

HIGH CAPACITY TRANSIT CORRIDOR STUDY

FEDERAL WAY TO TACOMA

7/17/2014

FINAL REPORT

High Capacity Transit Corridor Study Federal Way to Tacoma

Final Report



SOUND TRANSIT

Central Puget Sound Regional Transit Authority
401 South Jackson Street
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Acronyms and Abbreviations

BPA	Bonneville Power Administration
BRT	bus rapid transit
ESA	Endangered Species Act
FTA	Federal Transit Administration
GHG	greenhouse gas
GMA	Growth Management Act
HCT	high capacity transit
HOV	high-occupancy vehicle
I-5	Interstate 5
LOS	Level of Service
LRT	light rail transit
PSRC	Puget Sound Regional Council
Sound Transit	Central Puget Sound Regional Transit Authority
SR	State Route
ST2	Sound Transit 2
WSDOT	Washington State Department of Transportation

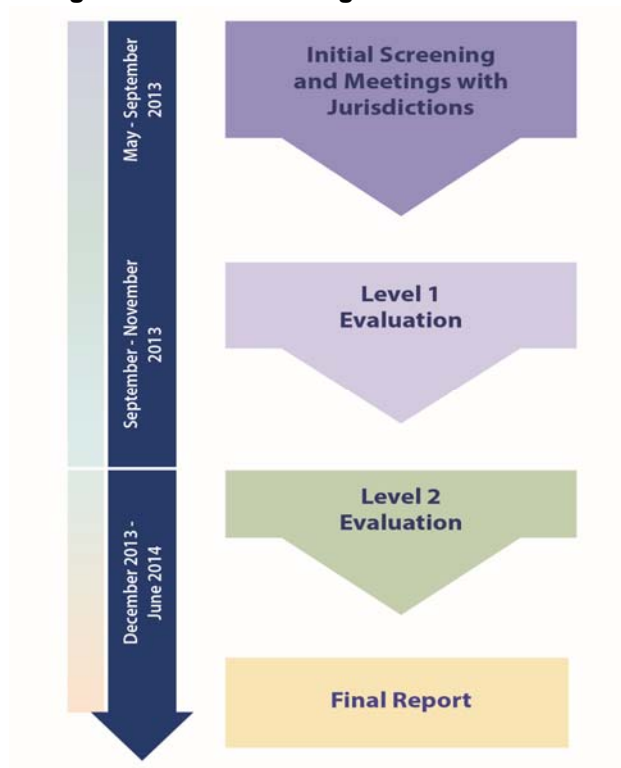
1 EXECUTIVE SUMMARY

1.1 Introduction

The Federal Way to Tacoma High Capacity Transit (HCT) Corridor Study evaluates options to provide high-capacity transit service between the Federal Way Transit Center and the Tacoma Dome Station area.¹ The Sound Transit 2 (ST2) regional transit system plan, approved by voters in 2008, directed that HCT Corridor Studies be conducted and available for use by the Sound Transit Board of Directors and others to inform their update of the Regional Transit Long-Range Plan and for development of future regional transit system plans. This study could also be used to inform any future environmental process.

The study commenced in 2013 with an inventory of conditions within the study area (i.e., the "corridor," which generally encompasses the area between the Federal Way Transit Center and the Tacoma Dome Station within ½ mile of State Route [SR] 99 and Interstate 5 [I-5]). This was followed by an initial screening process to develop HCT options for evaluation. Subsequently, Level 1 and Level 2 evaluations were conducted as shown in Figure 1-1, Screening Process Timeline. A summary of the Level 1 and Level 2 findings follows. For further details, see the Level 1 and Level 2 Evaluation Reports for this corridor (Sound Transit 2014a, 2014b).

Figure 1-1. Screening Process Timeline



¹ The Federal Way to Tacoma HCT Corridor Study is a major element of the South Corridor Alternatives Planning project. The other element of the South Corridor Alternatives Planning project is the development of a range of potential future regional transit capital improvements and service options for the Pierce subarea and environs. This task was conducted separate from this HCT Corridor Study and is not the subject of this report.

1.2 Initial Screening

An initial screening of possible options was conducted to determine the options to evaluate in the Level 1 screening. Because of topographic and development constraints, options outside of the I-5 and SR 99 vicinity were not advanced for further consideration. Options west of SR 99 in Milton and north of SR 99 in Fife were not advanced because they would potentially require long tunnel segments or be located within Port of Tacoma intermodal transfer facilities. Options east of I-5 in Milton and south of I-5 in Fife were not advanced because the alignment length and travel time would increase and the areas served by potential station areas are not planned for higher-density transit-oriented development.

One option along the SR 509 corridor through north Fife was considered in the initial screening with a terminus in downtown Tacoma adjacent to the University of Washington Tacoma campus. This option was not advanced into the Level 1 evaluation because:

- The option bypassed the Fife City Center area and would not provide it with light rail service.
- Intermodal transfer opportunities at the Tacoma Dome Transit Center would not be provided.
- Redevelopment opportunities in the Tacoma Dome/Brewery District would be affected by the lack of light rail service directly to Sea-Tac Airport and Seattle.

Reconsideration of this option during Level 1 evaluation showed that the overall ridership was 10 to 20 percent lower than other options. As a result, it continued not to be included in the Level 1 options.

1.3 Level 1 Evaluation

The Level 1 evaluation was performed for the options that were developed from an initial screening of a broad range of HCT services and potential routes that would serve the study corridor between Federal Way and Tacoma. Seven light rail transit (LRT) and two bus rapid transit (BRT) options were defined and evaluated between the Federal Way Transit Center and Tacoma Dome District station area. All options share the assumption that Central Link light rail is extended and in service to the Federal Way Transit Center.

Figure 1-2, Level 1 Options, shows the schematic alignment for each option. The Level 1 options are:

- **SR 99 West**—This option places LRT service along the west side of SR 99. The alignment is primarily elevated with an at-grade section between south Federal Way and Milton.
- **SR 99 Center**—This option places LRT in the center median of SR 99. The alignment is elevated for the entire length of the corridor.
- **SR 99 At-Grade**—This option places LRT service in the center median of SR 99. The alignment is at-grade for the entire length of the corridor.
- **SR 99 Separated**—This LRT option is similar to SR 99 West; however, the alignment south of S. 356th Street in Federal Way to near Porter Way in Milton is at-grade and separated from SR 99 to the west.

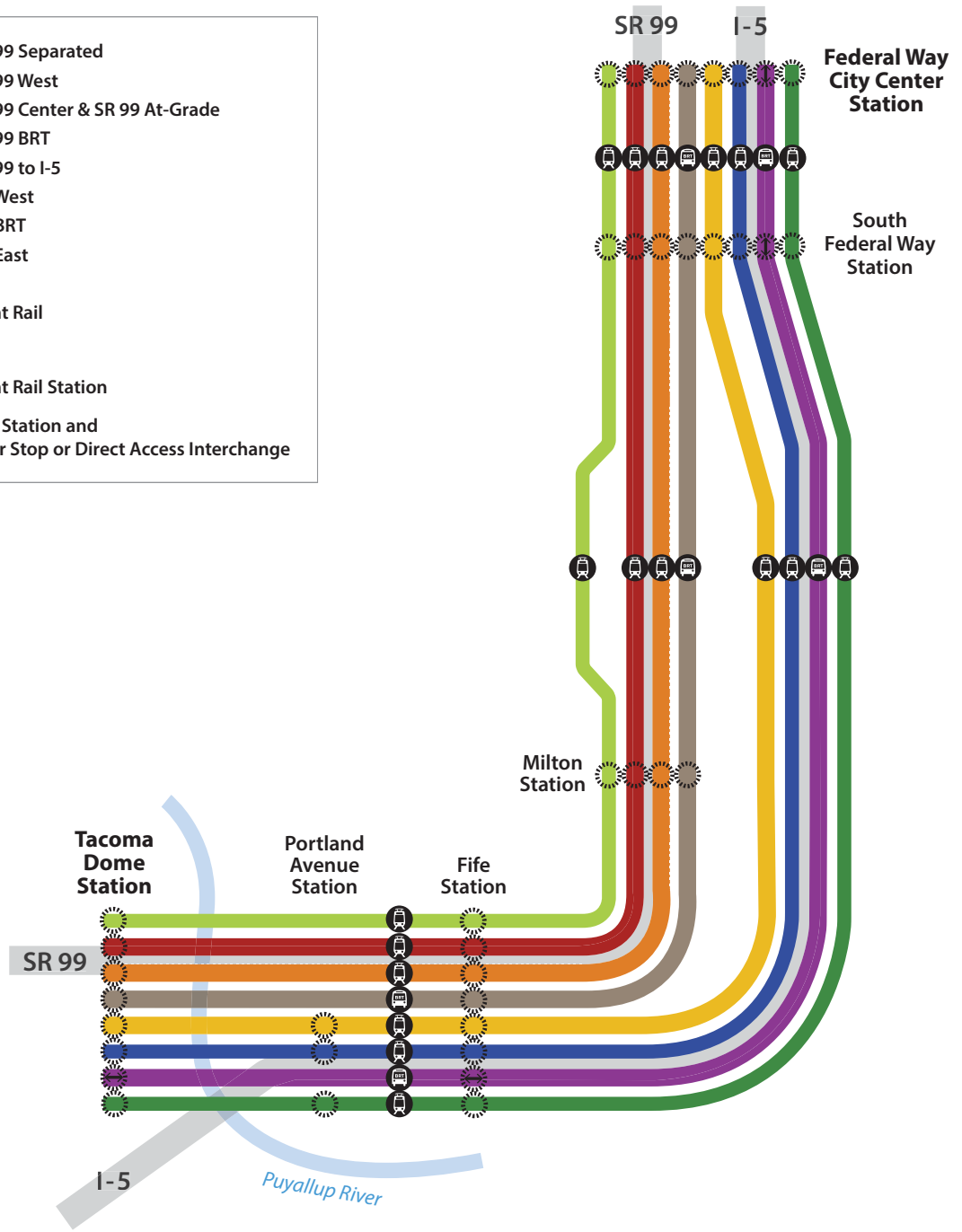
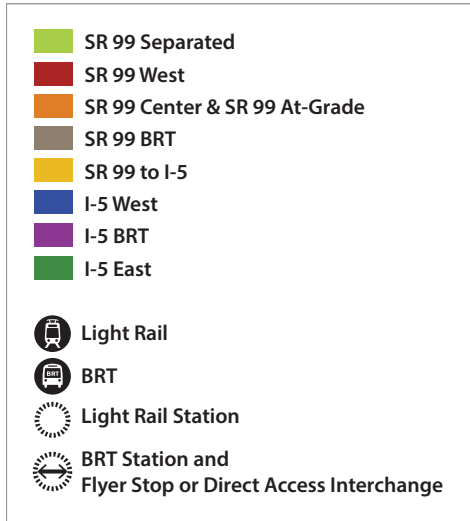


Figure 1-2.
Level 1 Options Summary

- **SR 99 to I-5**—This option places LRT service on an elevated structure in the center median of SR 99 and 16th Avenue S. to I-5. Along I-5 it is the same as the I-5 West Option.
- **I-5 West**—This option places LRT service primarily on an elevated structure along the west side of I-5 with short at-grade sections.
- **I-5 East**—This option places LRT service primarily on the east side of I-5 and includes a mix of elevated and at-grade sections.
- **SR 99 BRT**—This option implements BRT service on SR 99.
- **I-5 BRT**—This option implements BRT service on I-5.

Figure 1-3, Level 1 Ratings Summary, broadly compares the potential for operational efficiency, development potential, environmental impacts, and capital cost of the options. At this conceptual level, the ratings provide a comparative evaluation of what options would be lower or higher performing and do not represent specific effects. Table 1-1, Estimated Range of Costs for the Level 1 Options, gives conceptual capital cost estimates (low/high) for the options based on very preliminary schematic designs. These conceptual numbers are for comparative purposes only. Chapter 4 of this Final Report presents further information about the options and summarizes the data used for the Level 1 analysis.

Review of the Level 1 evaluation and findings resulted in the SR 99 At-Grade and SR 99 BRT options not advancing to the Level 2 evaluation mainly due to operational efficiency ratings. Another result was the addition of one new light rail option in the Level 2 evaluation, the SR 99 Hybrid. This option combines portions of the SR 99 West, Center, and At-Grade alignments with the intent of creating a potentially lower cost option that has operational characteristics similar to the other LRT options.

Figure 1-3. Level 1 Ratings Summary



Table 1-1. Estimated Range of Costs for the Level 1 Options

OPTION	LOW (2013\$, Billions)	HIGH (2013\$, Billions)
SR 99 West	1.8	2.1
SR 99 Center	1.8	2.1
SR 99 At-Grade	1.0	1.2
SR 99 Separated	1.9	2.2
SR 99 to I-5	1.8	2.1
I-5 West	1.8	2.0
I-5 East	1.7	1.9
SR 99 BRT	< 0.1	< 0.1
I-5 BRT	0.4	0.6

1.4 Level 2 Evaluation

A more detailed evaluation of six light rail options and one BRT option was conducted in the Level 2 evaluation. Figure 1-4, Level 2 Options, shows the schematic alignment for each option. The Level 2 options are:

- SR 99 West**—This option places LRT service along the west side of SR 99. The alignment is primarily elevated with an at-grade section between south Federal Way and Milton. There are four stations along the alignment in South Federal Way, Milton, Fife, and near the Tacoma Dome.
- SR 99 Center**—This option places LRT service in the center median of SR 99. The alignment is elevated for the entire length of the corridor. There are four stations along the alignment in South Federal Way, Milton, Fife, and near the Tacoma Dome.
- SR 99 Hybrid**—This option is a modified version of the SR 99 At-Grade Option evaluated in Level 1. The SR 99 Hybrid Option places an elevated LRT alignment in the center median of SR 99 to the South Federal Way Station. The alignment then transitions to at-grade along the west side of the roadway before shifting to the center of SR 99 to the Milton Station. South of the Milton Station, the at-grade alignment shifts back to the west side of the roadway. It transitions back to an elevated structure as it enters Fife and has the same configuration as the SR 99 Center Option as it continues to the Fife and Tacoma Dome stations. This option has the same station areas as the SR 99 West and SR 99 Center options; however, the Milton Station is at-grade instead of elevated.
- SR 99 to I-5**—This option places LRT service on an elevated structure in the center median of SR 99 and 16th Avenue S. to I-5 where it would then follow the I-5 West Option. Stations with this option are located in South Federal Way, Fife, near E. Portland Avenue, and at the Tacoma Dome.

