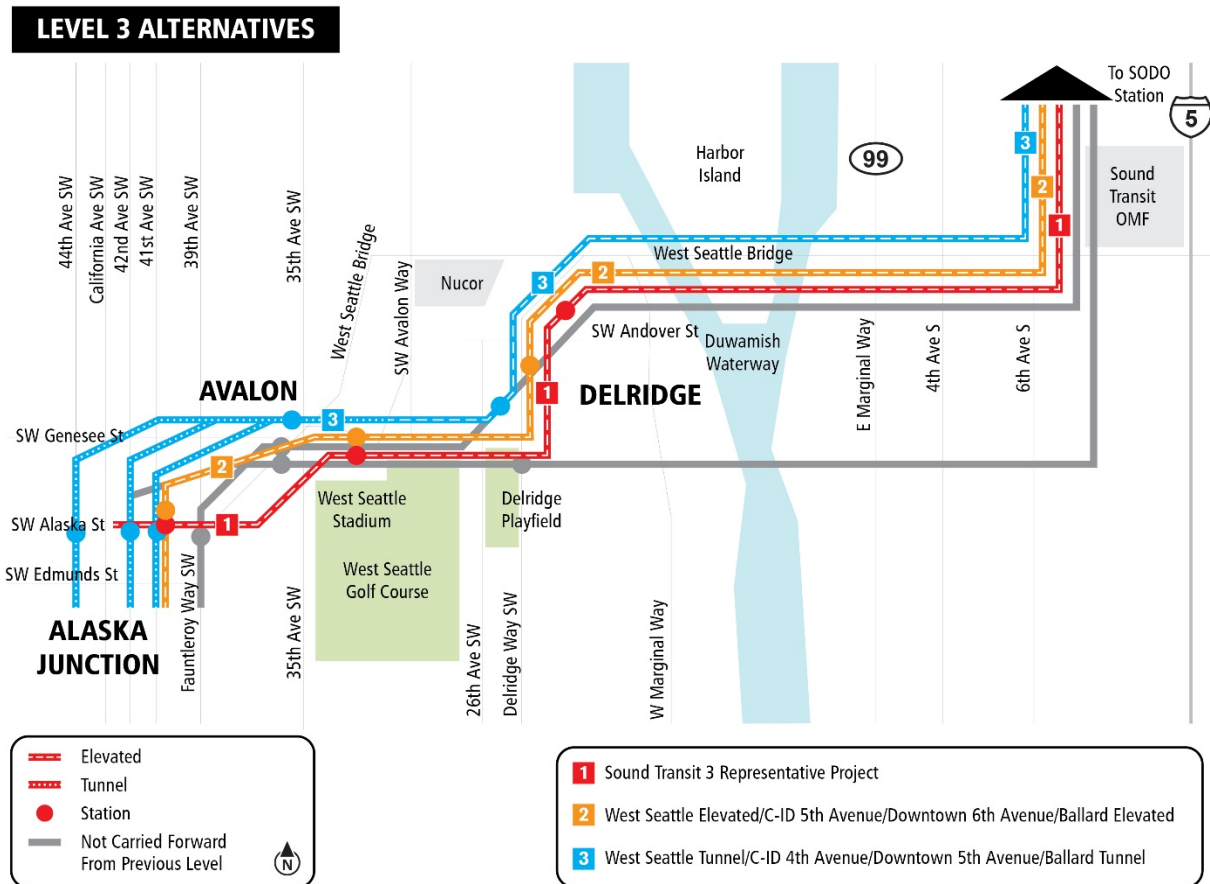
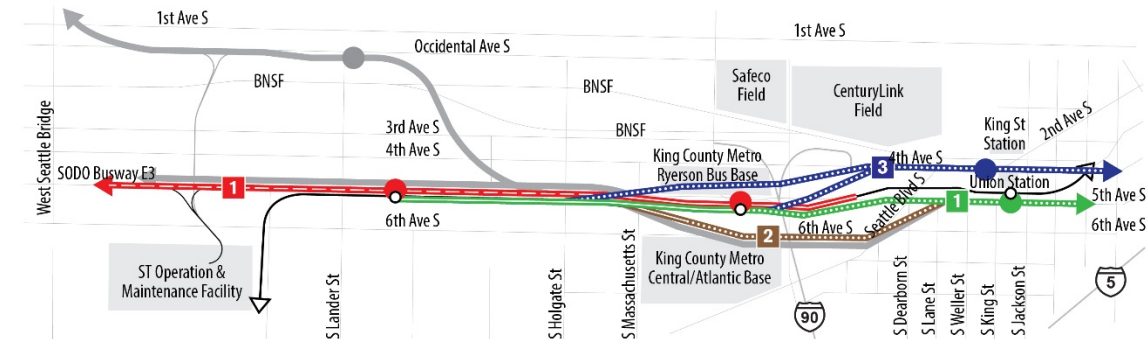
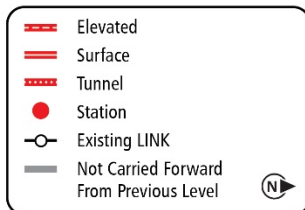


Figure 4-2. Level 3 Alternatives in the SODO and Chinatown-International District Segments

