SR 518 Corridor Planning Study

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NORTHWEST REGION

SR 518 Corridor Study

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List of Abbreviations

Abbreviation	Explanation	Abbreviation	Explanation
(A)ADT	(Annual) Average Daily Traffic	PLCE	Planning-Level Cost Estimate
ALS	Advanced Life Support	PSRC	Puget Sound Regional Council
ATMS	Advanced Traffic Management Systems	RRFB	Rectangular Rapid Flashing Beacon
AWSC	All-Way Stop-Controlled	SAE	South Airport Expressway
BLS	Basic Life Support	SAMP	Sustainable Airport Master Plan
BRT	Bus Rapid Transit	SB	Southbound
CD	Collector-Distributor	Sea-Tac	Seattle-Tacoma International Airport
CIVA	Climate Impacts Vulnerability Assessment	SOV	Single-Occupancy Vehicle
DMMD	Des Moines Memorial Drive S	SPUI	Single-Point Urban Interchange
DTA	Dynamic Traffic Assignment	SR	State Route
EB	Eastbound	ST	Sound Transit
EMT	Emergency Medical Technician	TDM	Transportation Demand Management
ESJ	Equity and Social Justice	TIBS	Tukwila International Boulevard Station
GIS	Geographic Information Systems	TNC	Transportation Network Company
HCS	Highway Capacity Software	TSMO	Transportation Systems Management and Operations
HFST	High Friction Surface Treatment	TSP	Transit Signal Priority
HOT	High-Occupancy Toll	TWSC	Two-Way Stop-Controlled
HOV	High-Occupancy Vehicle	Veh/h	Vehicles Per Hour
IRT	Incidence Response Team	VMT	Vehicle-Miles Traveled
ITS	Intelligent Transportation Systems	VPD	Vehicles Per Day
KCM	King County Metro	WB	Westbound
NAE	North Airport Expressway	WDFW	Washington State Department of Fish and Wildlife
NB	Northbound	WSDOT	Washington State Department of Transportation
ORCA	One Regional Card for All		

1 Executive Summary

The State Route 518 Corridor Planning Study is a planning level effort that assesses current and future conditions on SR 518 between the cities of Burien and Tukwila. The western end of SR 518 begins at the interchange of SR 518 and SR 509 in Burien and continues east past Seattle-Tacoma International Airport. It intersects with SR 99 in the City of SeaTac and terminates at the Interstate 5 (I-5)/Interstate 405 (I-405) interchange in the City of Tukwila.

The SR 518 Corridor Planning Study was commissioned by the Washington State Legislature to conduct a planning-level assessment and inventory of existing conditions and future baseline needs for the entire SR 518 corridor. It was authorized in the 2018 Supplemental Transportation Budget (ESSB 6106, Section 218 (5)) as well as the 2019 Transportation Budget (ESHB 1160, Section 218 (2)), and is due to the legislature by November 30, 2019.

This study documents future growth in travel demand that is projected to occur as result of growth and development in communities along the corridor (Burien, Des Moines, SeaTac, and Tukwila) as well as at Sea-Tac International Airport through the year 2045. This study also considered and incorporated relevant elements of adjacent projects, including the I-405 Corridor Program and the Puget Sound Gateway Program (SR 509 completion in King County). The Gateway Program Subarea Dynamic Traffic Assignment (DTA) model was employed to conduct subarea analysis for the SR 518 corridor. As the Environmental Impact Statement for SR 509 included a South Access to Sea-Tac Airport, for the 2045 horizon the baseline assumptions embedded in the DTA modeling work included a southern airport connection (currently unfunded). Consistent with WSDOT protocol, a Practical Solutions approach is applied in this study, whereby early action improvement strategies have been assessed prior to the consideration of higher-cost, capital improvement options.

The SR 518 corridor serves mostly commercial and mixed-use zones, in addition to an airport, major freight hubs and service centers, retail shopping, and other large businesses. SR 518 also serves a large commuter base by providing a strong east-west connection between urban centers such as Seattle, Burien, White Center, Renton, Bellevue, and the eastside/South King County. Beyond the local and regional context, the SR 518 corridor also serves a significant statewide role by providing primary access to the state's largest and busiest commercial airport, Sea-Tac International Airport. It also provides primary access and connection to Interstates 5 and 405 on the east end of the corridor in Tukwila. Because of considerable growth in commercial and residential activity along the SR 518 corridor as well as pronounced growth in regional airport demand, vehicular congestion levels on SR 518 have increased over time and are expected to continue increasing in the future, especially during peak weekday and weekend periods.

This study was funded by the Washington State Legislature to identify potential improvement strategies and options for addressing identified performance gaps on the SR 518 Corridor. The Port of Seattle was also a key funding partner and provided supplemental funding to complete more detailed subarea analysis in the SR 518 corridor study area. The study findings and recommendations will serve as a blueprint for addressing current and future travel impacts.

1.1 Study Purpose and Need

The purpose of this study is to analyze current and future travel patterns, explore volume growth trends to characterize existing and future multimodal needs, and identify possible solutions for improving operational performance and reducing crash potential. The evaluation outcomes for this study will be measured and reported in terms of congestion management potential, access to primary destinations, crash potential benefits and implementation feasibility, as well as environmental compliance. The need for this study is due to the rapidly increasing regional population and employment growth, which translates into higher demands on SR 518, capacity limitations on SR 518 and connecting corridors, and increased airport growth.

1.2 Study Process

The SR 518 Corridor Planning Study identifies near-, mid-, and long-term multimodal improvement strategies to meet growing operational, demand-management, and capacity needs on SR 518. Consistent with WSDOT's Practical Solutions approach, WSDOT worked closely with stakeholders in evaluating and ranking multimodal improvement strategies through an incremental approach, whereby lower-cost, near term Transportation Systems Management and Operations (TSMO) and Transportation Demand Management (TDM) strategies were considered first before capacity expansion strategies because these can be implemented relatively quickly and cost-effectively.

The SR 518 Corridor Planning Study used an interim (mid-term) year of 2030 to identify near-term strategies, and the year 2045 for assessment of long-term strategies. The forecast years and improvement strategies were developed and screened in close consultation with stakeholders. The study team developed Practical Solutions evaluation criteria to establish priorities for the near-, mid-term and long-term TSMO, TDM, and capacity strategies. This prioritization allowed WSDOT and study partners to identify appropriate corridor investments where and when they are needed.

The major study elements completed in the SR 518 Corridor Planning Study include:

- Stakeholder and Community Engagement
- Existing and Future Baseline Conditions (2030/2045) analysis
- Strategy Development and Evaluation

1.3 Strategy Development and Evaluation

Upon completion of data-gathering for existing and future baseline conditions, local understanding of traffic operations and demand, and community outreach, the study consultant and the WSDOT team worked with study stakeholders to develop a preliminary list of strategies to address performance needs on the SR 518 corridor. This list of strategies was compiled using a Practical Solutions approach and included near-term cost-effective strategies, mid-term improvement concepts, and long-term higher-cost capital improvement options.

This initial list of over 70 strategies was developed based on input from previous studies, stakeholders, the public, and analysis of corridor needs and conditions. Detailed discussion regarding the cursory screening process is provided in Section 6 Performance Evaluation Development and Criteria. The "Level II" screening of alternatives involved a more detailed level of qualitative and quantitative analysis. Fifty nine near, mid, and long-term strategies were considered in the Level II screening.

The five key performance measures identified in the Level I screening (mobility, safety, environmental, feasibility, and access) were applied and further defined in the Level II screening process. Each of the five key performance measures included between three and five sub-category screening elements. Additional details on the "Level II" screening process is provided in Section 6 Performance Evaluation Development and Criteria of this final report.

The results of the Level II screening of improvement options were packaged into near-term, mid-term, and long-term timeframe scenarios and were shared with the study stakeholders and tribes for review and endorsement.

1.4 Recommendations

1.4.1 Transportation Demand Management Strategies

Transportation Demand Management (TDM) strategies include opportunities to reduce vehicle trips and/or shift trips to off-peak periods when there is less congestion on the corridor.

TDM strategies that were developed and evaluated have been packaged with the near-term strategies, where they will provide the most immediate benefit and opportunities to accommodate growing demand on the SR 518 corridor up to the year 2030. Additional details regarding the ranking evaluation and recommendations for TDM strategies are summarized below and in Section 6 Performance Evaluation Development and Criteria.

1.4.2 Near-Term Strategies

These are lower-cost strategies that have a high return on investment and can be delivered relatively quickly. Typical near-term strategies can include intelligent transportation systems investments, multimodal alternatives, signing/striping, and other spot capital improvements and demand management strategies. These near-term strategies could be implemented by year 2030, if funding is made available.

1.4.3 Mid-Term Strategies

Mid-term strategies consist of a mix of moderate to higher cost improvements that could be implemented in year 2030 and beyond. Several capital strategies related to adding lanes on SR 518, primarily between the SR 99/North Airport Expressway and the I-5/I-405 interchange are identified for this time period. Some of these strategies consist of phased improvements address capacity needs on the SR 518 and I-405 corridors up to the year 2045 and beyond. Additional mid-term strategies include addressing capacity and operational needs at key interchanges along the SR 518 corridor, improved local and airport access,

various system management elements, and several multimodal transit/TDM options that could be addressed beyond the first decade of implementation.

1.4.4 Long-Term Strategies

These highest-cost improvement options could provide corridor-wide benefits. These high-cost capital improvement options include a full rebuild of the SR 518/I-5/I-405 interchange and implementation of managed lanes on the SR 518 corridor. The implementation timeframe for these long-term strategies could start in 2045 and continue into the future.

The table below shows the recommended packages. Further details can be found in Section 8 Improvement Strategy Packages.

Table 1 Strategy Packages

Strategy Packages	Cost Estimate
Near-Term Strategies	
TSMO: Signage Improvements Review signing and wayfinding to and from the airport, major highways, and attractions on local streets	$2-4 million
TSMO: Operations Enhancement on EB SR 518 A combination of strategies, such as Advanced Traffic Management Systems, High Friction Surface Treatments, restriping and additional lane markings, and increased incidence response which serves to improve mobility and reduce crashes.	$10-20 million
TSMO: Operations Enhancement on WB SR 518 Utilize lane markings and signage to direct drivers and provide information	$100k-1 million
TSMO: Active transportation Improvements Active transportation improvements at SR 99 and Des Moines Memorial Drive S	$250k-1 million
TSMO: ITS/ATMS Implement Intelligent Transportation Systems throughout the corridor, to support ramp metering at SR 99 and 51st Ave S, ATMS near the airport, and Transit Signal Priority	$6-12 million
Transportation Demand Management (TDM) Use a combination of demand management strategies to increase non-SOV driving among corridor users	$4-8 million
Capital Improvement: SR 518 Ramps	$34-49 million
Mid-Term Strategies	
Capital Improvement: Eastbound SR 518 Add capacity to the corridor using auxiliary lanes and an additional lane underneath the I-5 interchange	$190-244 million
Capital Improvement: Airport South Link Access	TBD
Capital Improvement: SR 518/SR 509 Interchange	$50-70 million
Capital Improvement: Widening of Westbound SR 518	$33-45 million
Capital Improvement: Improvements at SR 518 Ramp Termini	$200k-5 million per location

Strategy Packages	Cost Estimate
Improve ramp termini operations through the construction of roundabouts or signals, as well as channelization and optimization of existing signals	
Capital Improvement: Active Transportation Bridge Connections	$5-10 million per location
Long-Term Strategies	
Capital Improvement: Managed Lanes on SR 518	$150-200 million
Capital Improvement: Full Rebuild of the I-5/I-405/SR 518 Interchange	TBD

1.5 Next Steps

The improvement strategies recommended in the SR 518 Corridor Planning Study will enable WSDOT and partner agencies to address identified performance issues and gaps on the SR 518 corridor. Currently, there is no funding identified for the recommended strategies packages in this study, so it will be incumbent upon WSDOT and study partners to determine priorities for moving strategies forward into implementation. Grants, partnerships, and other funding sources will need to be pursued for immediate priorities that are unfunded and/or do not screen through statewide prioritization. The recommended solutions must be incorporated into state, regional, and local plans to position the proposed improvements for future funding and implementation.

The initial identification and suggested action plan for addressing fish-passage barriers on and along the SR 518 corridor is an important outcome for the SR 518 Corridor Planning Study. This should be a priority focus for WSDOT, The Muckleshoot Indian Tribe, and study partners. WSDOT is operating under a Supreme Court mandate to address numerous fish-passage barriers statewide. An initial environmental screening review of this study has identified six (6) unaddressed fish-passage barriers that must be retrofitted as part of this injunction mandate.

WSDOT will continue to work closely with SR 518 Stakeholders and agency partners to implement cost-effective operational and transportation-demand management strategies recommended for near, mid-, and long-term implementation in this study. The recommended strategies must be consistent with state, regional, and local planning efforts. Furthermore, none of the identified improvement options recommended in this study have any funding identified to move them into implementation.

2 Introduction and Background

State Route (SR) 518 is a 3.42-mile state highway located in King County, Washington. The highway begins, at its western end, near the SR 509/SR 518 interchange in the City of Burien, WA, and continues to the east past Seattle-Tacoma (Sea-Tac) International Airport, intersecting SR 99 in the City of SeaTac and ending at the Interstate 5 (I-5)/Interstate 405 (I-405) interchange in the City of Tukwila. The SR 518 corridor serves mostly commercial and mixed-use zones, in addition to an airport, major freight hubs and service centers, retail shopping, and other large businesses. SR 518 also serves a large commuter base by providing a strong east-west connection between urban centers such as Seattle, Burien, Renton, Bellevue, and the eastside/South King County.

Due to considerable growth in commercial and residential activity surrounding the highway as well as pronounced growth in regional airport demand, vehicular congestion levels on SR 518 have increased over time and are expected to continue increasing in the future, especially during peak weekday and weekend periods. Thus, SR 518 is a candidate for potential near-term (present-to year 2030), mid-term (2030-2045) and long-term (2045-beyond) corridor improvement strategies that will benefit all users of the highway. This study investigates current and future corridor conditions and aims to develop potential congestion management strategies and crash reduction improvements that can be implemented through WSDOT's Practical Solutions framework, which begins by evaluating demand and system management, before considering larger capital improvements.

The SR 518 study was commissioned through a state appropriation from the motor vehicle account and supplemental funds from the Port of Seattle. It conducted a planning-level assessment and inventory of the entire corridor that documents future growth in highway demand, including airport travel growth. The findings of this work will establish a blueprint for addressing current and future travel impacts and safety concerns.

2.1 Purpose and Need

The purpose of this study is to identify current and future travel patterns, explore volume growth trends to identify existing and future multimodal needs, and identify possible solutions for improving operational performance and reducing crash potential. The evaluation outcomes for this study will be measured and reported in terms of congestion management potential, access to primary destinations, crash reduction benefits and implementation feasibility, as well as environmental compliance. The need for the study stems from rapidly increasing population and employment in the region translating to higher demands on SR 518, capacity limitations on SR 518 and connecting corridors, and increasing airport activity.

2.1.1 Previous Studies

WSDOT has conducted several planning level assessments and inventory checks of the entire SR 518 corridor, documenting future expected growth in past years. This study expands upon previous feasibility studies and builds upon the experience gained from them.

There have been three studies conducted on the SR 518 corridor: the SR 518 Route Development Plan (2002), the SR 518 Interchange at International Boulevard/S 154th Street – Interchange Alternatives Analysis (2007) and the SR 518 and Des Moines Memorial Drive Full Access Interchange Analysis (2010). These studies suggested alterations to the SR 518 corridor to improve connectivity to the Sea-Tac Airport as well as mobility for the communities within the study area, based on the evaluation of traffic conditions and needs of the study region.

The SR 518 Route Development Plan (2002) evaluated existing conditions and conducted a future baseline analysis. It included public involvement and recommended interchange improvement concepts for three interchanges: a partial SPUI at SR 509; a combined SPUI and half diamond, or a split diamond with loop ramp at the 24th Avenue S/SR 99 interchange; and a combined solution with several improvements at the Tukwila interchange, as well as no improvements at the Des Moines Memorial Drive Interchange.

The International Boulevard/S 154th Street Interchange Alternatives Analysis examined the feasibility of an interchange at SR 518 with SR 99 and S 154th Street in SeaTac based on 2010 and 2030 PM peak hour traffic and potential high-density development in the northwest section of the interchange. The study recommended a diamond-type ramp configuration that would connect to International Boulevard, while retaining the existing loop and direct access ramps.

The 2010 Full Interchange Report was an amendment to the 2002 Route Development Plan and recommended full interchange access to the Northeast Redevelopment Area, and Des Moines Memorial Drive, introducing a westbound braided ramp, and an eastbound auxiliary lane.

2.1.2 Current and Future Projects

There are multiple projects underway near the SR 518 study corridor. These projects have a potential to affect the study to some degree. Major projects are shown in Figure 1 and additional projects are listed in Table 2.

Table 2 Current projects near the SR 518 study area

Agency	Project Name	Project Regions	Current Stage	Completion Year
WSDOT	SR 509 Completion Project	South King County	Planning-Construction	2028
WSDOT	I-405/SR 167 Corridor Program	ETL Expansion Renton-Canyon Park	Planning-Construction	2024-2025
WSDOT	SR 518 at DMMD Interchange Phase II – WB Ramps	SR 518	Planning	2030
Sound Transit	I-405 BRT Project	SR 518/I-405 Corridor	Planning (2016-2019)	2024
Sound Transit	Link Light Rail System Expansion	Lynnwood, Federal Way, Tacoma, West Seattle	Planning	2024-2035
Port of Seattle	Sustainable Airport Master Plan	Sea-Tac Airport	Environmental Analysis	Near-term projects by 2027

Source: WSDOT, Sound Transit, Port of Seattle

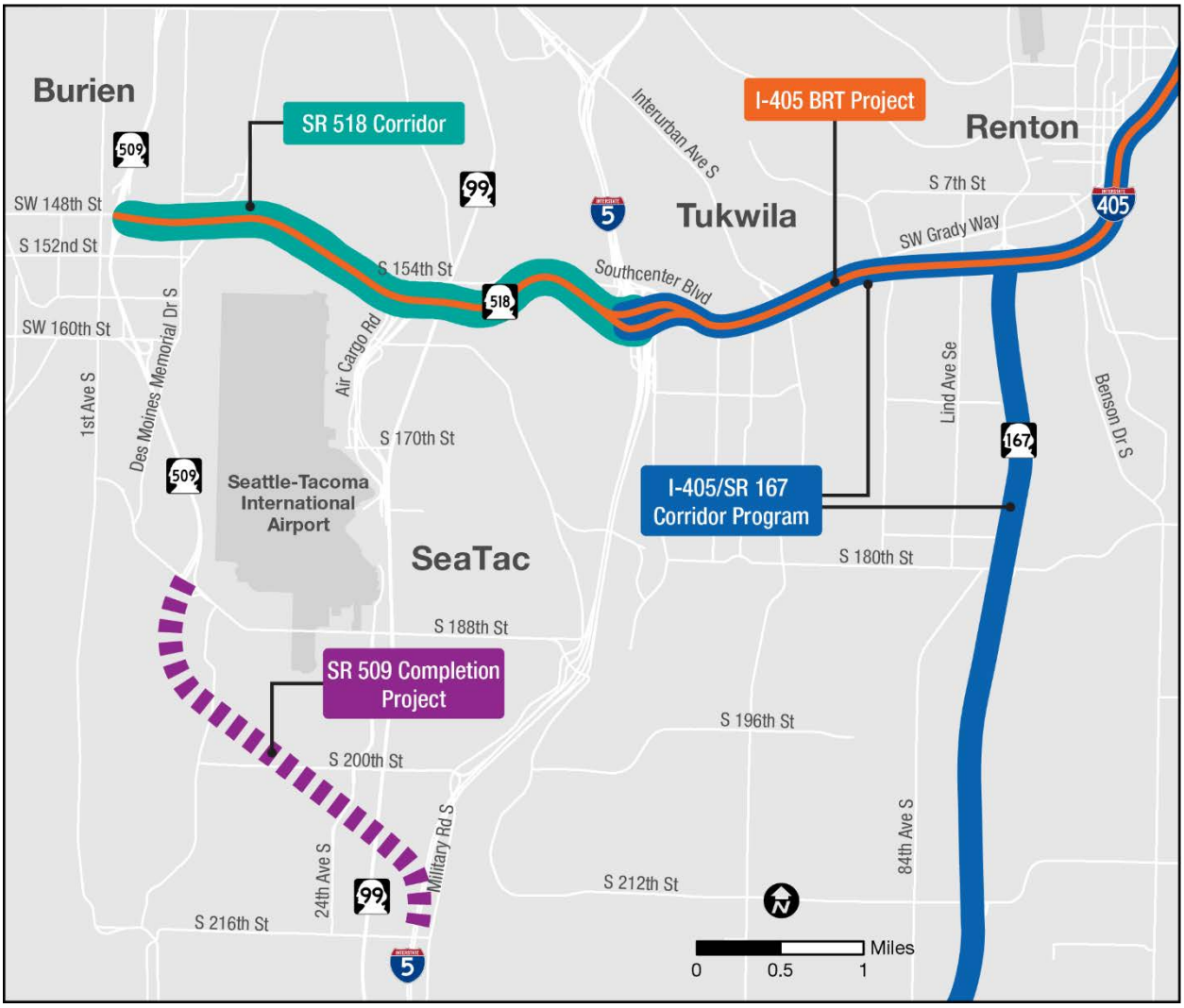

Figure 1 Current and future projects surrounding the SR 518 study area

The future documented transportation projects highlighted in Table 2 will very likely influence traffic demands and peak period operations on SR 518 and affect freight movements to and from the corridor. Mode shift is also a distinct possibility in the future as specific projects such as the Link light rail extensions to Lynnwood, Redmond, Federal Way, and Tacoma will open new markets for transit-related access to/from the airport, though I-405 BRT will replace Sound Transit Route 560 and no longer serve the Sea-Tac Airport. Major private sector site development projects are being undertaken in the Tukwila and SeaTac areas, which could also lead to changes in traffic demand and travel patterns along the corridor. Similarly, the assumed baseline South Link connection (by 2045), if not constructed, could also impact traffic demands and patterns. The corridor study seeks to investigate and evaluate the impact of these surrounding projects through traffic modeling efforts to gain a comprehensive understanding of future SR 518 activity.

2.1.3 Practical Solutions

WSDOT is using the Practical Solutions approach to increase the focus on transportation system performance and enable more flexible and sustainable transportation investment decisions. The approach includes increasing collaboration with communities and partners as we identify needs and develop coordinated strategies to address these needs. By using this approach, WSDOT will make transportation investments at the right place and time for the lowest cost.

Transportation planning establishes a performance framework for transportation decision making and management of system assets. Planning also coordinates with other transportation providers to identify performance gaps and works with communities and partners to prioritize needs and assesses strategies to address the needs.

3 Study Area

The study area extends along the entirety of the SR 518 segment from 1st Avenue S and SR 509 near Burien to the I-5/I-405 interchange. For traffic analysis, a segment of I-405 between I-5 and State Route 167 (SR 167) is considered an influence area on the study corridor, shown as "Extended Traffic Analysis Area" in the figure below. The study corridor intersects the cities of Burien, SeaTac, and Tukwila and for the most part consists of a three-lane bi-directional highway with a protective raised concrete barrier or guard rails. The study corridor is a freeway facility and contains several interchanges along the corridor, including at SR 99, I-5, and I-405. The influence area examines the North Airport Expressway, SR 181, and SR 167. The study area includes 41 intersections near the corridor, of which 19 are signalized. The study corridor and extended traffic analysis area is shown in Figure 2.

Figure 2 SR 518 study corridor

The study includes a series of interchanges and ramp terminals that are reflected in the traffic analysis effort. These are listed in Table 3 below.

Table 3 SR 518 study interchanges and ramp terminals

ID	Interchange Name	Interchange Type	Description
1	SR 518 & SR 509	System	Diamond with Partial Cloverleaf
2	SR 518 & Des Moines Memorial Dr. S	Service	¾ Interchange
3	SR 518 & 154th Street	Service	Half Diamond, to/from West
4	SR 518 & North Airport Expressway/ SR 99	System	Directional Ramps to/from South
5	SR 518 & 51st Avenue	Service	Half Diamond, to/from West
6	SR 518/I-405 & I-5	System	Full directional system interchange
7	I-405/Interurban Ave (SR 181)	Service	Diamond and Partial Cloverleaf from east
8	I-405/SR 167	System	Full Cloverleaf w/ Collector-Distributor

To assess the impact of the corridor and its operational performance on the surrounding area, intersections near the corridor are included for analysis. These intersections are shown in Table 4.

Table 4 SR 518 study intersections

ID	Intersection Name	Control Type
1	1st Ave S & S 146th St	Signalized
2	SR 509 Off-Ramp & S 146th St	Stop-Controlled
3	SR 509 On-Ramp & S 146th St	None
4	SR 509 Off-Ramp & SR 518	Signalized
5	SR 509 On/Off Ramp & SW 148th St	Signalized
6	1st Ave S & SW 148th St	Signalized
7	1st Ave S & S 150th St	Signalized
8	Des Moines Memorial Drive S & SR 518 WB Off-Ramp	Stop-Controlled
9	Des Moines Memorial Drive S & SR 518 EB On-Ramp	No Control
10	24th Ave S & S 148th St	Stop-Controlled
11	24th Ave S & S 150th St	Stop-Controlled
12	24th Ave S & S 152nd St	Stop-Controlled
13	24th Ave S & S 154th St	Signalized
14	SR 518 Off-Ramp & S 154th St	Stop-Controlled
15	SR 518 On-Ramp & S 154th St	None
16	29th Ave S & S 154th St	None
17	30th Ave S & S 154th St	Stop-Controlled
18	32nd Ave S & S 154th St	Stop-Controlled
19	SR 518 Off-Ramp & S 154th St near SR 99	Stop-Controlled
20	Military Rd S & S 152nd St	Stop-Controlled
21	Pacific Hwy S & S 152nd St	Signalized
22	Pacific Hwy S & Military Rd S	Stop-Controlled
23	Pacific Hwy S & S 154th St	Signalized
24	Pacific Hwy S & SR 518 On-Ramp	Signalized
25	Pacific Hwy S & S 160th St	Signalized

ID	Intersection Name	Control Type
26	Sea-Tac Rental Car Facility Driveway & S 160th St (East)	Stop-Controlled
27	Sea-Tac Rental Car Facility Driveway & S 160th St (West)	Signalized
28	Host Road/SR 518 On-Ramp & S 160th St	Stop-Controlled
29	Air Cargo Rd & S 160th St	Stop-Controlled
30	51st Ave S & SR 518 On-Ramp	None
31	Klickitat Drive & SR 518 Off-Ramp	Stop-Controlled
32	I-405 Off-Ramp & Southcenter Blvd	Stop-Controlled
33	I-405 On-Ramp & Tukwila Pkwy	Signalized
34	Southcenter Pkwy & I-5 Off-Ramp	Signalized
35	Southcenter Pkwy & Klickitat Drive	Signalized
36	I-5 Off-Ramp & Southcenter Pkwy	None
37	Klickitat Drive & I-5 On-Ramp	None
38	Interurban Ave S & Fort Dent Way	Signalized
39	Interurban Ave S & Southcenter Blvd	Signalized
40	W Valley Hwy & I-405 Ramps	Signalized
41	Rainier Ave S & S Grady Way	Signalized

4 Stakeholder Involvement and Outreach

4.1 Stakeholder Meetings

A total of six of stakeholder meetings were held during the study period to involve stakeholders and address concerns of various authorities and agencies that use or are located near the study corridor. A variety of stakeholders participated, including WSDOT, Sound Transit, King County Metro, Port of Seattle, PSRC, City of Burien, City of Tukwila, and City of SeaTac. The meetings were held at the following dates and locations:

- Stakeholder Meeting #1 – October 24, 2018 – Burien Community Center
- Stakeholder Meeting #2 – January 23, 2019 – Tukwila Community Center
- Stakeholder Meeting #3 – May 1, 2019 –Sea-Tac Airport Office Building
- Stakeholder Meeting #4 – June 26, 2019 – City of SeaTac Council Chambers
- Stakeholder Meeting #5 – September 19, 2019 – City of SeaTac Council Chambers
- Stakeholder Meeting #6 – October 17, 2019 – City of SeaTac Council Chambers

Stakeholder meetings #1 through #6 are covered in the existing conditions memo, attached in Appendix A. Additionally, materials provided at the stakeholder meetings can be found in Appendix C.