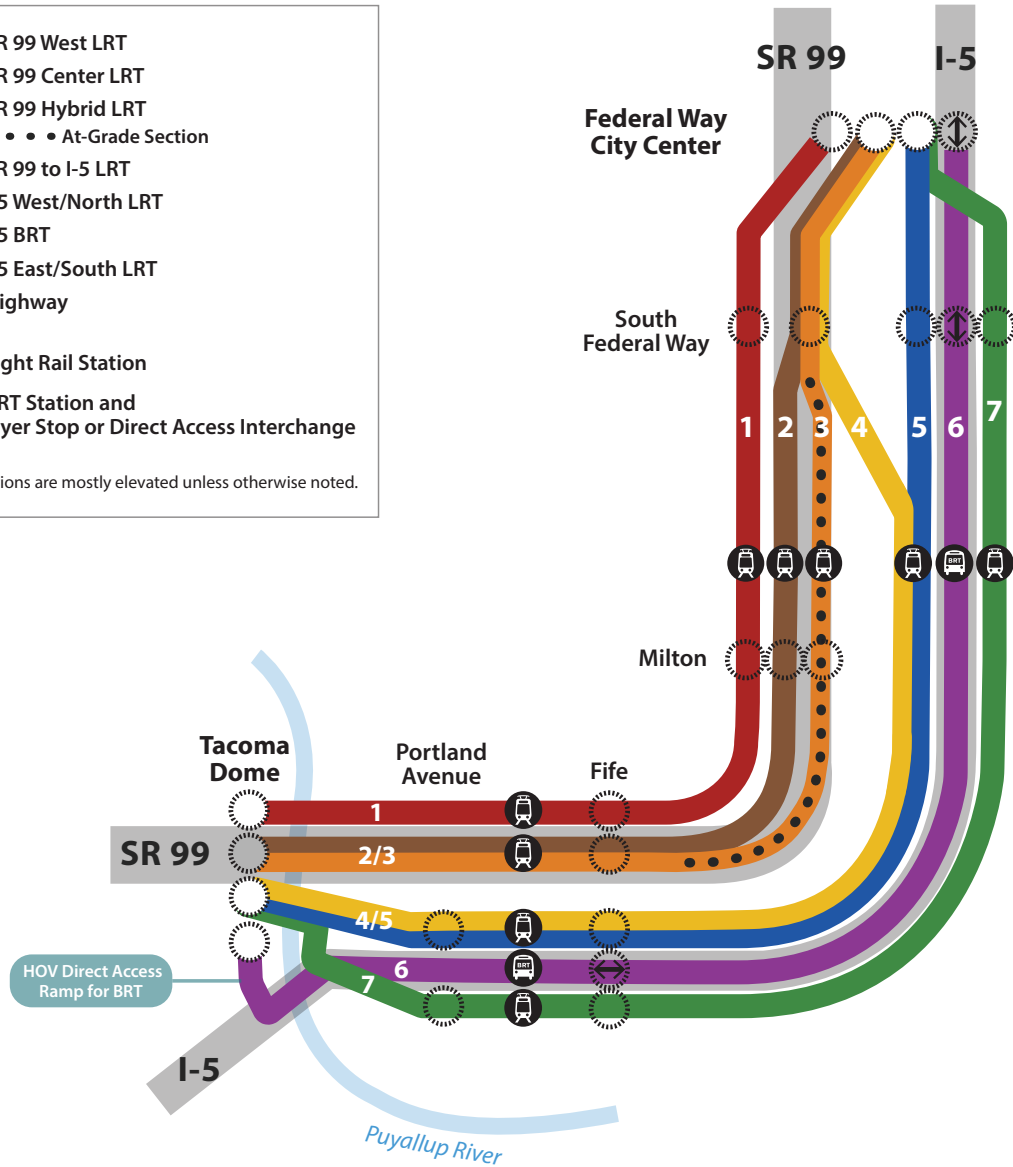
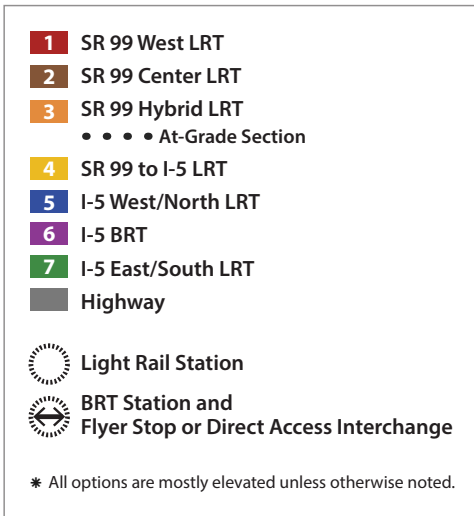


Figure 1-4.
Level 2 Options Summary

- **I-5 West**—This option places LRT service primarily on an elevated structure along the west side of I-5 with short at-grade sections. There are four stations along the alignment in South Federal Way, Fife, near E. Portland Avenue, and at the Tacoma Dome.
- **I-5 East**—This option places LRT service primarily on the east side of I-5 and includes a mix of elevated and at-grade sections. The alignment crosses to the north side of I-5 just east of the Puyallup River. There are four stations along the alignment in South Federal Way, Fife, near E. Portland Avenue, and at the Tacoma Dome.
- **I-5 BRT**—This option places BRT service on I-5. The buses use available high-occupancy vehicle (HOV) lanes on the freeway, and direct access ramps are provided at interchanges to connect to stations in South Federal Way, Fife, and Tacoma.

Figure 1-5, Level 2 Ratings Summary, broadly compares the potential for each option to perform in the various evaluation criteria developed for the Level 2 analysis. The ratings are assessed across a low to high range. These ratings are for the relative comparison of the options and do not represent specific effects.

Figure 1-5. Level 2 Ratings Summary

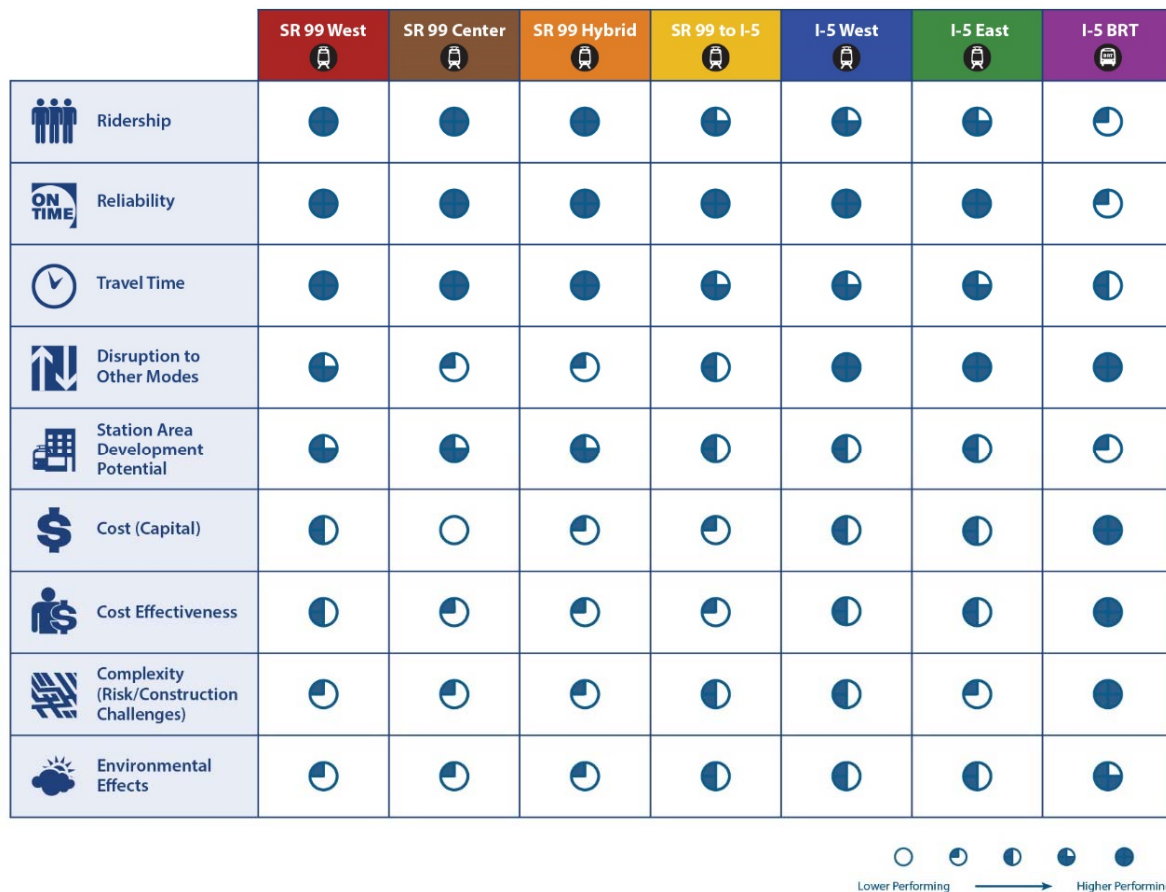


Table 1-2, Estimated Range of Costs for the Level 2 Options, provides an indication of capital costs based on the preliminary schematic designs; these are conceptual numbers intended for comparative purposes only.

Table 1-2. Estimated Range of Costs for the Level 2 Options

LEVEL 2 OPTION	LOW (2013\$, Billions)	HIGH (2013\$, Billions)
SR 99 West	1.9	2.2
SR 99 Center	2.5	2.9
SR 99 Hybrid	2.3	2.6
SR 99 to I-5	2.0	2.3
I-5 West	1.7	1.9
I-5 East	1.7	1.9
I-5 BRT	0.6	0.7

2 OVERVIEW OF THE CORRIDOR

In studying potential HCT improvements for the Federal Way to Tacoma Corridor, Sound Transit considered transportation plans and policies, land use patterns and plans, and the existing infrastructure. Population, demographics, and other environmental conditions that could influence the type and location of potential HCT improvements were also considered. Sound Transit also engaged agencies and tribes in the initial planning process to discuss potential types of HCT improvements.

2.1 Transportation Plans and Programs

Regional transit planning has a long history in the Puget Sound area, including the Federal Way to Tacoma Corridor, and much progress has been made to create the foundation of the region's current regional transit plans. The current transit plans that are in effect for the study area include *Sound Move* (Sound Transit's 1996 voter-approved *Ten-Year Regional Transit System Plan*), Sound Transit's *Regional Transit Long-Range Plan*, and *Sound Transit 2: A Mass Transit Guide—The Regional Transit System Plan for Central Puget Sound*, approved by voters in 2008.

Transit plans and programs in the South King County and Pierce County area that could affect transit planning include:

Washington State Department of Transportation (WSDOT)

- *Moving Washington*—WSDOT's vision of investments and priorities for the next 10 years to operate efficiently, manage demand, and add capacity strategically
- I-5 Improvements at Joint Base Lewis-McChord
- SR 509 Extension and I-5 Improvement
- SR 167 Extension
- Completion of SR 99 HOV lanes in Federal Way
- Completion of I-5/SR 18/SR 161 Triangle Interchange Improvements

Pierce County

- Pierce County Transportation Plan
- Transportation Improvement Program

Pierce Transit

- Transit Development Plan

2.2 Land Use Planning

2.2.1 Comprehensive and Land Use Plans and Policies

State and Regional Plans and Policies

Washington State's Growth Management Act (GMA) requires state and local governments to manage growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, and preparing comprehensive plans supported by capital investments and development regulations.

The Puget Sound region has a coordinated series of regional, county, and local plans and policies that guide how the region manages its growth, consistent with the state's GMA. The primary plans at the regional level are the Puget Sound Regional Council's (PSRC) *VISION 2040* (PSRC 2009) and *Transportation 2040* (PSRC 2010).

Part of PSRC's *VISION 2040*'s transportation policy is to support growth and provide greater mobility options for the growing number of people living and working in the region. The Federal Way City Center and downtown Tacoma are identified by PSRC as regional growth centers and the Port of Tacoma is identified as a manufacturing and industrial center within the urban growth boundary (PSRC 2013). Both the SR 99 and I-5 corridors connect these growth centers. The South Federal Way and Milton stations are not within a designated regional growth center. The Fife Station is within the Port of Tacoma regional manufacturing/industrial center.

Local Plans and Policies

Adopted local plans and policies for the cities (Federal Way, Milton, Fife, and Tacoma) potentially affected by the HCT corridor planning effort include:

- *City of Federal Way Comprehensive Plan* (City of Federal Way, originally adopted in 2007 with subsequent amendments; last amended in 2013)
- *Federal Way Bicycle and Pedestrian Master Plan* (City of Federal Way 2012)
- *City of Milton Comprehensive Plan* (City of Milton 2002)
- *City of Fife Comprehensive Plan* (City of Fife 2005)
- *City of Tacoma Comprehensive Plan* (City of Tacoma, last amended June 2012)

Local plans and policies also include zoning ordinances, subarea plans, and functional plans.

2.2.2 Land Use Patterns

On the west side of I-5 between the Federal Way Transit Center and south Federal Way, the land use is predominantly commercial. Along the east side of I-5 in Federal Way there are office and residential uses. The City of Federal Way plans to increase mixed-use development in the city core near the Federal Way Transit Center and create more intensive residential communities supported by transit south of the core.

From south Federal Way through Milton, the development density is lower with a mixture of residential, industrial, and commercial uses, as well as open space. In Fife the land uses are predominantly commercial, mixed use, and industrial with large sections of land surrounding I-5 designated as mixed use in the future. In Tacoma, the land uses are primarily mixed use and industrial.

2.3 Population and Employment

The areas of highest employment density are the two regional growth centers, the Federal Way City Center and downtown Tacoma. The Port of Tacoma manufacturing and industrial center is also a major employment area.

All of the communities along the Federal Way to Tacoma HCT Study Corridor have a fairly low residential population within ½ mile of SR 99 and I-5. The land use in the SR 99 and I-5 corridors in Federal Way is predominantly commercial, with few residences. Milton is a relatively low-density residential community with most of its population located east of the I-5 corridor. Near the boundary between Milton and Fife, there are residential developments located to the west of the SR 99 corridor. Along the SR 99 and I-5 corridors in Fife, there is a low residential population because the land uses are predominantly commercial and service oriented. The residential population within ½ mile of the Tacoma Dome Station, where the corridor ends, is also low but the area serves a large population due to the station's transit center and events at the Tacoma Dome.

2.4 Demographics

Census tract statistics from the 2011 5-Year American Community Survey were used to estimate minority, Hispanic, and low-income populations within ½ mile on either side of the corridors and within ½ mile of potential station areas to assess demographics and identify if any differences exist.

The SR 99 corridor and I-5 corridor each have a minority population of approximately 36 percent. Both corridors exceed the weighted average for the combined King County and Pierce County region by approximately 8 percent.

Overall, there is not a noticeable difference among the SR 99 and I-5 corridors in the composition of the populations residing within ½ mile of the options. All corridors are more diverse compared to the weighted averages for minority, Hispanic, and low-income populations in the combined King County and Pierce County region. The area between Fife and Tacoma along the I-5 corridor has the highest percentage of minority, Hispanic, and low-income populations (primarily located to the south of I-5 near E. Portland Avenue). The central portion of the SR 99 corridor near Milton has the lowest minority, Hispanic, and low-income population percentages.

The SR 99 corridor include a slightly higher percentage of Hispanic and low-income populations than the I-5 corridor. For low-income populations, this is primarily because the potential South Federal Way Station near S. 348th Street at SR 99 includes a higher low-income population compared to the potential locations located along I-5.

All of the options would support equitable mobility and accessibility for minority and low-income populations.