LEVEL 3 ALTERNATIVES



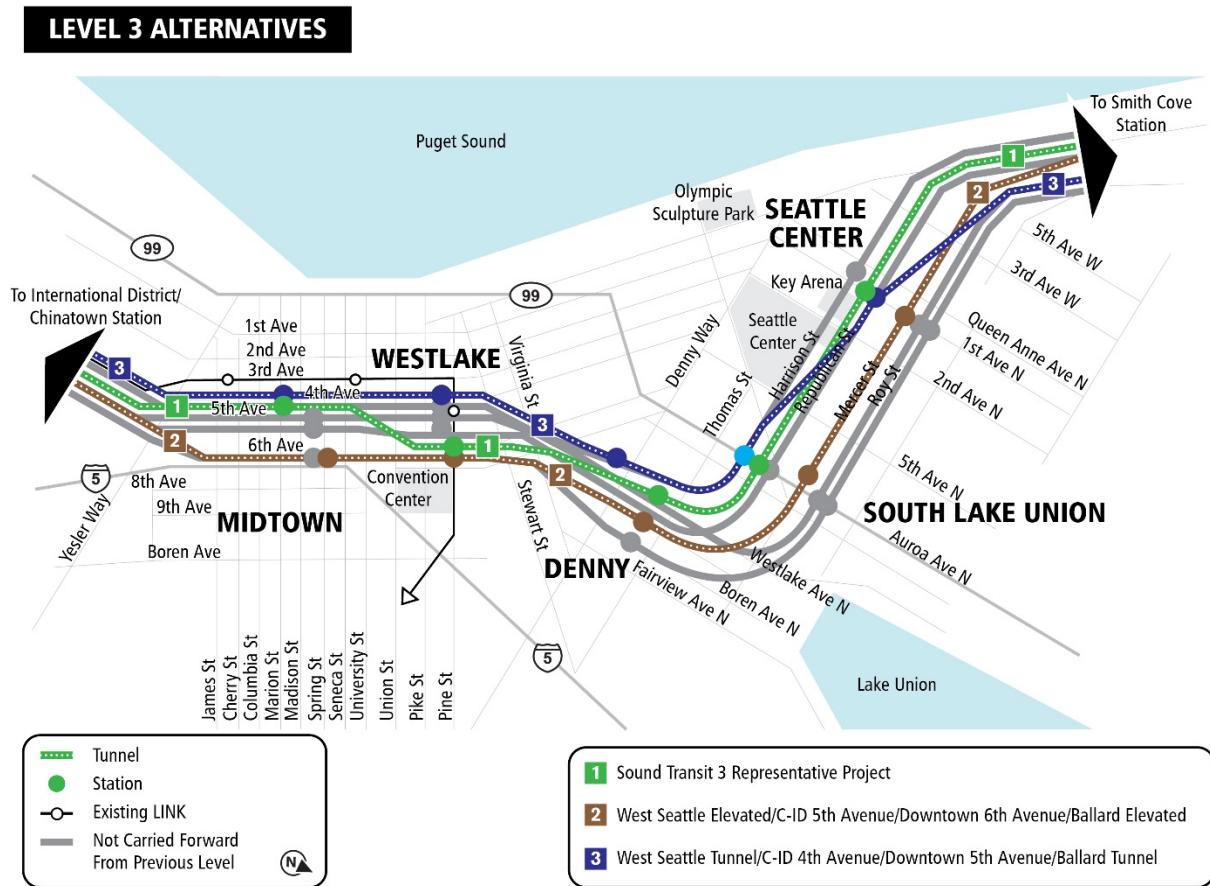
Alternative colors match with Level 1 Alternative.



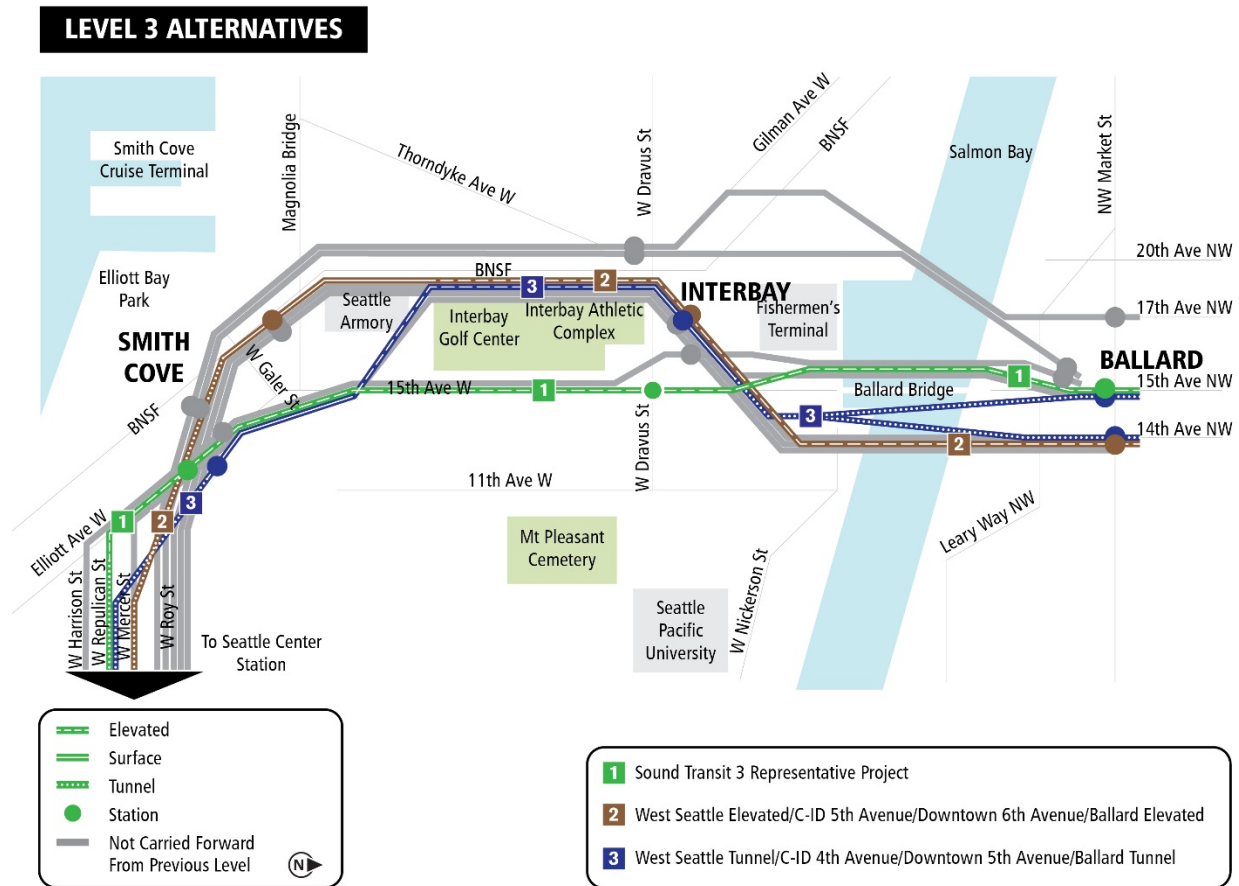
Diagrams are for illustration purposes only and are not to scale.