4.2 Public Engagement: Web Survey

In fall 2018, WSDOT conducted an online, stated-preference survey regarding the SR 518 corridor. There was feedback from approximately 1,470 survey respondents. The objective was to gather feedback from current corridor users about existing conditions and future improvements. These users included residents and businesses, freight carriers, emergency services, and travelers to/from Sea-Tac Airport. The survey population was representative of the working population in age, but was slightly over-weighted in terms of non-minority demographics, higher income households and people who own personal vehicles and commute by car. The survey population largely represents people who use SR 518 themselves, and does not fully reflect the opinions of people who rarely or never use SR 518. The full survey description can be found in Appendix A.

5 Existing and Future Baseline Conditions Assessment

This section provides a description of the existing conditions within the study corridor and the surrounding study area, as presented in the Existing Conditions and Future Baseline Assessment Report. A full version can be found in Appendix A.

5.1 Environmental

5.1.1 Demographics

The Equity and Social Justice (ESJ) study area used in the analysis is composed of census block groups that intersect a one-half mile radius of the SR 518 corridor study alignment, from the SR 509/SR 518 interchange to the I-5/I-405/SR 518 interchange. Overall, the review found that the corridor has a higher percentage of minority populations, limited English speaking households, and a lower median household income, compared to King County. More households live under the poverty line within the study area compared to the rest of the county. Specific consideration should be taken to understand more about who is in the study area and how to meaningfully engage with these populations. This can help provide access to the decision-making process and to avoid disproportionately adverse effects on these communities.

5.1.2 Critical Areas

Critical areas are generally defined as those providing valuable and beneficial biological and physical functions to the human and natural environment, such as water quality protection or fish and wildlife habitat, or are those that pose a threat to human safety or property, such as landslide or flood hazard areas. Local jurisdictions regulate the development and alteration of critical areas and their buffers to protect the natural environment as well as public health and safety. Critical areas are present within the study area, which would need further evaluation if a strategy were to move forward as a project.

5.1.3 Fish Passage and Injunction Barriers

To address the question of fish passage sites within the study area, the SR 518 Corridor Planning Study group sought input from the Muckleshoot Indian Tribe because the corridor is contained within the Muckleshoot tribal consultation area. Two meetings were held, with several other invited parties, including the Washington Department of Fish and Wildlife (WDFW), WSDOT's Environmental Tribal Coordinator and Environmental Services Office, and the City of Tukwila to discuss how the SR 518 Corridor Planning Study identifies known water crossing structures within the study area. These meetings were held on May 16, 2019 and September 10, 2019 in Tukwila City Hall and Tukwila Community Center, respectively. The outcome of the meetings was to request WDFW compile existing fish passage site information, review it for thoroughness and accuracy, and identify potential data gaps. This effort, termed map triage, was completed over the summer of 2019 by WDFW Fish Passage Program staff. More information can be found in Appendix A.

5.1.4 Climate Vulnerability Impacts

WSDOT relies on the University of Washington Climate Impacts Group as its primary source for climate information. The UW's Washington Climate Change Impacts Assessment (2009) provides sufficient information to enable planning-level considerations of Washington's forecasted climate impacts. WSDOT's Climate Impacts Vulnerability Assessment (CIVA) is a qualitative assessment of risks to the state's transportation infrastructure from climate change. In 2010 and 2011, WSDOT collected an inventory of department-owned and managed assets and climate change data using Geographic Information Systems (GIS). The agency's qualitative assessment of climate impacts in this study area found it to be an area of low vulnerability. However, the assessment notes that extreme rain may exacerbate landslide risk along the slopes at the east end of the corridor by the intersection with I-5. SR 518 provides important network connections and east/west route resiliency within the region.

5.1.5 Habitat Connectivity and Pollinator Enhancement Priorities

WSDOT's wildlife carcass removal database has never recorded a large mammal carcass removal on SR 518, though in recent years, WSDOT Maintenance has recorded several raccoon carcass removals. SR 518 is not a priority corridor for habitat connectivity.

5.2 Pedestrian and Bicycle Facilities

There are no pedestrian and bicycle facilities available on SR 518. Bicycle travel is in general allowed on Washington State Highways, unless specifically prohibited, and is specifically prohibited from milepost 1.46 to milepost 3.81 of SR 518. Pedestrians and bicyclists are allowed on all surrounding non-prohibited infrastructure.

There are no direct changes to the availability of pedestrian and bicycle facilities included in the future year baseline. Several trail projects are under development in the area, including King County Park's Lake to Sound Trail, which will run alongside SR 518 for a portion, connecting Lake Washington through Renton to Puget Sound in Des Moines, and connecting several existing pieces of trail along the way. The construction of the project should be complete by 2023, though several segments will be completed prior to that.

5.3 Public Transit

While transit services exist within the study area, the study corridor itself does not currently serve transit users via freeway stops, though transit, including Sound Transit Route 560, utilizes SR 518. For the study area surrounding the study corridor, the existing transit services can be seen in Table 5.

Table 5 Existing public transit service in the study area (2019)

Transit Authority	Service Type	Route	Daily Ridership*
KCM	Rapid Ride	F-Line, A-Line	A-Line: 9,900; F-Line: 5,700
KCM	Frequent	150	6,200
KCM	Express	153, 154, 157, 158, 159, 177,178, 179, 190, 192, 193, 197	153: 400; 154: 200; 157: 200; 158: 600; 159: 400; 177: 500; 178: 400; 179: 800; 190: 400; 192: 100; 193: 500; 197: 500
KCM	Local	124, 128, 156, 180, 906	124: 4,000; 128: 3,500; 156: 1,100; 180: 4,400; 906: 400
ST	Light Rail	N/A	Tukwila International Blvd: 2,879; Sea-Tac Airport: 5,679
ST	Express Bus	560, 566, 577, 578	560: 1,791; 566: 2,038; 577/578: 3,840
ST	Commuter Train	Sounder	16,418

** Daily ridership reflects all stops, unless otherwise specified, and reflects average weekday boardings.*

The primary change to transit availability in the future is the implementation of the I-405 Bus Rapid Transit service, also known as Stride, which is expected to open in 2024. This service will connect Burien Transit Center to Lynnwood City center through a series of 9 freeway stations on I-405, running every 10 minutes. The expected travel time from Lynnwood to Bellevue is between 46 and 51 minutes, and a daily ridership level of 9,600 to 13,000 is expected in 2042. For Burien to Bellevue, the expected travel time is 38 to 42 minutes, with an expected daily ridership of 9,600-12,800. It will provide riders with an alternative to traveling by personal vehicle, which can potentially affect congestion levels. The planned I-405 BRT project includes a set of freeway stations located on SR 518 just east of the SR 99/International Boulevard overcrossing. SR 518 at SR 99 (TIB Station) will provide an important interchange for transit integration. It is anticipated that Sound Transit Route 560, which currently provides service into the airport terminal, will be discontinued with the introduction of I-405 BRT.

5.4 Freight Mobility

SR 518 is a key freight corridor as it serves air cargo trucking trips to and from Sea-Tac Airport, as well as regional freight trips for the Green River Valley, the Duwamish Manufacturing Industrial Center, and the significant warehousing developments in Burien, SeaTac, and Tukwila. SR 518 is considered a T-2 Corridor, meaning a total tonnage of 4 million to 10 million is carried by truck on the corridor each year.

By the future horizon years, the need for freight mobility enhancement is expected to increase. In 2011, Washington State highways carried 335.6 million tons of freight, corresponding with a value of $365 billion dollars. This number is expected to increase to 602.7 million tons in 2030, corresponding with a value of $822 billion dollars, a 125 percent increase over 19 years.

In considering improvements to the SR 518 corridor, it is crucial to evaluate strategies' compatibility with freight and other multi-modal concerns, as well as consider strategies for improving freight reliability.

5.5 Mobility and Operations

5.5.1 Traffic Volumes

To understand the movement of traffic through a 24-hour period, data was collected from permanent tube counts and CDD retrieval methods along the study segment on a typical weekday during the month of October 2018. The counters shown in the figure below were used to collect this data.

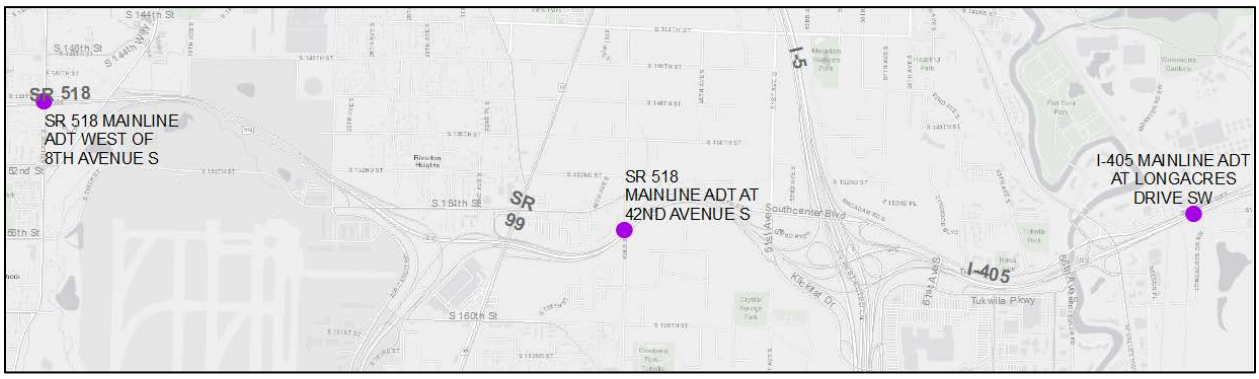

Figure 3 Counter Locations for SR 518 24-Hour Volume Data

The full data set can be seen in Appendix A. For the two SR 518 locations, the 24-hour volumes were as follows.

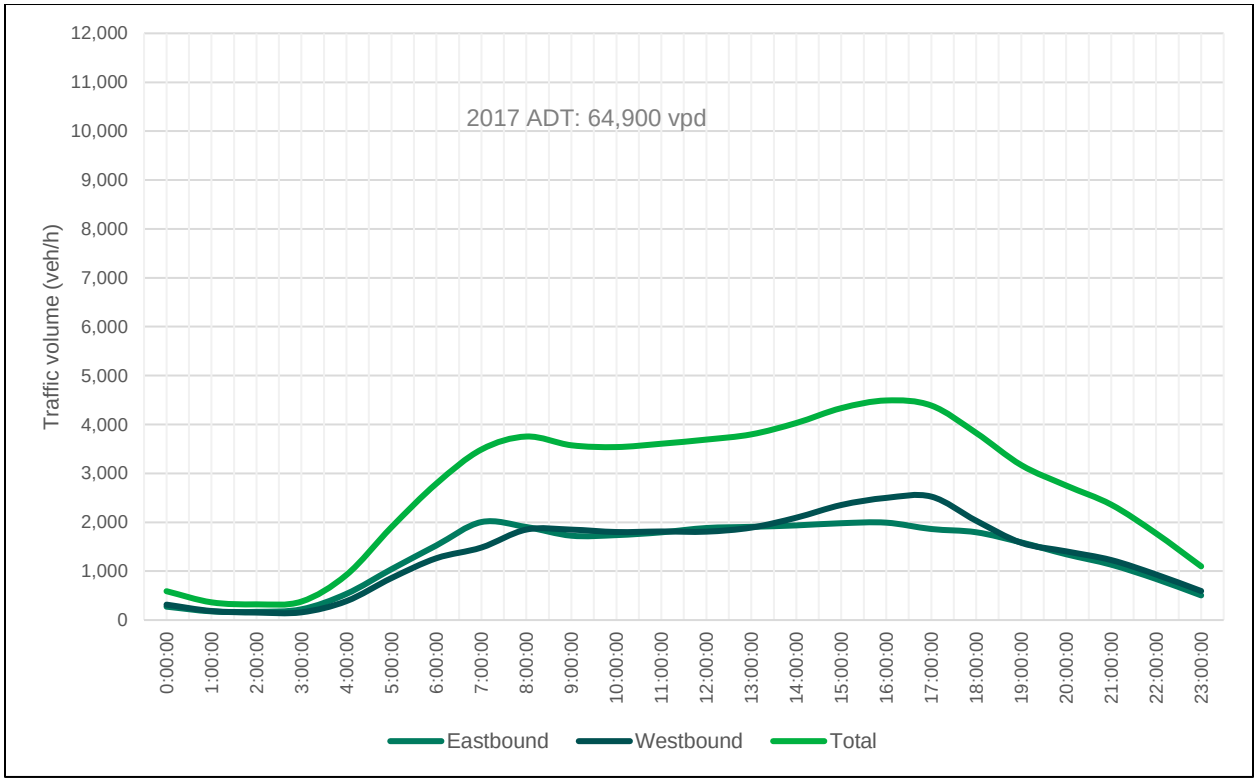

Figure 4 SR 518 mainline ADT west of 8th Avenue S

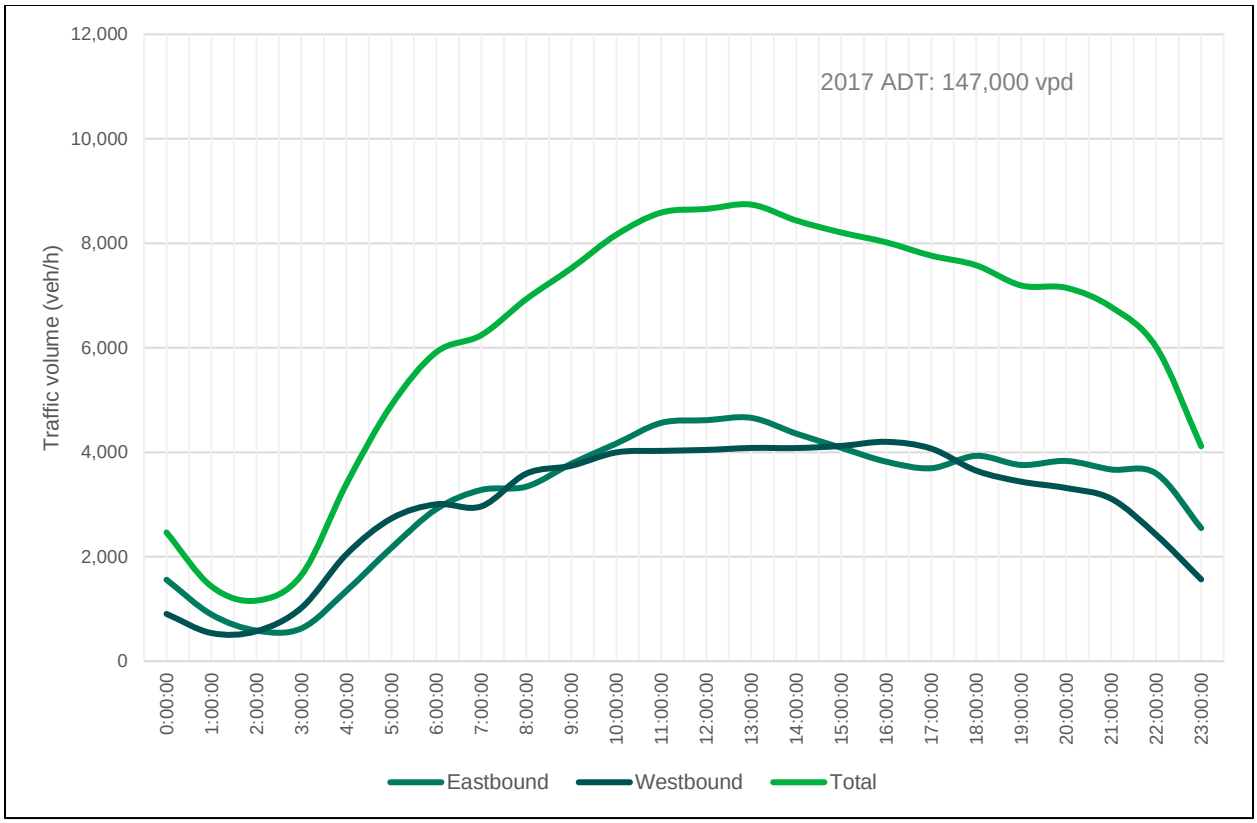

Figure 5 SR 518 mainline ADT at 42nd Avenue S

Tube counts were utilized as inputs to the model, along with DTA-modeling outputs. For the westbound direction in the AM peak hour, the highest volume was observed on I-405 between SR 167 and SR 181, followed by the I-405 segment between SR 181 and the I-5/I-405/SR 518 interchange. For the eastbound volumes, they are generally found to be higher in the eastern section of the corridor, along I-405, compared to the western part of the corridor, like the westbound volumes. Slightly increased volumes are observed around Des Moines Memorial Drive and S 154th St, which then steadily increase from North Airport Expressway (NAE) through the I-5/I-405/SR 518 interchange.

For the westbound direction in the PM peak hour, the highest volumes were observed between the SR 167 interchange with I-405, along the mainline, across the I-5/I-405/SR 518 interchange, and continuing to the intersection of SR 518 and SR 99/Tukwila International Boulevard. The volumes on these segments through the peak hours on average vary from 4,140 vehicles/hour to 4,611 vehicles/hour. For the PM, peak period in the eastbound direction, the volumes are also generally higher in the eastern part of the study corridor, compared to the western part. The volumes peak between I-5 and SR 181, just past the halfway point, and are lowest between S 154th St and North Airport Expressway.

In addition to AM and PM Peak volumes, midday volumes were also tabulated, but were not used as part of the analysis. These were presented and compared to AM and PM peak volumes in a separate technical memorandum, titled Midday Peak Period Assessment Summary, attached as Appendix EC-L to the Existing Conditions and Future Baseline Report, attached as Appendix A.

Future SR 518 mainline and ramp volumes for the targeted horizon years of 2030 and 2045 were based on growth projections from the SR 518 Dynamic Traffic Assignment (DTA) model. Due to capacity constraints along the SR 518 corridor and on I-5 and SR 509, the DTA model projections showed modest volume growth between existing conditions and future 2030 or 2045 horizons for many segments. For segments and directions of SR 518 most affected by traffic shifts to the new SR 509 extension (to be completed by 2028), volume projections showed a decrease in SR 518 demand for segments such as the eastbound segment between SR 509 and SR 99. The results of the analysis are shown in Figure 6.

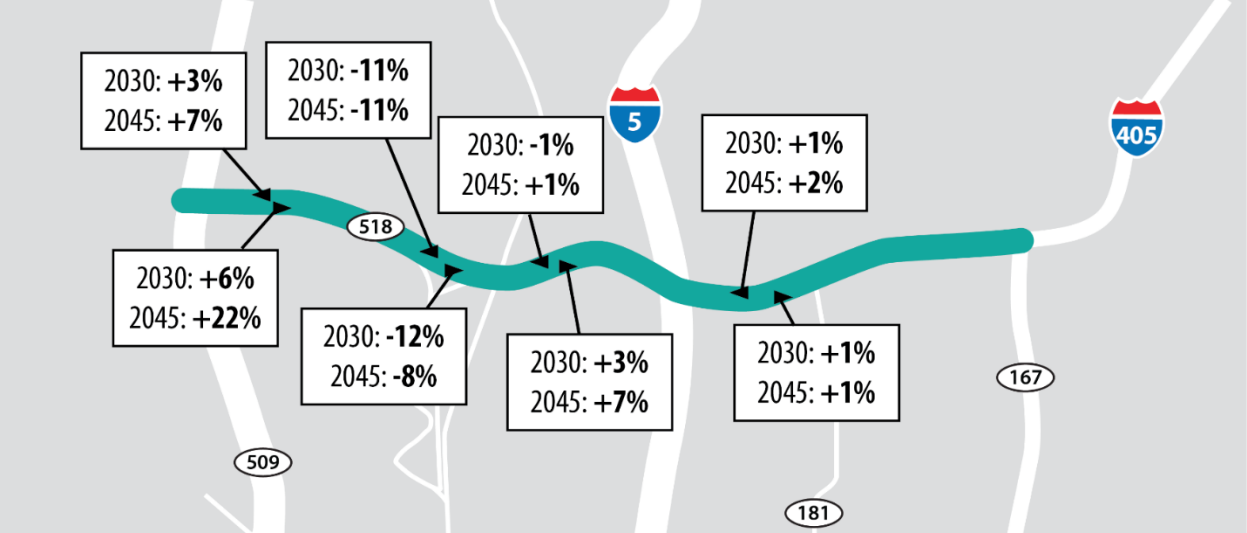

Figure 6 Future PM Demand based on the DTA-Model

5.5.2 Intersection Operations

Intersection Operations Analysis was completed using Synchro as described in Appendix A. Under 2018 existing conditions, 34 of 41 study intersections in the AM or PM peak hour meet jurisdictional mobility standards. The seven intersections that do not meet mobility standards are listed below.

Table 6 Intersections failing to meet standards under 2018 existing conditions

ID	Name	Level of Service	Time Period
4	SR 509 Off-Ramp/SR 518	LOS E	AM Peak
5	SR 509 On-Off-Ramp/148th Street	LOS E	AM Peak
6	1st Avenue/148th Street	LOS E	AM Peak
19	SR 518/154th Street	LOS F	PM Peak
31	Klickitat Drive/SR 518 Off-Ramp	LOS F	PM Peak
32	I-405/Southcenter Boulevard	LOS F	PM Peak
41	Rainier Avenue/Grady Way	LOS F	PM Peak

Under 2030 Baseline conditions, 26 of 41 study intersections in either the AM or PM peak hour meet jurisdictional mobility standards. The 15 intersections that do not meet mobility standards under 2030 Baseline conditions are listed below.

Table 7 Intersections failing to meet standards under 2030 baseline conditions

ID	Name	Level of Service	Time Period
4	SR 509 Off-Ramp/SR 518	LOS F	PM Peak
8	Des Moines Memorial Drive S & SR 518 Off-Ramp	LOS F	PM Peak
9	Des Moines Memorial Drive S & SR 518 EB Off-Ramp and On-Ramp	LOS F	AM & PM Peak
14	SR 518 Off-Ramp & S 154th St	LOS F	PM Peak
18	32nd Ave S & S 154th St	LOS F	PM Peak
19	SR 518 Off-Ramp & S 154th St near SR 99	LOS F	PM Peak
23	Pacific Hwy S & S 154th St	LOS F	PM Peak
28	Host Road/SR 518 On-Ramp & S 160th St	LOS F	PM Peak
29	Air Cargo Rd & S 160th St	LOS F	PM Peak
31	Klickitat Drive & SR 518 Off-Ramp	LOS F	PM Peak
32	I-405 Off-Ramp & Southcenter Blvd	LOS F	PM Peak
36	I-5 Off-Ramp & Southcenter Pkwy	LOS F	PM Peak
38	Interurban Ave S & Fort Dent Way	LOS F	PM Peak
39	Interurban Ave S & Southcenter Blvd	LOS F	PM Peak
41	Rainier Ave S & S Grady Way	LOS F	PM Peak

Under 2045 Baseline conditions, 22 of 41 study intersections in either the AM or PM peak hour meet jurisdictional mobility standards. All the 15 intersections that are not meeting mobility standards under 2030 Baseline conditions continue to not meet standards under 2045 Baseline conditions. The four additional intersections that do not meet standards under 2045 Baseline conditions are listed below.

Table 8 Additional intersections failing to meet standards under 2045 baseline conditions

ID	Name	Level of Service	Time Period
6	1st Avenue/148th Street	LOS E	PM Peak
17	30th Ave S & S 154th St	LOS F	PM Peak
21	Pacific Hwy S & S 152nd St	LOS F	PM Peak
40	W Valley Highway & I-405 Ramps	LOS F	AM Peak

5.5.3 Travel Times and Corridor Speeds

SR 518 travel times between SR 509 and I-5 are expected to increase between 30 percent and 52 percent in the eastbound direction and between 2 percent and 13 percent in the westbound direction under 2030 and 2045 Baseline conditions for PM Peak hour conditions. For the main travel time route between the existing airport terminal and I-5 (along NB North Airport Expressway and EB SR 518, ending at I-5), travel times are expected to increase 33 percent under 2030 Baseline conditions and increase 74 percent under 2045 Baseline conditions. The PM Peak corridor travel time summary is shown in the table below.

Table 9 Corridor Travel Time Summary: Existing vs. 2030/2045 Baseline – EB SR 518 & NB I-405 Travel Times - PM Peak Hour

ID	Start Point	End Point	Distance (miles)	Free Flow Travel Time (min)	Existing Travel Time (min)	2030 Baseline Travel Time (mins)	2030 Baseline Delta (mins/%)	2045 Baseline	2045 Baseline Delta (mins/%)
1	SR 509: East of 1st Avenue	I-5 at Interchange	3.4	4.0	5.8	7.5	1.7/30%	8.8	3.0/52%
1A	SR 509: East of 1st Avenue	North Airport Expressway: to SB Ramp	2.0	2.0	2.5	2.7	0.2/8%	2.7	0.2/9%
1B	NAE, at Sea-Tac Terminal: South of 170th	I-5 at Interchange	2.6	3.0	7.0	9.3	2.3/33%	12.2	3.7/74%
1C	I-5: from NB mainline to SR 518	SR 167 at interchange via I-405	3.5	4.0	N/A	8.0	N/A	14.5	N/A
2	SR 509: East of 1st Avenue	SR 167 at interchange: via I-405	5.7	6.0	12.1	12.8	0.7/6%	14.6	3.1/20%
2A	I-5 at Interchange	SR 167 at interchange: via I-405	2.3	3.0	5.6	5.0	-0.6/-11%	5.3	-0.3/-6%

Table 10 Corridor Travel Time Summary: Existing vs. 2030/2045 Baseline – SB I-405 & WB SR 518 Travel Times - PM Peak Hour

ID	Start Point	End Point	Distance (miles)	Free Flow Travel Time (min)	Existing Travel Time (min)	2030 Baseline Travel Time (mins)	2030 Baseline Delta (mins/%)	2045 Baseline	2045 Baseline Delta (mins/%)
3	I-5 from SB ramp: To SR 518	SR 509: East of 1st Avenue	3.4	4.0	4.4	4.5	0.1/2%	5.0	0.6/13%
3A	I-5 from SB ramp: To SR 518	North Airport Expressway: To SB Ramp	1.8	3.0	2.0	2.2	0.2/10%	2.9	0.9/46%
3B	North Airport Expressway: NB ramp to WB SR 518	SR 509: East of 1st Avenue	2.7	4.0	3.5	3.8	0.3/7%	4.1	0.6/17%
3C	I-5: from NB mainline to SR 518	North Airport Expressway: to SB Ramp	3.4	4.0	N/A	4.3	N/A	9.8	N/A
3D	I-5: from NB mainline to SR 518	SR 509: East of 1st Avenue	4.7	6.0	N/A	6.6	N/A	11.9	N/A
4	SR 167 at interchange: via I-405	SR 509: East of 1st Avenue	5.7	6.0	8.6	8.9	0.3/3%	11.8	3.2/37%
4A	SR 167 at interchange: via I-405	I-5 at Interchange	2.3	3.0	3.9	4.2	0.3/8%	7.1	3.2/82%

Complete information on volumes, intersection operations, travel times and corridor speeds can be found in Appendix EC-K of the Existing Conditions and Future Baseline report.

5.6 Crash History, Emergency Services and Target Zero

5.6.1 Crash History[1]

To assess the current conditions of the SR 518 corridor, a crash data analysis was carried out based on data provided by WSDOT's Crash Portal and.

Vehicle crash data was requested from and provided by WSDOT for the study area from January 1, 2013 through year 2018, covering five full years for analysis and review.