2.5 Environmental Conditions

As part of developing the options and evaluating impacts for this study, data were collected to identify environmentally sensitive areas, including:

- Historic properties
- Archaeological resources
- Wetlands, streams, and waterbodies
- Fish, wildlife, and plant species listed as threatened or endangered under the Endangered Species Act (ESA) or by the State of Washington
- Parks, trails, and recreational facilities
- Schools, churches, cemeteries, and other community facilities

2.6 Travel Demand and Ridership

2.6.1 Existing Highways and Major Local Roads

The major limited-access highways in the study corridor include:

- I-5
- SR 18
- SR 509

Other major state highways and principal arterials in the study area include:

- SR 99
- SR 161
- S. 320th Street in Federal Way
- S. 348th Street in Federal Way
- 54th Avenue E. in Fife
- Port of Tacoma Road in Fife
- E. Portland Avenue in Tacoma

Potential station areas along the corridor are located on or adjacent to these major roadways to provide convenient access and connections to residential areas in the vicinity of the corridor.

2.6.2 Travel Patterns and Transit Usage in the Corridor

Existing and projected travel patterns and potential transit usage in the Federal Way to Tacoma HCT Corridor Study area were evaluated to determine areas that are well-served by existing transit and areas where strong travel demands exist, but transit usage is low. Transit mode shares are not anticipated to increase dramatically for travel within the South King-Pierce County study area. This is a reflection of the

relatively low-density and automobile-oriented nature of the study area. Serving transit demand is more feasible in areas with high densities because low density areas require more routes and vehicles to provide adequate transit coverage.

Commute trips from the study area (see Figure 3-1) are primarily destined to points north of the corridor such as Sea-Tac Airport and Seattle. Secondary markets in the study corridor exist between downtown Tacoma, Federal Way, and Fife.

Projected ridership is directly affected by station location, access to population and employment, and travel times. Ridership estimates were prepared using the regional travel demand model adapted for use in this study. Ridership is anticipated to be higher than the total boardings in the study corridor because some riders board light rail at stations north of the Federal Way Transit Center.

At least half of the daily riders on the Federal Way to Tacoma HCT Corridor are likely to travel to and from downtown Seattle or Sea-Tac Airport. About 8 percent of the daily riders travel to downtown Seattle, then transfer to reach destinations east of Lake Washington, such as Bellevue or Redmond. Ten to 25 percent of the Federal Way to Tacoma HCT daily riders are making “short trips” that begin and end between Tacoma and Federal Way. The remaining riders are taking trips to areas such as south King County, Rainier Valley, SODO, Capitol Hill, University of Washington, or the north end.

3 ALTERNATIVES DEVELOPMENT

A draft purpose and need statement was developed to help guide this study and to inform the Sound Transit Board about the need for HCT in the Federal Way to Tacoma corridor as they consider the possible expansion of the transit network during future system planning. If a project is identified to move forward in the future, this draft purpose and need would be updated and further developed during a future alternatives analysis or environmental process.

3.1 Purpose and Need

3.1.1 Purpose of the Federal Way to Tacoma HCT Corridor Study

The purpose of the potential improvement represented by the options evaluated in the Federal Way to Tacoma HCT Corridor Study is to improve regional and sub-regional mobility through possible expansion of and access to the regional transit system for southern King County and Pierce County residents, employees, and visitors. This goal could be accomplished by extending the high-capacity transit system between Federal Way and Tacoma to provide direct connections with Sounder commuter rail, Tacoma Link and Central Link light rail, Amtrak passenger rail (upon planned relocation to the Tacoma Dome Station area), and ST Express, Pierce Transit, and King County Metro bus transit systems.

Figure 3-1 shows the study area. It extends between the cities of Federal Way and Tacoma and includes portions of the cities of Milton and Fife, a small portion of unincorporated King County, and land owned and/or administered by the Puyallup Tribe of Indians. Potential improvements will increase mobility and access by:

- Providing reliable, rapid, and efficient two-way, peak, and off-peak transit service with sufficient capacity to meet the existing and projected demand between the communities and activity centers located in the corridor and to those connected to the larger regional transit system.
- Providing a mobility alternative to travel on congested roadways and improving connections to and expanding the capacity of the regional multimodal transportation system.
- Supporting the corridor communities' and the region's adopted land use, transportation, and economic development vision, which promotes the well-being of people and communities, enhances economic vitality, and preserves a healthy environment.

3.1.2 Need for the Federal Way to Tacoma HCT Corridor Study

A high-capacity transit service is needed in the study corridor to:

- Meet the rapidly growing connectivity needs of the corridor and the region's current and future residents and workers by increasing mobility, access, and transportation capacity to and from regional growth and activity centers in Tacoma, Federal Way, and the rest of the region, as called for in the region's adopted plans, including PSRC's *VISION 2040* (PSRC 2009) and *Transportation 2040* (PSRC 2010), the Countywide Planning Policies for Pierce County and King County, as well as related county and city comprehensive plans.

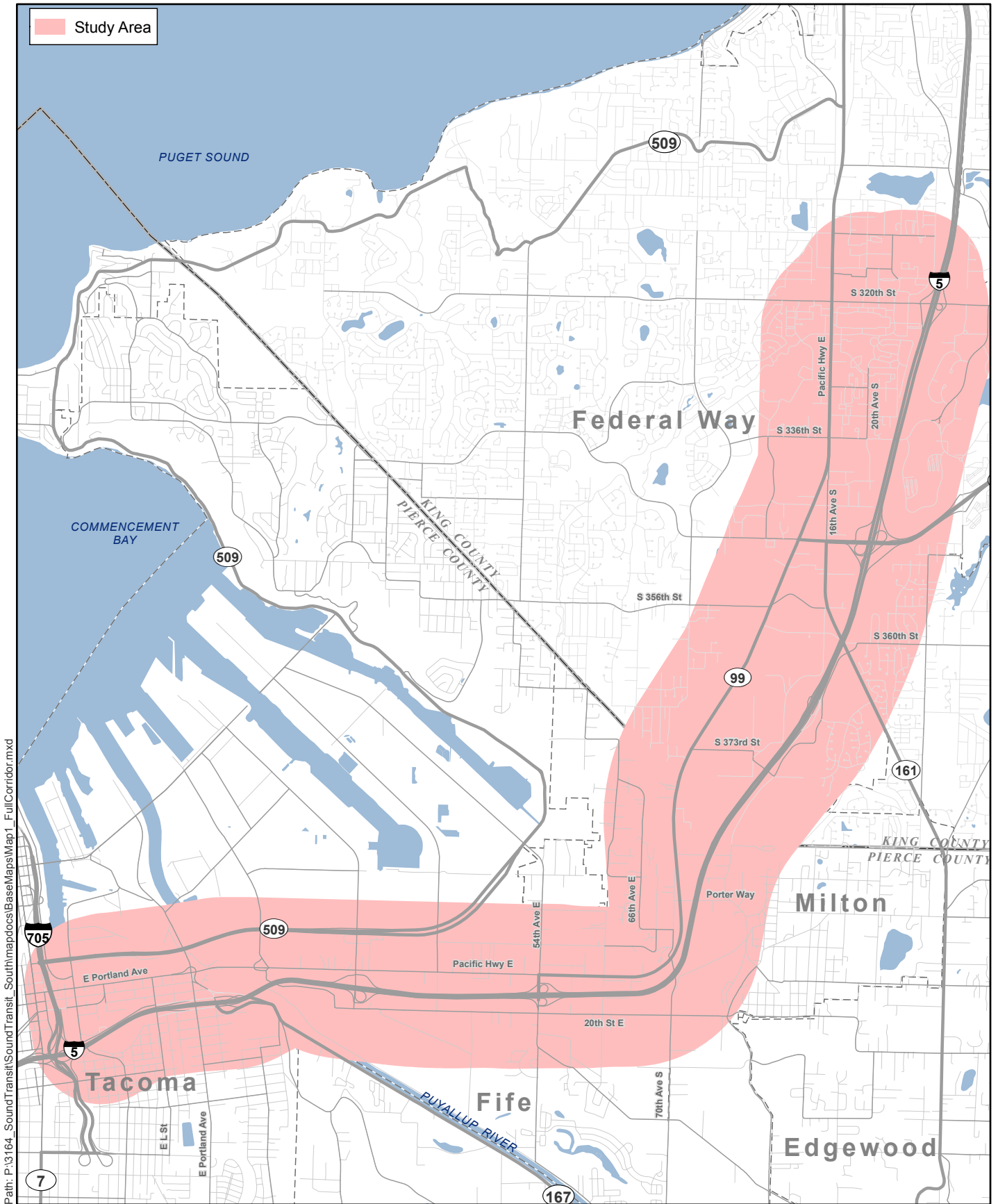


Figure 3-1.
Study Area

- Address the problem of unreliable travel time for transit users in the corridor who are dependent on highly congested roadways and HOV systems on I-5.
- Address overcrowding facing current and future transit riders due to insufficient capacity of the current transit system in the corridor.
- Provide an alternative to automobile trips using I-5 and SR 99 (Pacific Highway S.)—the two primary highways serving the corridor which experience congested and over-capacity conditions throughout significant portions of the day. Overall travel safety and comfort can potentially be improved by reducing automobile use and traffic congestion.
- Connect regional growth centers in the corridor and encourage economic development within those areas. Expanding transit connections from Federal Way to Tacoma would encourage and support denser, more transit-oriented development; concentrate jobs; and provide greater opportunities to reduce the number of vehicle miles traveled for commuting. The *City of Tacoma Comprehensive Plan—Growth Strategy and Development Concept Element* (City of Tacoma 2013) includes policies that specify the City’s intention to locate major residential and employment growth in mixed use and manufacturing/industrial centers. The *Federal Way Comprehensive Plan* (City of Federal Way 2013) includes goals to redevelop the City Center into a high-density, mixed-use urban core.
- Serve increasing commuter trips between the downtown Tacoma core and Federal Way via transit. The PSRC’s 2002 report on the *Downtown Tacoma Regional Growth Center* (PSRC 2002) indicated that Tacoma’s downtown core contains a majority of the jobs within the city and is projected to continue to do so in the future. An increasing number of commuters will need alternative ways to access jobs within the downtown Tacoma core. The *Federal Way Comprehensive Plan* indicates that Tacoma is a destination outside of the city that generates trips and is in need of increased transit service.
- Support local land use planning and economic development goals. The City of Tacoma is currently undertaking planning processes for the South Downtown subarea (Dome/Brewery District). The planning process is designed to encourage transit-oriented, mixed-use development and economic revitalization in areas of Tacoma that are designated for future regional growth concentrations. The City of Federal Way is undertaking efforts to transform its "City Center" as an area of concentrated employment and housing. The Cities of Fife and Milton are also planning for increased growth in housing, commercial activity, and employment within the corridor. Expanding transit within the corridor would help to bring these Cities' future growth goals to fruition.
- Support the reduction of pollutants, including greenhouse gas (GHG) emissions. Increasing the use of all public transportation modes is a key strategy to help reduce pollution generated from automobile use and achieve GHG reduction goals for Tacoma and other jurisdictions.
- Address the travel needs of underserved communities and neighborhoods. Many communities and neighborhoods within the corridor are demographically and economically diverse, have not received significant state and regional infrastructure investments, and are not well connected to the transportation system. Lower income, youth, elderly, and physically challenged populations

represent important segments of the transit market that can greatly benefit from improved regional transit.

- Enhance access to regionally significant public and private institutions and facilities. Many facilities and organizations that provide transportation, educational, cultural, and health services to the local community and beyond are within or near the study corridor. Sea-Tac Airport provides national and international passenger and freight air service and has transit connections via Link light rail and other bus services. The Tacoma Dome multipurpose arena, the University of Washington-Tacoma campus, the Washington State Historical Museum and two other museums, and a federal courthouse are located along the Tacoma Link light rail system within walking distance and two stops of Tacoma Dome Station. The Saint Francis Hospital, the King County Aquatic Center, and a large outdoor amusement park are located in the south Federal Way area. Entertainment/gaming venues are located near I-5 in Tacoma and Fife.

3.2 Evaluation Criteria

The draft purpose and need established five objectives that have been used to develop the evaluation criteria and measures. The objectives are to:

- Provide effective transportation solutions to meet mobility, access, and capacity needs
- Support land use plans and economic development
- Preserve the environment
- Support equitable mobility
- Provide an affordable and constructible project

The evaluation criteria and screening measures are listed in Table 3-1, Level 1 and Level 2 Screening. The Level 1 measures were refined as the analysis moved into the Level 2 screening process. The Level 2 measures have been used to assess the differences in performance or potential effects among the options in this evaluation.

Table 3-1. Level 1 and Level 2 Screening

Objective	Evaluation Criteria	Level 1 Measures	Level 2 Measures
Provide Effective Transportation Solutions to meet Mobility, Access, and Capacity Needs	Ridership potential	M1: Travel time	M1: Travel time
			M2: Number and time delay of transfers
		M2: Total population and employment within ½ mile of a station	M3: Daily and annual projected ridership
		M3: Access to existing/future population and employment centers/areas within ½ mile of a station	M4: Projected station boardings
	M4: General accessibility	M5: Integration with Link and local bus facilities and services	
Reliability	M5: Degree of grade-separation and operational exclusivity	M6: System delay potential from at-grade intersections or other factors	

Table 3-1. Level 1 and Level 2 Screening (continued)

Objective	Evaluation Criteria	Level 1 Measures	Level 2 Measures
Support Land Use Plans and Economic Development	Supports adopted plans and policies for land use and economic development in the communities along the corridor	M6: Consistent with comprehensive plan goals and regionally identified centers (PSRC) with high density uses	M7: Assessment of existing and planned land use, high-density zoning and transit-oriented development within ½ mile of potential stations, including connectivity from major trip generators to stations
		M7: Development potential within ½ mile of station	M8: Connectivity within ½ mile of station areas and identification of activity centers
Preserve the Environment	Effects on the natural environment	M8: Presence of major wetlands, streams, or other natural habitat areas within 100 feet of an option	M9: Potential effects on wetlands or other natural habitat areas
			M10: Potential effects on streams/stream crossings
			M11: Potential effects on ESA species in the corridor
	Effects on the built environment	M9: Estimated property acquisitions levels	M12: Estimated property acquisitions levels
			M13: Potential effects on parks, recreational resources, or community facilities
			M14: Potential effects on historic resources
			M15: Potential effects on cultural and archaeological resources
			M16: Potential visual effects along the alignment
M11: Qualitative assessment of visual effects	M17: Potential effects on sensitive noise and vibration receptors		
M12: Presence of noise receptors nearby	This is covered under M6 in the Level 2 Measures.		
M13: Potential for affecting areas with existing congestion			
Support Equitable Mobility	Low-income or minority populations	M14: General demographic differences among options' census data	M18: General demographic differences among options' census data
Provide an Affordable and Constructible Project	Cost considerations	M15: Estimated capital cost (2013)	M19: Estimated capital cost (2013)
			M20: Estimated operating cost (2013)
	Design considerations	M16: Potential risks (major utilities or structures)	M21: Potential conflicts with major utilities
M22: Number of sites requiring environmental remediation within ¼ mile of an option			
			M23: Construction challenges

3.3 Involvement with Jurisdictions and Tribes

Sound Transit engaged agencies and tribes in the initial planning process for the Federal Way to Tacoma HCT Corridor Study (as part of the South Corridor Alternatives Planning) in order to share information, discuss potential options, and ask for feedback to identify any needs or issues. Sound Transit drafted an Agency and Tribal Coordination Plan in April 2013. Staff held individual meetings with the Puyallup Tribe of Indians and the following agencies between May and September 2013:

- City of Auburn
- City of Bonney Lake
- City of DuPont
- City of Edgewood
- City of Federal Way
- City of Fife
- City of Fircrest
- City of Lakewood
- City of Milton
- City of Pacific
- City of Puyallup
- City of Steilacoom
- City of Sumner
- City of Tacoma
- City of University Place
- Pierce Transit

At these meetings, Sound Transit provided an overview of the HCT study and shared the draft purpose and need, screening criteria, and options to be evaluated. Sound Transit also met with WSDOT and King County Metro staff and shared a high level of information with these agencies.