- 1 / 1** Sound Transit 3 Representative Project
- 2** West Seattle Elevated/C-ID 5th Avenue/Downtown 6th Avenue/Ballard Elevated
- 3** West Seattle Tunnel/C-ID 4th Avenue/Downtown 5th Avenue/Ballard Tunnel

**Figure 4-3. Level 3 Alternatives in the Downtown Segment**



**Figure 4-4. Level 3 Alternatives in the Interbay/Ballard Segment**



**Table 4-1. Summary of Level 3 Alternatives Not Carried Forward into Draft Environmental Impact Statement**

Segment	Level 3 Alternative <sup>a</sup>	Key Findings	Stakeholder Advisory Group and Elected Leadership Group Screening Reasoning
West Seattle/Duwamish	Elevated 41st Avenue Alaska Junction Station (North-South Orientation)	More residential effects between Alaska Junction and Avalon stations. North-south oriented elevated Alaska Junction Station accommodates future light rail extension.	No support from the Stakeholder Advisory Group or Elected Leadership Group for this alternative due to the property effects in West Seattle Junction neighborhood.
West Seattle/Duwamish	44th Ave Alaska Junction Tunnel Station	Less direct for future extension to the south than tunnel alternatives on 41st Avenue Southwest or 42nd Avenue Southwest. Would cost approximately \$700 million more than the Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships	Would not provide any greater benefit than the other tunnel options. It would be the same distance from California Avenue Southwest as the 42nd Avenue Southwest tunnel option, but with a longer tunnel.
West Seattle/Duwamish	Sound Transit 3 Representative Project (Delridge Station North of Andover)	Similar number of residential effects in Delridge for all alternatives. Delridge station further north would not serve the Delridge community as well as other alternatives with Delridge station further south.	Station would not serve the Delridge community as well as other station locations farther south.
SODO	Sound Transit 3 Representative Project (Elevated West Seattle Line) in SODO	Would not remove at-grade crossings between roadways and the existing light rail line in SODO. Would not allow track interconnections between the West Seattle and Ballard light rail lines needed for system operational flexibility.	Would not allow track interconnections between the West Seattle and Ballard light rail lines needed for system operational flexibility.
Chinatown-International District	Sound Transit 3 Representative Project (Cut-and-Cover Tunnel and Station) in Chinatown-International District	Would have longest section of cut-and-cover tunnel construction along 5th Avenue South in Chinatown-International District.	Would have extensive surface construction impacts along 5th Avenue South compared to the other 5th Avenue alternatives.
Downtown	Sound Transit 3 Representative Project (5th/6th/Republican)	Would have construction challenges with conflicts with State Route 99 off-ramp and large sewer pipe on Republican Street in South Lake Union.	Would conflict with the State Route 99 off-ramp or large sewer pipe in South Lake Union.

<sup>a</sup> This column lists the portions of the Level 3 end-to-end alternatives that were not carried forward into the Draft Environmental Impact Statement.