The SR 518 corridor has experienced an increasing trend in total crashes from 2014 to 2018. 25 fatal and serious injury crashes have occurred on SR 518 and within the I-5/I-405/SR 518 interchange, making up approximately 1 percent of the total crashes in the study area over the five years. Minor or possible injury crashes make up about 29 percent of the total crashes along the SR 518 roadway segment and the I-5/I-405/SR 518 interchange, leaving about 70 percent of the crashes occurring with property damage only.

5.6.2 Emergency Services

Emergency Services involves three branches of service: Medical assistance, fire rescue, and law enforcement. The primary law enforcement agency on Washington State highways is the Washington State Patrol. They respond to an average of 3,100 incidents per day on 18,700 state lane miles. Several other law enforcement agencies are present within the study area and use SR 518 and I-405 for access to incidents.

In King County 4,200 EMTs are employed at 30 fire-based agencies and provide life support: Basic Life Support (BLS) and Advanced Life Support (ALS). BLS is the first tier of care deployed when life support is requested and are usually the first on scene. The second tier, ALS, are deployed second to BLS if needed, e.g. if the patient is unresponsive or in respiratory distress. In 2018, BLS responded to 211,551 scenes and ALS to 51,654 scenes. BLS on average arrives after 6.4 min (with 58.7 percent reached within 6 min), and ALS in 11.8 min (with 35.5 percent reached within 8 min and 74 percent within 14 min). These numbers represent the time from the emergency call is received to the time the unit arrives on scene.

King County Emergency Medical Services publishes a six-year strategic plan, with the current one expiring in December 2019, and the next one being valid from 2020 through 2025. They do not publish any other forecasting regarding their expected call and services levels. Looking at the history data, the number of ALS calls has plateaued over the past five years, even as population in the county has increased, while the number of BLS calls has followed the population increase. These trends can be seen in Figure 7 below.

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1 Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

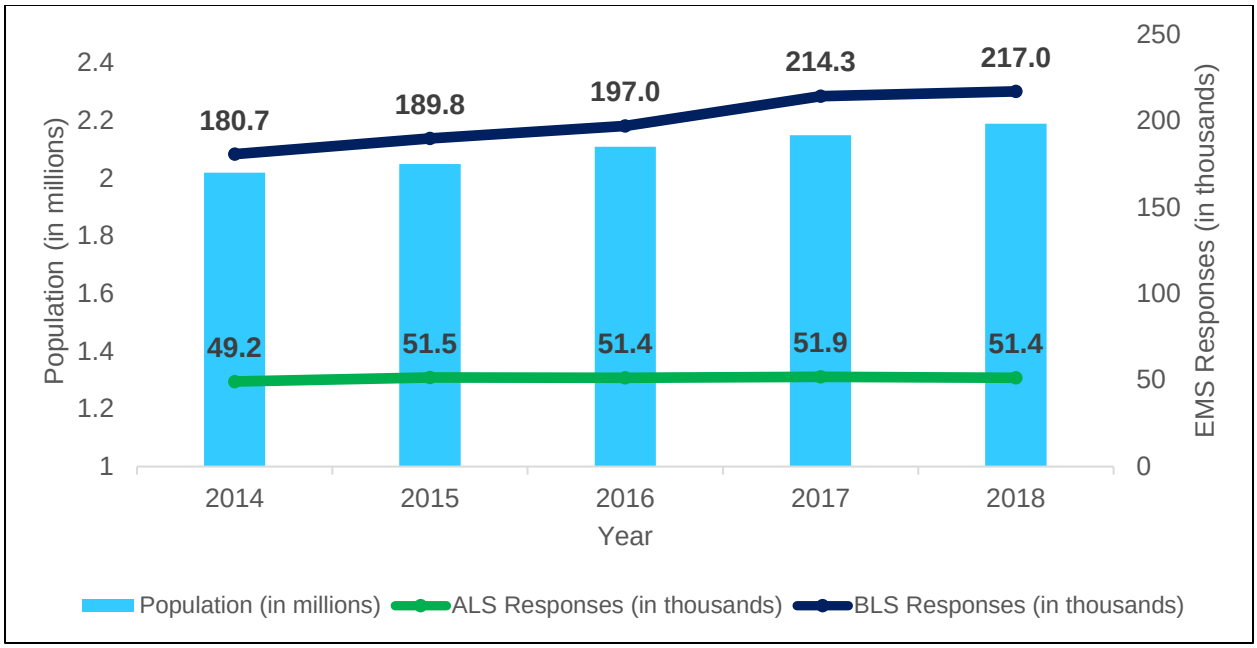


Figure 7 Population, ALS and BLS call volume historic trends

5.6.3 Target Zero[2]

WSDOT utilizes historic data for predicting crash levels on state highways, by weighing the observed crash history against the predicted number of crashes per year. In 2016, WSDOT published their initiative and plan Target Zero: Washington State Strategic Highway Safety Plan 2016: Zero Deaths & Zero Serious Injuries by 2030. The goal of the plan and its programmed activities is to decrease the number of fatalities and serious injuries on Washington roads to zero by the year 2030. This is done through a series of interventions, such as changes to law and legislation regarding impaired and distracted driving, surveillance, e.g. by using intermediate driver decals, and engineering, such as improving roads and intersections to lower the crash risk. The state is currently not on track to meet their specified goal, as can be seen in Figure 8 below.

2 Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

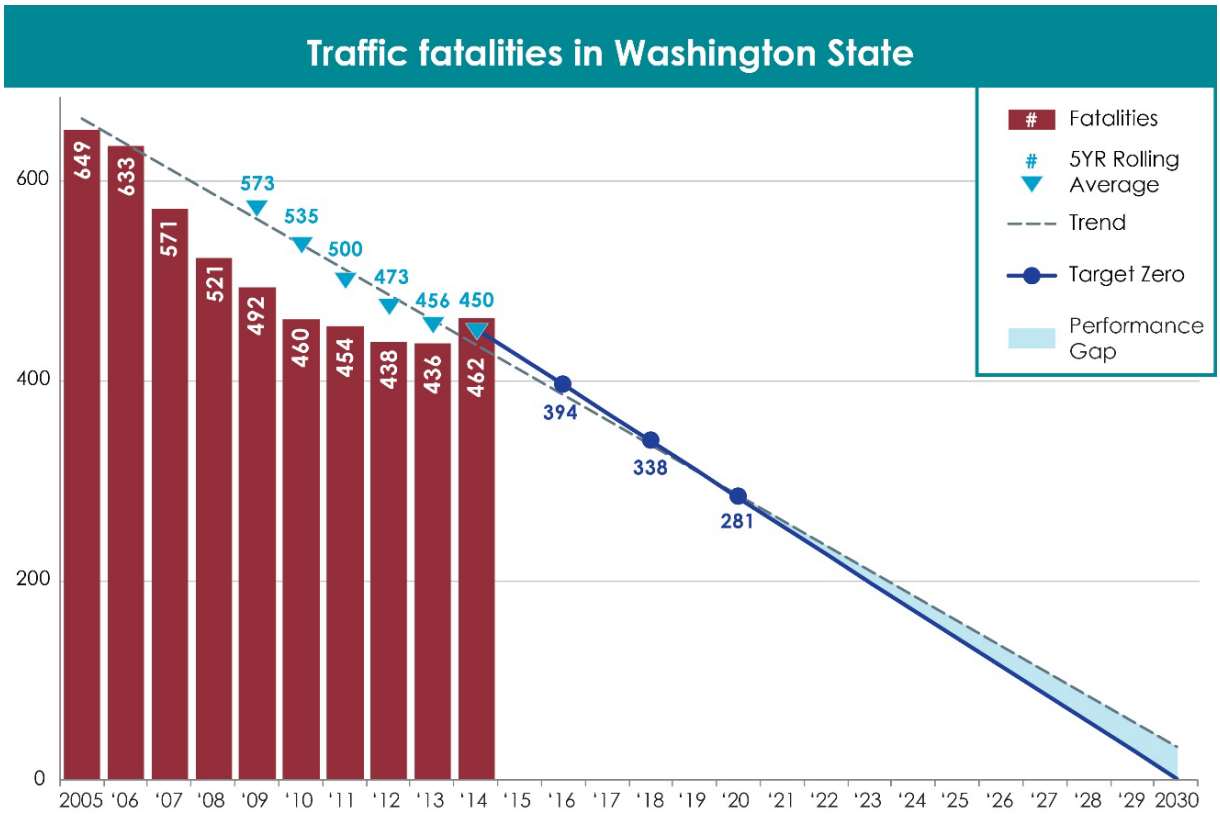


Figure 8 Fatalities in Washington State, 2030 Target Zero forecast

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

6 Performance Evaluation Development and Criteria

To evaluate the proposed strategies, performance evaluation criteria were developed to compare the strategies to each other, as well as to foster discussion with stakeholders. The screening criteria and categories, developed based on previous reports and WSDOT best practices, were presented to stakeholders, who confirmed that they adequately capture the spirit and intent of the evaluation process. These overarching categories were Mobility, Safety, Environmental, Feasibility, and Access. In discussion with the stakeholders, weighting of the categories was deemed appropriate. However, the team ultimately determined that each category should be considered equally, with each of the five criteria receiving a 20 percent weight. Sub criteria were developed for each strategy, in accordance with the goals and objectives of SR 518 study, while including stakeholder interest and industry best practice. This resulted in 17 sub criteria spanning the five categories, and weighted per stakeholder preferences and objectives. An overview of the criteria and sub criteria can be seen in Figure 9.

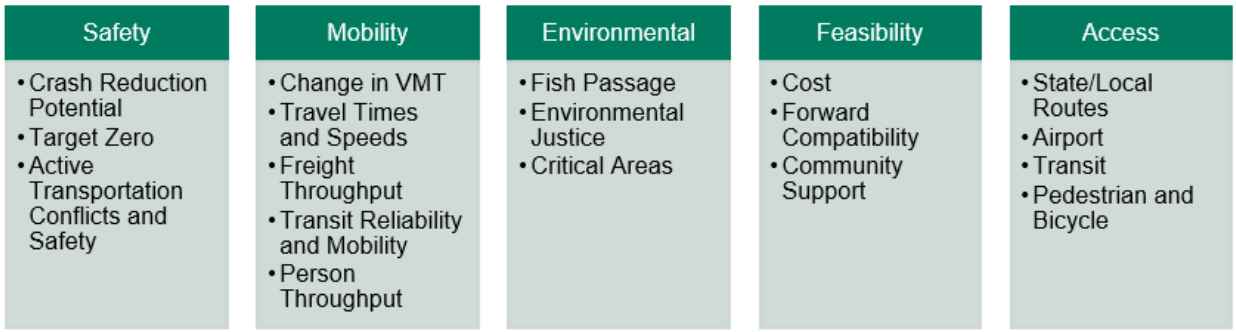


Figure 9 Performance criteria categories and subcategories

The following section describes the five categories and their subcategories, presents the assigned weighting to each and includes some consideration to applying the respective criteria.

6.1 Performance Criteria Descriptions and Weighting

6.1.1 Mobility (20% of overall weighting)

Change in VMT (20%)

Due to environmental concerns, such as vehicle emissions, it is in the interest of the state to reduce the number of vehicle miles traveled (VMT) on the state's roadways. This criterion is measured using a DTA-model with input from the Sound Transit ridership model and/or PSRC travel forecasting model, and provides a percent output change in VMT for a given scenario. A more than five percent increase in corridor or sub-area VMT is given a score of 1, while a more than five percent reduction in VMT is given a score of 5. A score of 2 is given for a 2-5 percent increase, and a score of 4 is given for a 2-5 percent decrease in VMT. Finally, a minor increase or decrease of less than 2 percent VMT in the corridor or sub-area receives a score of 3.

Travel Times and Speeds (20%)

Travel time expresses the time it takes to travel from one point to another at a certain point in time, usually during peak hours. For this criterion, three paths are evaluated using modeling software to assess whether a strategy or improvement has the potential to increase or decrease the travel time on one or more of these segments, on average. A more than 20 percent reduction in the average point-to-point travel time will receive a score of 5. A 10-20 percent reduction will receive a score of 4. Less than 10 percent increase or decrease in travel times will receive a score of 3. A score of 2 is given to a strategy with a 10-20 percent expected increase in travel times, while a 1 is given for a more than 20 percent expected increase in travel times.

Freight Throughput (20%)

This criterion evaluates the potential to influence expected freight throughput, an important measure on this T-2 corridor, as defined in Existing and Future Baseline Conditions Assessment. It is gauged by potential mode shift or physical capacity enhancement. An expected significant decrease in the expected throughput receives a score of 1, while some decrease will receive a score of 2. Little or no impact on freight throughput can receive a score of 3, while a score of 4 is given for an expected increase in freight throughput. A score of 5 is given to a strategy that significantly increases expected freight throughput.

Transit Reliability & Mobility (20%)

Transit is important to ensure the mobility of the corridor, and to provide options to travelers and commuters alike. More reliable transit, meaning less variation in total travel times, is more attractive to riders and can help support the goals of the state and of the corridor. Transit reliability is evaluated in terms of the potential to impact the amount of transit service delays and of interruptions on SR 518 to and from the airport. The highest score (5) is given to a strategy that noticeably and significantly improves the connections and/or removes the potential for transit service delay and interruptions, and the lowest score (1) is given to a strategy that noticeably increases the potential for delays and interruptions.

Person Throughput (20%)

While it is desirable to maintain or reduce VMT, it is also WSDOT's goal to increase person throughput on the corridor, as this indicates an increased utilization of vanpooling, carpooling, and transit versus Single Occupancy Vehicles (SOVs). The lowest score (1) is given to a strategy that significantly decreases the expected person throughput and a score of 2 is given to a strategy that provides a moderate decrease in the expected person throughput. A score of 3 is given for little or no impact on expected person throughput. A moderate increase in expected person throughput will receive a score of 4, while the potential to significantly increase the expected person throughput receives a score of 5.

6.1.2 Safety (20% of overall weighting)

Crash Reduction Potential (40%)

Property damage only, no injury, and minor injury are the most common types of crashes on highways, and often result in congestion and delays, especially during peak hours. It is therefore the state's goal to reduce the number of these types of crashes, as well as serious and fatal injury crashes. A score of 1 is

given for the potential to noticeable and significantly increase the number and severity of crashes and a score of 2 will be awarded for a modest increase in number and severity of crashes. A score of 3 is given for little or no effect on crash frequency or severity. A score of 4 is given for the potential to modestly reduce the number and severity of crashes and a score of 5 is given for the potential to noticeably and significantly reduce the frequency and severity of crashes.

Target Zero (40%)

Target Zero is Washington State's program to eliminate fatal and serious injuries on state roadways before 2030 through a variety of improvements, including infrastructural, behavioral, and legal initiatives. For this category, the highest score (5) is given to a strategy that has the potential to noticeably reduce the number of fatal and serious injuries. A 3 is given for a strategy that has little to no effect on the number of serious and fatal injuries. A score of 1 is given to a strategy that has no potential to reduce the number of fatal and serious injuries.

Active Transportation Conflicts & Safety (20%)

This criterion's primary concern is the expected representation of pedestrian, bicycle, and other active transportation user conflicts with traffic, especially around ramp termini and access points to SR 518. If no reduction in conflict is expected from a strategy or improvement, a score of 3 is given. A score of 2 is given for a modest increase in expected conflicts, while a score of 4 is given for a moderate reduction in the expected number of conflicts. A score of 5 is given for a moderately-high reduction in conflicts between active transportation users and traffic. The lowest score of 1 is given for a strategy that has the potential to significantly increase the number or severity of conflicts.

6.1.3 Environmental (20% of overall weighting)

Fish Passage (35%)

Following a federal court injunction issued in March 2013, the State has a treaty-based duty to preserve fish runs at the state's infrastructure. This criterion evaluates the expected impacts on fish passage locations. Scores will range from no impact (with no streams or corrected passages nearby) given a score of 5, to significant impact given a score of 1, as these would most likely need to be corrected as part of a given strategy.

Environmental Justice (35%)

A strategy cannot disproportionately affect or have high adverse impact on minority groups, or groups that have traditionally been underserved. These includes minority racial groups, people with low incomes, the elderly, and people without access to a car or transit. This criterion evaluates whether such a group is significantly impacted by a specific strategy. A high score (5) is given when a strategy or improvement positively benefits a minority group or historically underserved population, including providing better access to jobs, residences, and green areas, or lowering the environmental impact from noise or local pollution. A low score (1) is given when a strategy would result in significant, disproportionately high and adverse impact on a minority or low-income group.

Critical Areas (30%)

Critical areas include wetlands and buffers, aquifer recharge areas, wellhead protection areas, frequently flooded areas, geographically hazardous areas, fish and wildlife habitat, and conservation areas and this criterion evaluates the impact on those areas, in terms of encroachment etc. The impacts are evaluated based on the expected footprint of the strategy being considered and are evaluated using GIS mapping tools. Strategies that do not impact any critical areas are given a score of 5. Some impact receives a score of 4, including minimal wetland filling or floodplain impact, if a habitat buffer is present but unaffected, or if there are streams within 1,000 feet (but without encroachment). If there is moderate impact, such as if a habitat buffer is affected or there is some stream encroachment, a score of 3 is given. A score of 2 is given for one type of habitat impact, substantial filling, significant encroachment, or floodplain impact, and a score of 1 is given if more than one impact is present.

6.1.4 Feasibility (20% of overall weighting)

Cost (30%)

This category evaluates the cost based on rough estimates of approximate costs of a strategy or improvement. These estimates are meant to provide a means of differentiating the improvement using capital cost, but not to provide programmatic budget estimation. In accordance with WSDOT policy on Practical Solutions, lower-cost alternatives are valued higher than improvements that require significant capital investment. Strategies estimated at less than $1 million would rate highest at 5 points. A strategy estimated to cost between $1 million and $5 million is awarded 4 points. 3 points would be given for a strategy cost of $5-$10 million and 2 points would be awarded for a strategy cost of between $10 million and $20 million. The lowest score is awarded to strategies with an expected capital cost of more than $20 million.

Forward Compatibility (30%)

This evaluation criterion describes whether a strategy is compatible with other future projects and programs by either WSDOT or other agencies within the area. The highest score (5) is given to a strategy that is compatible, without modification, with all planned and unplanned, funded and unfunded projects and programs. With full forward compatibility, unfunded and unplanned programs and projects may be more easily deployed than if a strategy further complicated it. The lowest score (1) is given to strategies that hinder, complicate, or disable several smaller programs or projects, or one program or project of significance, whether it is of federal, regional, or state significance.

Community Support (40%)

This category measures the community's support for an improvement, including that of the public as well as stakeholders. It is in partly based on the feedback and priorities obtained from the online survey conducted by WSDOT in Fall 2018. A score of 5 indicates substantial community and stakeholder support of the proposed improvement. A score of 4 indicates a moderate level of community support. Neutral or mixed community disposition toward an improvement option is rated a 3. Moderate opposition by the community toward the improvement is scored a 2. Substantial community and agency opposition (along with little to no support) toward the improvement is given a score of 1.

6.1.5 Access (20% of overall weighting)

State Routes/Local Routes (25%)

This criterion evaluates how well connections in the vehicular network are maintained, including connections of the local network, the state network, and between local and state network facilities. A score of 1 is given to a strategy that results in significant negative impacts on network connections, and a score of 2 is given for a negative impact. A score of 3 is given to a strategy that has no impact on local routes, state routes, or the connections between them. A score of 4 is given for an improvement to network connectivity, and a score of 5 is given for a significant improvement to network connectivity, especially in locations of high attraction.

Airport Access (25%)

This criterion evaluates whether a strategy has an impact on access to and from the airport for all modes and purposes. A score of 1 is given for a significant decrease in access, 2 for a decrease, and 3 for no impact. A score of 4 is given when airport access for all modes and purposes is increased, and a score of 5 is given when access is significantly improved.

Access to Transit (25%)

Access to transit reflects both physical access, e.g. locations of facilities and routing of services, as well as non-physical access, such as ORCA Lift (Reduced Fare) cards, or other strategies enabling more use of transit. The highest score (5) is given to strategies that significantly improve many current and potential transit users' access to high-capacity, frequent transit, such as Light Rail Transit (LRT) or Bus Rapid Transit (BRT) service. A medium score of 3 is given for no impact to users' access to LRT, BRT or similar service, or close connections to this. The lowest score (1) is given for strategies that degrades or removes users' access to transit or transit connections.

Pedestrian and Bicycle Access (25%)

Though there are no pedestrian and bicycle uses of the SR 518 corridor itself, this use on the surrounding streets is important to facilitate movements throughout the study area. This criterion evaluates access to bicycle facilities, trails, sidewalks, and crosswalks, etc. The highest rating (5) is given to a strategy that would provide significant access to any type of active transportation facility that connects to a major attraction. A score of 4 is given for a strategy that provides access to a minor degree or to sections of access, but not necessarily to any specific attraction; this could include completing a section of sidewalk. A score of 3 is given for no impact on active transportation facilities and a score of 1 is given for a degradation of facilities, including removing access to and use of bicycle facilities, trails, sidewalks and crosswalks.

7 Strategy Development and Evaluation Process

The Existing Conditions and Future Baseline Assessment (Appendix A) documented the analysis of existing and future anticipated performance gaps in the study corridor. Based on these identified performance gaps, a Practical Solutions approach was used to identify and screen improvement treatments to address performance gaps and group ideas as solutions into strategy packages, before further evaluating and refining the solutions and strategy packages.

The list of strategies was developed in collaboration among WSDOT, Port of Seattle, the consultant team and the stakeholders previously listed, through several meetings, working sessions and rounds of review and feedback. Initially, a combination of well-known and often-used strategies were suggested, e.g. transit investment. Later in the process, strategies that addressed specific issues or points of congestion were suggested, e.g. specific treatments for identified ramp termini, and added to the list. The final list of strategies was vetted in the September 19, 2019 Stakeholder meeting, as described in Section 4 Stakeholder Involvement and Outreach.

Following the stakeholder meetings, support or opposition was expressed by stakeholders to the individual strategies. This feedback was not intended to represent a statement of responsibility, but indicated where various stakeholders see potential for a positive impact, contingent upon appropriate planning and allocation.

7.1 Strategy Performance Refinement and Evaluation

Strategies were initially presented at a stakeholder meeting as a forum for stakeholders to add additional strategies for evaluation. Approximately 80 strategies were identified on the initial list. These strategies were submitted and carried through a cursory screening process, using the five primary evaluation criteria categories as described in Section 6: Mobility, Safety, Environmental, Feasibility, and Access, based on a simplified scale of 1 to 3. The outcomes of the cursory screening were used to guide the elimination of poor performing strategies with low support from stakeholders. The cursory screening did not eliminate any strategies based on score alone and some were retained for further evaluation, due to stakeholder support, forward compatibility, or interest through other programs. Approximately 10 strategies were eliminated following the cursory screening.

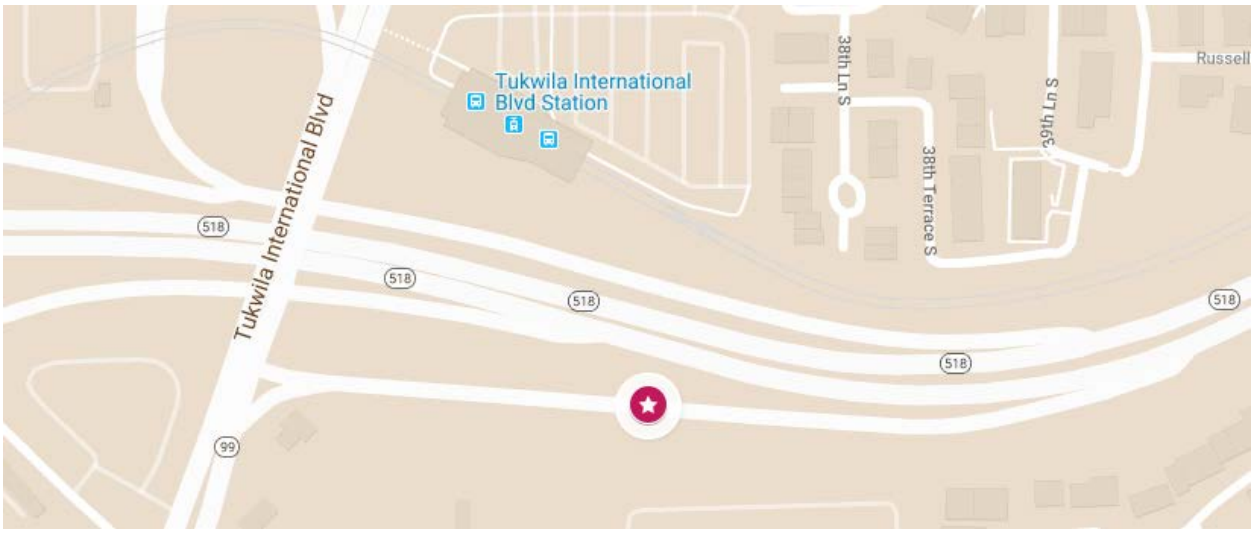
The second-tier screening applied the sub criteria to each strategy, based on a combination of qualitative and quantitative assessments. This was initially done in combination with WSDOT and the Port of Seattle, before being shared with stakeholders at the September 19, 2019 Stakeholder Meeting as described in Section 4 Stakeholder Involvement and Outreach, for verification and discussion of the evaluation itself. Some strategies had opposing opinions, e.g. varying community support, and those strategies generally resulted in a more moderate score. The strategies were then assigned to an implementation timeline, either near-term (now-2030), mid-term (2030-2045) or long-term (2045-) based on when a solution would address a particular performance gap or likely could be implemented based on an estimated level of investment as described in Section 6 Performance Evaluation Development and Criteria.

Each section contains a sketch or map of the strategy as well as a description of need, elements and other related factors. Each strategy also identifies a cost, which is sourced from various sources including previous studies, current estimates for similar projects, the WSDOT Planning Level Cost Estimation-tool (PLCE), and rough estimates based on engineering judgement. The PLCE provides costs based on standard unit costs for projects and is to be used for rough estimating only. A more detailed cost estimate will be required for all strategies moving forward. The PLCE costs have been verified with WSDOT Program Development. The cost year is Year 2016-dollars for the PLCE-estimates. The rough estimates, marked as "Estimated cost range", are assumed to be Year 2019-dollars. Each strategy furthermore contains a section on stakeholder support, which has been expressed throughout the stakeholder involvement process. Support by stakeholders does not indicate implementation responsibility or funding role, should a strategy advance. Each strategy identifies whether it progresses into a recommendations package.

7.2 System Management Strategies

7.2.1 Near-Term System Management Strategies

#1 - Ramp Metering: SR 99 to EB 518 All Lanes



To manage traffic flow onto eastbound SR 518, this strategy suggests adding ramp metering to all lanes of the on-ramp from NB SR 99 to EB SR 518. Further analysis and coordination with transit agencies and stakeholders will identify the future implementation strategies, such as a metered HOV bypass, metered general purpose lane, metered shoulder, etc. Benefits include better management of turbulence on SR 518 resulting from increasing HOV bypass usage. Challenges include lack of storage space behind the meter which may push the queue backwards to SR 99 and reduction of benefits to HOV eligible drivers, and considerations must be given to the impacts on local streets and queues.