Additional agencies were contacted but meetings did not occur. Updates and opportunities for input will continue at key milestones during the planning process.

Input received from local jurisdictions, agencies, and stakeholders during this study provides additional information for the Sound Transit Board to consider when updating the Regional Transit Long-Range Plan. Should the Board decide in the future to pursue a HCT project of the types included in this study, this early engagement can be useful in the development of further alternatives for more detailed analysis.

3.4 Initial Screening

An initial screening of possible options was conducted to determine the options to evaluate in the Level 1 screening. Because of topographic and development constraints, options outside of the I-5 and SR 99 vicinity were not advanced for further consideration. Options west of SR 99 in Milton and north of SR 99 in Fife were not advanced because they would potentially require long tunnel segments or be located within Port of Tacoma intermodal transfer facilities. Options east of I-5 in Milton and south of I-5 in Fife were not advanced because the alignment length and travel time would increase and the areas served by potential station areas are not planned for higher-density transit-oriented development.

One option along the SR 509 corridor through north Fife was considered in the initial screening with a terminus in downtown Tacoma adjacent to the University of Washington Tacoma campus. This option was not advanced into the Level 1 evaluation because:

- The option bypassed the Fife City Center area and did not provide a Fife station.
- Intermodal transfer opportunities at the Tacoma Dome Transit Center would not be provided.
- Redevelopment opportunities in the Tacoma Dome/Brewery District would be affected by the lack of light rail service directly to Sea-Tac Airport and Seattle.

Reconsideration of this option during the Level 1 evaluation showed that the overall ridership was 10 to 20 percent lower than other options. As a result, it continued not to be included in the Level 1 options.

4 SUMMARY OF LEVEL 1 EVALUATION

This section describes the options and briefly summarizes the evaluation and findings for the Level 1 evaluation completed in September 2013.

4.1 Level 1 Options

Two high-capacity transit modes, LRT and BRT, were considered in the Level 1 evaluation. The LRT options include multiple profile and alignment options in the corridors as summarized in Table 4-1, Option Types Initially Considered. BRT would operate on the existing roadways in either the SR 99 or I-5 corridor.

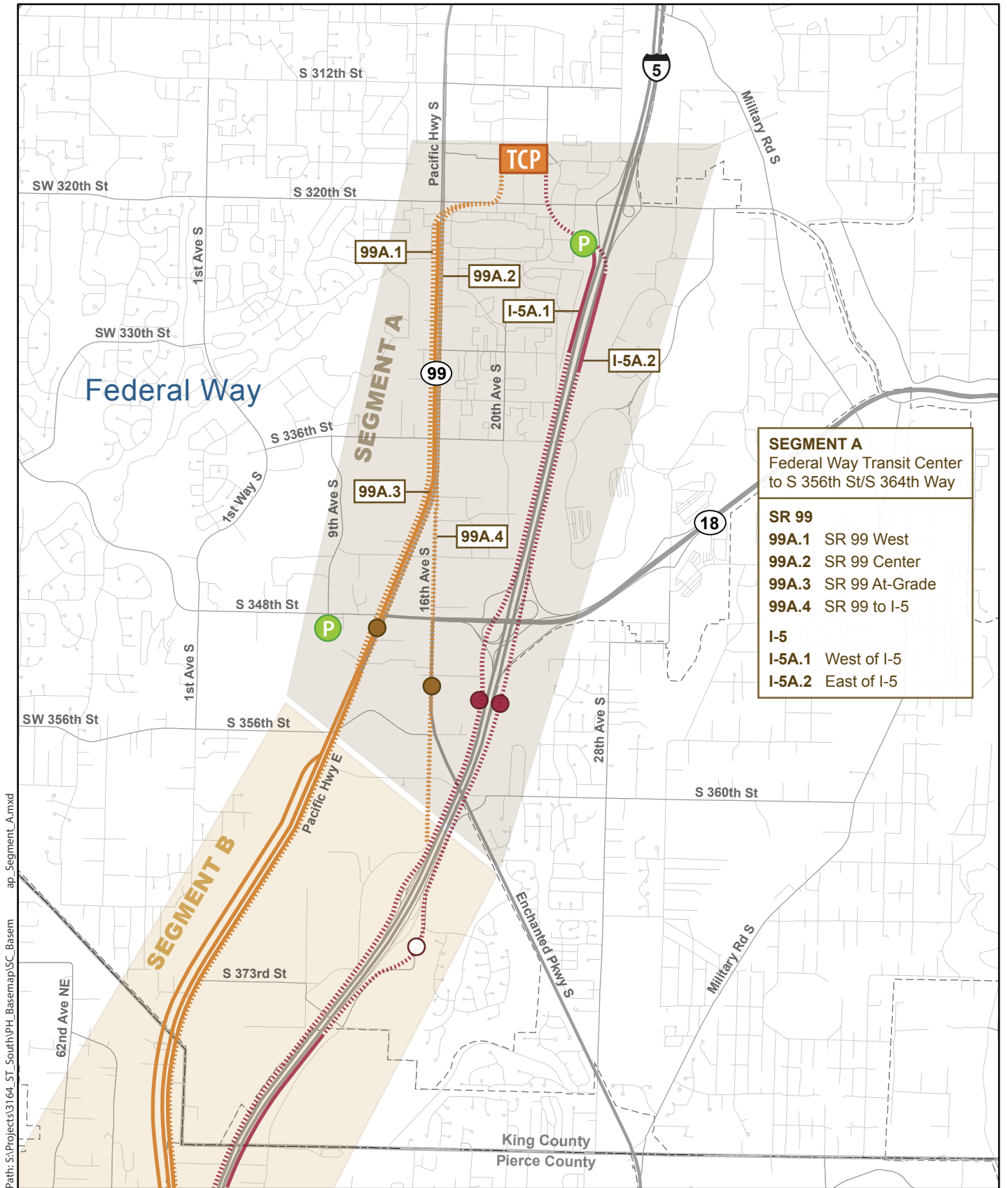
Table 4-1. Option Types Initially Considered

Mode		LRT
		BRT
Profile		Elevated
		At-grade
		Mixed
Alignment	SR 99	West side of SR 99
		Center of SR 99
		Separated from SR 99
	I-5	West and north side of I-5
		East and south side of I-5

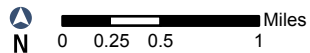
This led to seven LRT and two BRT options being developed and evaluated for the Level 1 analysis:

- SR 99 West LRT
- SR 99 Center LRT
- SR 99 At-Grade LRT
- SR 99 Separated LRT
- SR 99 to I-5 LRT
- I-5 West LRT
- I-5 East LRT
- SR 99 BRT
- I-5 BRT

For all of the LRT options, the exact location for the Puyallup River crossing is unknown at this early stage of study. Should a project in this corridor be developed in the future, coordination with the Puyallup Tribe of Indians would take place during the development of alternatives, alternatives analysis, and the environmental documentation phases. Figures 4-1 through 4-3 show the general profile and alignment configurations for the LRT options. Figure 4-4 shows the general alignments for the BRT corridors.

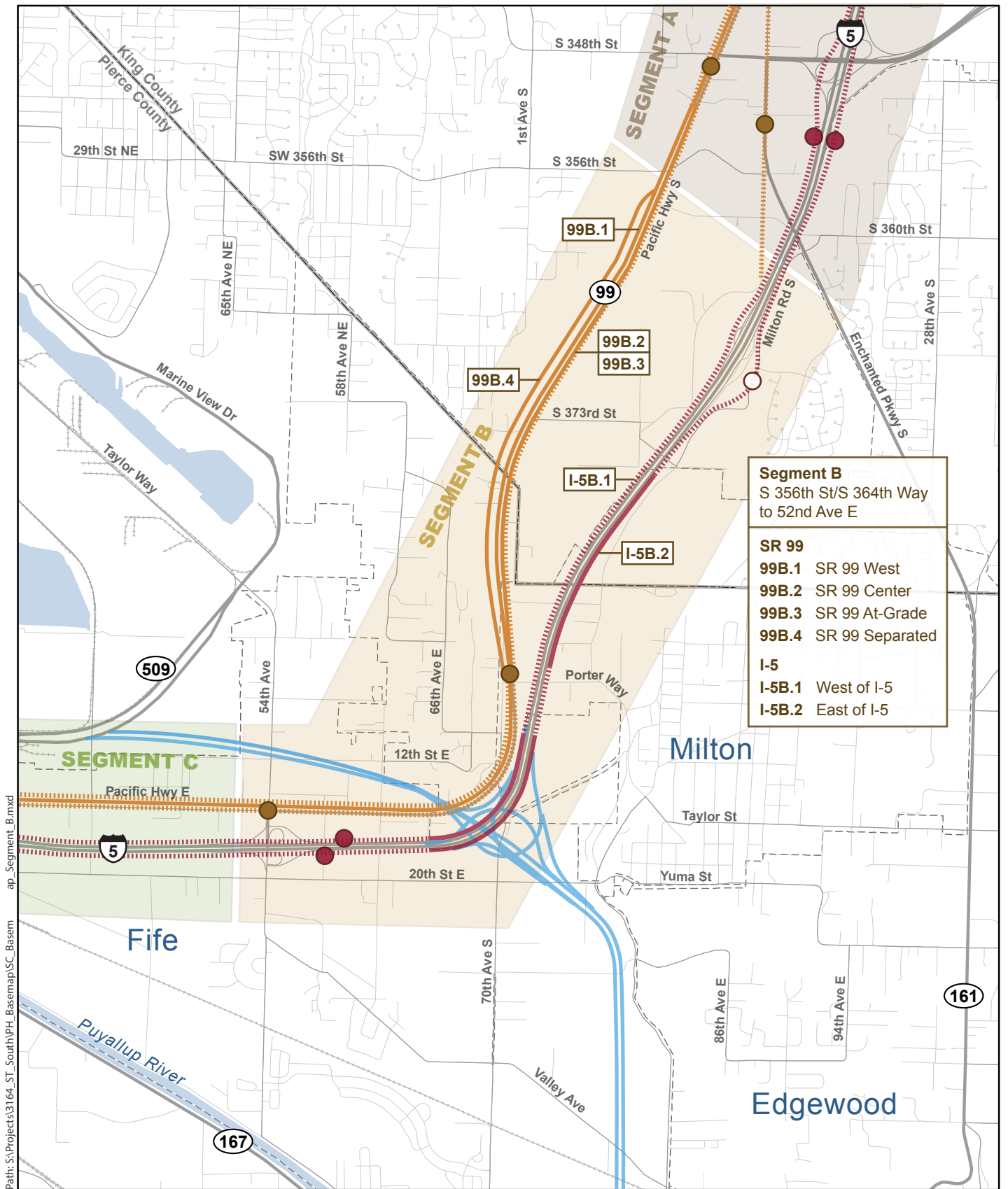


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- SR 99 Corridor
- Station Area Options
- I-5 Corridor
- Station Area Options
- Alternate Station Area Option
- At-Grade
- Elevated
- Park & Ride
- Transit Center and Park & Ride

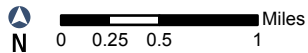
Figure 4-1.
Level 1 Light Rail Options
(Map 1 of 3)



Segment B
S 356th St/S 364th Way to 52nd Ave E

SR 99
 99B.1 SR 99 West
 99B.2 SR 99 Center
 99B.3 SR 99 At-Grade
 99B.4 SR 99 Separated

I-5
 I-5B.1 West of I-5
 I-5B.2 East of I-5



- SR 99 Corridor
- Station Area Options
- I-5 Corridor
- Station Area Options
- Alternate Station Area Option
- At-Grade
- - - Elevated
- Future SR 167 Extension

Figure 4-2.
Level 1 Light Rail Options
(Map 2 of 3)

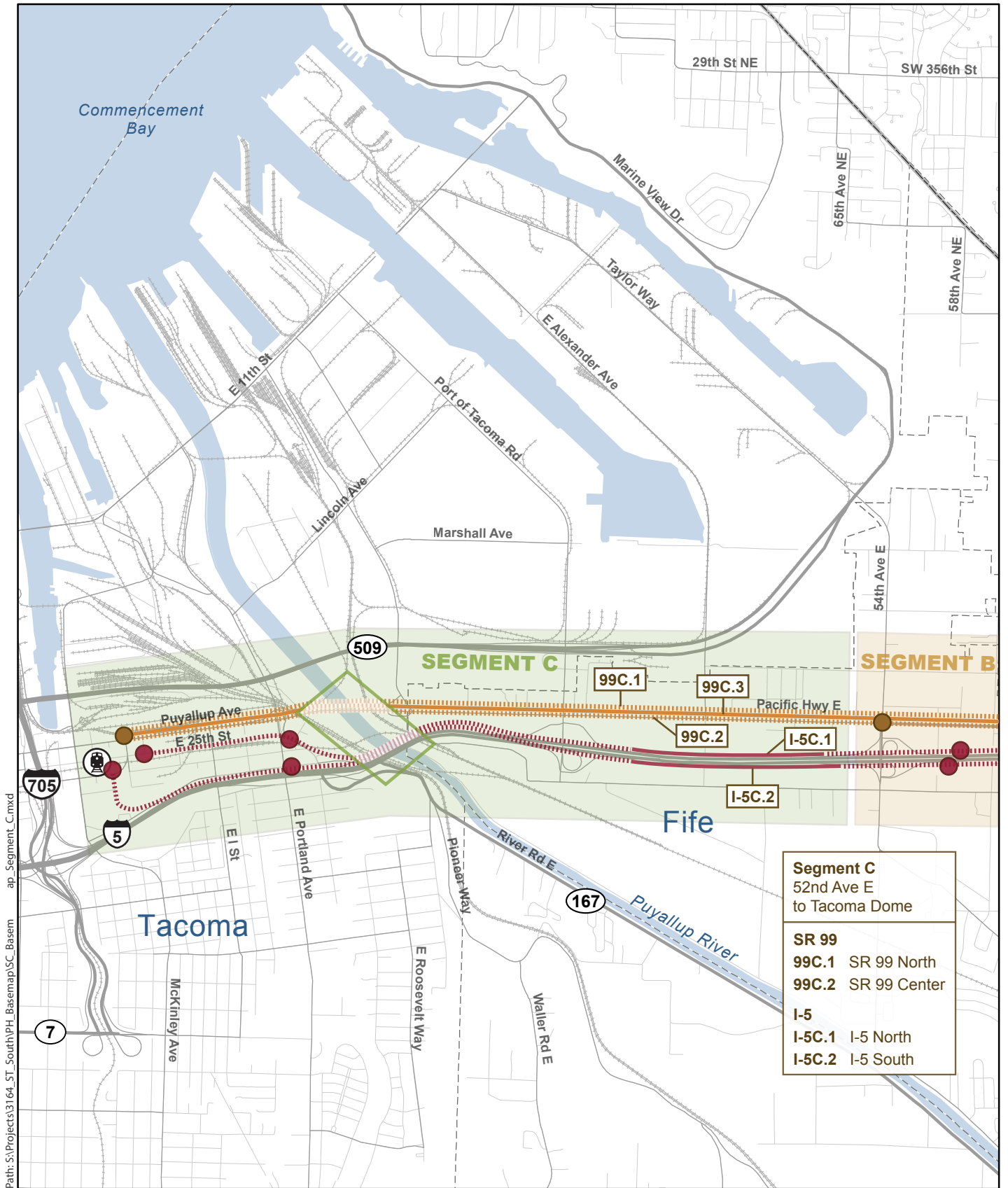


Figure 4-3.
Level 1 Light Rail Options
(Map 3 of 3)

4.1.1 Common to all SR 99 LRT Options

All of the SR 99 LRT options begin at the Federal Way Transit Center and place LRT along the west side of 20th Avenue S. and the north side of S. 320th Street before reaching SR 99. The SR 99 LRT options cross under the Bonneville Power Administration's (BPA) high-voltage transmission lines near S. 324th Street.