## 5 INITIAL ASSESSMENT

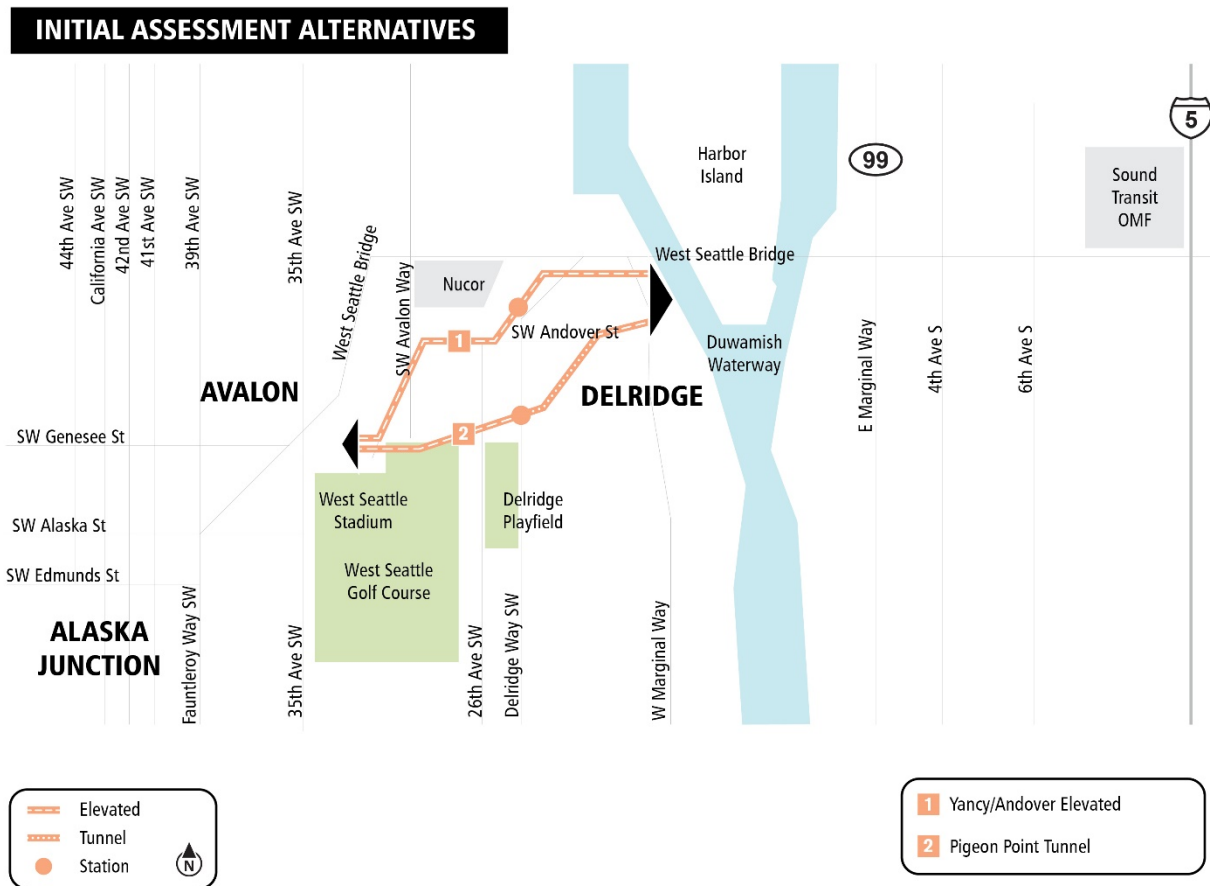
In May, 2019, the Sound Transit Board adopted Motion M2019-51 (Sound Transit Board of Directors 2019a), which identified preferred alternatives, preferred alternatives with third-party funding, and other alternatives to study in the Draft Environmental Impact Statement. In this motion, the Board also directed Sound Transit staff to conduct an initial assessment of four additional alternatives suggested during the scoping comment period, to establish whether further detailed study in the Draft Environmental Impact Statement was appropriate. As Sound Transit staff began evaluating these alternatives, they were refined, and two additional design options were added to respond to engineering constraints. The initial assessment evaluated four alternatives and associated design options as follows:

- Yancy/Andover Elevated Alternative.
- Pigeon Point Tunnel Alternative.
- SODO Elevated Alternative.
  - SODO Double Elevated Design Option.
  - SODO Partial Elevated Design Option.
- Tunnel with 20th Avenue Station in Ballard Alternative.
  - 20th Avenue Tunnel Ballard – BNSF Portal Design Option.
  - 20th Avenue Tunnel Ballard – Thorndyke Portal Design Option.

The initial assessment alternatives and design options in each study segment are shown on Figures 5-1 through 5-3.

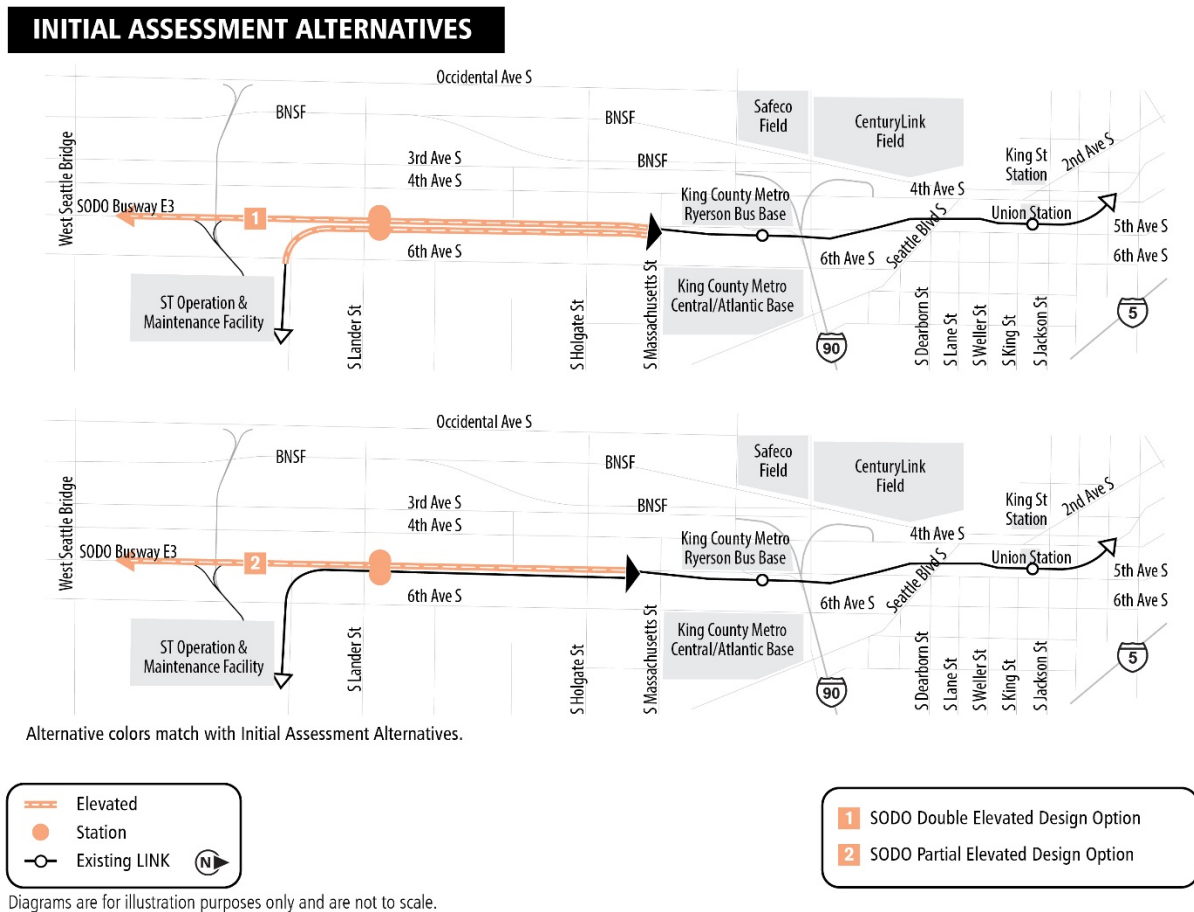
Following completion of the initial assessment, the Board reviewed the initial assessment findings (Sound Transit 2020) and public input. In October 2019, the Board approved Motion M2019-104 (Sound Transit Board of Directors 2019b), which identified additional alternatives to study in the Draft Environmental Impact Statement. Table 5-1 summarizes the alternatives from the initial assessment that were not carried forward for further study in the Draft Environmental Impact Statement.