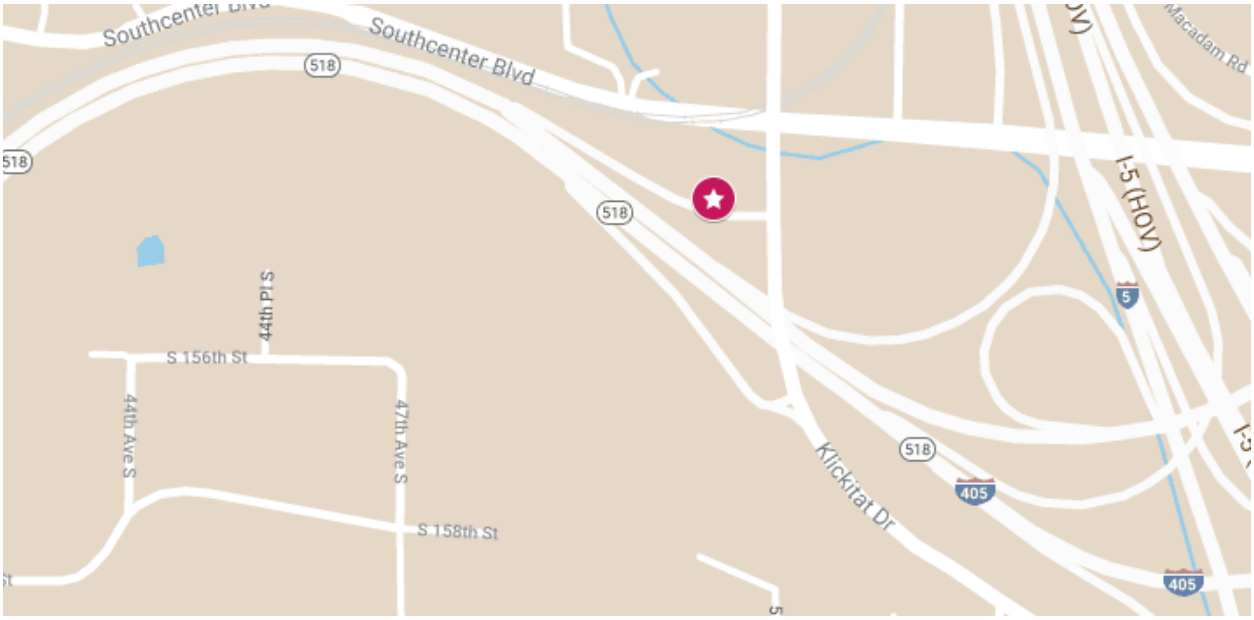
- This strategy is part of a recommendation package.
- Total Score: 3.65
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Sound Transit
  Port of Seattle

#2 - Ramp Metering: 51st Ave S to WB 518



Adding ramp meters to the 51st Ave S on-ramp to WB SR 518 may improve traffic flow and manage turbulence in this weave area between the I-5 on-ramps and the SR 99 off-ramps. The benefit of this is smoother traffic flow entering the mainline. One challenge is a lack of storage space, possibly pushing queues back to 51st Ave S or Klickitat Drive S, and considerations must be given to the impact on local streets and queues.

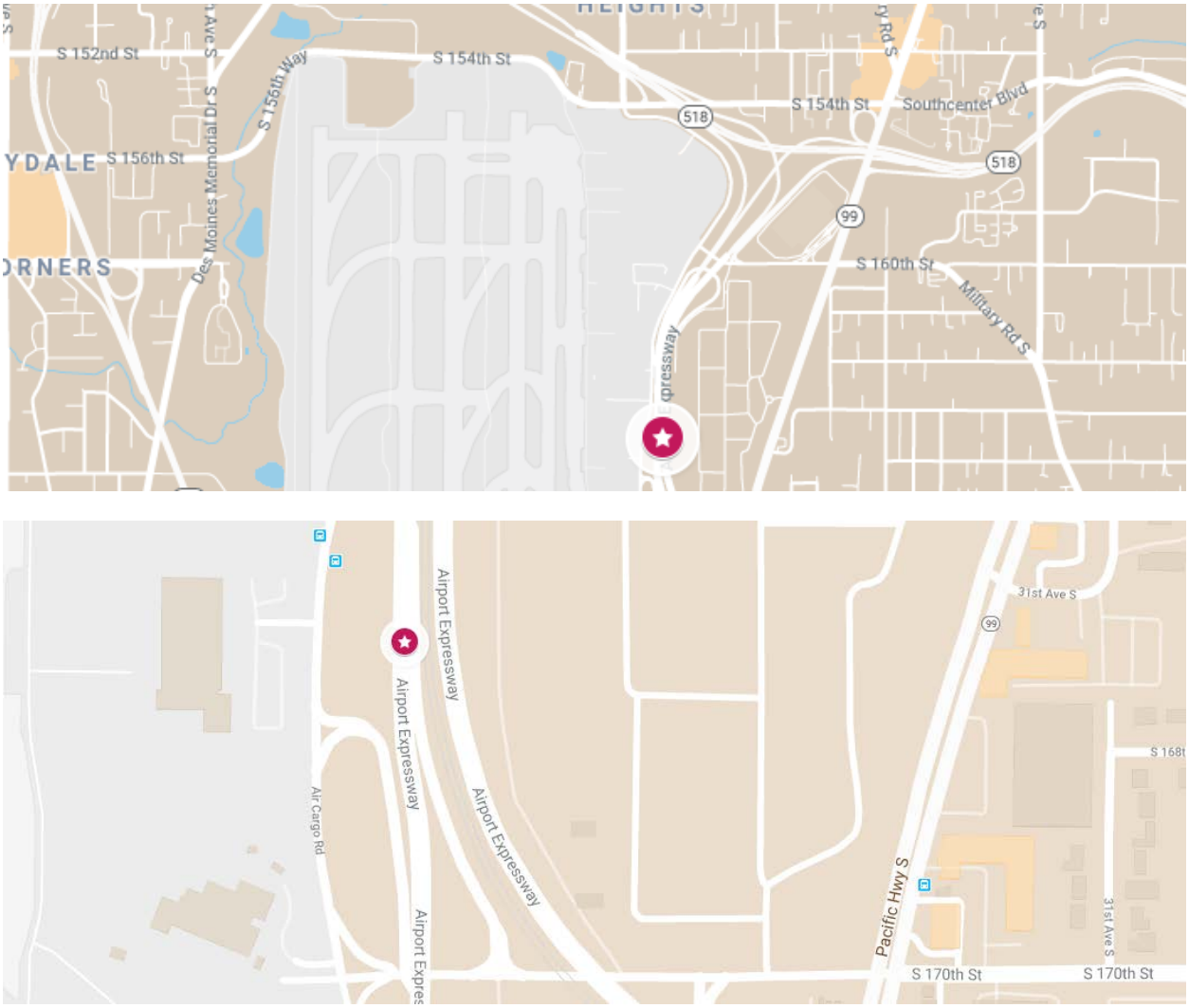
- This strategy is part of a recommendation package.
- Total Score: 3.53
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  City of Tukwila

#3 - ATMS: Travel Time Signs on NAE - Seattle via SR 509 or I-5



Currently, airport travelers may not be aware that WB SR 518 to NB SR 509 to SR 99 is a viable alternative for traveling from the Sea-Tac Airport to Seattle. During high-congestion times of the day, it may be faster than utilizing EB SR 518 to NB I-5. This strategy suggests placings signs in strategic places to inform travelers of current travel times of available routes, optimally distributing drivers through the freeway system. Advanced Traffic Management System (ATMS) improvement require gantries for equipment, as well as the supporting ITS infrastructure to collect and distribute the information. However, it provides real-time benefit to travelers by providing them more complete information.

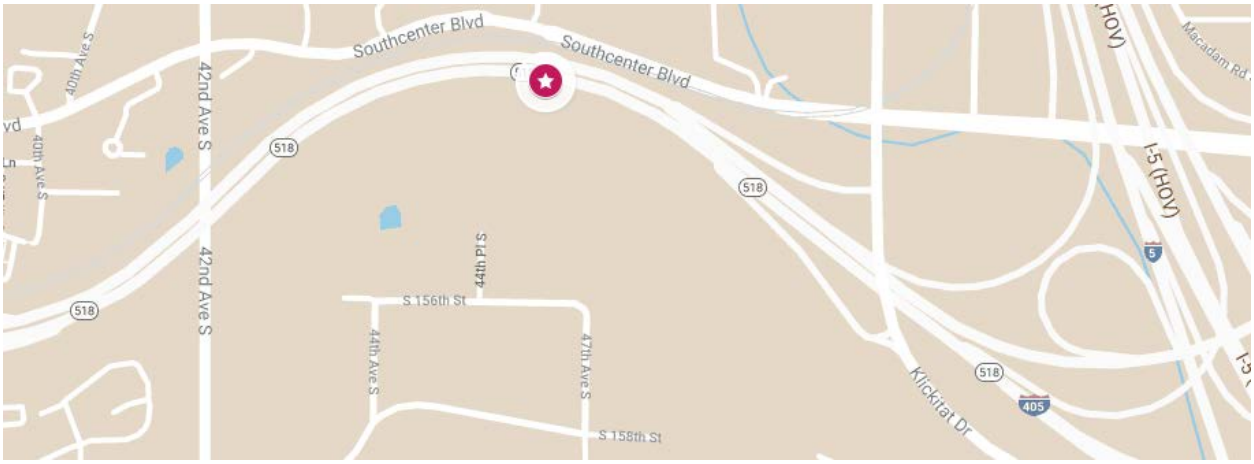
- This strategy is part of a recommendation package.
- Total Score: 3.58
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

#4 - ATMS: Speed and corridor management on EB SR 518

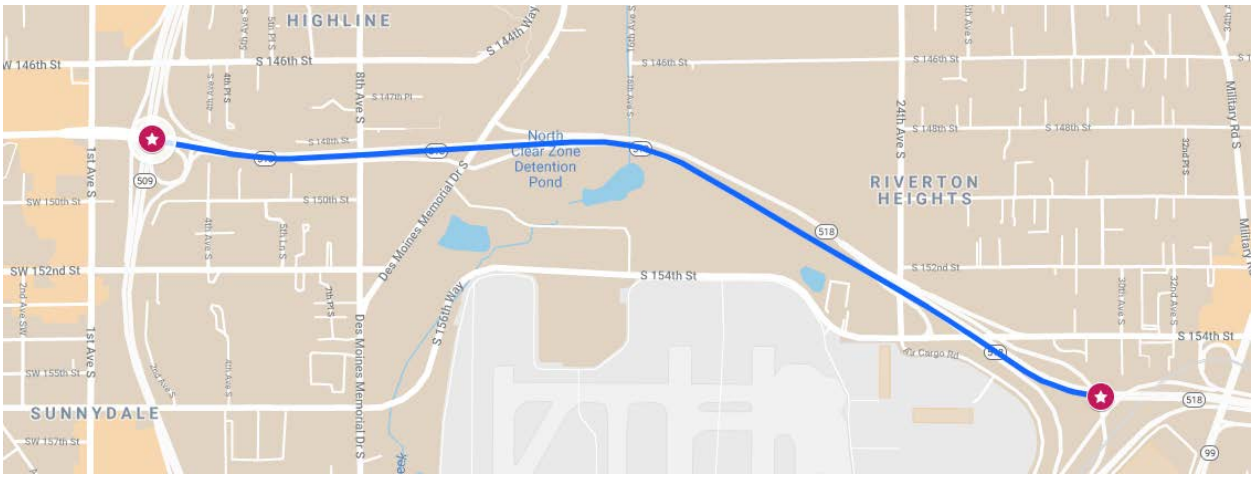


Eastbound SR 518 has a large gap in safety performance, particularly with rear-end crashes, towards the I-5/I-405/SR 518 interchange. Drivers navigating eastbound SR 518 must contend with sudden queueing, multiple lane changes, and differentials in speed between adjacent lanes as they approach the I-5 interchange. ATMS can give drivers timely, relevant information about speed and corridor conditions using a variety of signs and other features, which can mitigate the risk of crashes and help ease traffic flow towards I-5. ATMS improvements require gantries for equipment, as well as available ITS infrastructure. A full review would be required to determine adequate sight distance and reaction time.

- This strategy is part of a recommendation package.
- Total Score: 3.46
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

#5 – Complete ITS throughout corridor and add ATMS Bidirectional on SR 518 near SR 509



To support several of the ATMS-strategies proposed, completion of the ITS infrastructure is required. This could further aid in data collection along the corridor and ensure forward compatibility for increasingly technology-based traffic operations. It also suggests adding real-time travel time signs as well as corridor management tools in both directions on the west-segment on SR 518 between the North Airport Expressway and SR 509. ATMS improvements require gantries for equipment, as well as available ITS infrastructure.

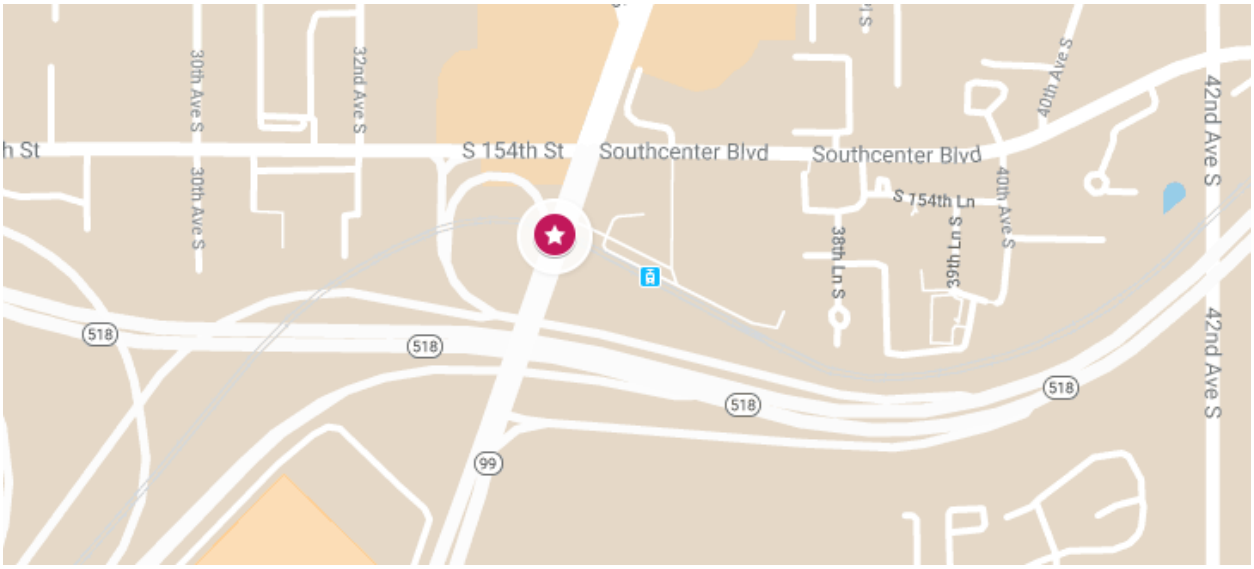
- This strategy is part of a recommendation package.
- Total Score: 3.55
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Sound Transit
  Port of Seattle

#6 - Transit Signal Priority on SR 99



Transit Signal Priority (TSP) reduces transit vehicle dwell time at traffic signals by holding green lights longer, shortening red lights, or actuating a transit priority signal for transit vehicles. This treatment shortens transit riders' commutes, improving transit rider satisfaction. Adding TSP on SR 99 helps current transit services move quickly and safely through congested intersections by prioritizing transit.

- This strategy is part of a recommendation package.
- Total Score: 3.60
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Sound Transit
  Port of Seattle

#7 - Advance Traffic Signal Performance Measures

This strategy suggests upgrading local street system signals to centralized control systems. Currently, most of the signals within the subarea are controlled by a local signal controller at each signal. These controllers need to be serviced in place as needs arise. Recently, many jurisdictions have upgraded to advanced traffic signals, which control all signals from a centralized location. The jurisdiction can then change signal timing sooner and survey signals for maintenance.

- This strategy is not part of a recommendation package.
- Total Score: 3.59
- Cost: $10,000,000-$20,000,000

  Source: Estimated cost range.
  This cost estimate varies widely based on which and how many signals would be upgraded under this strategy, and this cost estimate is provided for order-of-magnitude-comparison only.

- This strategy is supported by:

  City of SeaTac

#8 - Add/replace data loops

Additional data loops within the corridor can provide more traffic data. They can be used for both long-term analysis and planning, as well as short-term traffic management. This strategy suggests adding new loops, as well as replacing outdated loops on WB SR 518 to SB North Airport Expressway (NAE); WB I-405 to WB SR 518 and on EB SR 518 to SB I-5. Data loops are used in conjunction with corridor management tools such as ATMS and travel times. The data also helps inform long-term analysis and planning used in studies such as this one.

- This strategy is not part of a recommendation package, as a standalone improvement, but is incorporated into strategies containing ATMS or ITS elements.
- Total Score: 3.55
- Cost: Less than $1,000,000

  Source: Estimated cost range.
  This cost estimate varies widely based on the number of loops being added or replaced as well as necessary supporting equipment, and a cost estimate is provided for order-of-magnitude-comparison only.

- This strategy is supported by:

  Port of Seattle

#9 - Freight Data Collection

There is currently a lack of data available on freight movements within the corridor. A data collection effort is suggested to optimize freight movements. By assessing mobility and performance, the data collection could procure specific treatments for SR 518 and the subarea.

- This strategy is not part of a recommendation package, but freight needs are further discussed in Section 7.5 Freight-Specific Improvement Strategies.
- Total Score: 3.43
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

#10 - Expand Incident Response Team presence on SR 518

WSDOT has had success with the deployment of Incident Response Teams (IRT) on highways and freeways surrounding Seattle. These teams are floating and attend a variety of sites and situations that are creating traffic queues or increasing crash potential and help resolve the situation. These issues include debris, crash sites, disabled vehicles, etc. Additional presence of the IRTs on SR 518 and the surrounding area, including SeaTac, Burien, Tukwila and Des Moines, may accelerate incident resolution and minimize delays within the corridor, resulting in less congestion and better performance.

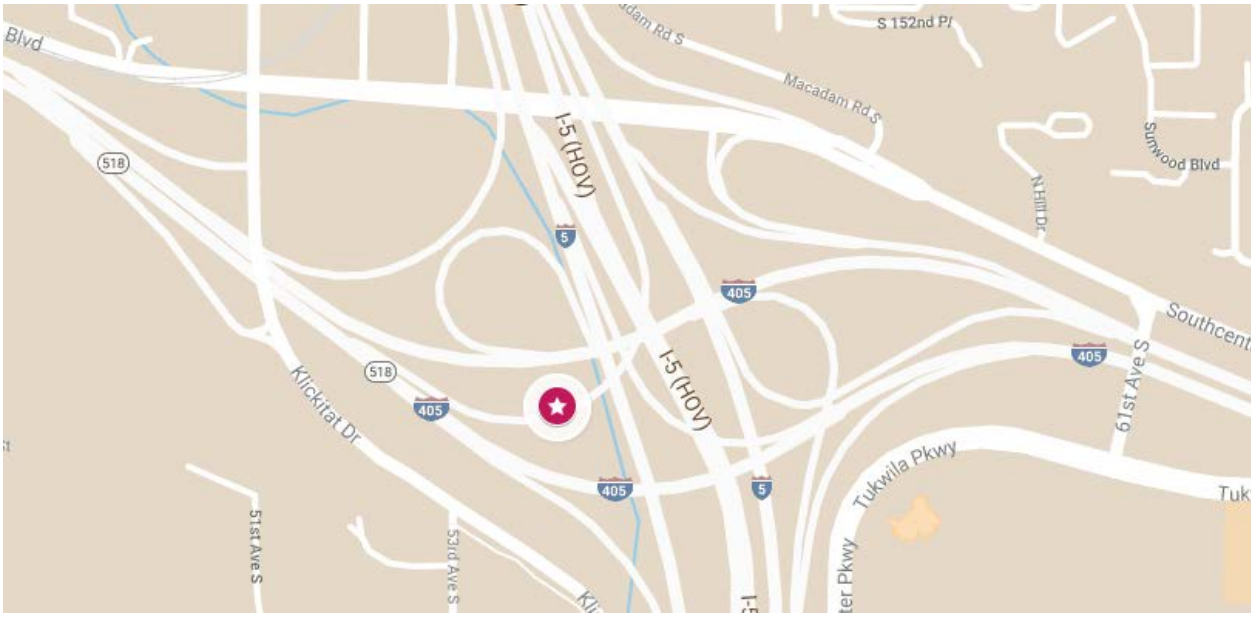
- This strategy is part of a recommendation package.
- Total Score: 3.91
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Sound Transit
  Port of Seattle

#11 - High Friction Surface Treatment (HFST) for EB SR 518 to NB I-5



High Friction Surface Treatment (HFST) place a thin layer of specially engineered, durable, high friction aggregates as a topping on a thermosetting polymer resin binder - usually epoxy, modified polyester, or urethane. It improves pavement friction, which can "dramatically and immediately reduce crashes, injuries and fatalities associated with friction demand issues" per FHWA. Friction demand issues includes wet conditions, vehicles speeds, and roadway geometrics. This ramp from EB SR 518 to NB I-5 sees crashes related to high speeds and wet conditions within the curve, which HFST could improve. The same treatment could potentially also be used on the I-5 SB ramp to I-405 NB if the need is identified.

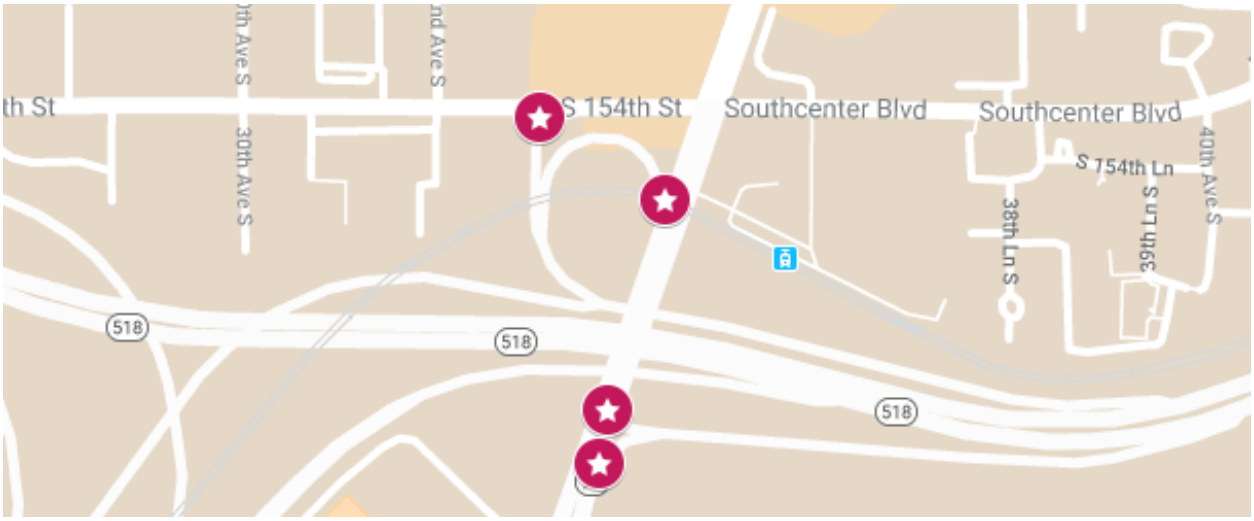
- This strategy is part of a recommendation package.
- Total Score: 3.73
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

#12 - Active transportation improvements at SR 99 ramps



This strategy suggests active transportation improvements at ramp terminals at SR 99 ramps, e.g. crossing infrastructure, pedestrian signal heads, leading pedestrian interval, RRFB, or other appropriate improvement. Due to the proximity to high-capacity transit, as well as being an important node for both north-south and east-west connections, this area has higher active transportation activity, which can be enhanced through reduced crash potential.

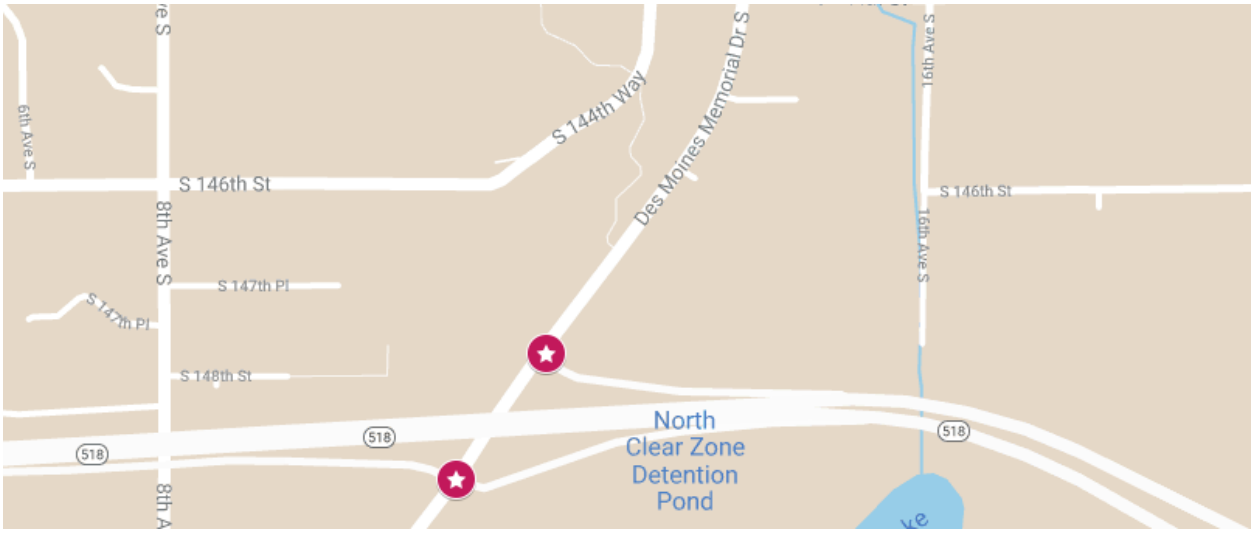
- This strategy is part of a recommendation package.
- Total Score: 3.73
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Sound Transit
  Port of Seattle
  City of SeaTac

#13 – Active transportation improvements at Des Moines Memorial Drive S



This location currently has limited pedestrian and bicycle crossing opportunity, though Des Moines Memorial Drive S is equipped with sidewalks and other facilities. This strategy suggests completing the existing active transportation network by providing crossing opportunities. The recently completed EB SR 518 off-ramp has active transportation crossing infrastructure, which could be extended to the rest of the area, providing a more predictable crossing facility. This crossing would also serve a King County Regional Trail, the Westside Trail, which runs along Des Moines Memorial Drive and continues as the Lakes to Sound Trail.

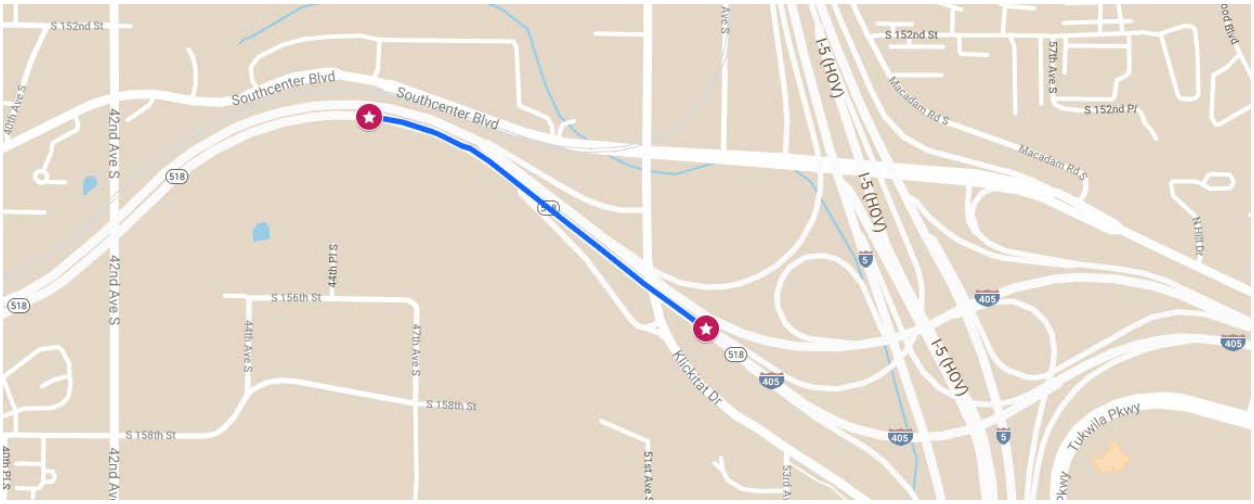
- This strategy is part of a recommendation package.
- Total Score: 3.73
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  City of SeaTac

#17 - Lane Markings/Signage: Around I-5 interchange



The current eastbound SR 518 channelizes drivers into individual lanes before splitting into three separate ramps to the destinations of northbound I-5, northbound I-405 or southbound I-5. Between the North Airport Expressway and the I-5 interchange, drivers must first comprehend the lane arrangement, make appropriate lane changes, navigate horizontal curves and a downhill grade, and react to potential queues extending back from I-405 all within one mile. In response, this strategy suggests modifying the lane markings in this one-mile segment between the North Airport Expressway and I-5 to better communicate to drivers the lane arrangement and help them navigate to their destination.