Each of the SR 99 LRT options have four potential station areas located in:

- South Federal Way near S. 348th Street
- Milton near Porter Way
- Fife near 54th Avenue E.
- Tacoma on Puyallup Avenue adjacent to the Tacoma Dome Station

4.1.2 SR 99 West Option

The SR 99 West Option is elevated and places LRT along the west side of SR 99 to a potential South Federal Way Station area located just south of S. 348th Street. South of the station, at approximately S. 351st Street, the profile for this option transitions to at-grade. Between S. 351st Street in Federal Way to Birch Street in Milton, the SR 99 West Option is at-grade along the west side of the roadway. The profile then transitions back to an elevated profile with potential station areas near Porter Way in Milton and 54th Avenue E. in Fife.

The SR 99 West Option continues the elevated light rail alignment along the west side of SR 99 through Fife to the Tacoma Dome District and a potential station area located on Puyallup Avenue.

4.1.3 SR 99 Center Option

The SR 99 Center Option is elevated along the center median of SR 99 from Federal Way to Tacoma with potential stations located near S. 348th Street in Federal Way, Porter Way in Milton, 54th Avenue E. in Fife, and on Puyallup Avenue in Tacoma.

4.1.4 SR 99 At-Grade Option

The SR 99 At-Grade Option places LRT at-grade along the center median of SR 99 from Federal Way to Tacoma with potential stations located near S. 348th Street in Federal Way, Porter Way in Milton, 54th Avenue E. in Fife, and on Puyallup Avenue in Tacoma.

4.1.5 SR 99 Separated Option

The SR 99 Separated Option is the same as the SR 99 West Option to S. 356th Street in Federal Way. Just south of S. 359th Street, the SR 99 Separated Option curves west and is separated from the SR 99 roadway. The alignment curves back to the west side of SR 99 near Birch Street in Milton. The profile is at-grade between approximately S. 356th Street and Birch Street in Milton. South of Birch Street it transitions back to an elevated profile and is the same as the SR 99 West Option. The SR 99 Separated Option has the same potential stations areas as the other SR 99 options.

4.1.6 SR 99 to I-5 Option

The SR 99 to I-5 Option begins as the other SR 99 LRT options. From the Federal Way Transit Center, the option places LRT along the west side of 20th Avenue S. and the north side of S. 320th Street before reaching SR 99. The option crosses under BPA's high-voltage transmission lines near S. 324th Street. The SR 99 to I-5 Option is elevated along the center median of SR 99 until it intersects 16th Avenue S. The SR 99 to I-5 Option then follows 16th Avenue S. to S. 364th Way where it connects to the I-5 West Option. A station is located on 16th Avenue S. near S. 352nd Street.

Once this option reaches I-5, it is the same as described below in Section 4.1.7, I-5 West Option.

4.1.7 I-5 West Option

From the Federal Way Transit Center, the I-5 West Option places LRT along the east side of 23rd Avenue S. After crossing S. 320th Street, the option curves east to meet I-5 near S. 324th Street. BPA's high-voltage transmission lines cross the I-5 corridor near S. 322nd Street. This option has a short at-grade section from S. 322nd Street to S. 333rd Street in order to cross underneath these lines. The rest of the alignment is elevated between the Federal Way Transit Center and S. 364th Way. This option then parallels the west side of I-5 with a station area located just south of the I-5/SR 18 interchange.

The I-5 West Option is elevated between S. 364th Way and 52nd Avenue E., except for a short at-grade section underneath the proposed SR 167 new interchange with I-5. A station is located near 59th Avenue Court E. in Fife.

Between Fife and the Tacoma Dome, the light rail alignment for the I-5 West Option is elevated except for a short at-grade section between 54th Avenue E. and the Port of Tacoma Road. This option places LRT along the north side of I-5, with a station at E. Portland Avenue, and then curves north just before reaching the Tacoma Dome at a station area near E. F Street and E. 26th Street.

4.1.8 I-5 East Option

The I-5 East Option places LRT on an elevated structure south from the Federal Way Transit Center along the east side of 23rd Avenue S. After crossing S. 320th Street, the option curves east to cross over I-5 just south of S. 324th Street. BPA's high-voltage transmission lines cross the I-5 corridor near S. 322nd Street. The transmission lines need to be raised to provide sufficient vertical clearance for the I-5 East Option.

After crossing I-5, this option then places LRT along the east side of I-5 with a short at-grade section to S. 333rd Street, and from just south of SR 18 to S. 340th Street. This option could have a station area just south of the I-5/SR 18 interchange or at an alternate location south of Enchanted Parkway adjacent to the Wild Waves Amusement Park.

The I-5 East Option has at-grade sections from S. 375th Street to near Porter Way and underneath the proposed SR 167 interchange, but is otherwise elevated through Milton and Fife. A station is located near 58th Avenue E. in Fife.

Between Fife and the Tacoma Dome, the light rail alignment for the I-5 East Option is elevated, except for a short at-grade section between 54th Avenue E. and the Port of Tacoma Road. This option places LRT along the south side of I-5 through the Port of Tacoma/I-5 interchange. The alignment then crosses

over I-5 to the north side and approaches the Tacoma Dome District station area along E. 25th Street. Stations are located near E. Portland Avenue and near the Tacoma Dome along E. 25th Street.

4.1.9 SR 99 BRT Option

After leaving the Federal Way Transit Center, buses travel south in the HOV lane on SR 99 between S. 316th Street and S. 359th Street (HOV lanes are anticipated to be extended to S. 359th Street by 2017). The SR 99 BRT Option includes six potential station areas near:

- S. 320th Street (Federal Way)
- S. 348th Street (Federal Way)
- Porter Way (Milton)
- 54th Avenue E. (Fife)
- Port of Tacoma Road (Fife)
- Tacoma Dome Station (Tacoma)

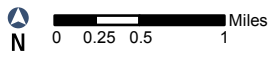
Through Milton, Fife, and into Tacoma, buses travel in general-purpose traffic lanes with transit signal priority and queue jump lanes assumed at signalized intersections. All of the stations in between the Federal Way Transit Center and Tacoma Dome Station have pullouts so that the buses do not block traffic on SR 99 when loading and unloading. At the Tacoma Dome Station, the BRT service terminates in the existing bus bay area near Puyallup Avenue and E. G Street.

4.1.10 I-5 BRT Option

The I-5 BRT Option begins at the Federal Way Transit Center where buses use the S. 317th Street direct access ramp to I-5. BRT travels south in the I-5 HOV lanes all the way to Tacoma, with flyer stops near Enchanted Parkway in south Federal Way and 54th Avenue E. in Fife. In Tacoma, the I-5 BRT Option uses new direct access ramps from the center HOV lanes on I-5 to connect to the Tacoma Dome Station near E. L Street. The planned HOV lanes on I-5 south of the Port of Tacoma Road are currently in final design. At the Tacoma Dome Station, the BRT service terminates in the existing bus bay area near Puyallup Avenue and E. G Street.

4.1.11 Options Not Advanced in Level 1

An option located in the center of I-5 was considered but not advanced in the Level 1 analysis because it conflicts with the recent SR 18 interchange improvements. In addition, the construction challenges and cost to widen and realign I-5 to accommodate light rail in the center of the freeway are prohibitive.



ROADWAYS
 — Interstates, Freeways
 — Other Principal Arterials
 (All included except where noted. Label in GIS)

--- City Boundary
 --- County Boundary
 --- Tribal Boundary

P Park & Ride
TCP Transit Center and Park & Ride
 Sounder Rail Line Station and Parking
 Tacoma Link

Pacific Highway BRT Option
 Arterial BRT Station Areas
 I-5 BRT Option
 Freeway BRT Station Areas

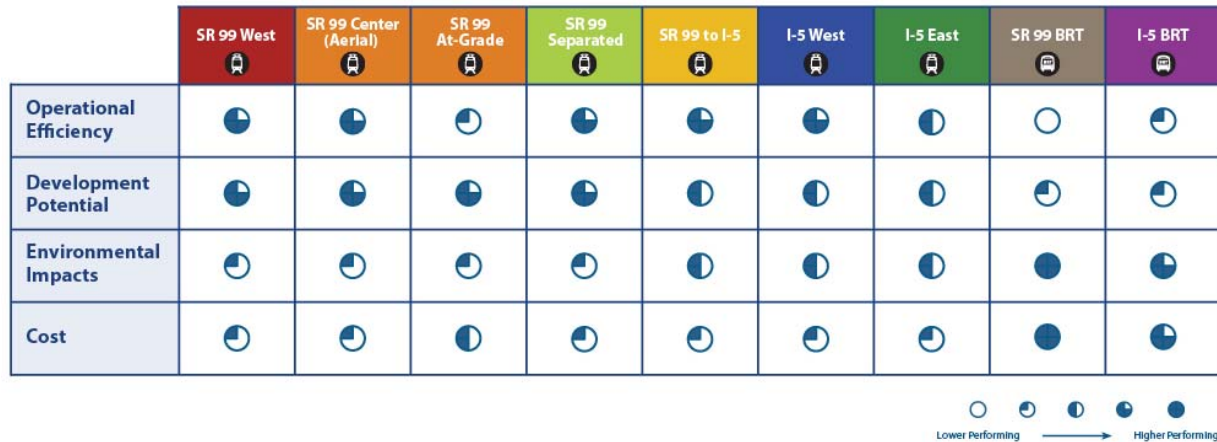
Future SR 167 Extension
 New Direct Access Ramps

Figure 4-4.
 Level 1 BRT Options

4.2 Level 1 Findings

Based on the schematic designs, Figure 4-5, Level 1 Ratings Summary, presents the ratings for each option to differentiate or support whether an option is advanced to the Level 2 evaluation.

Figure 4-5. Level 1 Ratings Summary



The LRT options advanced into the Level 2 evaluation are the SR 99 West, SR 99 Center, SR 99 to I-5, I-5 West, and I-5 East options. The I-5 BRT Option was also advanced. The SR 99 At-Grade and SR 99 Separated LRT options, and SR 99 BRT options were not advanced into the Level 2 evaluation.

Additional information about each option studied can be found in the Level 1 Evaluation Report.

4.2.1 SR 99 West, SR 99 Center, and SR 99 Separated Options

As shown in Figure 4-5, the operational efficiency for the SR 99 West, SR 99 Center, and SR 99 Separated options is rated moderately high. This is because the ridership potential for these options is strong due to consistent and relatively fast travel times. The development potential around these LRT options is rated moderately high because there is good access to park-and-ride facilities and transfer services, including access to population and employment centers. The rating for environmental impacts is lower because of potential impacts to streams, wetlands, and views. The SR 99 Separated Option has the potential to affect more wetlands and natural habitat areas compared to the other options. Constructing LRT along SR 99 has a high number of property impacts and requires a new crossing of the Puyallup River. The rating for cost is lower because all of these options have a higher cost compared to other options.

4.2.2 SR 99 At-Grade Option

The operational efficiency rating is lower for the SR 99 At-Grade Option because travel time and reliability are impacted by adjacent intersection congestion when vehicle queues extend through intersections. The option also requires up to 20 signal retiming and capacity improvements along SR 99. The development potential around these LRT options is rated moderately high because there is good access to park-and-ride facilities and transfer services, as well as to population and employment centers. The rating for environmental impacts is lower because of potential impacts to streams, wetlands, and

views. Constructing LRT along SR 99 has a high number of property impacts and requires a new crossing of the Puyallup River. The SR 99 At-Grade Option is the lowest cost option out of the LRT options resulting in a moderate cost rating.

4.2.3 SR 99 to I-5 Option

As shown in Figure 4-5, the operational efficiency for the SR 99 to I-5 Option is rated moderately high. This is because it also has a strong ridership potential due to consistent and relatively fast travel times between Federal Way and Tacoma. The development potential around this option is rated moderate because there is good access to park-and-ride facilities and transfer services, as well as to population and employment centers along the SR 99 portion of the alignment. However, there is less potential for development where the alignment is constrained by I-5 and the existing built environment. The rating for environmental impacts is also moderate because of potential impacts to streams, wetlands, and views. This option requires a new crossing of the Puyallup River. The rating for cost is lower because the SR 99 to I-5 Option is one of the higher cost options.

4.2.4 I-5 West and I-5 East Option

The operational efficiency for the I-5 West Option is rated moderately high because it has a strong ridership potential due to consistent and relatively fast travel times and good access to park-and-ride facilities and transfer services. The operational efficiency for the I-5 East Option is rated moderate because there is less general accessibility to park-and-ride facilities and transfer services that are primarily located on the west side of I-5. The development potential around both of these options is rated moderate because the alignments are constrained by I-5 and the existing built environment. The rating for environmental impacts is also moderate for both options because construction within WSDOT right-of-way limits some of the impacts to natural resources and the number of property acquisitions. Both options require a new crossing of the Puyallup River. The rating for cost is lower because both of these options have a relatively high cost compared to other options.

4.2.5 SR 99 BRT Option

The flexibility in the number and locations of stations allows the SR 99 BRT Option to have good access to population and employment centers. However, due to congestion along SR 99, it also has the lowest ridership and longest travel times out of all of the options, which results in a low operational efficiency rating. Because ridership is low, the development potential around stations is also low. This option has few environmental impacts because it operates in the existing SR 99 roadway, resulting in a high rating for environmental impacts. The SR 99 BRT Option also has a high rating for cost because it is the lowest cost option.

4.2.6 I-5 BRT Option

With the I-5 BRT Option, the location and limited number of stations provides less access to population and employment centers. Because of potential congestion on I-5, it also has lower ridership and potentially longer travel times than the LRT options. As a result, the operational efficiency and development potential ratings for this option are low. The I-5 BRT service operates in the inside HOV lane. If the HOV lane is managed to 45 mph or better per WSDOT guidelines (which, among other

techniques, could require a change in occupancy requirements), travel times could be maintained similar to LRT options. The I-5 BRT Option has some environmental impacts and costs associated with building new direct access ramps and flyer stops. The potential environmental impacts and costs are much less than for the LRT options but higher than for the SR 99 BRT Option, resulting in a moderately high rating for both evaluation criteria.

4.3 Level 1 Results

After reviewing the Level 1 evaluation and findings, the SR 99 At-Grade, SR 99 Separated, and SR 99 BRT options were not advanced into the Level 2 evaluation.