**Figure 5-1. Initial Assessment Alternatives in the West Seattle/Duwamish Segment**

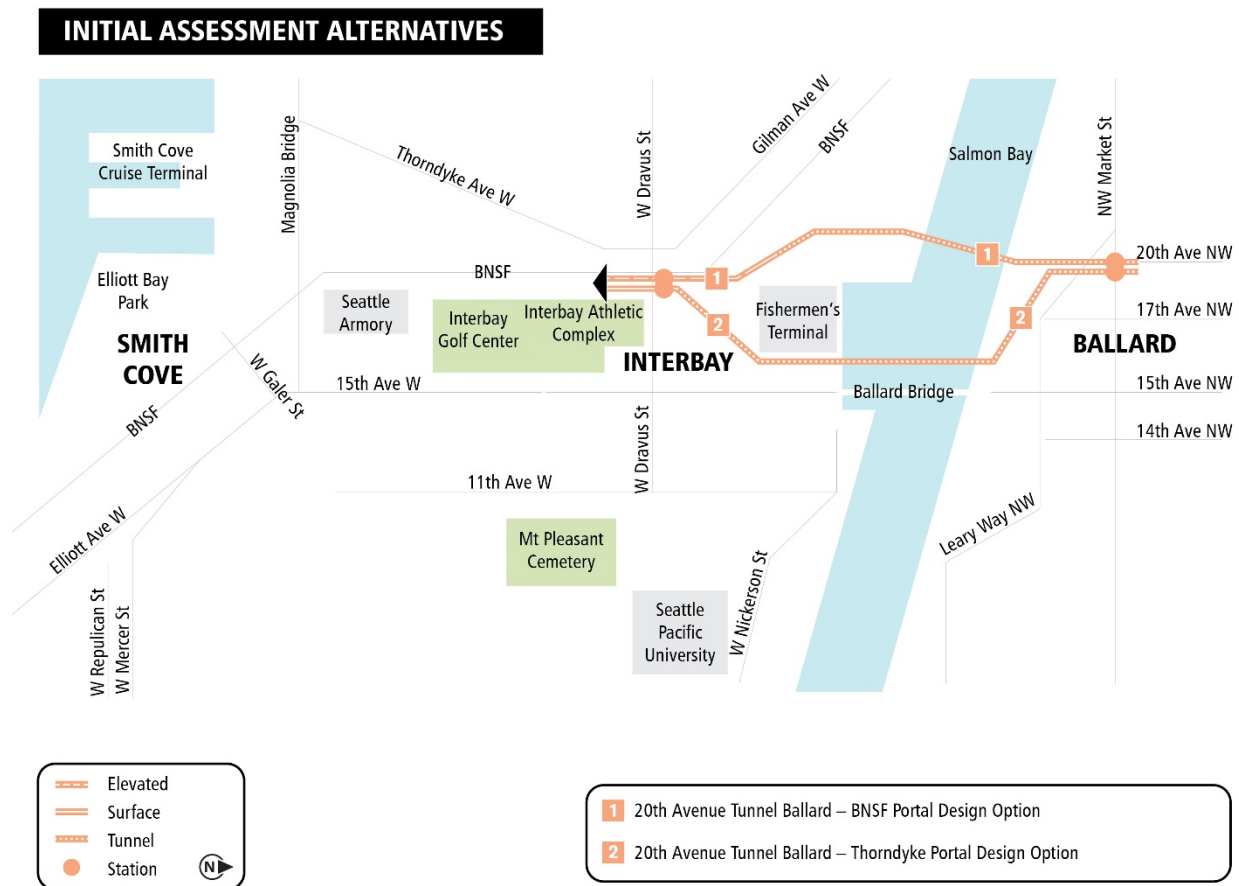


Diagrams are for illustration purposes only and are not to scale.