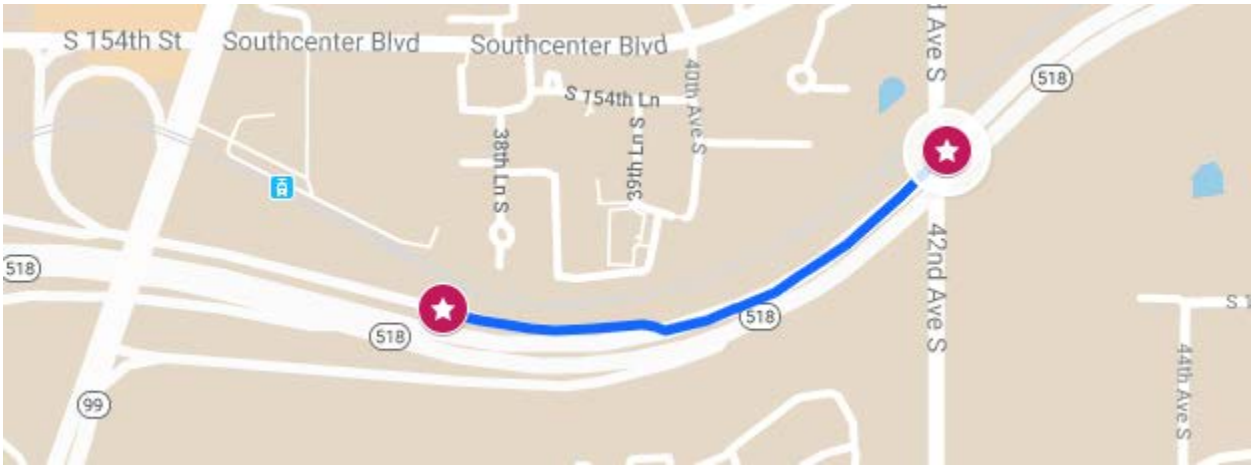
- This strategy is part of a recommendation package.
- Total Score: 3.70
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  City of SeaTac

#18 - Lane Markings/Signage: Delineation WB towards Airport exit



On westbound SR 518 approaching the airport exit, the right-most lane develops a new lane to the outside, with the new outside lane being an exit only to the airport, and the second from the right lane being an optional-exit lane. The lane markings indicate that the new, outside lane exits to the airport, but based on observed behavior, it is often not apparent to drivers that the second from the right lane also allows access to the airport exit or continuation onto westbound SR 518. To address this issue, this strategy suggests modifying and enhancing the lane markings and signing approaching the exit to better communicate to drivers the lane arrangement and help them navigate to the airport.

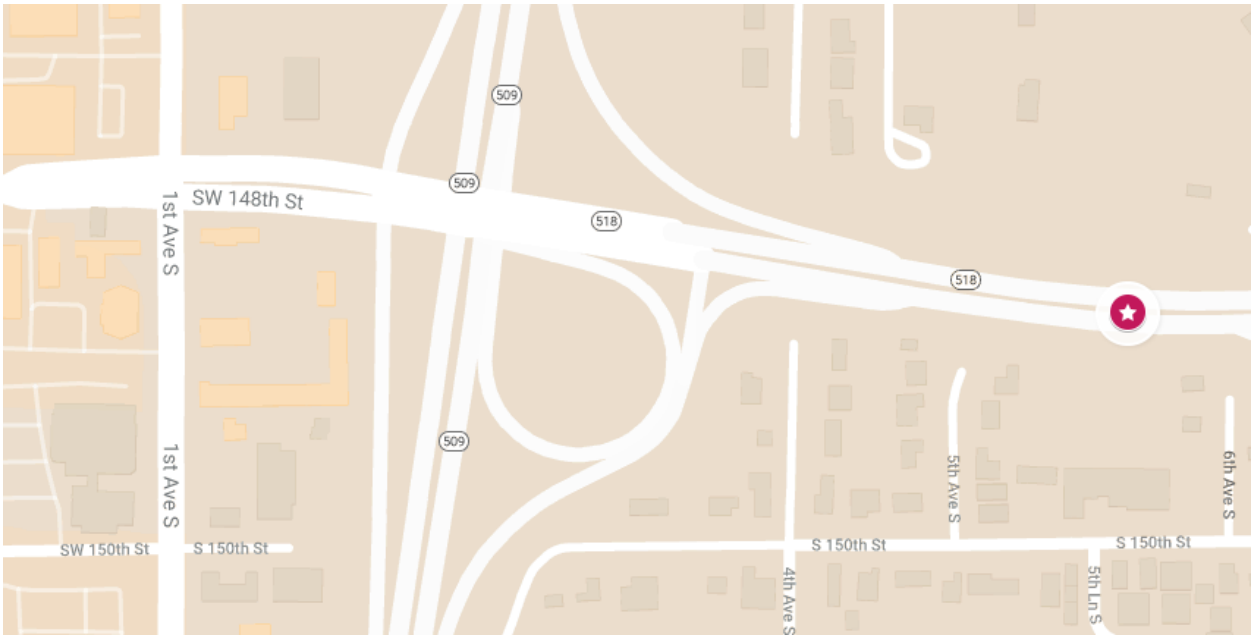
- This strategy is part of a recommendation package.
- Total Score: 3.71
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  City of SeaTac

#19 - Marking/Signage: Signal Ahead - WB approaching SR 518/509 Signal

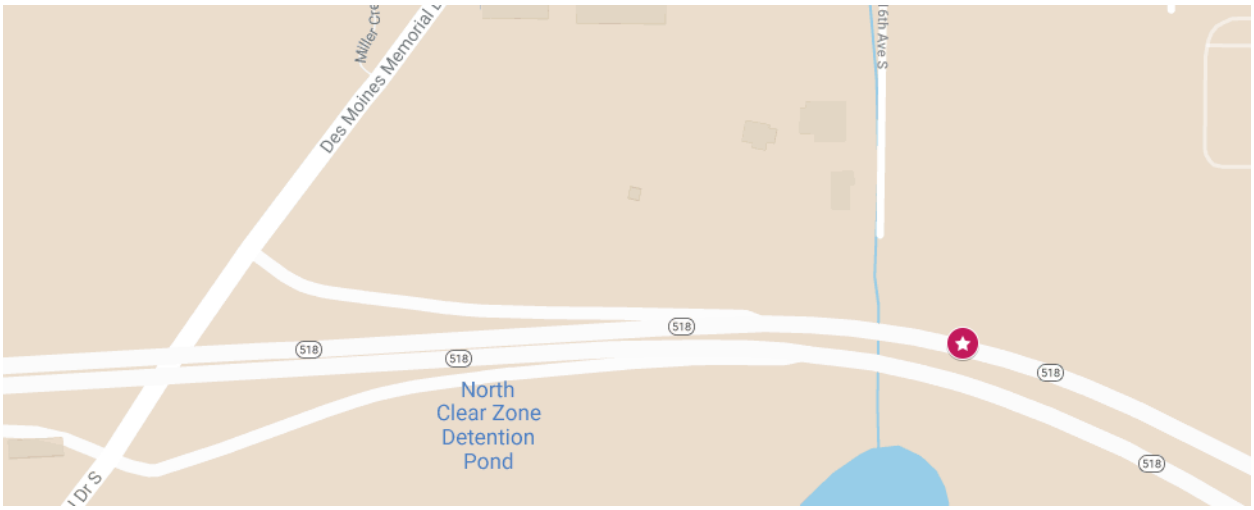


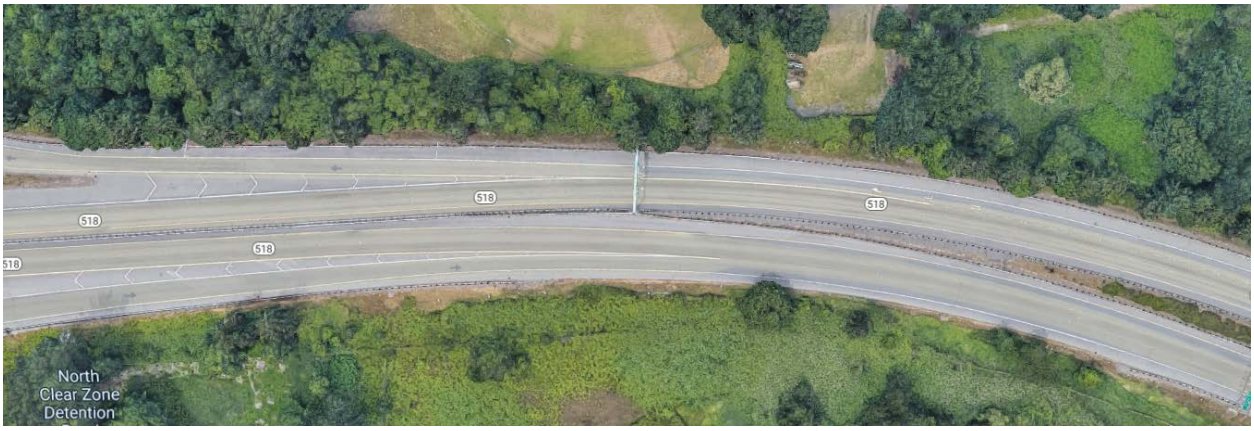
SR 518 terminates at a signalized intersection with the ramps from SR 509 before continuing as an arterial named SW 148th St. Inattentive drivers may not observe this transition from a freeway to an urban-arterial environment with a traffic signal. At this transition point in the corridor, there is also an identified crash reduction potential, specifically concerning rear-end crashes. This strategy suggests modification and enhancement to westbound SR 518 approaching SR 509 with dynamic or static signing and lane markings.

- This strategy is part of a recommendation package.
- Total Score: 3.66
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

#20 - Marking/Signage: Lane Ends - WB approaching Des Moines Memorial Drive S Off-Ramp





The WB SR 518 off-ramp to Des Moines Memorial Drive S ends as an exit-only lane when dropping from westbound SR 518. Observed late lane-changing behavior and sideswipe crashes indicates that drivers are not aware that this lane drops and they perform late lane changes to remain on SR 518 westbound. This strategy suggests adding additional signage prior to the off-ramp, making it clearer to drivers that it is an exit-only lane.

- This strategy is part of a recommendation package.
- Total Score: 3.72
- Cost: Less than $1,000,000

  Source: Estimated cost range

#21 - Signage: Wayfinding to Airport

As part of this corridor study, a public survey received a high volume of comments about airport signing and wayfinding and the need for improvement. Current sign sequences on roadways leading to the airport need additional guidance and replacement of deficient signs. This strategy suggests a retrofit and enhancement to signing and wayfinding from interstate and freeway facilities to Sea-Tac Airport.

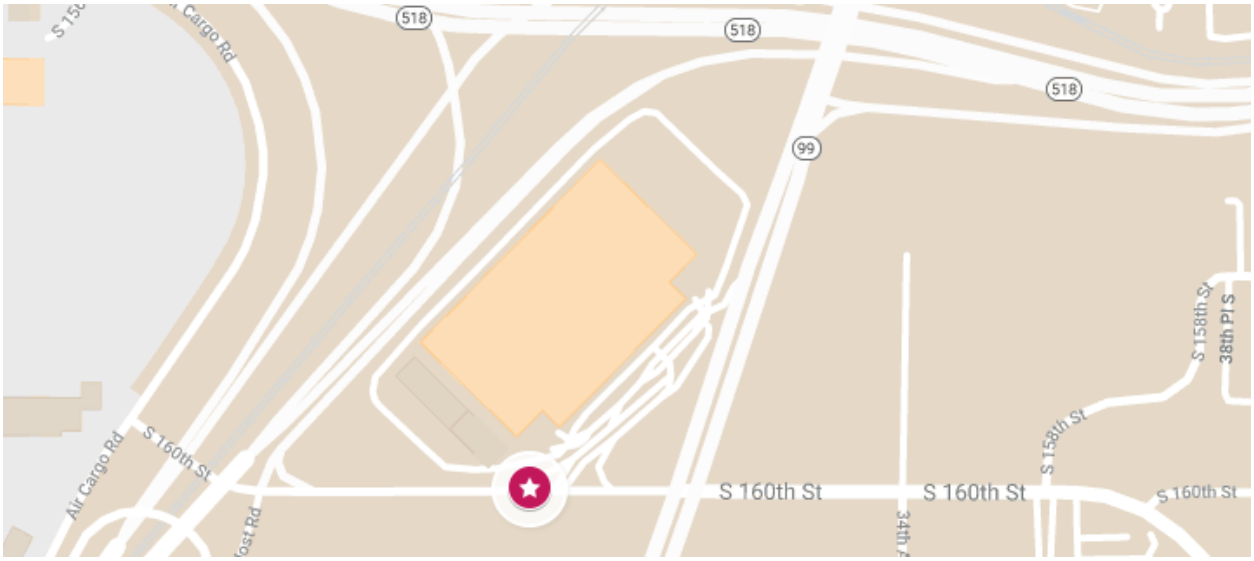
- This strategy is part of a recommendation package.
- Total Score: 3.75
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  City of SeaTac, if a comprehensive signing plan for accessing the airport is established and state funding for signage on City right-of-way is provided.

#22 – Improved signing from rental car facility/S 160th to WB 518



Exiting the rental car facility, there is no signing indicating routes to the airport or to Seattle or other freeway destinations. Additional signage could aid drivers in reaching highways leading to their desired destinations.

- This strategy is part of a recommendation package.
- Total Score: 3.78
- Cost: Less than $1,000,000

  Source: Estimated cost range

- This strategy is supported by:

  City of SeaTac, if a mandate for state funding for follow-through signs, or establishment of a comprehensive plan for accessing the airport

#23 - Review local street signing to and from the airport

Currently there is limited signing to and from the airport on local streets. This strategy suggests reviewing and adding additional signage as needed on relevant local streets to aid drivers.

- This strategy is part of a recommendation package.
- Total Score: 3.85
- Cost: $1,000,000-$5,000,000

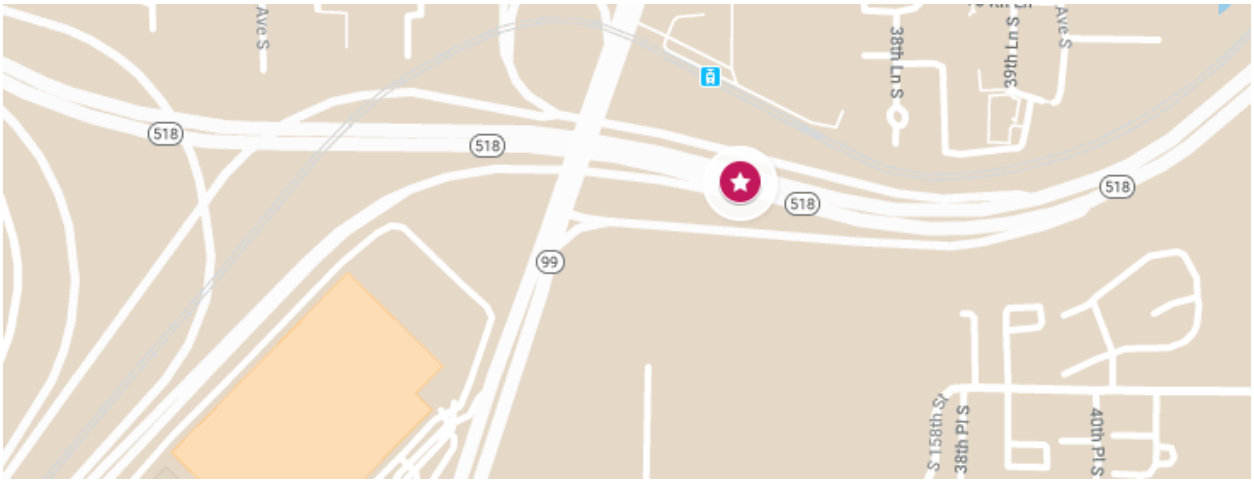
  Source: Estimated cost range

- This strategy is supported by:

  City of SeaTac, if a comprehensive signing plan for accessing the airport is established and state funding for signage on City right-of-way is provided.

7.2.2 Mid-Term System Management Strategies

#34- ATMS: Lane Control: Lane switch between SR 518 and NAE

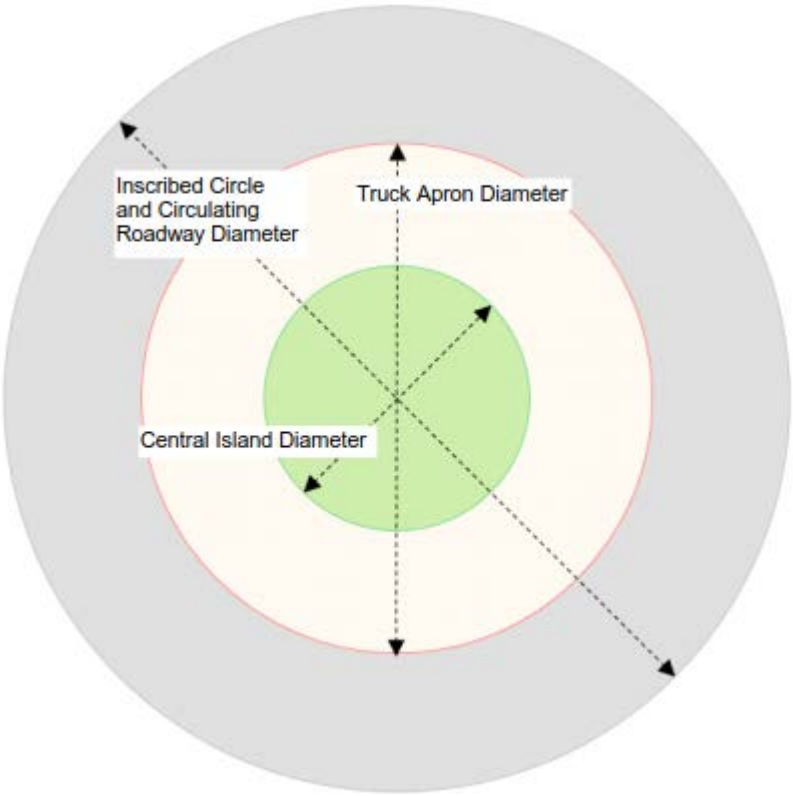


The airport experiences different peak hours than the standard commute times with AM and PM peaks on SR 518. This means that additional traffic is leaving the airport via North Airport Expressway, at times where mainline SR 518 is operating well. This fact could be utilized to prioritize traffic coming from the airport, onto EB SR 518 by installing gates which enables the use of the right-most lane of SR 518 for the North Airport Expressway on-ramp, during times where volumes from NAE warrants it and it isn't contraindicated by volumes on SR 518. This could smooth flow for airport travelers and ensure an improved use of the capacity available as well as a safer freeway merge. This strategy would require the use of ITS to estimate current volumes as well as physical gates installed at the on-ramp to shift traffic as needed.

- This strategy is not part of a recommendation package.
- Total Score: 2.82
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

#42-#43 - Ramp Terminal Treatments – Roundabouts, Signals, Channelization



The evaluation of intersection performance within the study area identified 11 intersections that will fail to perform adequately in future baseline years and which could benefit from ramp terminals improvements. The following locations are considered for a signal or roundabout improvement:

- ID 8: Des Moines Memorial Drive S/SR 518 WB Off-Ramp
- ID 9: Des Moines Memorial Drive S/SR 518 EB On/Off-Ramp
- ID 17: 30th Ave S/S 154th St
- ID 18: 32nd Ave S/S 154th St
- ID 19: SR 518 WB Off-Ramp to 154th St at SR 99
- ID 14: SR 518 EB Off-Ramp to S 154th St
- ID 28: Host Road/SR 518 On-Ramp/S 160th ST
- ID 29: Air Cargo Rd/S 160th St
- ID 31: Klickitat Drive/SR 518 Off-Ramp
- ID 32: I-405 WB Off-Ramp to Southcenter Blvd
- ID 36: I-5 NB Off-Ramp/Southcenter Pkwy

Though it is not directly on SR 518, improving performance within the study area is considered a practical solution and can aid in the overall experience and performance of the traffic environment.

- This strategy is part of a recommendation package.
- Total score:

  Roundabouts and Signals: 3.71

Channelization: 3.69

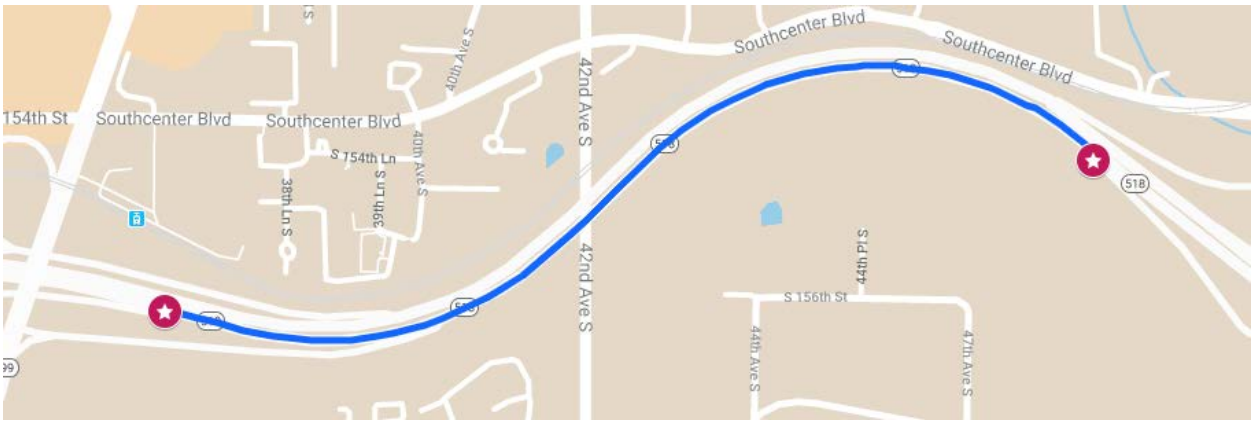
- Cost: $200,000-5,000,000 per location

  Signalized Option: $1,500,000-$2,000,000 per location
  Roundabout Option: $1,000,000-$5,000,000 per location
  Channelization: Less than $1,000,000 per location
  Source: Estimated cost range

- This strategy is supported by:

  Sound Transit

#44 - Peak-use shoulder running: EB from NAE to 51st Ave S

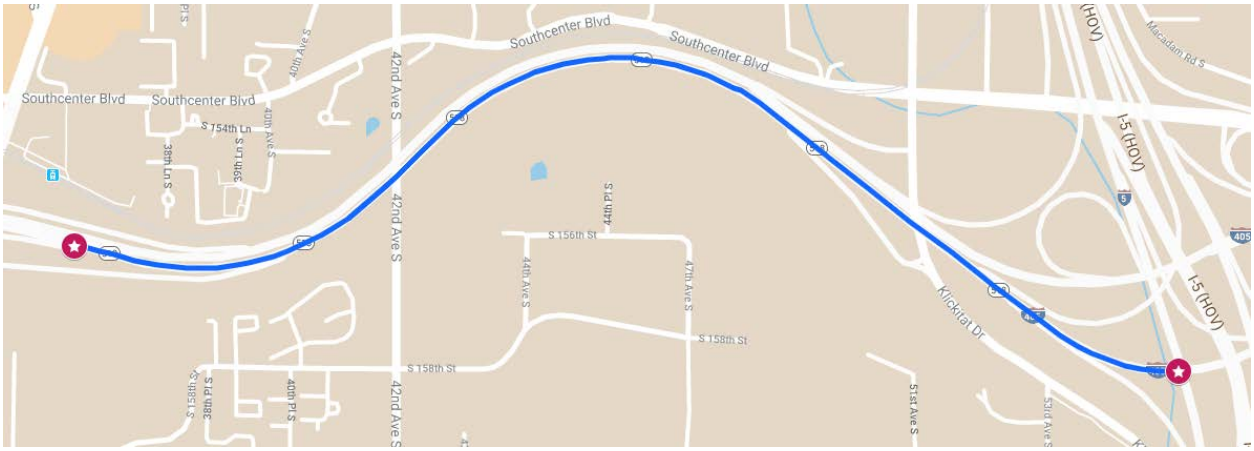


This strategy suggests using the shoulder pavement on EB SR 518 to incorporate a shoulder-running lane for peak-hour use. It will extend from the North Airport Expressway on-ramp and to the 51st Ave S/Southcenter off-ramp. This shoulder would be open during high-volume times of the day to temporarily increase capacity. A shoulder-running lane does not assume full standard and would limit the amount of available shoulder to emergency vehicles. This strategy assumes that some additional pavement widening is necessary, and could include ATMS improvements, which would contribute to higher cost.

- This strategy is not part of a recommendation package.
- Total Score: 2.85
- Cost: $5,000,000-$15,000,000

  Source: Estimated cost range

#45 - Peak use-shoulder running: EB from NAE to I-5 SB



This strategy suggests using the shoulder pavement on EB SR 518 to incorporate a shoulder-running lane for peak-hour use, from the North Airport Expressway on-ramp to the I-5 interchange. This shoulder would be open during high-volume times of the day to temporarily increase capacity. A shoulder-running lane does not assume full standard and would limit the amount of available shoulder to emergency vehicles. This strategy assumes that some additional pavement widening is necessary, and could include ATMS improvements, which would contribute to higher cost.

- This strategy is not part of a recommendation package.
- Total Score: 2.85
- Cost: $5,000,000-$15,000,000

  Source: Estimated cost range

7.2.3 Long-Term System Management Strategies

No Long-Term System Management Strategies were identified.

7.3 Demand Management Strategies

7.3.1 Near-Term Demand Management Strategies

#24 - Free ride on Link with boarding pass

This strategy suggests a campaign coordinated between Sound Transit and airlines operating out of Port of Seattle to encourage Link ridership with airport travelers, by offering a free ride on Link Light Rail with a valid boarding pass, e.g. through TransitGo or new ORCA products in the future. The goal of the strategy is to encourage using Link Light Rail, by having travelers use the service before having to buy fare.

- This strategy is not part of a recommendation package.
- Total Score: 3.75
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  King County Metro

#25 - Downtown to Airport Direct Bus Connection

This strategy suggests reinstating a direct bus service between downtown Seattle and the airport, like what was previously in service before the Link Light Rail opened. During non-freeway peak time, the travel time from Downtown Seattle to Sea-Tac Airport on Link Light Rail is substantially greater than what it would take by vehicle, which discourages travelers from using transit to reach their destination. A direct bus from downtown to the airport could better compete with Link Light Rail travel times outside standard commuting peak hours. This would require a policy change between Sound Transit and King County, giving King County the ability to provide duplicative express service to service provided by Sound Transit, if public transit were to be the operator of this service.

- This strategy is not part of a recommendation package.
- Total Score: 3.37
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is opposed by King County Metro and Sound Transit, due to their service agreement which limits overlapping service within the region.

#26 - KCM/ST Coordination on filling 1-5am gap

Currently, there are limited transit opportunities between 1 am and 5 am to the airport, which especially impacts workers at the airport. It results in these workers needing to utilize either personal vehicles or other ridesharing modes. They are unable to use transit either due to inconvenience, unavailability, or personal reasons. Continued coordination on expanding transit strategies is important to the region and airport employees.

- This strategy is not part of a recommendation package.
- Total Score: 3.80
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

#27 - Parking Management Strategies

Parking management can be used as an effective tool for managing roadway demand, as it reflects people's willingness to pay for a service or good. This strategy does not only apply to airport parking, but to parking within the subarea in general. The objective of this is to reach a balance that works for the relevant authorities and jurisdictions. This strategy could include dynamic parking pricing.