The SR 99 At-Grade Option travel time and reliability are impacted by congestion at intersections, which requires signal retiming and likely capacity improvements at up to 20 signalized intersections along SR 99. Constructing light rail at-grade along the center of SR 99 restricts left turns except at signalized intersections and results in a high number of property impacts from roadway widening.

The SR 99 Separated Option is the same as the SR 99 West Option except for where it diverges from the roadway. In this section it has a higher potential to impact wetlands and does not result in any benefits to travel time. The SR 99 Separated Option also likely requires more full property acquisitions than the other options because it does not follow an existing road alignment and affects more vacant land than commercial uses.

The SR 99 BRT Option has the lowest ridership and longest travel times out of all of the options due to congestion along SR 99. It does not meet Sound Transit's vision for HCT projects.

One LRT option was added as a result of the Level 1 evaluation, the SR 99 Hybrid. This new option combines portions of the SR 99 Center Option with an at-grade alignment from south Federal Way to Fife. The purpose of adding the SR 99 Hybrid Option to the Level 2 evaluation was to analyze an LRT option with relatively fast travel speeds while reducing property acquisitions and overall cost.

5 SUMMARY OF LEVEL 2 EVALUATION

This section describes the station and alignment options that were advanced from the Level 1 evaluation into a more detailed Level 2 evaluation. The station and alignment conceptual design information used as the basis for the Level 2 evaluation was advanced to a more detailed level, including refined estimates for potential right of way costs. The Level 2 options were evaluated using an expanded list of 23 measures compared to 16 measures used in the Level 1 evaluation (refer to Table 3-1 for a list of Level 1 and Level 2 measures). The LRT and BRT options are shown in Figures 5-1 to 5-3.

Six LRT and one BRT option were developed and analyzed in the Level 2 evaluation:

- SR 99 West
- SR 99 Center
- SR 99 Hybrid
- SR 99 to I-5
- I-5 West
- I-5 East
- I-5 BRT

5.1 Level 2 Options

5.1.1 SR 99 West Option

The SR 99 West Option begins at the Federal Way Transit Center and has four stations along the alignment:

- South Federal Way
- Milton
- Fife
- Tacoma Dome

From the Federal Way Transit Center, the SR 99 West Option places LRT south along the west side of 20th Avenue S., and crosses over S. 320th Street and the northwest portion of The Commons mall parking lot, as it curves west to SR 99. This option is elevated along the west side of SR 99 to the South Federal Way Station. The station platform is elevated and spans S. 348th Street. A 500-stall parking garage is located on the southwest corner of the SR 99 and S. 348th Street intersection.

South of the station, this option transitions to at-grade along the west side of SR 99 from approximately S. 359th Street to just south of Birch Street in Milton where the profile transitions back to an elevated structure. The Milton Station is on the west side of SR 99 with an elevated platform just north of Porter Way and a 200-stall parking garage just south of Porter Way.

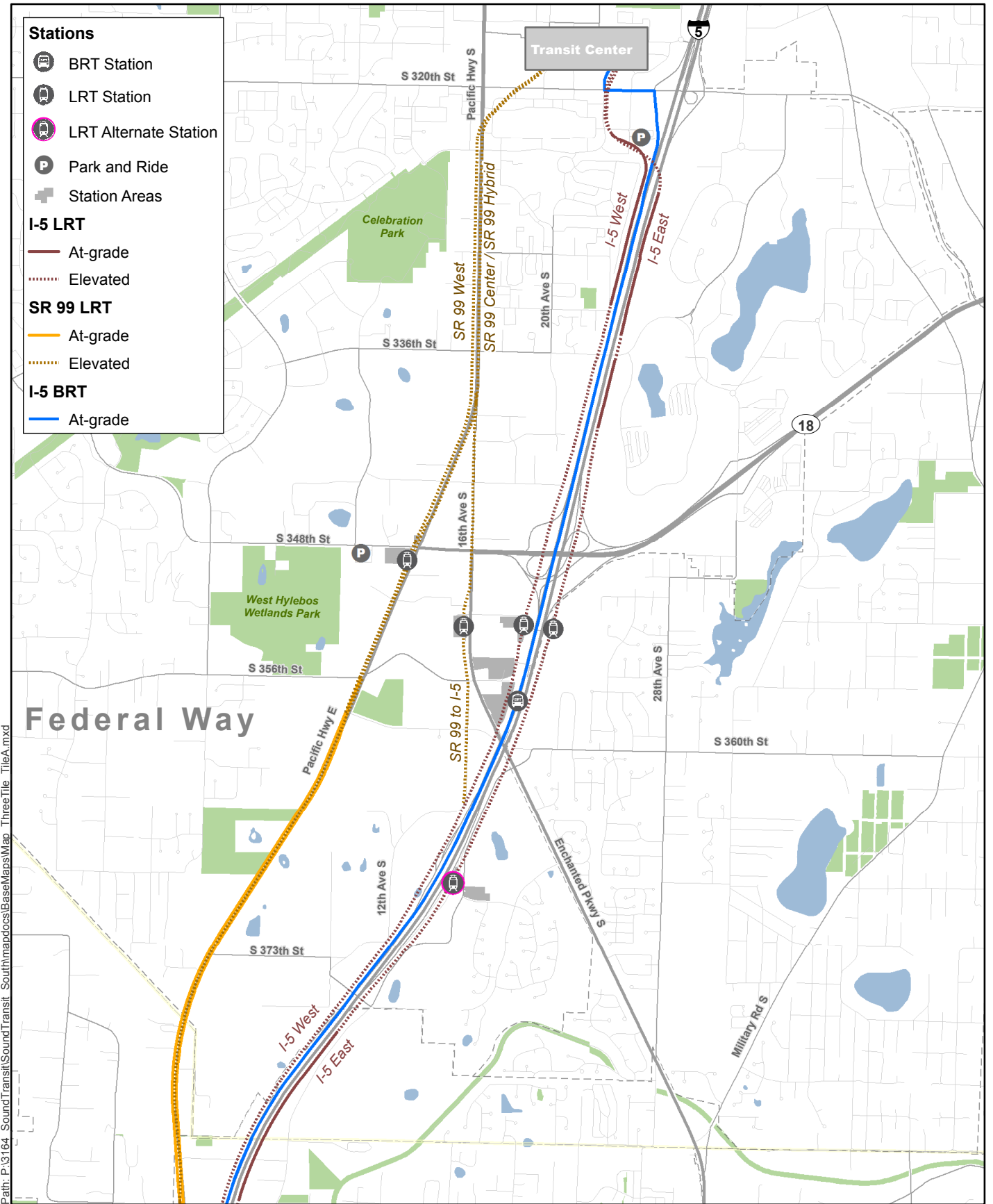
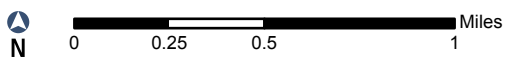


Figure 5-1.
Level 2 HCT Options
(Map 1 of 3)





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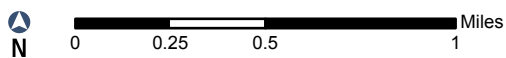
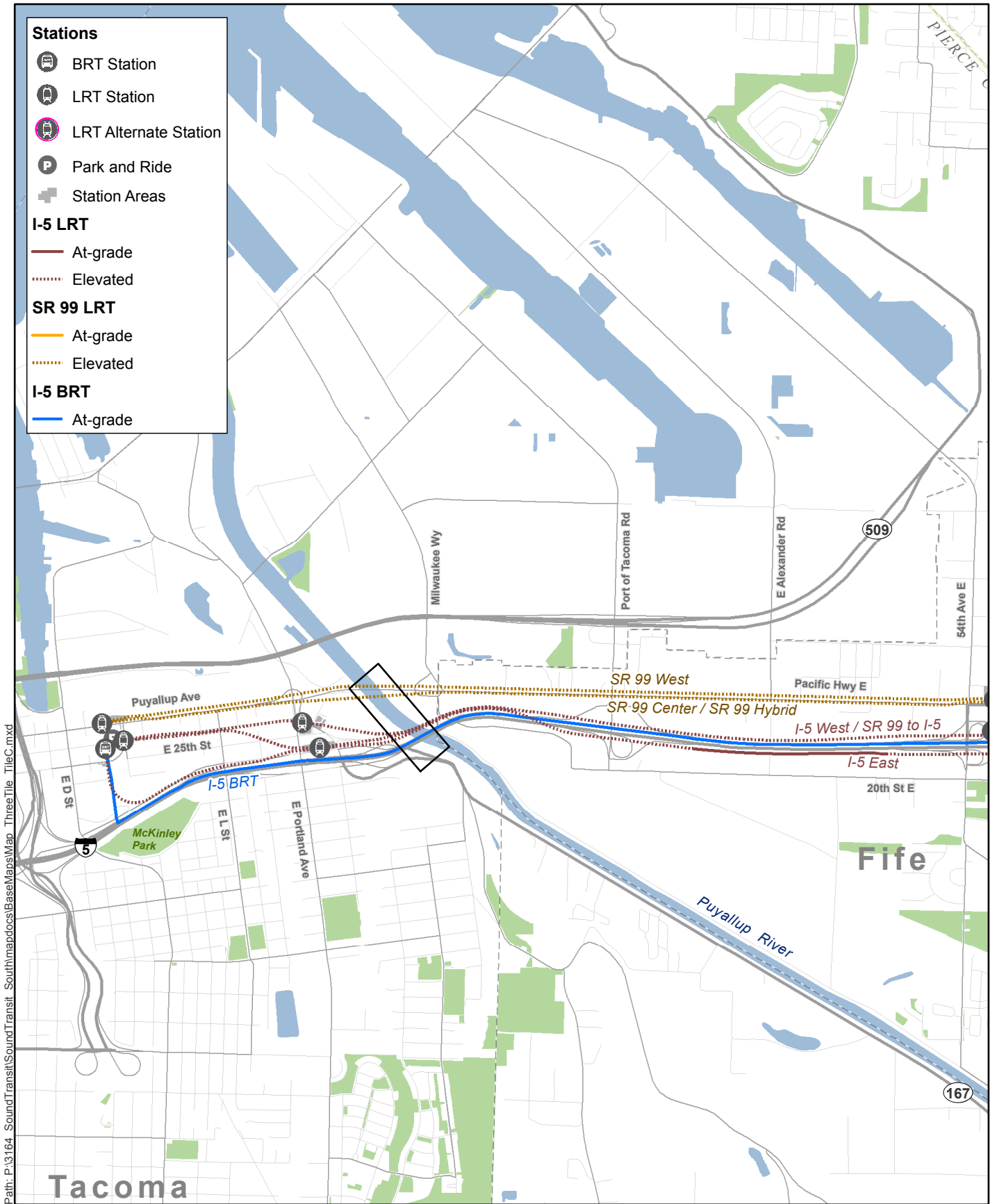
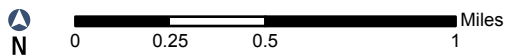


Figure 5-2.
Level 2 HCT Options
(Map 2 of 3)



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Location of new bridge for Puyallup River crossing to be determined during future project work



Figure 5-3.
Level 2 HCT Options
(Map 3 of 3)

The SR 99 West Option is elevated as it continues south through Fife to Tacoma. The option is on the north side of SR 99 and the Fife Station is located just east of 54th Avenue E. The station has an elevated platform and 300-stall parking garage.

The exact location for crossing the Puyallup River has not been determined. For this early analysis, the option is parallel to the SR 99 crossing and continues along Puyallup Avenue to the Tacoma Dome Station area. The station is located north of the existing Tacoma Dome Station parking garage on Puyallup Avenue between E. F Street and E. G Street. The station has an elevated platform with a pedestrian bridge connecting to the existing garage.

5.1.2 SR 99 Center Option

The SR 99 Center Option begins at the Federal Way Transit Center and is entirely elevated to the Tacoma Dome Station. From the Federal Way Transit Center, the SR 99 Center Option is located on the west side of 20th Avenue S., and crosses over S. 320th Street and the northwest portion of The Commons mall parking lot, as it curves west to SR 99. This option is located in the center of SR 99, except at station areas where the alignment curves to the west or north side of the roadway. The four stations and their parking facilities are located at:

- South Federal Way—500-stall parking garage
- Milton—200-stall parking garage
- Fife—300-stall parking garage
- Tacoma Dome—Connect to the existing parking garage

The SR 99 Center Option's station locations and parking garages are the same as for the SR 99 West Option. All of the stations have elevated platforms.

5.1.3 SR 99 Hybrid Option

The SR 99 Hybrid Option begins on an elevated structure at the Federal Way Transit Center, places LRT along the west side of 20th Avenue S., and crosses over S. 320th Street and the northwest portion of The Commons mall parking lot, as it curves west to SR 99. This option is elevated in the center median of SR 99 and curves to the west side of the roadway at the South Federal Way Station.

The SR 99 Hybrid Option has the same station locations and proposed parking garages as the SR 99 West and SR 99 Center options:

- South Federal Way—500-stall parking garage
- Milton—200-stall parking garage
- Fife—300-stall parking garage
- Tacoma Dome—connects to the existing parking garage

This option is the same as the SR 99 Center Option from the Federal Way Transit Center to the South Federal Way Station. The SR 99 Hybrid Option remains elevated along the west side of the roadway from the South Federal Way Station until it crosses S. 356th Street. South of S. 356th Street, the option transitions to an at-grade center alignment. The alignment continues at-grade in the center of SR 99 to the Milton Station at Porter Way. South of the Milton Station, the at-grade alignment crosses the

southbound lanes of SR 99 and travels along the west side of the roadway. The alignment transitions back to an elevated structure as it enters Fife, near 65th Avenue E. From this point, the SR 99 Hybrid Option has the same configuration as the SR 99 Center Option, as it continues to the Fife and Tacoma Dome stations. The at-grade Milton Station has side platforms, while the other three stations are elevated with center platforms.

5.1.4 SR 99 to I-5 Option

The SR 99 to I-5 Option is primarily elevated and has four station locations:

- South Federal Way
- Fife
- Portland Avenue
- Tacoma Dome

The SR 99 to I-5 Option begins on an elevated structure at the Federal Way Transit Center, places LRT along the west side of 20th Avenue S., and crosses over S. 320th Street and the northwest portion of The Commons mall parking lot as it curves west to SR 99. This option is elevated in the center median of SR 99 until it reaches 16th Avenue S. The SR 99 to I-5 Option transitions to an elevated structure down the center median of 16th Avenue S., curving to the west side of the road where the South Federal Way Station is located near S. 352nd Street. This station includes a 500-stall parking garage. The alignment continues south on 16th Avenue S. until it meets I-5 near S. 364th Way.

The SR 99 to I-5 Option are the same as the I-5 West Option from this point south. Along I-5, the alignment is located on the edge of the WSDOT right-of-way as much as possible to avoid affecting other properties. The alignment transitions to a short at-grade section from approximately 70th Avenue E. to 62nd Avenue E. to cross under the future SR 167 interchange. The Fife Station is located between the southbound I-5 off-ramp and SR 99 just west of the Emerald Queen Casino and includes a 500-stall parking garage. As the SR 99 to I-5 Option enters Tacoma, a station is located near Portland Avenue at E. Bay Street. This location does not include a parking garage. The alignment continues along E. 25th Street to a station between E. G Street and McKinley Avenue on the east side of Freighthouse Square and the existing Tacoma Dome Station parking garage. A pedestrian bridge connects the station platform to the existing sidewalks and possibly to the parking garage.