**Figure 5-2. Initial Assessment Alternatives in the SODO Segment**



**Figure 5-3. Initial Assessment Alternatives in the Interbay/Ballard Segment**



**Table 5-1. Summary of Initial Assessment Alternatives Not Carried Forward into Draft Environmental Impact Statement**

Segment	Initial Assessment Alternative	Key Findings	Screening Reasoning
West Seattle/ Duwamish	Pigeon Point Tunnel	<p>Fewer business, freight, and visual effects.</p> <p>Similar residential effects.</p> <p>More accessible Delridge station</p> <p>Bisects habitat areas of the West Duwamish Greenbelt.</p> <p>Would cost approximately \$900 million more than the Sound Transit 3 Representative Project for the two tunnels (+\$700 million for the West Seattle Junction Tunnel and +\$200 million for the Pigeon Point Tunnel); tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships.</p>	<p>Would have a higher cost with limited additional benefit compared to other alternatives. Would bisect the West Duwamish Greenbelt.</p>
SODO	SODO Double Elevated Design Option	<p>Similar to At-Grade Alternative, would have full grade separation at South Holgate and South Lander streets, improving traffic and light rail reliability.</p> <p>Would improve transit integration by shifting the SODO Station south, closer to South Lander Street and allow the SODO Busway to continue operations.</p> <p>Would require the construction of two elevated guideways in poor soils.</p> <p>Would require two extended shutdowns of Central Link during construction, disproportionately affecting communities of color and low-income populations.</p> <p>Would cost approximately \$300 million more than the Sound Transit 3 Representative Project (approximately \$500 million more than the Preferred At-Grade Alternative).</p>	<p>Would require extended shutdowns of Central Link during construction, which would disproportionately affect communities of color and low-income populations and would have a higher cost.</p>
Interbay/ Ballard	20th Avenue Tunnel Ballard – BNSF Portal Design Option	<p>Ballard Station would be closer to the center of the Ballard Hub Urban Village.</p> <p>Additional property effects due to the constrained right-of-way along 20th Avenue Northwest in Ballard.</p> <p>Constructability challenges due to relocation of major underground utilities in Interbay and a long span structure over BNSF tracks.</p> <p>Would cost approximately \$750 million more than the Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships.</p>	<p>Would have additional property effects in the core of the Ballard Hub Urban Village. Would add constructability challenges, cost, and risk</p>
Interbay/ Ballard	20th Avenue Tunnel Ballard – Thorndyke Portal Design Option	<p>Ballard Station would be closer to the center of the Ballard Hub Urban Village.</p> <p>Additional property effects due to the constrained right-of-way along 20th Avenue Northwest in Ballard.</p> <p>Constructability challenges due to relocation of major underground utilities in Interbay, though less than with the BNSF Portal.</p> <p>May require a retrofit or reconstruction of the West Dravus Street and West Emerson Street bridges.</p> <p>Would cost approximately \$450 million more than the Sound Transit 3 Representative Project; tunnel costs not included in Sound Transit 3 financial plan or evaluation methodology and requires funding partnerships.</p>	<p>Would have additional property effects in the core of the Ballard Hub Urban Village. Would add constructability challenges, cost, and risk.</p>

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## 6 ALTERNATIVES SUGGESTED DURING SCOPING BUT NOT CARRIED FORWARD

The scoping process for the Environmental Impact Statement generated some new alternative suggestions that were considered but not identified for study in the Draft Environmental Impact Statement for the reasons shown in Table 6-1 for the West Seattle Link Extension and in Table 6-2 for the Ballard Link Extension. A multi-year local planning process identified the Sound Transit 3 Plan for which voters approved funding. The Representative Project in the Sound Transit 3 Plan identified mode, corridor, and station areas. Alternatives suggested during scoping that included modes, corridors, or stations that were inconsistent with the Representative Project and not identified or analyzed in the Sound Transit 3 Plan were not carried forward.

**Table 6-1. West Seattle Link Extension Alternatives Suggested During Scoping and Not Carried Forward**

Alternative Suggested	Reason Not Evaluated in Draft Environmental Impact Statement
Tunnel alignment in West Seattle Junction on Fauntleroy Way Southwest that terminates near Southwest Alaska Street and does not include Avalon Station and/or Delridge Station.	A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). Sound Transit 3 Plan calls for station areas at SODO, Avalon, Delridge, and the Alaska Junction; an alternative that does not contain these stations would be inconsistent with the Sound Transit 3 Plan.
Pigeon Ridge/West Seattle Tunnel from Level 1 and Level 2.	This alternative was considered in the Level 1 and Level 2 Alternatives Development but was not recommended to be carried forward by Elected Leadership Group due to high cost and engineering constraints. Board Motion M2019-51 directed Sound Transit project staff to conduct an initial assessment of a modified version of the Pigeon Ridge/West Seattle Tunnel from Level 1 and Level 2 Alternatives Development. This alternative was not identified for study in the Draft Environmental Impact Statement because it would have a higher cost with limited additional benefit compared to other alternatives and it would bisect the West Duwamish Greenbelt.
Duwamish Waterway (also known as Duwamish River) crossing primarily on the south side of the West Seattle Bridge that would transition to the north side on the west side of the Duwamish Waterway to avoid both Port of Seattle property and Pigeon Point.	A Duwamish Waterway crossing as described would have to cross the West Seattle Bridge three times. Any south-north-south crossing presents the following challenges: more very tall structures, longer water crossings, longer spans and more curvature in long spans, and larger foundations and more constrained locations for these foundations. The engineering and constructability issues with the south-north-south crossing concepts performs lower than the Draft Environmental Impact Statement south and north crossing alignments.
Using a portion of the West Seattle Golf Course or the Delridge Playfield to minimize impacts to the Youngstown/North Delridge neighborhood. Suggestions included using the northern portion of the golf course along Southwest Genesee Street or traveling south of the West Seattle Stadium to a tunnel portal in the vicinity of Rotary Viewpoint Park near Southwest Alaska Street and 35th Avenue Southwest.	The Golf Course/West Seattle Junction Alternative was considered in Alternatives Development. The Level 1 alternative traveled through the golf course and did not have an Avalon Station area as called for in the Sound Transit 3 Plan, while the Level 2 analysis shifted the guideway through the north edge of the golf course in order to minimize park impacts and accommodate an Avalon Station. Refinements to this alternative and additional alternatives in the Delridge Segment are considered in the Draft Environmental Impact Statement to reduce impacts to North Delridge and Youngstown neighborhoods.