- This strategy is part of a recommendation package.
- Total Score: 3.12
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

- This strategy is opposed by the City of SeaTac

#28 – Airport Transportation Management Association

The strategy suggests that the airport would develop a Transportation Management Association (TMA), to the benefit of airport employee commuters, which would continue the work to improve transportation options and transit strategies, and promoting services, as well as other non-SOV options for employees, in collaboration among the Port of Seattle, King County Metro and WSDOT. This strategy builds upon the efforts and outcomes of a 2018-2019 pilot program to implement a TMA for airport employees in the area, which was supported by funding from WSDOT, the Port of Seattle and King County Metro, and implemented by City of Tukwila staff.

- This strategy is part of a recommendation package.
- Total Score: 3.83
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

#29 - Prioritize/incentivize vanpools for employees

Many employees at the airport work in the same area and could potentially ride to work together. This strategy suggests prioritizing or incentivizing vanpools for airport employees, to support a shift from single occupancy vehicles. This strategy includes information sharing via employer events, kiosks, residential and employee awareness campaigns, which offer rewards, incentives for and information on custom trip planning of vanpool opportunities, including emergency ride home guarantees.

- This strategy is part of a recommendation package.
- Total Score: 3.51
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  King County Metro

#30 - Employee commuter trip reduction strategies

This strategy would leverage existing commute trip reduction (CTR) programs already in place and aim to explore and identify additional non-SOV options for commute travel into and out of the airport and surrounding areas. Trip reduction options could include HOV/vanpool incentives, secured long-term bike parking, additional transit pass subsidies, etc. This strategy includes information sharing via employer events, kiosks, residential and employee awareness campaigns, which offer rewards, incentives for and information on custom trip planning of transit, carpool/vanpool, bicycle mode, and emergency ride home.

- This strategy is part of a recommendation package.
- Total Score: 3.83
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  King County Metro

#31 - First/last mile services

Expansion or addition of new first/last mile services at Link stations would be targeted as part of this strategy. Existing 1st/last mile services at major transit hubs such as Tukwila International Boulevard Station would be modeled and expanded, if deemed feasible, to encourage transit use and reduce SOV demand on SR 518 and SR 99. This strategy includes information sharing via employer events, kiosks, residential and employee awareness campaigns, which offer rewards, incentives for and information on custom trip planning of transit, carpool/vanpool, bicycle mode and emergency ride home.

- This strategy is part of a recommendation package.
- Total Score: 3.83
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  King County Metro
  City of Tukwila

#32 - Carpool Incentives Program for airport travelers

This strategy would involve subsidies or other incentives to encourage airport travelers to carpool and/or access the airport terminal(s) via sharing or express shuttles. This could include partnering with major airport shuttle service providers, providing reduced parking for carpools, etc.

- This strategy is part of a recommendation package.
- Total Score: 3.69
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle
  King County Metro

#33 - Partnership with TNCs

Like Strategy #32, this idea would involve coordination and partnership with TNCs (Uber, Lyft, etc.) to maximize airport passenger trip activity by encourage two-way service. In addition, TNCs would be called on to expand multi-passenger, shuttle-type services to/from the airport to reduce vehicular demand on the NAE and SR 518, e.g. by offering incentives to passengers, such as discounted fare for carpool trips/shared TNCs.

- This strategy is not part of a recommendation package.
- Total Score: 3.49
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

7.3.2 Mid-Term Demand Management Strategies

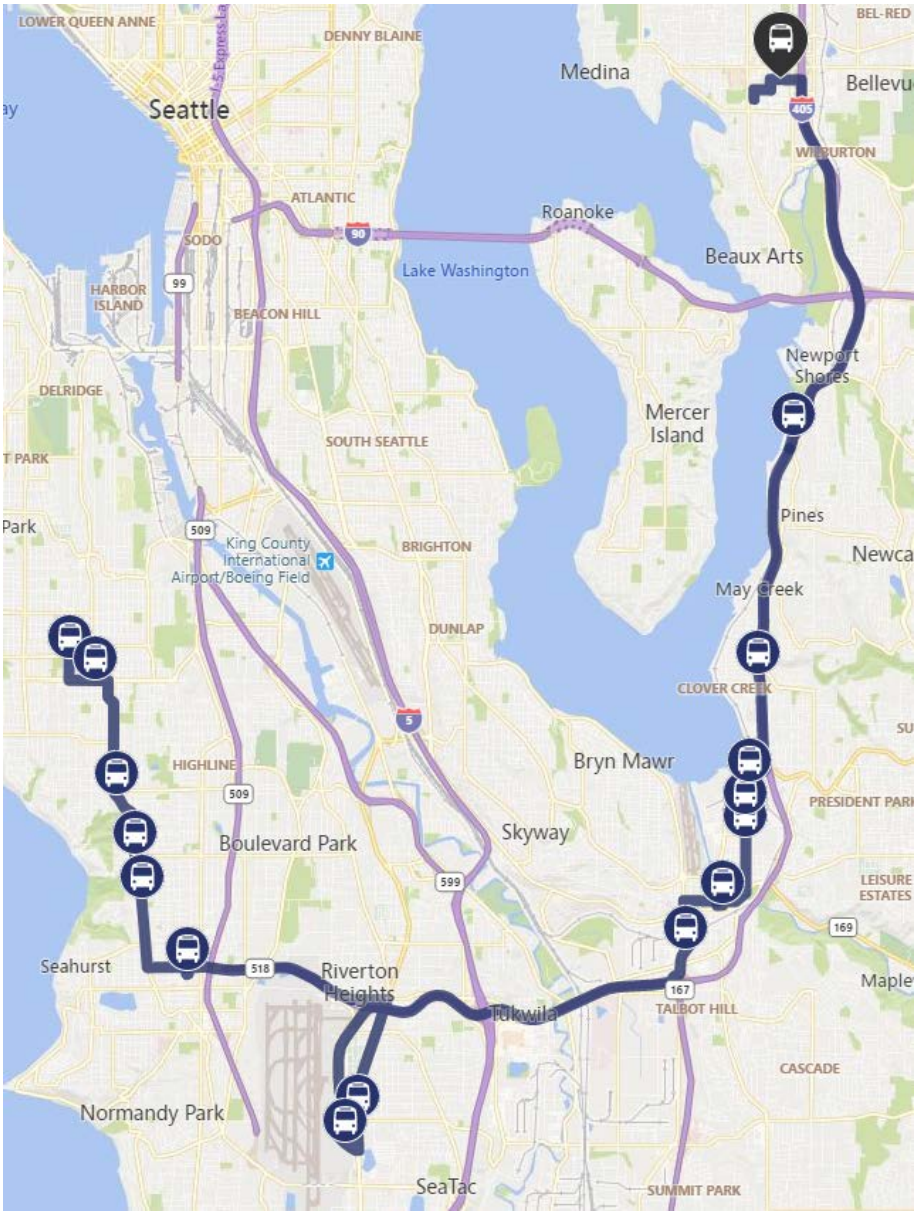
#46 - Airport Express Bus Service

This strategy would implement express bus service, potentially privately operated, from selected markets to provide direct, one-seat ride service to/from the airport. The targeted markets would include those identified previously through a study commissioned by the Port of Seattle. The frequency and breadth of such express service would be established through further assessment of potential ridership and travel time benefits.

- This strategy is not part of a recommendation package.
- Total Score: 3.31
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

#47 - Continue buses from Eastside and West Seattle to Sea-Tac Airport

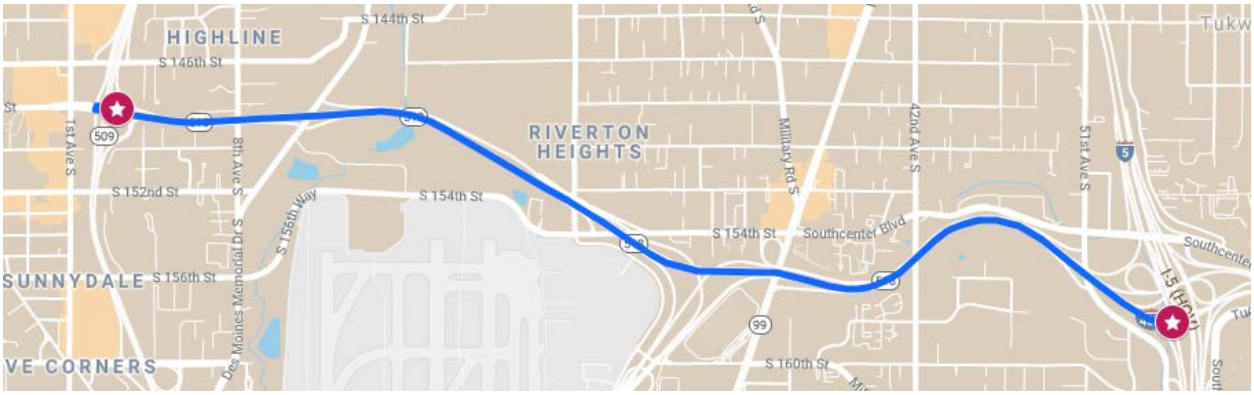


Currently Sound Transit Route 560 connects West Seattle, through Burien to the airport, with the Eastside through Renton and May Creek. This service is slated to be discontinued or altered with the introduction of Sound Transit I-405 BRT. Some interest has been disclosed in maintaining the service of Route 560 after the implementation of ST I-405 BRT, to continue to serve riders from the I-405 corridor and north of Burien traveling to the airport, without needing to change buses.

- This strategy is not part of a recommendation package.
- Total Score: 3.32
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

#48 - Toll Strategies/Congestion Pricing SR 518



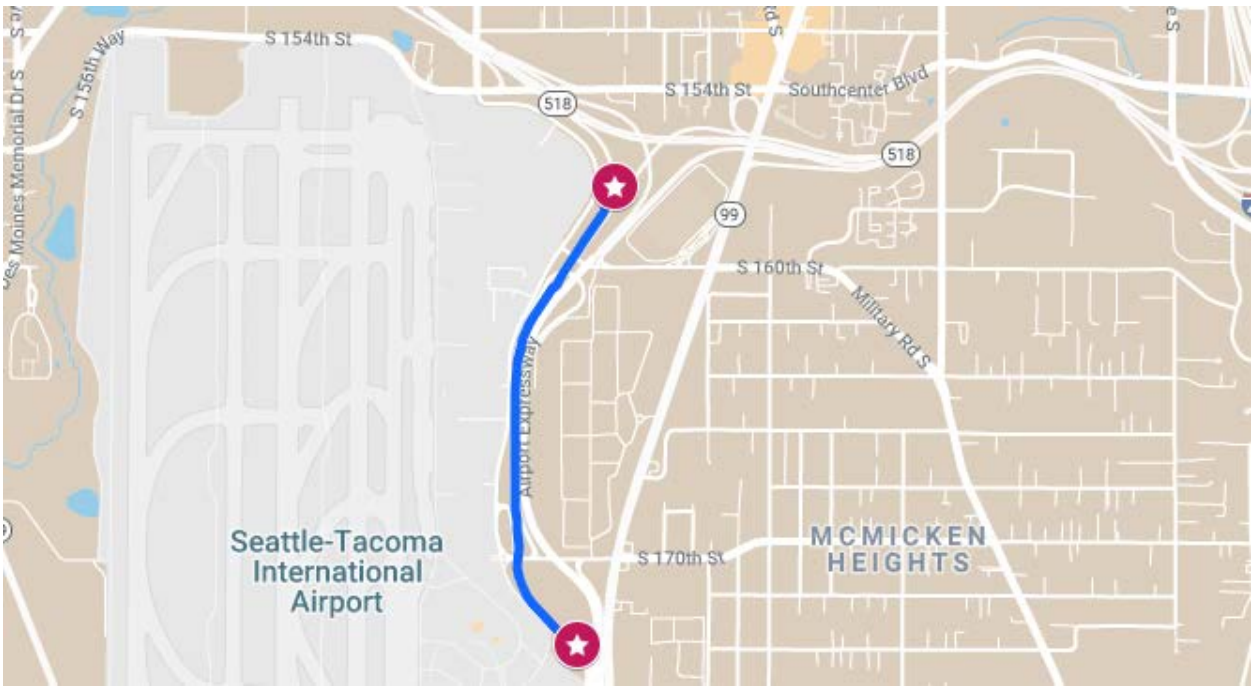
This strategy suggests a cordon area congestion pricing type scheme to manage congestion on the entirety of SR 518. This would toll all lanes between SR 509 and I-5. Cordon refers to the entire area being restricted, as opposed to the typical by-lane restrictions. This strategy would also toll the NAE to discourage cut-through traffic.

- This strategy is not part of a recommendation package.
- Total Score: 3.21
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

- This strategy is opposed by the City of SeaTac, City of Burien and the City of Tukwila

#49 – Airport Access Fee (Toll) Strategies to reduce discretionary NAE Trips



This strategy suggests a cordon-type congestion pricing scheme to manage congestion on North Airport Expressway. This would implement access fees for all lanes between SR 518 and the airport.

- This strategy is not part of a recommendation package.
- Total Score: 2.93
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

- This strategy is opposed by the City of SeaTac and the City of Tukwila

7.3.3 Long-Term Demand Management Strategies

While no long-term demand management strategies were identified, WSDOT continues to support TDM strategies in general to encourage reduction in VMT and SOV trips, and will continue to look for additional TDM strategies into the future for this corridor.

7.4 Capital Improvement Strategies

7.4.1 Near-Term Capital Improvement Strategies

#14 – TIBS South Access Pedestrian Bridge Extension from I-405 BRT Freeway Station to SE Quadrant

See full version in Appendix F

The Phase 1 Refinement of the Sound Transit I-405 BRT Program led to the location of the Tukwila International Boulevard Station stop being in-line on SR 518 as opposed to at the current light rail station. This decision resulted in the development of a pedestrian and bicycle connection from the current light rail station to the in-line station pair, but not continuing across SR 518 EB to the southeast quadrant of the SR 99/SR 518 interchange. This strategy is the extension of the pedestrian and bicycle bridge to the SE quadrant that is currently incorporated into the Environmental Review of I-405 BRT for potential implementation at a later point. SR 518 Corridor Planning Study supports this improvement, due to its expected positive impact on active transportation activity as well as transit use.

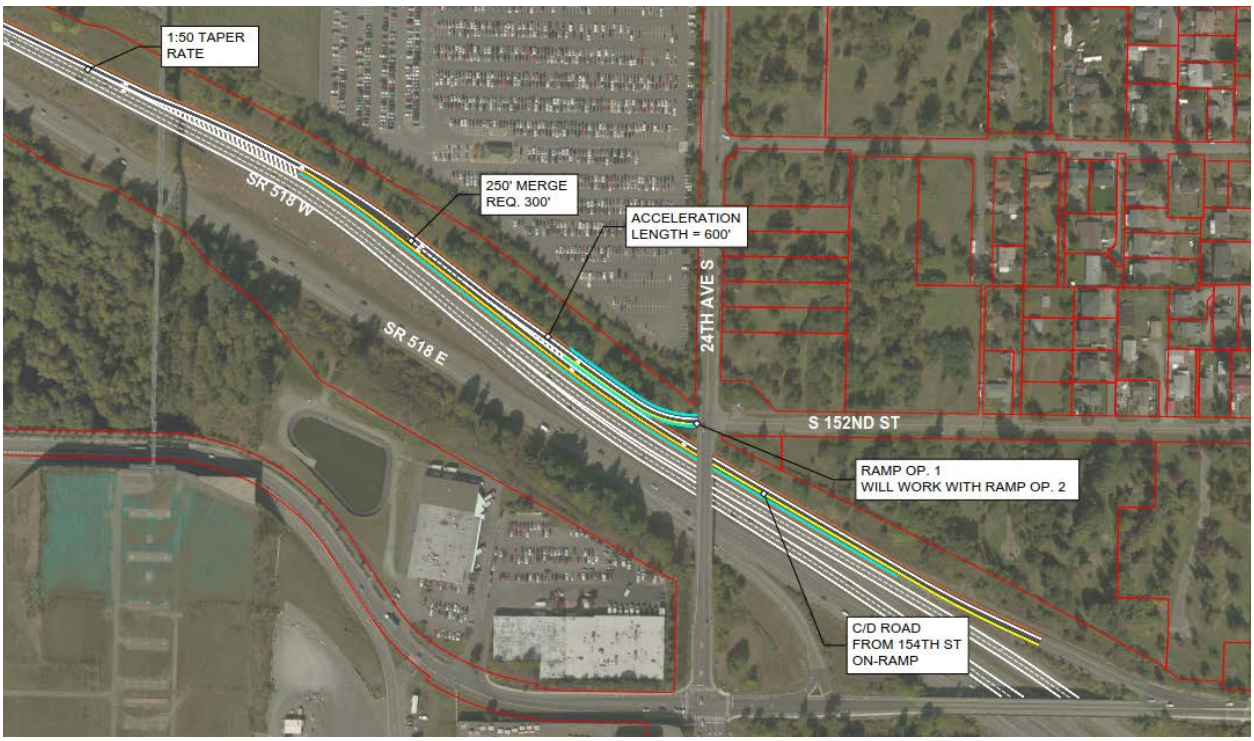
- This strategy is not part of a recommendation package.
- Total Score: 3.76
- Cost: $5,000,000-$10,000,000

  Source: Estimated cost range

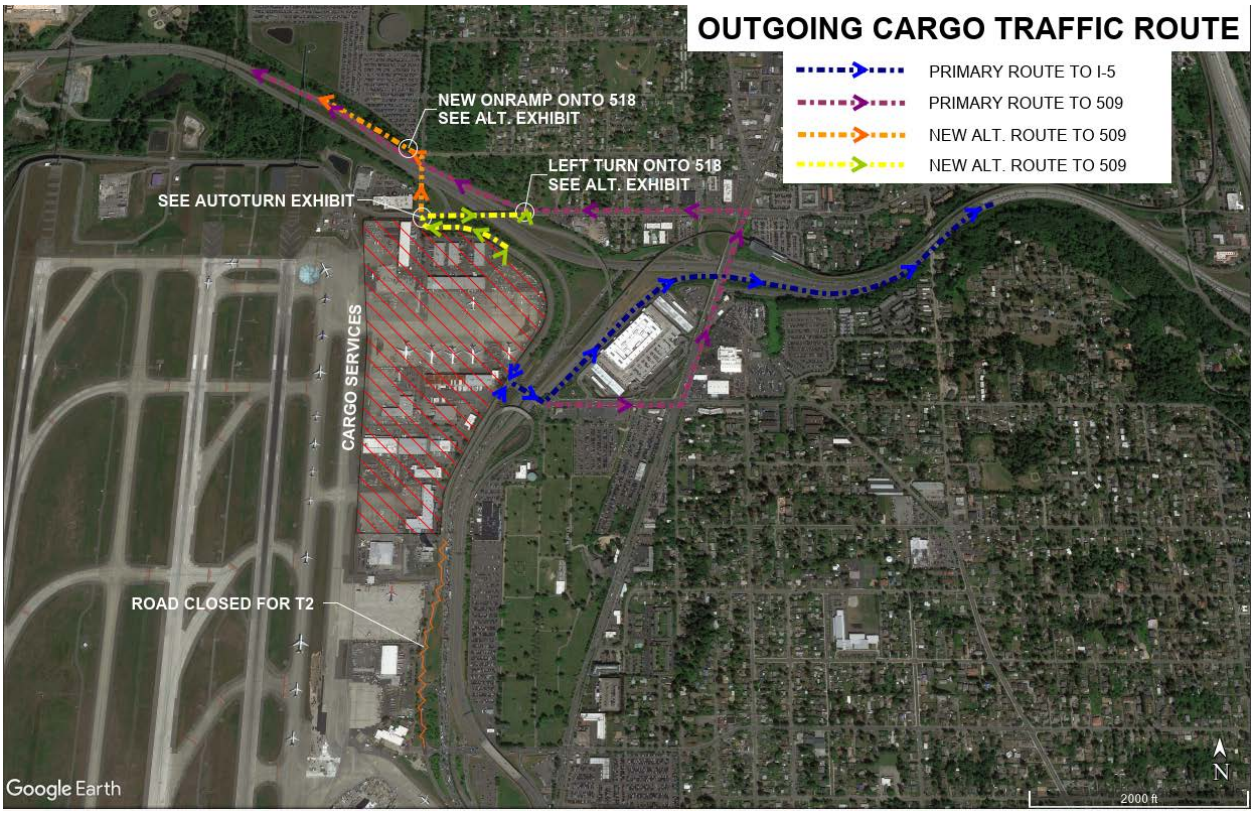
- This strategy is supported by:

  City of SeaTac, provided a different landing location is elected
  City of Tukwila

#15 - 152nd on-ramp to WB SR 518, Collector-Distributor



See full version in Appendix F



To support freight movement and improve the access to WB SR 518, this improvement strategy suggests adding an additional on-ramp from S 152nd St and 24th Ave S to WB SR 518, as a collector-distributor. Substantial increases in freight activity is expected, and would benefit from additional options to access SR 518. Freight access from this area is currently somewhat limited and would benefit from additional entryways onto SR 518. The current routing paths can be seen in the two figures above. The on-road bike lane on 154th St is part of the Lake to Sound trail, a major regional non-motorized trail that connects the area around the airport to the broader King County Regional Trails network. Freight mobility improvements on this stretch of road present an opportunity to maintain or improve pedestrian and bicycle access and reduce conflicts with freight. Improving the trail on the south side of 154th St to provide grade-separated two-way access could mitigate potential conflicts with freight access to SR 518 via a ramp on the north side of 154th St. This is an alternative solution to #16.

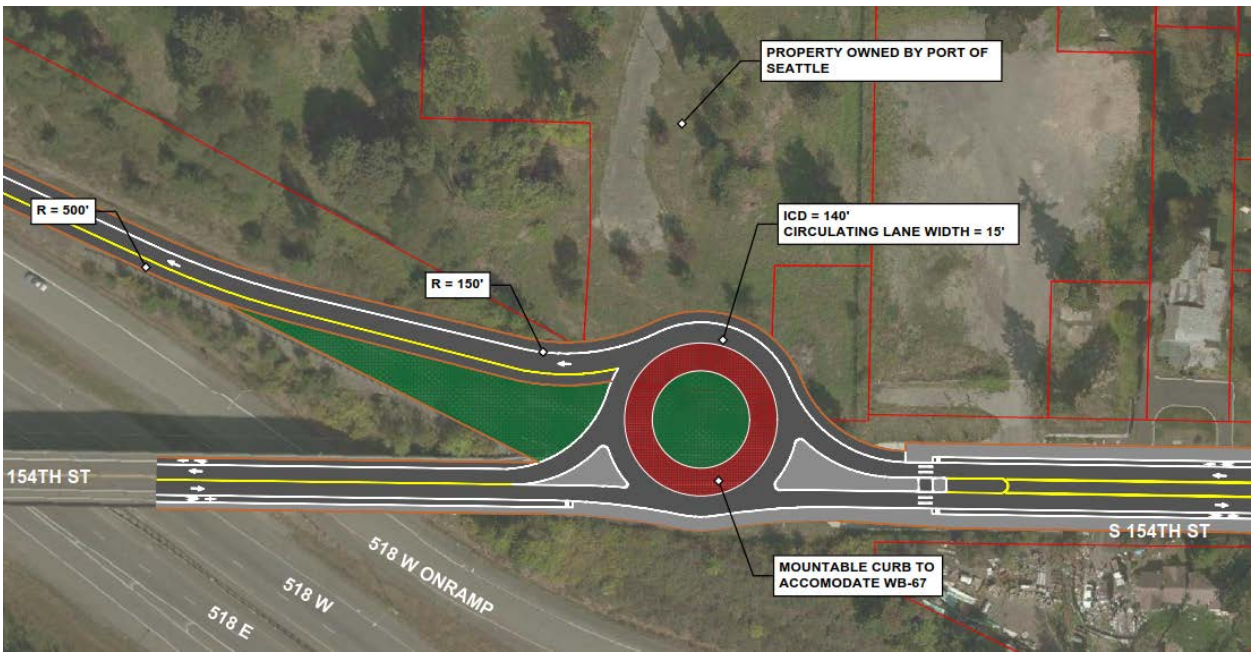
- This strategy is part of a recommendation package.
- Total Score: 3.29
- Cost: $15,000,000-$20,000,000

  Source: WSDOT Planning-Level Cost Estimation Tool
  Additional details on this estimate can be found in Appendix G

- This strategy is supported by:

  Port of Seattle (preference is given to #15 over #16)

#16 - S 154th St On-Ramp Roundabout to allow EB to WB left movement



See full version in Appendix F

To support freight movement and improve the access to SR 518, this improvement strategy suggests adding a roundabout or other intersection control type at the on-ramp from S 154th St to allow traffic from the Air Cargo Road the ability to turn left onto this existing ramp. Freight access from this area is currently somewhat limited and would benefit from additional entryways onto SR 518. The current routing paths can be seen in the two figures shown under Strategy #15. This is an alternative solution to #15.

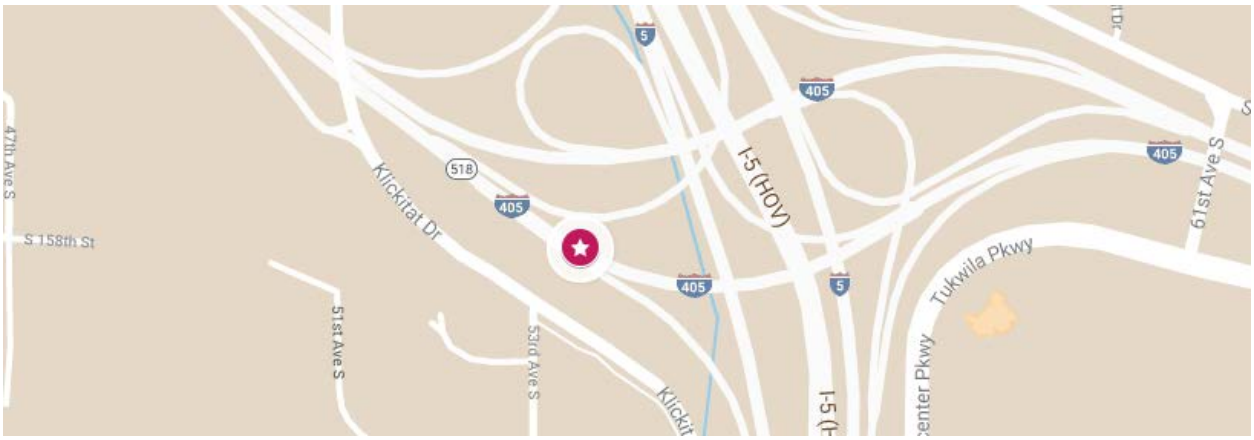
- This strategy is part of a recommendation package.
- Total Score: 3.25
- Cost: $11,000,000-$15,000,000

  Source: WSDOT Planning-Level Cost Estimation Tool
  Additional details on this estimate can be found in Appendix G

- This strategy is supported by:

  Port of Seattle (preference is given to #15 over #16)

#36 - 2nd EB lane on SR 518 to I-405, merges with the existing EB lane, west of I-5 overpass



This strategy suggests modifying and enhancing striping and signing on the eastbound SR 518 approach to the I-5 interchange by carrying two eastbound lanes that merge into one lane just west of the I-5 overpass. The current eastbound SR 518 channelizes drivers into individual lanes before splitting into three separate ramps to the destinations of northbound I-5, northbound I-405 or southbound I-5. Congestion from northbound I-405 propagates back on to eastbound SR 518 and forms a long queue in the center lane, which creates a speed differential between it and the two outside lanes and contributes to the current gap in safety performance. In response, this strategy would mitigate the queue length and speed differential between lanes by distributing the queue to two lanes before transitioning into one lane to northbound I-405.