5.1.5 I-5 West Option

The I-5 West Option begins at the Federal Way Transit Center and has four stations along the alignment:

- South Federal Way
- Fife
- Portland Avenue
- Tacoma Dome

From the Federal Way Transit Center, the I-5 West Option places LRT along the east side of 23rd Avenue S. After crossing S. 320th Street, the option curves east to meet I-5 near S. 324th Street. This option has a short at-grade section from S. 322nd Street to S. 333rd Street in order to cross underneath BPA's high-

voltage transmission lines. The I-5 West Option is located on the west side and parallel to I-5 with the South Federal Way Station located just south of the I-5/SR 18 interchange at S. 352nd Street. The station platform is elevated and adjacent to a 500-stall parking garage.

This option has short at-grade sections where I-5 curves to the west as it enters Fife, where the alignment travels underneath the proposed SR 167 Extension and between approximately 70th Avenue E. and 62nd Avenue E. in Fife. The rest of the alignment is elevated.

The Fife Station is located east of 54th Avenue E. above the I-5 southbound off-ramp, and a 500-stall parking garage is located just west of the Emerald Queen Casino. The alignment follows I-5 until it crosses the Puyallup River where the I-5 West Option follows E. Bay Street to a station at E. Portland Avenue. Alternatively, the Portland Avenue Station could be located on E. 27th Street and E. Portland Avenue. A parking garage is not included with either Portland Avenue Station location. The alignment continues along E. 25th Street to a station between E. G Street and McKinley Avenue on the east side of Freighthouse Square and the existing Tacoma Dome Station parking garage. A pedestrian bridge connects the station platform to the existing sidewalks and possibly to the parking garage.

5.1.6 I-5 East Option

The I-5 East Option includes a mixture of elevated and at-grade sections, with four station locations:

- South Federal Way
- Fife
- Portland Avenue
- Tacoma Dome

From the Federal Way Transit Center, the I-5 East Option places LRT along the east side of 23rd Avenue S. After crossing S. 320th Street, the option curves east to cross above BPA's high-voltage transmission lines and I-5. Once the alignment is along the east side of I-5, it transitions to at-grade between S. 324th Street and S. 341st Place with a short elevated structure over S. 336th Street. The alignment becomes elevated again as it approaches SR 18. The South Federal Way Station is located just south of the I-5/SR 18 interchange with a pedestrian bridge to connect to the 500-stall parking garage located on the west side of I-5 at S. 352nd Street. Alternatively, this station could be located above WSDOT's weigh station with a pedestrian bridge connecting to a parking garage located at Milton Road S. and S. 369th Street (on the southwest corner of the Wild Waves parking lot).

South of S. 375th Street, the alignment transitions to at-grade up to Emerald Street. The I-5 East Option is also at-grade in the vicinity of 70th Avenue E., to be under the proposed SR 167 Extension. The alignment then transitions back to an elevated structure with a station located at 58th Avenue E. This Fife Station has a pedestrian bridge that connects to the Emerald Queen Casino.

The I-5 East Option transitions to a short at-grade section between 48th Avenue Court E. and the Port of Tacoma/I-5 interchange. The alignment returns to an elevated structure and crosses to the north side of I-5, just west of the Port of Tacoma Road. The Portland Avenue Station is located at E. Portland Avenue and E. 27th Street. The I-5 East Option continues to parallel the north side of I-5 and curves north just before reaching the Tacoma Dome to a station area near E. F Street and E. 26th Street south

of Freighthouse Square and the Tacoma Dome Sounder station. This LRT station is connected to the Sounder station by an elevated walkway over the Sound Transit commuter rail tracks.

5.1.7 I-5 BRT Option

The I-5 BRT Option begins at the Federal Way Transit Center where buses use the S. 317th Street direct access ramp to I-5. Buses travel in the I-5 HOV lanes all the way to Tacoma. Direct access ramps connect to stations in South Federal Way, Fife, and Tacoma. The South Federal Way and Fife stations each include a 500-stall parking garage. In Tacoma, parking is available in the existing Tacoma Dome Station parking garage.

Three configurations are considered in this analysis for the South Federal Way Station. Each of the configurations shift the northbound I-5 lanes slightly east to accommodate the direct access ramp connections or flyer stop in the center HOV lanes, which requires the Enchanted Parkway S. overpass to be reconstructed. The three configurations are:

- **South Federal Way Station with S. 356th Street flyer stop**—This configuration locates the platforms for the freeway flyer stop along the center HOV lanes with a pedestrian walkway connecting to the parking garage on the west side of I-5. The parking garage is located just north of S. 356th Street.
- **South Federal Way Station with S. 356th Street HOV/transit direct access interchange**—This configuration locates the station and parking garage just north of S. 356th Street with a ramp connecting to the center HOV lanes.
- **South Federal Way Station with Enchanted Parkway S. flyer stop**—This configuration locates the platforms for the freeway flyer stop along the center HOV lanes at the Enchanted Parkway S. overpass. The overpass will require reconstruction to accommodate pedestrian access. The parking garage is located on the north side of Enchanted Parkway S. adjacent to I-5. The flyer stop connects from the center HOV lanes to the center of the existing Enchanted Parkway S. overpass.

For the Fife Station, one configuration was studied in this analysis. A flyer stop from the HOV lanes with center platforms is located just east of 54th Avenue E. A pedestrian walkway connects the flyer stop to both sides of the freeway. The parking garage is located on the south side of I-5 near 58th Avenue E., directly across from the Emerald Queen Casino. I-5 requires widening through this area to provide space for the flyer stop and the 54th Avenue E. overpass, and reconstruction of the on- and off-ramps.

In Tacoma, three configurations are considered for reaching the Tacoma Dome Station under the I-5 BRT Option. At the Tacoma Dome Station, BRT service terminates in the existing bus bay area near Puyallup Avenue and E. G Street. From the south side of I-5, the elevation in this area drops sharply towards the Tacoma Dome Station. Because of the topography, in order to construct new direct access ramps several

nearby overpasses and I-5 bridge structures have to be reconstructed. These configurations assume the planned HOV lane extension on I-5 south of the Port of Tacoma Road. The three configurations for providing direct transit access to the Tacoma Dome Station area are:

- **E. J Street HOV/Transit Direct Access Interchange**—From the center HOV lanes, the direct access ramps are configured beneath I-5 and through a short tunnel at E. J Street to E. 25th Street and the Tacoma Dome Station.
- **E. G Street HOV/Transit Direct Access Interchange**—This configuration routes BRT service to and from the center HOV lanes under the I-5 southbound lanes and through a short tunnel at E. G Street to E. 25th Street and the Tacoma Dome Station.
- **Longer tunnel HOV/Transit Direct Access Interchange**—The third configuration routes the direct access ramps under I-5 to a tunnel beginning at E. J Street. This tunnel extends west for a block before curving to align with E. G Street. Buses travel on E. 25th Street to reach the Tacoma Dome Station.

5.2 Level 2 Findings

Figure 5-4, Level 2 Ratings Summary, presents the ratings for each of the options. Table 5-1, Estimated Range of Costs for the Level 2 Options, provides an indication of costs based on the preliminary schematic designs. These preliminary cost estimates are intended for comparative purposes only. The key findings of the Level 2 ratings are summarized for each option in Sections 5.2.1 through 5.2.7.

Impacts to historic and cultural resources have not been specifically identified. Any future project-level analysis will follow the requirements of Section 106 of the National Historic Preservation Act, state, and local regulations. All of the LRT options require a new Puyallup River crossing. The location of the new bridge would be determined during future project work and coordinated with the Puyallup Tribe of Indians. All of the LRT options likely include similar levels of adverse effects on culturally important locations such as Gog-le-hi-tee and the Puyallup River.

5.2.1 SR 99 West Option

The estimated capital cost for the SR 99 West Option ranges from \$1.9 to \$2.2 billion, which is in the middle of the range of costs for the LRT options. Key findings for the SR 99 Center Option include:

Strengths

- **Ridership and Reliability**—The ridership potential is relatively high with estimated usage of 24,000 to 30,000 riders per weekday. The SR 99 West Option provides a direct connection between major origins and destinations which eliminates transfers. This improves travel time reliability and reduces day-to-day variation for LRT passengers.
- **Travel Time**—The modeled travel time for the SR 99 West Option is 16 to 17 minutes. This is the same for the SR 99 Center and Hybrid options. The SR 99 to I-5 and I-5 LRT options are slightly higher (18 to 19 minutes). All the LRT options are more reliable than the I-5 BRT Option (16 to 30 minutes).

Figure 5-4. Level 2 Rating Summary

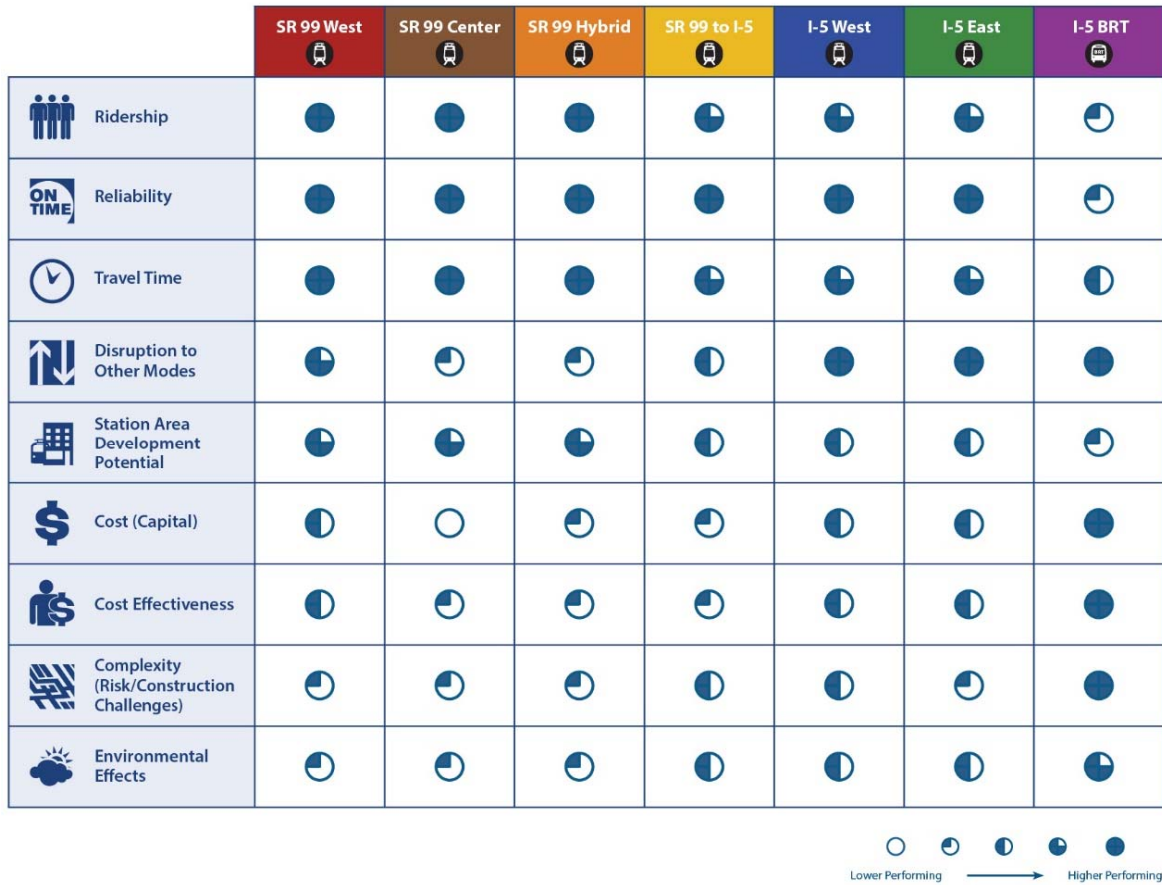


Table 5-1. Estimated Range of Costs for the Level 2 Options

LEVEL 2 OPTION	LOW (2013\$, Billions)	HIGH (2013\$, Billions)
SR 99 West	1.9	2.2
SR 99 Center	2.5	2.9
SR 99 Hybrid	2.3	2.6
SR 99 to I-5	2.0	2.3
I-5 West	1.7	1.9
I-5 East	1.7	1.9
I-5 BRT	0.6	0.7

- **Potential to Affect Adjacent Roadways**—The SR 99 West Option is mostly grade separated and located alongside SR 99, which minimizes impacts to other modes traveling on SR 99. Effects to traffic are primarily limited to increases in traffic associated with the park-and-ride lots.
- **Transit-Oriented Development**—The SR 99 options have more potential for transit-oriented development. The local and regional plans and policies support development, particularly in the urban growth centers in Tacoma and Federal Way.

Weaknesses

- **Wetlands and Streams**—A total of 13 wetlands covering 3.6 acres (including portions of the West Hylebos wetland complex) and 14 stream segments may be affected by the SR 99 West Option.
- **Property Acquisitions**—The SR 99 West Option potentially affects 240 to 300 properties. This option likely requires the most full acquisitions.
- **Visual Effects**—The SR 99 West Option includes the acquisition of adjacent commercial properties through south Federal Way and through Fife. Elevated tracks are likely to be prominent, but the existing visual quality of the surrounding neighborhood is low and there is potential that redevelopment, including enhancement of the SR 99 highway and roadside, could improve visual quality. Views of light rail along SR 99 from Gethsemane Cemetery are likely to be considered an effect, but could be partially screened. The proposed Milton Station is located adjacent to existing single-family homes and is likely to be a major contrast in both scale and character to the surrounding landscape.
- **Utilities**—Numerous utility relocations and replacement are required. This option crosses under BPA’s high-voltage transmission line near S. 324th Street in Federal Way.
- **Hazardous Materials Sites**—Twenty-eight sites of higher concern are identified within 200 feet of the SR 99 West Option. The SR 99 corridor has more identified hazardous materials sites and potential acquisitions, and thus potential liability and/or construction effects than the I-5 corridor.
- **Construction**—A new Puyallup River crossing is needed. The SR 99 West Option requires some street reconstruction but considerably less than for the SR 99 Center and Hybrid options.

5.2.2 SR 99 Center Option

The estimated capital cost for the SR 99 Center Option ranges from \$2.5 to \$2.9 billion, which is the highest cost range of all the options. Key findings for the SR 99 Center Option include:

Strengths

- **Ridership and Reliability**—The ridership potential is relatively high with estimated usage of 24,000 to 30,000 riders per weekday. The SR 99 Center Option provides a direct connection between major origins and destinations that eliminates transfers. This improves travel time reliability and reduces day-to-day variation for LRT passengers.

- **Travel Time**—The modeled travel time for the SR 99 Center Option is 16 to 17 minutes.
- **Transit-Oriented Development**—The SR 99 options have more potential for transit-oriented development. The local and regional plans and policies support development, particularly in the urban growth centers in Tacoma and Federal Way.