## Appendix M Summary of Alternatives Development and Initial Assessment Process

Alternative Suggested	Reason Not Evaluated in Draft Environmental Impact Statement
Continuing west along the West Seattle Bridge to Southwest Avalon Way and following Southwest Avalon Way on an elevated guideway to Avalon Station without a Delridge Station. Comments suggested a park-and-ride lot or transit hub near the west end of the West Seattle Bridge.	A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). The Sound Transit 3 Plan calls for station areas at SODO, Avalon, Delridge, and the Alaska Junction; an alternative that does not contain these stations would be inconsistent with the Sound Transit 3 Plan. An alternative that does not provide service to Delridge is inconsistent with the Sound Transit 3 Plan.
Tunnel under the Duwamish Waterway.	This alternative was not considered due to technical feasibility issues related to the impractical tunnel depth and length due to the topography in West Seattle.
An additional station on the east side of the Duwamish Waterway.	A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). An additional station on the east side of the Duwamish Waterway would not be consistent with the station areas identified and analyzed in the Sound Transit 3 Plan.
Light rail should terminate in North Delridge or near the West Seattle Bridge. This could be combined with a transit hub to provide transfers to improved bus service to reach Alaska Junction and other West Seattle neighborhoods.	A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). Sound Transit 3 Plan called for station areas at SODO, Avalon, Delridge, and the Alaska Junction; an alternative that does not contain these stations would be inconsistent with the Sound Transit 3 Plan. The Draft Environmental Impact Statement analysis does evaluate the Delridge Station as a potential Minimum Operable Segment.
Improving existing bus routes instead of light rail.	A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). The mode (bus) was considered in the Level 1 analysis but was not carried forward since it was not identified and analyzed in the Sound Transit 3 Plan.
Aerial tram at Delridge Station could connect areas to the west with this Delridge Way Southwest light rail alignment.	As part of the Sound Transit 3 planning process, Sound Transit developed the <i>High-Capacity Transit Technologies Issue Paper</i> (Sound Transit 2014a) to evaluate different technologies and determine their viability for high-capacity transit implementation. It identified that gondolas and aerial trams are not considered regional high-capacity transit. As a result, the mode (aerial tram) was not identified in the Sound Transit 3 Plan.
Alignment continues south on Delridge Way Southwest toward South Delridge, Westwood Village, White Center, and other neighborhoods to the south, rather than go to Alaska Junction. Some suggested this in combination with a transit hub near the west end of the West Seattle Bridge to facilitate bus connections to reach Alaska Junction and other West Seattle neighborhoods. Some suggested surface light rail on Delridge Way Southwest.	Future extensions were considered in Level 1 but were not carried forward because they were not identified or analyzed in the Sound Transit 3 Plan or the Long-Range Plan (Sound Transit 2014b). Extensions south that do not serve an Alaska Junction Station area were not identified or analyzed in the Sound Transit 3 Plan. A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016).

## Appendix M Summary of Alternatives Development and Initial Assessment Process

Alternative Suggested	Reason Not Evaluated in Draft Environmental Impact Statement
Extending south on 35th Avenue Southwest rather than to Alaska Junction with a tunnel under 35th Avenue Southwest or surface light rail.	A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). An alternative that does not include an Alaska Junction Station would be inconsistent with the Sound Transit 3 Plan.
Future extension from Alaska Junction should connect to the Fauntleroy Ferry Terminal.	Future extensions were considered in Level 1 but were not carried forward because they were not identified or analyzed in the Sound Transit 3 Plan or the Long-Range Plan (Sound Transit 2014b). A purpose of the project, as identified in Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). The Fauntleroy Ferry Terminal was not identified as one of these communities. All proposed Alaska Junction stations are oriented north-south so as not to preclude a future extension of light rail to the south.
A more southerly alignment to serve Georgetown, South Park, and White Center and extend to Burien and the airport. Other comments suggested the use of the State Route 509 highway corridor.	Future extensions were considered in Level 1 but were not carried forward because they were not identified or analyzed in the Sound Transit 3 Plan or the Long-Range Plan (Sound Transit 2014b). Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, identifies a purpose of the project is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). Georgetown, South Park, White Center, and Burien were not communities identified in the project corridor in Sound Transit 3.
A more southerly alignment, crossing the Duwamish in the vicinity of Georgetown and following a more gradual slope to reach Alaska Junction and connect underserved areas south of Alaska Junction. Some alignment suggestions included using the approximate corridors of Myers Way South, Southwest Roxbury Way, and 35th Avenue Southwest.	Routes to Georgetown were considered in Level 1 but were not carried forward because they were not identified or analyzed in the Sound Transit 3 Plan or Long-Range Plan. Chapter 1, Purpose and Need for West Seattle and Ballard Link Extensions, identifies a purpose of the project is to provide high-quality rapid, reliable, and efficient light rail transit service to communities in the project corridor as defined through the local planning process and reflected in the Sound Transit 3 Plan (Sound Transit 2016). Georgetown and the underserved areas south of Alaska Junction listed in these suggested alternatives were not communities identified in the project corridor in Sound Transit 3.
Elevate both the West Seattle line and the Ballard line through SODO.	Board Motion M2019-51 directed Sound Transit project staff to conduct an initial assessment of this alternative. This alternative was not identified for study in the Draft Environmental Impact Statement because it would require extended shutdowns of Central Link during construction, which could disproportionately affect communities of color and low-income populations, and would have a higher cost.