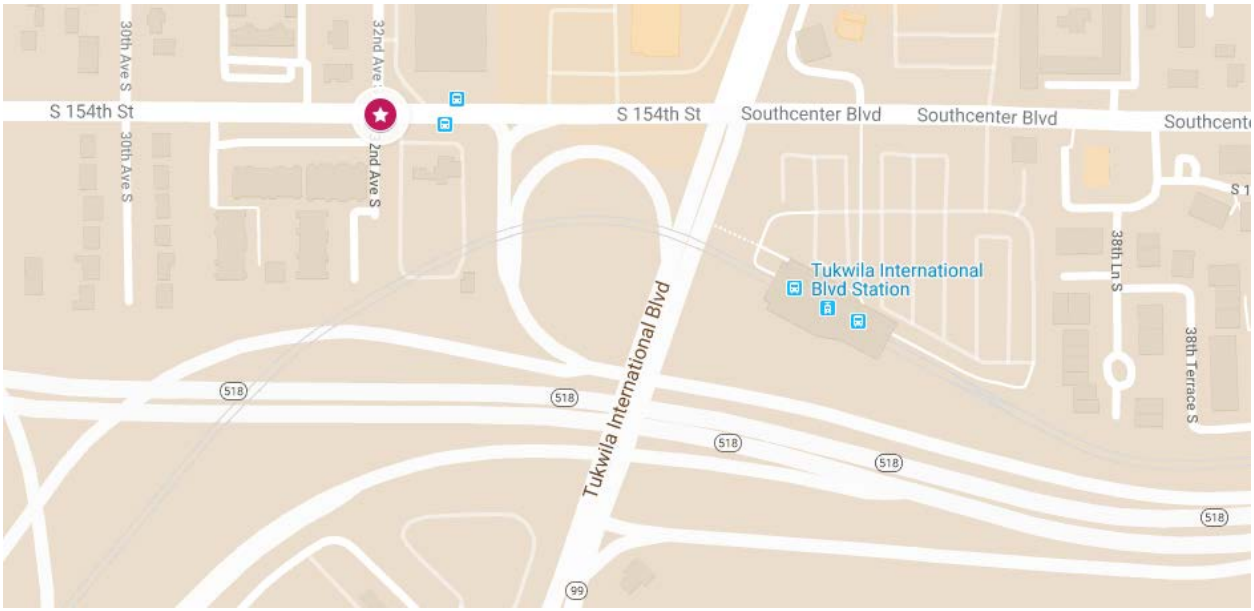
- This strategy is part of a recommendation package
- Total Score: 3.16
- Cost: $1,000,000-$5,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

#59 - Relocation of WB SR 518 Off-Ramp from SR 99 to 32nd Ave S vicinity



This strategy suggests realigning the WB SR 518 off-ramp to SR 99 from its current location on S 154th St to a new location at the intersection of S 154th/32nd Avenue S or 30th Avenue S, creating a four-legged intersection. The relocation of the ramp potentially results in smoother traffic operations and eliminates the current mid-block off-ramp.

- This strategy is part of a recommendation package
- Total Score: 3.15
- Cost: $22,000,000-$29,000,000

  Source: WSDOT Planning-Level Cost Estimation Tool
  Additional details on this estimate can be found in Appendix G

- This strategy is supported by:

  Port of Seattle
  City of SeaTac, noting that the city's involvement is limited to signalization

7.4.2 Mid-Term Capital Improvement Strategies

#37 - 2nd EB lane on SR 518 to I-405, including improvements to I-405 to accommodate demand

See full version in Appendix F

Capacity bottlenecks on northbound I-405 induce congestion on eastbound SR 518. To increase capacity and accommodate future traffic between eastbound SR 518 and northbound I-405, this strategy suggests adding a second lane to the existing through-lane, and carrying it through the I-5/I-405/SR 518 interchange, before terminating near SR 167. This strategy would require widening of the SR 518 through the interchange, as well as widening of existing bridges in the area. Several potential fish passage sites are identified within the area, which would need evaluation and a mitigation strategy prior to work being undertaken.

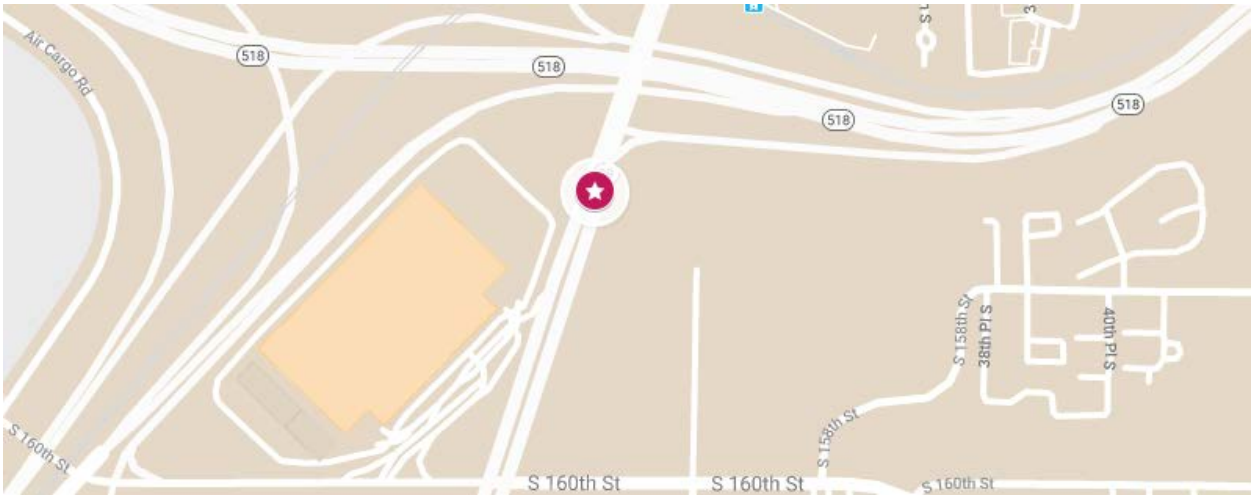
- This strategy is part of a recommendation package
- Total Score: 3.02
- Cost: $159,000,000-$212,000,000

  Source: WSDOT Planning-Level Cost Estimation Tool and I-405 Program cost guidance. Additional details for this estimate can be found in Appendix G.

- This strategy is supported by:

  Sound Transit
  City of SeaTac, assuming a phased approach is adopted

#39 – Non-Motorized connection from SE Quadrant to Rental Car Facility

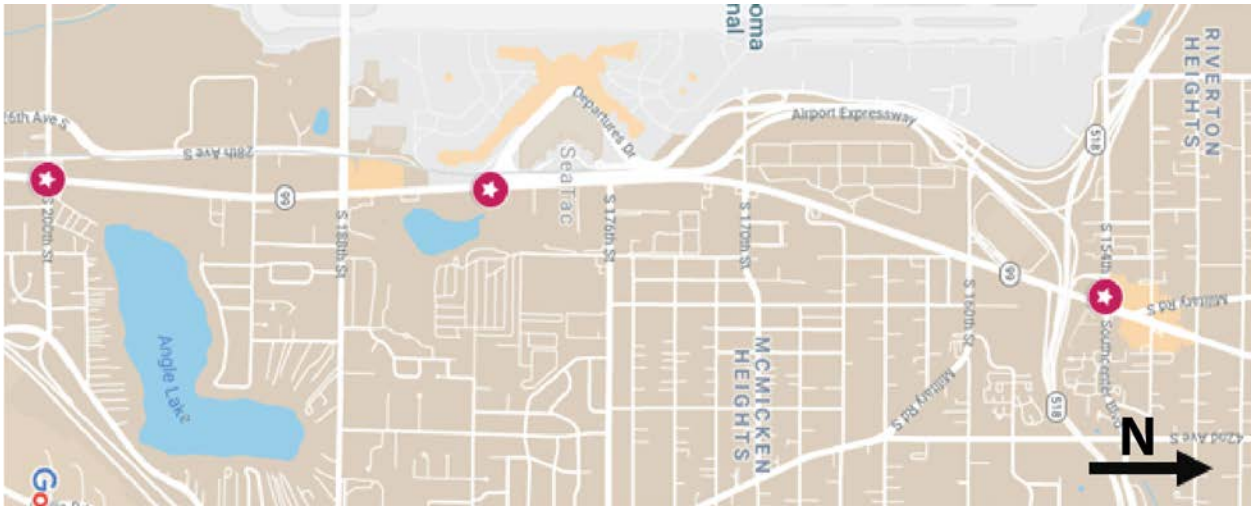


As part of the Port of Seattle Sustainable Airport Masterplan (SAMP) an elevated airport transit system is proposed, linking the existing terminal to the new terminal, as well as to the Rental Car Facility north of the terminals. This strategy suggests a pedestrian bridge connection from the SE quadrant of the SR 518/SR 99 interchange to the elevated airport transit system at the Rental Car Facility. A pedestrian and bicycle connection between the two facilities could potentially encourage transit use and promote crossing of SR 99, thereby improving the overall transit and pedestrian experience.

- This strategy is not part of a recommendation package.
- Total Score: 3.44
- Cost: More than $20,000,000

  Source: Estimated cost range

#40 - E-W Pedestrian and Bicycle Bridge Connections across SR 99



This strategy suggests expanding pedestrian and bicycle transit-oriented crossing infrastructure along SR 99, by constructing three bridges crossing SR 99 and connecting to three destinations: S 154th St, S 182nd St, and Angle Lake Station. A study of an Angle Lake pedestrian connection was completed by City of SeaTac in 2015.

- This strategy is part of a recommendation package.
- Total Score: 3.44
- Cost: $5,000,000-10,000,000

  Source: Estimated cost range

- This strategy is supported by:

  City of SeaTac

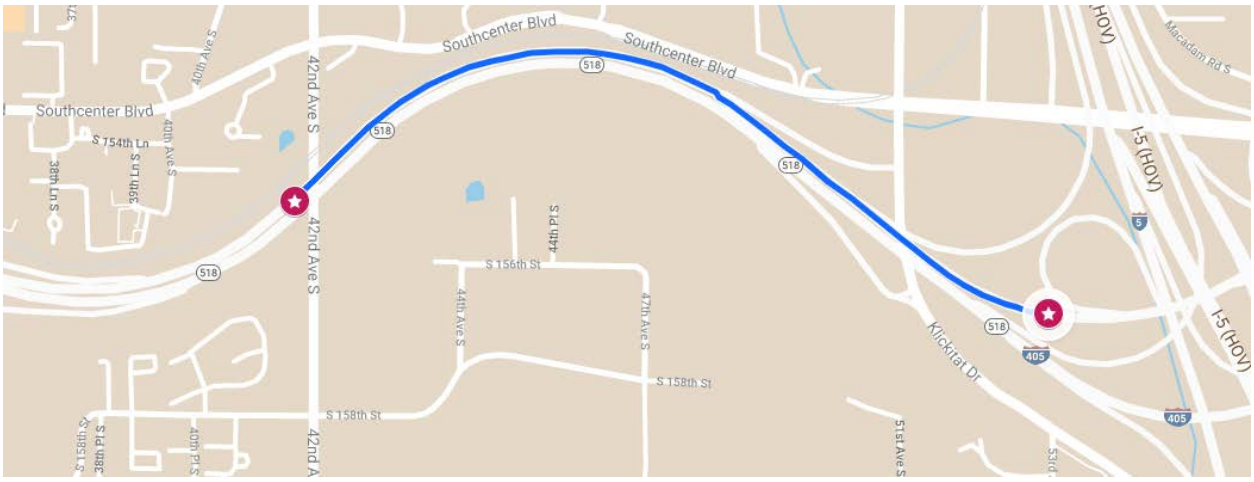
#50 - Auxiliary Lane Widening of EB SR 518 from SR 99 to Klickitat Curve/51st Ave S exit

With capacity constraints on northbound I-405 and at the I-5 interchange, mobility between SR 99 and 51st Ave S/Southcenter will decline as growth continues in the corridor. This strategy suggests adding an additional full-standard lane to EB SR 518 as an auxiliary lane, to increase capacity between SR 99 to the 51st Ave S/Southcenter exit. This would include both a full lane, as well as standard shoulders, which would require widening of the roadway with additional pavement, as well as widening of the bridge at 42nd Ave S.

- This strategy is part of a recommendation package.
- Total Score: 3.01
- Cost: $31,000,000-$42,000,000

  Source: WSDOT Planning-Level Cost Estimation Tool
  Additional details for this estimate can be found in Appendix G

#51 - Widening of WB SR 518

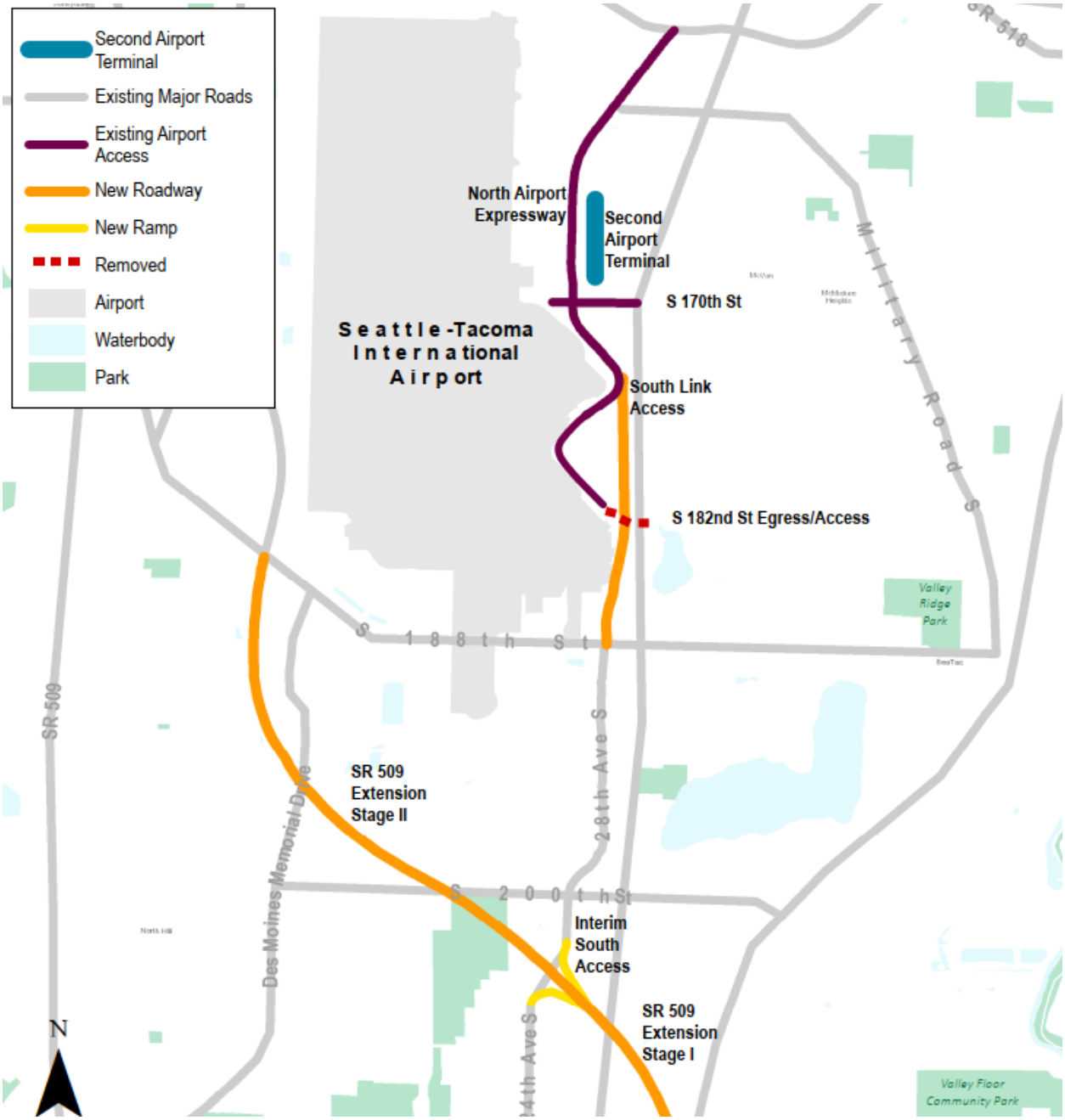


This strategy suggests full-standard widening of WB SR 518 from the I-5 interchange and the SB I-5 on-ramp. This would add an additional travel lane as well as full-standard shoulder for the road segment, with a focus on increasing capacity between SB I-405 and WB SR 518.

- This strategy is part of a recommendation package.
- Total Score: 2.90
- Cost: $33,000,000-$45,000,000

  Source: WSDOT Planning-Level Cost Estimation Tool
  Additional details for this estimate can be found in Appendix G

#52 – Airport South Link Access

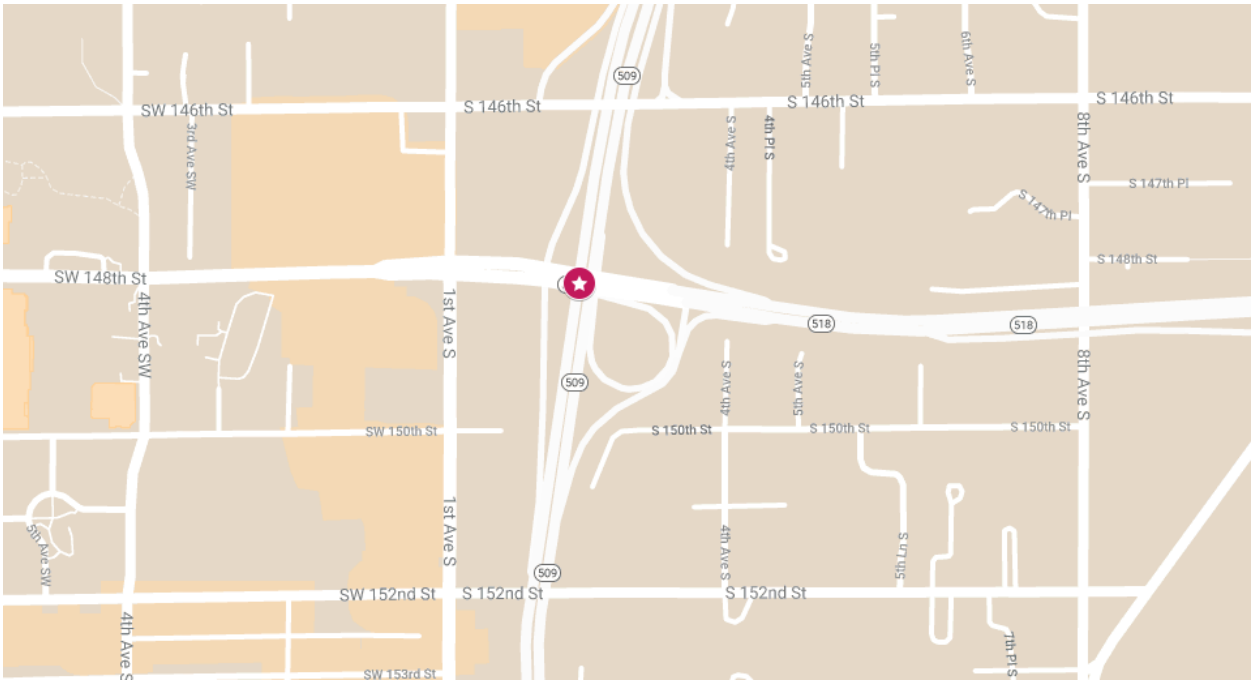


This strategy would improve south airport access by replacing the existing S 182nd Street airport driveway with a new connection via S 188th Street at 28th Ave S. This new access would better integrate the 24th Ave S/28th Ave S alignment for the future SR 509 extension.

- This strategy is part of a recommendation package.
- Total Score: 3.36
- Cost: TBD
- This strategy is supported by:

  City of SeaTac, if 182nd St is preserved

#54 - SR 518/SR 509 Interchange



The SR 518/SR 509 interchange is the terminal for SR 518, transitioning between a local arterial and a limited-access freeway. The interchange has three, closely spaced signalized intersections, which reduces efficiency and adds intersection conflict points. In response, this strategy suggests revising the interchange. Please note that the below text from the SR 518 Route Development Plan (WSDOT) reflects 2002 conditions and that more detailed analysis would be conducted should the strategy advance to a project in the future.

"*The SPUI concept at the SR 509 interchange replaces the existing diamond/loop interchange (which utilizes two signalized intersections) with a single signalized intersection that meets at the approximate center of the overpass. Right-turn slip lanes to and from the ramps are maintained or improved, while the SPUI intersection accommodates all left turns. In addition to consolidating the turning movements to a single location, the SPUI offers the advantage of further separating the interchange's signalized intersection from the arterial intersection at S 148th St/1st Avenue S in Burien. The increased distance between the intersections would provide improved storage for queuing, reduce the impacts of adjacent intersection operations, and provide better opportunities for Burien to provide a gateway feature at the western terminus of SR 518*". Adopted from the 2002 SR 518 Route Development Plan (WSDOT).

- This strategy is part of a recommendation package.
- Total Score: 3.44
- Cost: $60,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle

7.4.3 Long-Term Capital Improvement Strategies

#53 - Flyover ramp (EB SR 518 to NB I-5)

Source: 2002 SR 518 Route Development Plan (WSDOT)

The current eastbound SR 518 channelizes drivers into individual lanes before splitting into three separate ramps to the destinations of northbound I-5, northbound I-405 or southbound I-5. Between the North Airport Expressway and the I-5 interchange, drivers must first comprehend the lane arrangement, make appropriate lane changes, navigate horizontal curves and a downhill grade, and react to potential queues extending back from I-405 -- all within 1 mile. In response, this strategy suggests reconstructing the eastbound to northbound ramp to depart from the right-hand side of the freeway, so traffic bound for northbound I-5 will not have to weave across all lanes within this segment. Please note that the below text from the SR 518 Route Development Plan (WSDOT) reflects 2002 conditions and that more detailed analysis would be conducted should the strategy advance to a project in the future.

"*The right-side ramp concept at this interchange involves reconstruction of the EB to NB ramp on the right-hand of the freeway. The existing left side ramp could be considered for continued use by HOV's or transit vehicles*". Adopted from the 2002 SR 518 Route Development Plan (WSDOT).

- This strategy is not part of a recommendation package.
- Total Score: 2.81
- Cost: $59,400,000

  Source: 2002 SR 518 Route Development Plan (WSDOT) with CPI Inflation from Year 2001 $ to Year 2016$ Cost includes:

  - "Modifications to Tukwila Interchange (Right-side exit)" (Flyover Ramp from EB SR 518 to NB I-5)
  - Contingency

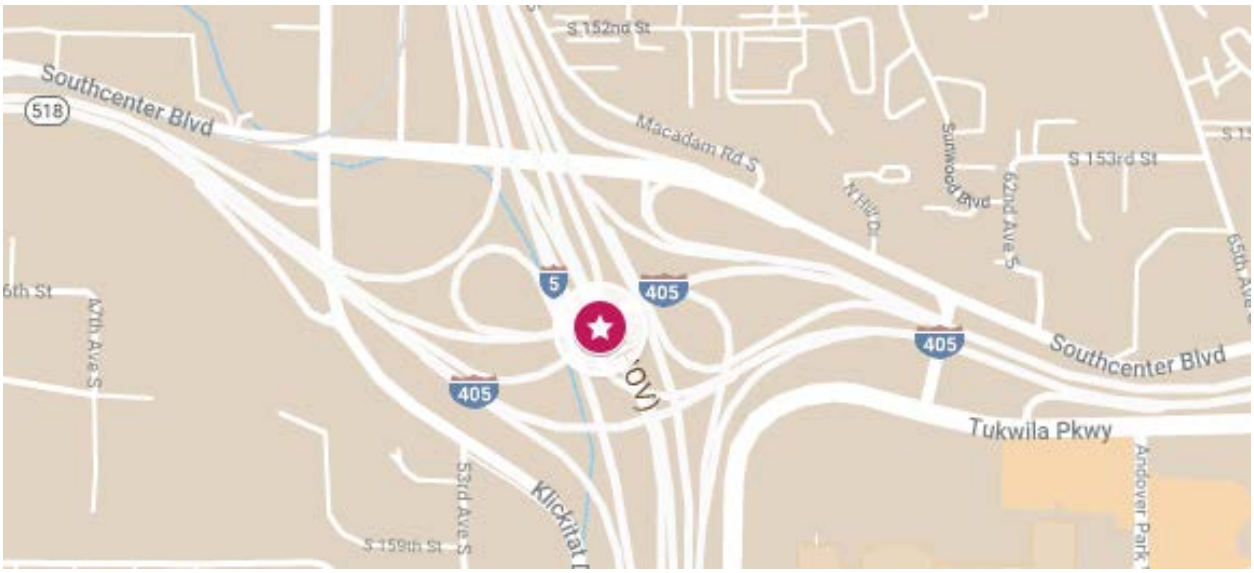
- Engineering and Construction Management

Costs are for order-of-magnitude estimation purposes only. Costs are for capital costs only and do not include right-of-way purchase, legal fees, WSDOT expenses, financing, inflation to construction time, or operations and maintenance.

- This strategy is supported by:

  Port of Seattle

#55 - Full Interchange Rebuild I-5/I-405/SR 518

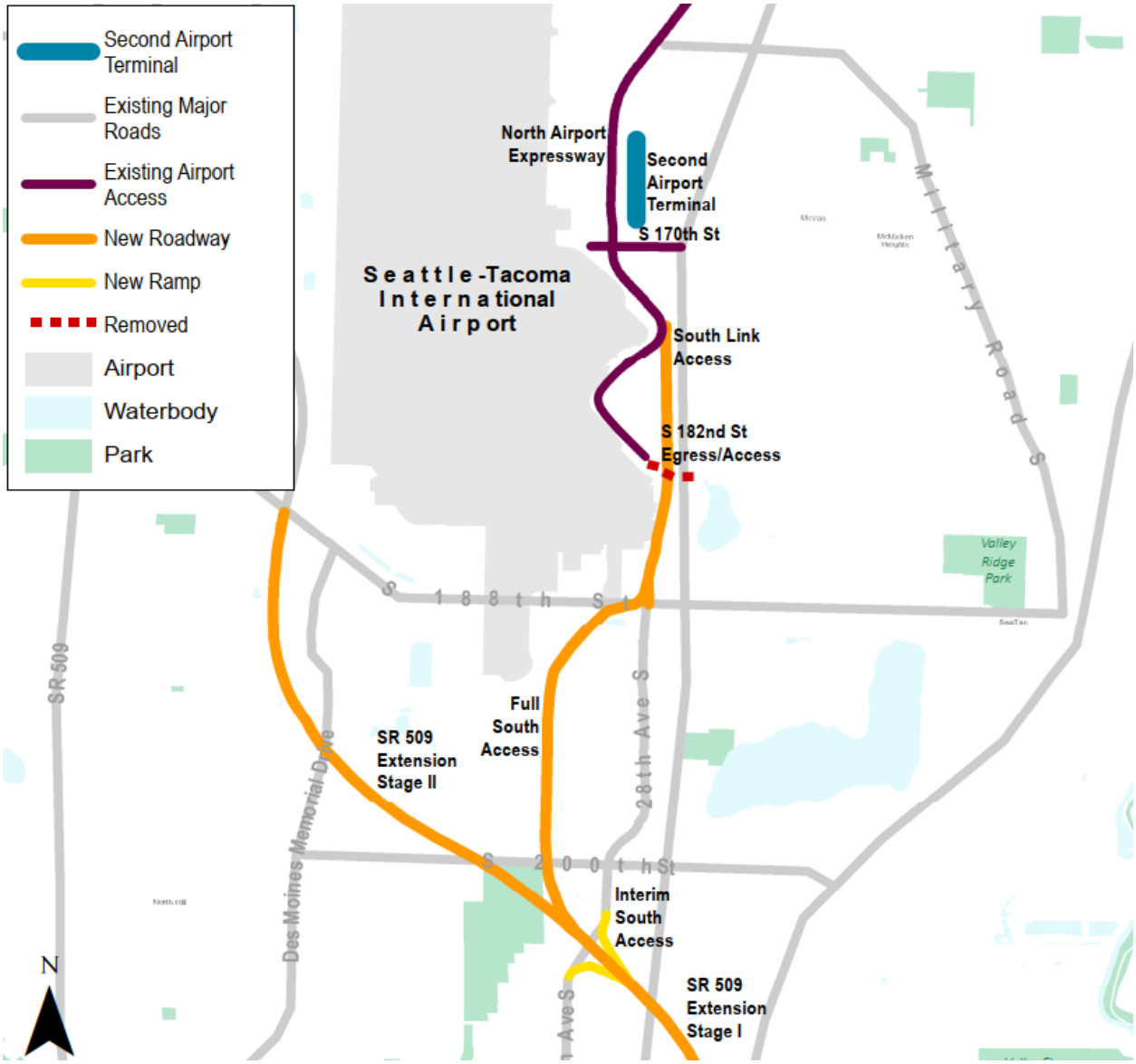


The I-5/I-405/SR 518 interchange is one of the most heavily trafficked interchanges in the state. Left-hand ramps and capacity constraints result in long periods of congestion and subsequent crashes. In response, this strategy suggests a full interchange rebuild of the I-5/I-405/SR 518 interchange. This is not currently a planned or programmed project, but is considered for the future as part of the I-5 Partnership, which is currently on-hold due to lack of funding from the most recent legislative session. This Partnership should explore a rebuild of the interchange to benefit all affected highways in the system, but there are currently no further details available.