Weaknesses

- **Potential to Affect Adjacent Roadways**—The SR 99 Center Option prohibits left turns from SR 99 at unsignalized locations and has the greatest impact (along with SR 99 Hybrid) on adjacent signals with increased U-turns. This likely requires traffic capacity improvements at some signalized intersections to maintain operations similar to a no build condition.
- **Wetlands and Streams**—The SR 99 Center Option may affect up to 14 wetlands covering 4.1 acres (including portions of the West Hylebos wetland complex) and 16 stream segments.
- **Property Acquisitions**—The SR 99 Center Option potentially affects 350 to 430 properties. This option requires the most overall property acquisitions because it requires widening both the east and west sides of SR 99. However, two-thirds of these properties are likely partial acquisitions.
- **Visual Effects**—The SR 99 Center Option includes the acquisition of adjacent commercial properties through south Federal Way and through Fife. Elevated tracks are likely to be prominent. However, the existing visual quality of the surrounding neighborhood is low, and there is potential for redevelopment, including enhancement of the SR 99 highway and roadside, that could improve visual quality. Views of light rail along SR 99 from Gethsemane Cemetery are likely to be considered an impact and be difficult to screen. The proposed Milton Station is located adjacent to existing single-family homes, and is likely to be a major contrast in both scale and character to the surrounding landscape.
- **Utilities**—Numerous utility relocations and replacements are required. This option crosses under BPA's high-voltage transmission line near S. 324th Street in Federal Way.
- **Hazardous Materials Sites**—Twenty-nine sites of higher concern were identified within 200 feet of the SR 99 Center Option. The SR 99 corridor has more identified hazardous materials sites and potential acquisitions, and thus potential liability and/or construction effects than the I-5 corridor.
- **Construction**—A new Puyallup River crossing is needed. The SR 99 Center Option requires full or partial street closures during construction of light rail tracks in the center of SR 99 and extensive roadway reconstruction.

5.2.3 SR 99 Hybrid Option

The estimated capital cost for the SR 99 Hybrid Option ranges from \$2.2 to \$2.6 billion, which is on the higher end of costs for the LRT options. Key findings for the SR 99 Hybrid Option include:

Strengths

- **Ridership and Reliability**—The ridership potential is relatively high with estimated usage of 24,000 to 30,000 riders per weekday. The SR 99 Hybrid Option provides a direct connection between major origins and destinations which eliminates transfers. This improves travel time reliability and reduces day-to-day variation for LRT passengers.
- **Travel Time**—The modeled travel time for the SR 99 Hybrid Option is 16 to 17 minutes.
- **Transit-Oriented Development**—The SR 99 options have more potential for transit-oriented development. The local and regional plans and policies support development, particularly in the urban growth centers in Tacoma and Federal Way.

Weaknesses

- **Potential to Affect Adjacent Roadways**—The SR 99 Hybrid Option prohibits left turns from SR 99 at unsignalized locations and has the greatest impact (along with SR 99 Center) on adjacent signals with increased U-turns. This likely requires traffic capacity improvements at some signalized intersections to maintain operations similar to a no build condition.
- **Wetlands and Streams**—The SR 99 Hybrid Option may affect up to 12 wetlands covering 2.9 acres (including portions of the West Hylebos wetland complex) and 16 stream segments.
- **Property Acquisitions**—The SR 99 Hybrid Option potentially affects 250 to 310 properties.
- **Visual Effects**—The SR 99 Hybrid Option includes the acquisition of adjacent commercial properties through south Federal Way and through Fife. Elevated tracks are likely to be prominent, but the existing visual quality of the surrounding neighborhood is low and there is potential redevelopment, including enhancement of the SR 99 highway and roadside, which could improve visual quality. Views of light rail along SR 99 from Gethsemane Cemetery are likely to be considered an impact but could probably be partially screened. The proposed Milton Station is located adjacent to existing single-family homes and is likely to be a major contrast in both scale and character to the surrounding landscape.
- **Utilities**—Numerous utility relocations and replacements are required. This option crosses under BPA's high-voltage transmission line near S. 324th Street in Federal Way.
- **Hazardous Materials Sites**—Twenty-nine sites of higher concern were identified within 200 feet of the SR 99 Hybrid Option. The SR 99 corridor has more identified hazardous materials sites and potential acquisitions, and thus potential liability and/or construction effects than the I-5 corridor.

- **Construction**—A new Puyallup River crossing is needed. The SR 99 Hybrid Option requires full or partial street closures during construction of light rail tracks in the center of SR 99 and extensive roadway reconstruction.

5.2.4 SR 99 to I-5 Option

The estimated capital cost for the SR 99 to I-5 Option ranges from \$2.2 to \$2.5 billion, which is on the higher end of costs for the LRT options. Key findings for the SR 99 to I-5 Option include:

Strengths

- **Ridership and Reliability**—The ridership potential is relatively high but slightly less than the SR 99 LRT options with estimated usage of 23,000 to 28,000 riders per weekday for the SR 99 to I-5 Option. This option provides a direct connection between major origins and destinations which eliminates transfers. This improves travel time reliability and reduces day-to-day variation for LRT passengers.
- **Travel Time**—The modeled travel time for the SR 99 to I-5 Option is 18 to 19 minutes.

Weaknesses

- **Potential to Affect Adjacent Roadways**—The SR 99 to I-5 Option prohibits left turns from SR 99, 16th Avenue S., and Enchanted Parkway S. in the Federal Way area, increasing U-turns at the signalized intersections. The signalized intersections within Federal Way operate at level of service (LOS) E or F; therefore, adding U-turns increase delay and may require the need for additional capacity improvements.
- **Transit-Oriented Development**—The SR 99 to I-5 Option has some potential for transit-oriented development but is constrained by the I-5 freeway. The local and regional plans and policies support development, particularly in the urban growth centers in Tacoma and Federal Way.
- **Wetlands and Streams**—A total of nine wetlands covering 2.8 acres and 14 streams segments may be affected by the SR 99 to I-5 Option.
- **Property Acquisitions**—The SR 99 to I-5 Option potentially affects 190 to 240 properties.
- **Visual Effects**—The portion of the SR 99 to I-5 Option that is on SR 99 includes the acquisition of adjacent commercial properties through south Federal Way. Elevated tracks are likely to be prominent, but the existing visual quality of the surrounding neighborhood is low and there is potential redevelopment, including enhancement of the SR 99 highway and roadside, which could improve visual quality. An elevated alignment is generally not considered compatible with adjacent residential uses; there are a few homes and an apartment complex on 16th Avenue S. In Fife, commercial properties along I-5 have been developed to benefit from visibility between the highway and the businesses. Elevated light rail facilities can likely screen some of these views. Major public areas in the Emerald Queen Casino are oriented to the view of Mount Rainier from upper-story windows. Elevated light rail facilities can likely obstruct views from some of these windows.

- **Utilities**—Numerous utility relocations and replacements are required. This option crosses under BPA’s high-voltage transmission line near S. 324th Street in Federal Way.
- **Hazardous Materials Sites**—Ten sites of higher concern were identified within 200 feet of the SR 99 to I-5 Option.
- **Construction**—A new Puyallup River crossing is needed. The SR 99 to I-5 Option requires some roadway reconstruction but considerably less than for the SR 99 Center and Hybrid options.

5.2.5 I-5 West Option

The estimated capital cost for the I-5 West Option ranges from \$1.8 to \$2.1 billion, which is on the lower end of costs among the LRT options. Key findings for the I-5 West Option include:

Strengths

- **Ridership and Reliability**—The ridership potential is relatively high, but slightly less than for the SR 99 LRT options. The I-5 West Option has estimated usage of 24,000 to 29,000 riders per weekday. The option provides a direct connection between major origins and destinations which eliminates transfers. This improves travel time reliability and reduces day-to-day variation for LRT passengers.
- **Travel Time**—The modeled travel time for the I-5 West Option is 18 to 19 minutes.
- **Potential to Affect Adjacent Roadways**—The I-5 West Option has minimal impact on adjacent roadways with increases in traffic primarily associated with the park-and-ride lots.
- **Property Acquisitions**—The I-5 West Option potentially affects 110 to 130 properties. The I-5 West and East options have fewer property acquisitions compared to the other LRT options.
- **Visual Effects**—The I-5 West Option has fewer areas where visual effects are a concern compared to options on SR 99. However, immediately south of the location where the I-5 West Option joins I-5 in Federal Way, the at-grade alignment is located approximately 30 feet from the back of more than 40 single-family residences in Belmor Park. The light rail facility removes existing mature vegetation that currently screens those homes from I-5. Views from these homes are negatively affected by both the light rail facility and I-5. In Fife, commercial properties along I-5 have been developed to benefit from visibility between the highway and the businesses. Elevated light rail facilities are likely to screen some of these views. Major public areas in the Emerald Queen Casino are oriented to the view of Mount Rainier from upper-story windows. Elevated light rail facilities are likely to obstruct views from some of these windows.

Weaknesses

- **Transit-Oriented Development**—The I-5 West Option has some potential for transit-oriented development but is constrained by the I-5 freeway. The local and regional plans and policies support development, particularly in the urban growth centers in Tacoma and Federal Way.
- **Wetlands and Streams**—The I-5 West Option may affect up to 10 wetlands covering 3.2 acres and 13 stream segments.

- **Utilities**—Numerous utility relocations and replacements are required. This option crosses under BPA’s high-voltage transmission line near S. 324th Street in Federal Way.
- **Hazardous Materials Sites**—Five sites of higher concern were identified within 200 feet of the I-5 West Option.
- **Construction**—A new Puyallup River crossing is needed. The I-5 West Option requires some minor roadway reconstruction. Lane or on-ramp and off-ramp closures on I-5 require approval by WSDOT.

5.2.6 I-5 East Option

The estimated capital cost for the I-5 East Option ranges from \$1.7 to \$1.9 billion, which is the lowest cost LRT option. Key findings for the I-5 East Option include:

Strengths

- **Ridership and Reliability**—The ridership potential is relatively high, but slightly less than for the SR 99 LRT options. The I-5 East Option has estimated usage of 24,000 to 29,000 riders per weekday. The option provides a direct connection between major origins and destinations which eliminates transfers. This improves travel time reliability and reduces day-to-day variation for LRT passengers.
- **Travel Time**—The modeled travel time for the I-5 East Option is 18 to 19 minutes.
- **Potential to Affect Adjacent Roadways**—The I-5 East Option has minimal impact on adjacent roadways with increases in traffic primarily associated with the park-and-ride lots.
- **Property Acquisitions**—The I-5 East Option potentially affects 100 to 130 properties with about 53 total acres in property acquisitions. The I-5 West and East options have fewer property acquisitions compared to the other LRT options.
- **Visual Effects**—The I-5 East Option has fewer areas where visual effects are a concern compared to options on SR 99. There is potential for effects to the view towards the Weyerhaeuser Corporation headquarters. This building is recognized as both a structure and landscape of national significance. In Fife, commercial properties along I-5 have been developed to benefit from visibility between the highway and the businesses. Elevated light rail facilities are likely to screen some of these views. Major public areas in the Emerald Queen Casino are oriented to the view of Mount Rainier from upper-story windows. Elevated light rail facilities are likely to restrict views from some of these windows.

Weaknesses

- **Transit-Oriented Development**—The I-5 East Option has some potential for transit-oriented development but is constrained by the I-5 freeway. The local and regional plans and policies support development, particularly in the urban growth centers in Tacoma and Federal Way.
- **Wetlands and Streams**—The I-5 East Option may affect up to 12 wetlands covering 12.3 acres and 11 stream segments. This option has the greatest effect on wetlands due to long guideway segments in wetlands adjacent to Hylebos Creek and ditched wetlands in Fife.

- **Parks and Recreation Facilities**—The Rhododendron Species Foundation and Botanical Garden is adjacent to I-5 on the Weyerhaeuser property in the northeast quadrant of the I-5/SR 18 interchange. The I-5 East Option is on an elevated structure adjacent to the Interurban Trail at 70th Avenue E. This could require construction-period effects requiring temporary closure and detours or both. The impact is limited to a short segment of the trail, and if any minimal acquisition is required it may be possible that it qualifies as a *de minimis* impact. The I-5 East Option requires property acquisition to accommodate an elevated facility over parking for the Tacoma Dome.
- **Utilities**—Numerous utility relocations and replacements are required. The I-5 East Option crosses over BPA’s high-voltage transmission line near S. 324th Street in Federal Way. This option requires Olympic Pipeline to be relocated and impacts a substation in Fife.
- **Hazardous Materials Sites**—One site of higher concern was identified within 200 feet of the I-5 East Option.
- **Construction**—A new Puyallup River crossing is needed. The I-5 East Option’s guideway passes over I-5 twice and includes a pedestrian bridge construction that presents a construction challenge. Some minor roadway reconstruction is needed. Lane or on-ramp and off-ramp closures on I-5 require approval by WSDOT.

5.2.7 I-5 BRT Option

The I-5 BRT Option has the lowest estimated capital cost of all the options, ranging from \$0.6 to \$0.7 billion. Key findings for the I-5 BRT Option include:

Strengths

- **Potential to Affect Adjacent Roadways**—The I-5 BRT Option has minimal impact on adjacent roadways with increases in traffic primarily associated with the park-and-ride lots.
- **Wetlands and Streams**—The I-5 BRT Option has the least amount of impact on all ecosystem resources because it involves fewer new facilities than any of the light rail options. The option may affect up to 3 wetlands covering 1.3 to 1.4 acres and 3 stream segments.
- **Property Acquisitions**—The I-5 BRT Option likely has the least amount of property acquisitions. This option potentially affects 30 to 40 properties depending on the station configurations in south Federal Way and Tacoma.
- **Visual Effects**—The I-5 BRT Option has the fewest areas of concerns for visual effects out of all the options.
- **Utilities**—Several utility relocations and replacements are required in areas where construction occurs but is substantially less compared to the LRT options. The I-5 BRT Option station in Fife may require a realignment of the Olympic Pipeline.
- **Hazardous Materials Sites**—Two sites of higher concern were identified within 200 feet of the I-5 BRT Option. The I-5 BRT Option has lower potential liability and adverse effects associated

with hazardous materials sites compared to the LRT options because it impacts far fewer properties.

- **Construction**—The I-5 BRT Option operates in existing HOV lanes with construction limited to the ramps and roadway modifications near the three station areas instead of the entire corridor. The option does not require a new Puyallup River crossing.

Weaknesses

- **Ridership**—The modeled travel time for the I-5 BRT Option is 16 minutes (with enhanced HOV lane management) to 30 minutes (with HOV lane management similar to today). Estimated usage ranges from 8,000 to 11,000 riders per weekday. Because the I-5 BRT Option operates with traffic in the HOV lane, it is less reliable than the LRT options.
- **Reliability**—The I-5 BRT Option requires passengers to transfer to other transit services to reach major origins and destinations. It does not connect as well as the LRT options to Link and other local bus services.
- **Transit-Oriented Development**—The I-5 BRT Option has the least potential for transit-oriented development because development around flyer stops is constrained by the I-5 freeway, and this option has lower ridership capacity. Overall, the option supports local and regional plans and policies for development, access, and mobility between the urban growth centers in Tacoma and Federal Way.
- **Parks and Recreation Facilities**—The I-5 BRT Option could include acquisition of a small portion of McKinley Park in Tacoma, which may qualify as a *de minimis* use under Section 4(f).
- **Construction**—The I-5 BRT Option includes some partial or full closures of WSDOT ramps and local roads during construction.

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