**Table 6-2. Ballard Link Extension Alternatives Suggested During Scoping and Not Carried Forward**

Alternative Suggested	Reason Not Evaluated in Draft Environmental Impact Statement
Station located east of Interstate 5.	An alignment with Midtown Station east of Interstate 5 was considered in Level 1 of the Alternatives Development but was not recommended by the Elected Leadership Group to be carried forward into Level 2 due to concerns regarding engineering feasibility and cost risks. A Midtown Station east of Interstate 5 was not identified in the Sound Transit 3 Plan.
Denny Station located farther west, on 5th Avenue/Denny Way or 6th Avenue/Denny Way, to better serve Belltown.	Alignments serving Belltown were considered in the <i>Ballard to Downtown Seattle Transit Expansion Study</i> (Sound Transit 2014c) as part of the early local planning process. A Denny Station in this vicinity would preclude a station in South Lake Union and would therefore not be consistent with the Sound Transit 3 Plan, which included a station at South Lake Union.
Seattle Center Station farther south to better serve Belltown.	A Seattle Center Station location on Harrison Street was considered in Levels 1 and 2 of the Alternatives Development. It was not recommended by the Elected Leadership Group to be carried forward to Level 3 because of concerns about distance from Key Arena (now Climate Pledge Arena) and effects to the neighborhood.
Alignment and station located on 4th Avenue, with Midtown Station between James and Madison streets.	A tunnel alignment beneath 4th Avenue was considered during Alternatives Development but not evaluated because of constructability challenges associated with avoiding a conflict with the existing BNSF Railway tunnel.
Alignment extending from 5th Avenue in the Chinatown-International District to 3rd Avenue near the existing rail station and then proceeding north to Denny Station.	A tunnel alignment beneath 3rd Avenue would conflict with the existing Downtown Seattle Transit Tunnel.
Siting South Lake Union Station east of Aurora Avenue North and spanning Mercer Street.	South Lake Union Station locations east of Aurora Avenue were considered during Alternatives Development but were not evaluated because a tunnel station beneath and spanning Mercer Street is problematic due to conflicts with existing large underground utilities.
Alignment and stations following State Route 99 from downtown to North Seattle.	Alignment and stations following State Route 99 would not meet the purpose of the project, which is to expand the light rail system from Downtown Seattle to West Seattle and Ballard, consistent with Sound Transit's Long-Range Plan and reflected in the Sound Transit 3 Plan. The Sound Transit 3 Plan specifies that light rail be extended from Downtown Seattle to Ballard with a new subway through Downtown Seattle and South Lake Union, with stations serving the Chinatown-International District, Midtown, Westlake, Denny, South Lake Union, Seattle Center, Smith Cove, Interbay, and Ballard. An alignment along State Route 99 from Downtown to North Seattle would not be consistent with the Sound Transit 3 Plan.
Alignment with a bridge over the BNSF railyard, an optional station at Fishermen's Terminal, a tunnel under Salmon Bay west of Fishermen's Terminal, and a station at 20th Avenue Northwest and Northwest Market Street in Ballard.	An alignment with Ballard Station at 20th Avenue Northwest and Northwest Market Street was considered in Level 1 but was not recommended by the Elected Leadership Group to be carried forward into Level 2 because of anticipated constructability issues and costs related to the length of the tunnel. An alignment with a bridge over the BNSF railyard, tunnel under Salmon Bay, and Ballard Station at 20th Avenue Northwest and Northwest Market Street was considered in the initial assessment following scoping, but the Board did not identify this alternative for study in the Draft Environmental Impact Statement due to constructability challenges with conflicts to major underground utilities, potential neighborhood effects, and cost.

## **Appendix M Summary of Alternatives Development and Initial Assessment Process**

<b>Alternative Suggested</b>	<b>Reason Not Evaluated in Draft Environmental Impact Statement</b>
A 20th Avenue West alignment in Interbay to better serve Magnolia.	An alignment along 20th Avenue West was evaluated in Level 2 but was not carried forward due to the added complexity of a long-span bridge over the BNSF Railway tracks.
Ballard Station closer to the core of the Ballard urban village. Suggestions included a station in the vicinity of 20th Avenue Northwest or 17th Avenue Northwest.	Ballard Station at 20th Avenue Northwest and Northwest Market Street in the urban village was considered in Level 1 but was not recommended by the Elected Leadership Group to be carried forward into Level 2 because of anticipated constructability issues and costs related to the length of the tunnel necessary to provide a station at this location. A station at 20th Avenue Northwest was considered in the initial assessment following scoping as directed by Board Motion M2019-51, but the Board did not identify this alternative for study in the Draft Environmental Impact Statement due to constructability challenges with conflicts to major underground utilities, potential neighborhood effects, and cost. A Ballard Station at 17th Avenue Northwest was considered in Levels 1 and 2 but was not recommended by the Elected Leadership Group to be carried forward into Level 3 because of potential residential property impacts.
14th Avenue Northwest fixed-bridge alignment with Ballard Station located on 15th Avenue Northwest.	An elevated alignment transitioning between a 14th Avenue fixed bridge and a station on 15th Avenue Northwest would result in greater potential property impacts in this area of Ballard.
Additional station immediately north of Ballard Bridge.	An additional station north of the Ballard Bridge would not be consistent with the Sound Transit 3 Plan. In addition, there are two other stations nearby, namely Ballard and Interbay stations, and adding another station north of the Ballard Bridge would increase travel times between Ballard and Downtown.
Alignment and locations to serve neighborhoods to the north (Whittier Heights, Crown Hill, and Greenwood) and east (Fremont, Phinney Ridge, Wallingford, and U-District, and the urban center of Upper Queen Anne).	This alignment and station locations would not meet the purpose of the project, which is to expand the light rail system from downtown Seattle to West Seattle and Ballard, consistent with Sound Transit's Long-Range Plan and reflected in the Sound Transit 3 Plan. The Sound Transit 3 Plan includes studies to continue planning for future expansion of the regional high-capacity transit system even farther, consistent with the regional transit system envisioned in the Long-Range Plan. Additional investments for future expansion must be approved by voters.

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