- This strategy is part of a recommendation package.
- Total Score: 3.09
- Cost: TBD
- This strategy is supported by:

  Sound Transit
  Port of Seattle
  City of Tukwila
  City of SeaTac

#56 - Full South Airport Access



This concept would involve construction of a new highway segment (South Airport Expressway or SAE) connecting the future SR 509 extension to/from the airport via a limited access, or partially limited access highway facility. This expressway would be grade separated over S 188th Street to provide uninterrupted airport access.

- This strategy is not part of a recommendation package.
- Total Score: 3.21
- Cost: More than $20,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Port of Seattle (for further study to confirm cost-effectiveness)
  City of SeaTac, if 182nd St is preserved

#57 - Expansion of LRT service beyond ST3

Seattle Subway Conceptual Map - https://www.seattlesubway.org/regional-map/

This strategy describes continued investment in the regions high-capacity transit, through the introduction of ST 4. Official details of the expansion are currently unavailable, but a far-reaching high-quality transit system encourages transit use and provides opportunity for mode shift, which can potentially benefit SR 518 as it does the entire region.

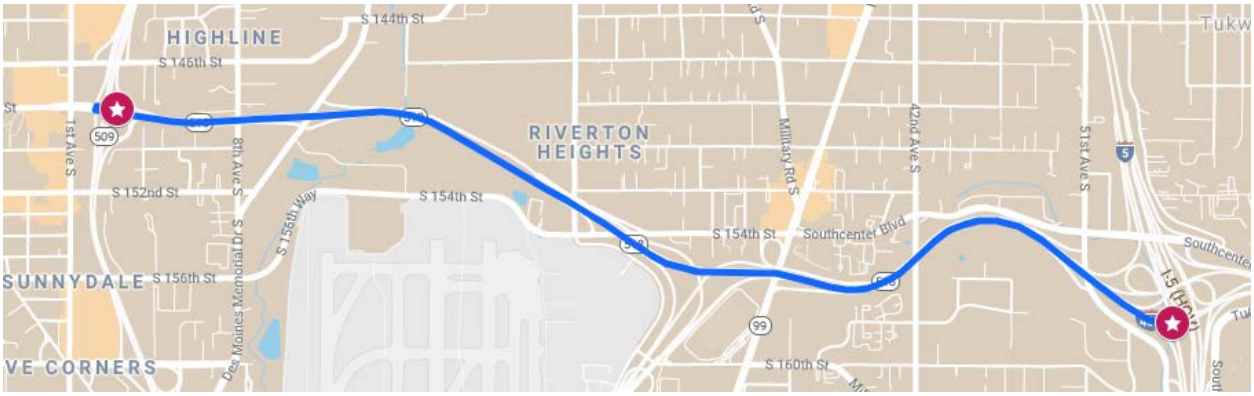
- This strategy is not part of a recommendation package.
- Total Score: 3.58
- Cost: More than $20,000,000

Source: Estimated cost range

- This strategy is supported by:

  King County Metro
  Port of Seattle
  City of SeaTac

#58 – Managed Lanes on SR 518



This strategy suggests the introduction of managed lanes on SR 518, either as HOV, tolled facilities or through other measures. The strategy was originally presented as an express toll lane, but there was a desire to maintain the flexibility for future planning efforts, in case this strategy moved forward as a project. Managed lanes allow for better capacity utilization and service levels throughout the corridor, while supporting the regional desire to increase the share of high-occupancy riders or to create revenue from the use of roads. The managed lanes would stretch throughout the corridor and connect to the planned facilities within the I-405 corridor.

- This strategy is not part of a recommendation package.
- Total Score: 2.91
- Cost: $150,000,000-$200,000,000

  Source: Estimated cost range

- This strategy is supported by:

  Sound Transit

7.5 Freight-Specific Improvement Strategies

As discussed in the Existing Conditions and Future Baseline Assessment, SR 518 is classified as a T-2 Freight Economic Corridor in the WSDOT Freight and Good Transportation System (FGTS) 2017 inventory. The FGTS T-2 categorization means that SR 518 carries between 4-10 million gross tons of goods per year. This indicates the importance of freight within the study area and on the SR 518 corridor itself. SR 518 connects to air cargo facilities at Sea-Tac, and this is important because most of the state's air cargo comes in and out of Sea-Tac. Air cargo plays a unique and critical role for the economy and freight system. Therefore, poor performance on the SR 518 corridor will affect the larger economy.

The SR 518 corridor is especially important for air cargo freight through the Sea-Tac Airport. Additionally, it connects SR509 and I-5, linking truck trips traveling between the Duwamish Manufacturing and Industrial center, Duwamish Port terminals, and the warehouse and distribution center of the Green River Valley. Finally, Southcenter Mall and the surrounding retail area is an important generator of freight activity, along with several industries and warehouses located near SR 518 in Tukwila, SeaTac and Burien. Freight activity is expected to increase in the future, as discussed in the Existing Conditions and Future Baseline Assessment.

While specific information on freight volumes, good types, and specific origins and destinations was unavailable for this specific study, freight mobility in the context of air cargo movements has been recently investigated as part of the Washington State Air Cargo Movement Study (December 2018) commissioned by the State Joint Transportation Committee (JTC). Overall corridor freight mobility was also included as an evaluation criterion since many of the strategies can influence freight mobility to varying degrees. Any of the strategies that improve mobility along SR 518 will also improve the mobility of freight and benefit the study area and the region. In addition to the general benefits expected from mobility, access, and crash reduction improvements, several strategies have specific freight improvements:

- #11 - High Friction Surface Treatment for EB SR 518 to NB I-5: This surface treatment will increase friction on this curved ramp, reducing the potential for truck crashes. Trucks are especially vulnerable to wet conditions and non-standard geometrics, and this strategy potentially increases drivers' ability to maneuver the curve in all conditions. This strategy could also be applied to the I-5 SB to I-405 NB ramp if indicated.
- #15 or #16 - 152nd on-ramp to WB SR 518 (with a collector-distributor roadway) or 154th On-Ramp Roundabout to allow EB to WB left movement – These two strategies allow freight traffic coming from the airport via Air Cargo road to access WB SR 518, which currently has no direct access. This especially improves access to SR 518 for logistics centers and warehouses located north of the study corridor.
- #42 and #43 – Ramp Improvements (roundabouts, signals, and improvement channelization) – These strategies will facilitate freight access to and from the freeway system by improving operations for all vehicles at the ramp termini and other adjacent intersections
- #54 – SR 518/SR 509 Interchange – Improvements to this interchange will improve freight mobility in the north/south direction to service Seattle and Tacoma, as well as alternate connections to I-5.

- #55 – SR I-5/I-405/SR 518 Full Interchange Rebuild – Improvements to this interchange will improve freight mobility to the state's major north/south corridor (I-5) as well as access to the east side of the Puget Sound region.
- #9 – Freight Data Collection – this strategy supports the collection of additional freight data to support further decisions in the study area.

Regional freight mobility is not only affected by the 3.5 miles of SR 518 itself, but by other corridors in the area and the efficiency of the network that they operate within. The operations of SR 509, I-5, and I-405 all need to be reviewed to identify freight specific improvements on a regional scale. Data collection is partially completed under the Washington State Freight Mobility Plan and recommendations from this study can be included into further endeavors recommended by the plan. Due to the importance of freight to this corridor and wider region, a systematic review of freight movements should be conducted to obtain a better understanding of operational challenges and necessary improvements.

7.6 Transit-Specific Improvement Strategies

Throughout the region, transit plays a key role in efficiently moving people during times of congestion, as well as providing transportation options for people who cannot or choose not to drive. This section lists transit-specific improvements considered, though individual strategies may not be supported by all stakeholders or recommended for further evaluation.

Sound Transit Link Light Rail service to and from the airport, through Tukwila and to Downtown Seattle, provides an important transit spine for travelers, as do existing bus routes such as the KCM F-Line and ST Route 560, serving more local destinations within the study area. The introduction of ST I-405 BRT (Stride) in 2024, which travels on SR 518 and connects with Link Light Rail at Tukwila International Boulevard Station, will further allow people to utilize high-capacity and high-frequency transit, but will not provide bus service directly into Sea-Tac Airport. Existing and future transit plans are discussed in the Existing Conditions and Future Baseline memo found in Appendix A.

Transit service enhancements could effectively improve mobility and access, and reduce crash potential along the corridor. Bus service can benefit from targeted roadway capacity improvements focused on high occupancy vehicles by bolstering travel reliability and enhancing the overall transit service and rider experience. Specific strategies addressing transit improvements for the SR 518 corridor include:

- #6 – Transit Signal Priority on SR 99: This strategy will allow buses entering or exiting the Tukwila International Boulevard Station and/or serving SR 99 to traverse intersections with fewer delays. A signal with transit priority can provide an advanced green signal or hold a green phase when buses approach an intersection thereby reducing bus slowdowns.
- #58 – Managed lanes on SR 518: Managed lanes strive to operate below capacity and generally accommodate transit vehicles usage, whether operating as HOV or ETL. This strategy would improve travel time reliability (on-time performance) and potentially decrease travel times for the ST I-405 BRT (Stride) service as well as other transit service in the corridor.

7.6.1 Access to Transit

Access to transit is an important part of the rider experience that directly affects the demand for service and is often seen as a key barrier for attracting new or existing riders or even maintaining an existing rider base. Ensuring safe and efficient transit access enables riders to quickly and effectively reach their destinations. Specific improvements that can benefit access to transit include:

- #14 - Tukwila International Boulevard Station South Access Pedestrian Bridge Extension: As part of the I-405 BRT program, this improvement is being considered in Environmental Review, for possible future construction as funding becomes available. It would connect a private parcel scheduled to be developed from a parking-lot into multi-story mixed use private development in the City of SeaTac to nearby the light rail and BRT service, potentially increasing ridership and service options for people already in the area, as well as riders that may be generated by redevelopment efforts.
- #31 – First/Last mile service: As previously discussed, accessing transit can be a key barrier provides friction for attracting or maintaining ridership levels. This strategy would support and leverage the existing KCM pilot program, which aims at decreasing access friction and enhancing provide better first/last mile connections to transit.
- #39 – Non-motorized from SE quadrant to Rental Car Facility at Elevated Airport Bus System: The potential introduction of an elevated bus system within the airport would improve direct links from the Tukwila area and ST I-405 BRT (Stride). A pedestrian connection between the two facilities could potentially encourage transit use and promote a safe crossing of SR 99, thereby improving the overall transit and pedestrian experience. At this point, modeling has not indicated increased ridership.
- #40 E-W Pedestrian Bridges across SR 99 at S 154th St, S 182nd St and Angle Lake Station: Additional grade separated pedestrian connections would provide safer options for access to transit, by allowing residents near SR 99 to more directly reach high-capacity transit service at Link Light Rail Stations at and around the airport.

7.6.2 Service Expansion

Continuing to expand transit service hours, frequency, reliability, and coverage increases transit ridership by both people who would otherwise drive or are faced with limited mobility options. WSDOT does not operate transit services directly, but rather partners with regional transit agencies to effectively offer serve on and near WSDOT freeways and arterials. Specific strategies which includes service expansion opportunities include:

- #25 - Downtown to Airport direct express bus connection: Though Link Light rail provides reliable service during all hours of the day, increased direct/express service, especially during non-peak hour commute times, could improve transit ridership to the airport. This strategy suggests evaluating the potential for direct, express bus routes between Downtown Seattle and Sea-Tac Airport, for faster service during non-commute hours. This would require a policy change between Sound Transit and King County, giving King County the ability to provide duplicative express service to service provided by Sound Transit (if public transit were to operate this service).
- #26 – King County Metro/Sound Transit Coordination on filling 1-5am gap: Currently airport transit service is limited between the hours of 1am and 5am. This strategy suggests evaluating the

potential for increased service hours, to benefit airport employees and travelers, as well as non-airport employees in the area working second or third shift.

- #46 – Airport Express Bus Service: This strategy was considered by the Port of Seattle to identify the need for express bus service from further airport markets that do not currently have light rail or other airport service.
- #47 – Continue buses from Eastside and West Seattle to Sea-Tac Airport: Route 560 is scheduled to be discontinued following the introduction of ST I-405 BRT (Stride). This strategy suggests maintaining the service, which may benefit markets (ex. airport travelers) that are not directly served by Stride.
- #57 – Expansion of LRT service beyond ST3: This strategy suggests increasing service coverage throughout the region, especially Link Light Rail, with the introduction and implementation of a potential ST4 package in the future or any in-fill service or line extensions.

7.6.3 Demand Management Strategies

Demand management strategies can encourage and promote mode shift to transit or ridesharing. Some strategies which aim to manage driver/rider behavior to benefit transit ridership include:

- #24 – Free ride on Link with boarding pass: Partnership between Sound Transit and airlines to allow for boarding passes to be used as valid ticket from the airport.
- #27 – Parking Management Strategies: Parking management, whether increased parking cost or reduced fees for carpool parking, may nudge some drivers to consider transit for accessing their destination.
- #28 - Airport TMA: These programs focus on creating and improving transit strategies, as well as other non-SOV options for employees within their focus areas.
- #30 – Employee commuter trip reduction strategies: These strategies, mandated under the WA Growth Management Act and its Commute Trip Reduction program, aims at reducing vehicle miles traveled and on switching employees from SOV to transit or other non-SOV modes.

Investments in transit are considered part of WSDOT's Practical Solutions toolbox, as transit enhancements have been shown to strongly influence a shift from personal vehicle use to alternative modes, resulting in less demand for roadway capacity. While transit improvements on their own may not significantly improve mobility on SR 518, they still have benefit, as transit is deemed a safe alternative to SOV driving and has numerous community and environmental benefits. For these reasons, this planning study supports transit improvement recommendations where they benefit the corridor.

7.7 Additional Improvements

Throughout the evaluation efforts, additional potentially relevant opportunities surfaced. These were not evaluated as part of the study, but could potentially provide additional value in the future, and are therefore mentioned in this section. As previously mentioned, strategies that are not recommended as part of this study may still be carried forward for implementation or further evaluation, if a need and/or a champion of a certain project arises. Potential improvements include:

- Completion of the SR 518 at Des Moines Memorial Drive S Interchange Phase II – WB Ramps: Phase I of this project was completed in 2019 and Phase II has an approved Interchange Justification Report available. This project may provide benefit to the corridor as whole, by completing the intersection and creating additional highway access points.
- Whilst non-motorized modes were discussed in the Existing Conditions and Future Baseline Conditions Assessment report, and considered for some strategies, especially related to crossings, additional evaluation could be undertaken to understand SR 518s and its surroundings' place in the regional trails system.
- A new on-ramp from Air Cargo Road to the North Airport Expressway (southbound) has been proposed by the Port of Seattle to address localized access into the future second airport terminal. This relocation of this on-ramp would be included as an element in the Port's Sustainable Airport Master Plan (SAMP) to replace future loss of access at the S 170th Street ramp that must be reconfigured due to the new terminal.
- Two ramp metering opportunities were included and evaluated as part of the strategies, though not carried forward as a recommendation[3]. Ramp metering continues to be a valuable tool and there may be additional locations on SR 518 that warrant the use of ramp metering, and so this may be an avenue to be explored, potentially as part of a comprehensive ramp metering review in the corridor or region.

7.8 Forward Compatibility

All strategies identified and evaluated for this study, including those related to demand management, operational enhancements, and capacity improvements, were screened to ensure their compatibility with future planned and programmed transit services in and around the SR 518 corridor. As discussed in previous sections, the most prominent change in the transit environment will be the implementation and operation of I-405 BRT (Stride) service along I-405 and SR 518 which includes a freeway BRT station pair near the TIBS Link light rail station as well as a pedestrian bridge that connects BRT to Link light rail and continues to the south side of SR 518. In addition, the proposed airport elevated bus system would likely be implemented by the Port of Seattle to connect the main airport terminal, Terminal 1 (T1), to the new north terminal, Terminal 2(T2), and the Rental Car Facility (RCF) on S 160th Street. The improvement

[3] "Subsequent to the completion of the study, the city of SeaTac requested reconsideration of a strategy involving ramp metering for the North Airport Expressway onto SR 518. Additional study that includes more detailed modeling would need to be conducted to assess potential traffic impacts/benefits."

strategies and treatments evaluated and carried into the package of recommendations were all considered forward-compatible with these planned transit system elements.

8 Improvement Strategy Packages

The SR 518 Corridor Planning Study incorporated performance-based Practical Solutions at the corridor level by grouping strategies into packages of solutions with the goal of comprehensively addressing performance gaps over the future years. Based on input from stakeholders and from additional traffic modeling and analysis completed, these recommended packages define opportunities to address performance gaps within the SR 518 corridor. Not all strategies moved forward from the assessment stage. Strategies that are not part of a recommendation may still be beneficial and are still available for advancement should a champion of a strategy arise; however, they are not priorities under the recommendations of this study. WSDOT endorses all improvements strategy packages recommended here. Inclusion in the recommendation packages reflects that the stakeholders agree on the potential benefits, and are supportive of their implementation should the opportunity arise.

Using guidance from the analysis of strategies, solutions were compiled into enhanced packages of preliminary recommended solutions for the three horizon durations years that closed performance gaps and meet the goals of the corridor planning study.

The scores assigned to each package reflects the average score of participating strategies. Per WSDOT's Practical Solutions framework, corridor improvement strategies reflected three main categories or themes. These include the following:

- Transportation Systems Management and Operations (TSMO)
- Transportation Demand Management (TDM)
- Capital Improvements

The following table provides an overview of the packages, followed by more detailed information.

Table 11 Detailed Strategy Packages

Strategy Packages	Score	Cost Estimate
Near-Term Strategies		
TSMO: Signage Improvements Review signing and wayfinding to and from the airport, major highways, and attractions on local streets • #21: Signage: Wayfinding to Airport • #22: Improved signing from rental car facility/S 160th to WB 518 • #23: Review local street signing to and from the airport	3.77	$2-4 million
TSMO: Operations Enhancement on EB SR 518 A combination of strategies, such as Advanced Traffic Management Systems, High Friction Surface Treatments, restriping and additional lane markings, and increased incidence response which serves to improve mobility and reduce crashes. • #4: ATMS: Speed and corridor management on EB SR 518 • #10: Expand Incident Response Team presence on SR 518 • #11: High Friction Surface Treatment (HFST) on EB SR 518 to NB I-5	3.58	$10-20 million

Strategy Packages	Score	Cost Estimate
• #17: Lane Markings: Around I-5 interchange • #36: 2nd EB lane on SR 518 to I-405, merges with the exist. EB lane, west of I-5 overpass		
TSMO: Operations Enhancement on WB SR 518 Utilize lane markings and signage to direct drivers and provide information • #18: Lane Markings/Signage: Delineation WB towards Airport exit (two lanes solid marking) • #19: Marking/Signage: Signal Ahead - WB approaching SR 518/509 Signal • #20: Marking/Signage: Lane Ends - WB approaching Des Moines Memorial Drive S Off-Ramp	3.72	$100k-1 million
TSMO: Active transportation Improvements Active transportation improvements at SR 99 and Des Moines Memorial Drive S • #12: Active transportation improvements at SR 99 ramps • #13: Active transportation improvements at Des Moines Memorial Drive S	3.73	$250k-1 million
TSMO: ITS/ATMS Implement Intelligent Transportation Systems throughout the corridor, to support ramp metering at SR 99 and 51st Ave S, ATMS near the airport, and Transit Signal Priority • #1: Ramp Metering: SR 99 to EB 518 All Lanes • #2: Ramp Metering: 51st Ave S to WB 518 • #3: ATMS: Travel Time Signs on NAE - Seattle via SR 509 or I-5 • #5: Complete ITS throughout corridor and add ATMS Bidirectional on SR 518 near SR 509 • #6: Transit Signal Priority on SR 99	3.58	$6-12 million
Transportation Demand Management (TDM) Use a combination of demand management strategies to increase non-SOV driving among corridor users • #27: Parking Management Strategies • #28: Airport Transportation Management Association • #29: Prioritize/incentivize vanpools for employees • #30: Employee commuter trip reduction strategies • #31: First/last mile services • #32: Carpool Incentives Program for airport travelers	3.64	$4-8 million
Capital Improvement: SR 518 Ramps • #15: 152nd On-ramp to WB SR 518 (CD roadway) • #16: 154th On-Ramp Roundabout to allow EB to WB left movement • #59: Relocation of WB SR 518 Off-Ramp from SR 99 to 32nd Ave S vicinity	3.20-3.22	$34-49 million

Strategy Packages	Score	Cost Estimate
Mid-Term Strategies		
Capital Improvement: Eastbound SR 518 Add capacity to the corridor using auxiliary lanes and adding an additional lane underneath the I-5 interchange • #50: Auxiliary Lane Widening of EB SR 518 from SR 99 to Klickitat Curve/51st Ave S exit • #37: 2nd EB lane on SR 518 to I-405, including improvements to I-405 to accommodate demand	3.01	$190-244 million
Capital Improvement: #52: Airport South Link Access	3.36	TBD
Capital Improvement: #54: SR 518/SR 509 Interchange	3.44	$50-70 million
Capital Improvement: #51: Widening of Westbound SR 518	2.90	$33-45 million
Capital Improvement: Improvements at SR 518 Ramp Termini Improve ramp termini operations through the construction of roundabouts or signals, as well as channelization and optimization of existing signals • #42: Ramp Terminal Treatments – Signal or Roundabout • #43: Ramp Terminal Treatments - Revised Channelization	3.7	$200k-5 million per location
Capital Improvement: #40 Active Transportation Bridge Connections	3.44	$5-10 million per location
Long-Term Strategies		
Capital Improvement: #58: Managed Lanes on SR 518	2.91	$150-200 million
Capital Improvement: #55: Full Rebuild of the I-5/I-405/SR 518 Interchange	2.09	TBD

8.1 Near-Term Strategy Packages

8.1.1 TSMO: Signage Improvements

- Merging and weaving friction and slow speeds resulting from driver confusion can increase crash potential and exacerbate corridor congestion.
- A holistic review of guide signage to provide timely and relevant information to travelers in the corridor could provide greater mobility benefits and reduced crash potential than reviewing individual segments.
- Signage strategies scored an average of 3.77 in the strategy evaluation process.

This package combines several of the suggested signage strategies to address wayfinding and safety through improved signage and lane markings along and surrounding the corridor. In cases where drivers are unclear of freeway routing or ramp connections, unsafe driving behavior can result such as abrupt lane-changing maneuvers, slower than appropriate speeds, and congestion from circulation or rerouting. Combining signage and wayfinding strategies into a holistic signage review both to and from the airport on SR 518 and the North Airport Expressway as well as surrounding access facilities (SR 99, SR 509, I-5, I-405) could enhance driver comfort, reduce crash potential, and improve overall corridor performance.

Strategies included:

- #21: Signage: Wayfinding to Airport
- #22: Improved signing from rental car facility/S 160th to WB 518
- #23: Review local street signing to and from the airport

Total cost estimate: $2,000,000-4,000,000

8.1.2 TSMO: Operation Enhancements on Eastbound SR 518

- Eastbound SR 518 towards I-5 experiences high levels of crash activity and congestion east of SR 99 and NAE[4].
- This package combines multiple approaches to address crash potential and provide information to drivers with the goal of decreasing crashes and maintaining corridor capacity.
- The included strategies scored an average of 3.58 in the strategy evaluation process.

This package combines several strategies focused on improving conditions on EB SR 518 towards I-5. ATMS strategies are proposed to give drivers advance warning of downstream conditions at the interchange and encourage slower speeds appropriately before reaching congestion at the interchange. HFST-treatment at the ramp towards I-5 would improve traction under wet conditions or high travel speeds and strongly reduce crash potential for trucks. Restriping and other lane marking changes on EB SR 518 approaching I-5 interchange may improve capacity (#36) by expanding mainline queue storage, but also helps drivers better position themselves in the proper exit lane (#17).

These two strategies combined, either phased or in concert, may provide significant benefit to this segment of the corridor. Finally, increased incident response team presence on SR 518 would allow for quicker resolution of crashes, debris and other breakdowns along the corridor, thereby reducing crash potential and maintaining consistent flow after crash events.

Strategies included:

- #4: ATMS: Speed and corridor management on EB SR 518
- #10: Expand Incident Response Team presence on SR 518
- #11: High Friction Surface Treatment (HFST) on EB SR 518 to NB I-5
- #17: Lane Markings: Around I-5 interchange
- #36: 2nd EB lane on SR 518 to I-405, merges with the existing EB lane, west of I-5 overpass

Total cost estimate: $10,000,000-20,000,000

The following table shows the modeled travel time reductions with the introduction of Strategy #36

4 Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Table 12 Strategy #36 2030 and 2045 Baseline Comparison

ID	Start	End	Distance	Free Flow TT (mins)	2030 Baseline (mins)	2030 Strategy #36 TT (mins)	2030 Strategy #36 %Δ	2045 Baseline (mins)	2045 Strategy #36 TT (mins)	2045 Strategy #36 %Δ
1	SR 509: East of 1st Avenue	I-5 at Interchange	3.4	4.0	7.5	7.0	-6.7%	8.8	8.6	-2.3%
1A	SR 509: East of 1st Avenue	North Airport Expressway: to SB Ramp	2.0	2.0	2.7	2.7	0.0%	2.7	2.8	3.7%
1B	NAE, at Sea-Tac Terminal: South of 170th	I-5 at Interchange	2.6	3.0	9.3	8.6	-7.5%	12.2	12.5	2.5%
1C	I-5: from NB mainline to SR 518	SR 167 at interchange via I-405	3.5	4.0	8.0	7.8	-2.5%	14.5	14.5	0.0%
2	SR 509: East of 1st Avenue	SR 167 at interchange: via I-405	5.7	6.0	12.8	12.3	-3.9%	14.6	14.4	-1.4%
2A	I-5 at Interchange	SR 167 at interchange: via I-405	2.3	3.0	5.0	5.0	0.0%	5.3	5.3	0.0%
3	I-5 from SB ramp: To SR 518	SR 509: East of 1st Avenue	3.4	4.0	4.5	4.5	0.0%	5.0	5.0	0.0%
3A	I-5 from SB ramp: To SR 518	North Airport Expressway: To SB Ramp	1.8	3.0	2.2	2.2	0.0%	2.9	2.9	0.0%
3B	North Airport Expressway: NB ramp to WB SR 518	SR 509: East of 1st Avenue	2.7	4.0	3.8	3.8	0.0%	4.1	4.1	0.0%
3C	I-5: from NB mainline to SR 518	North Airport Expressway: to SB Ramp	3.4	4.0	4.3	4.1	-4.7%	9.8	9.9	1.0%
3D	I-5: from NB mainline to SR 518	SR 509: East of 1st Avenue	4.7	6.0	6.6	6.5	-1.5%	11.9	12.0	0.8%
4	SR 167 at interchange: via I-405	SR 509: East of 1st Avenue	5.7	6.0	8.9	9.1	2.2%	11.8	11.7	-0.8%
4A	SR 167 at interchange: via I-405	I-5 at Interchange	2.3	3.0	4.2	4.4	4.8%	7.1	7.0	-1.4%

8.1.3 TSMO: Operation Enhancements on Westbound SR 518

- Crash profile[5] for westbound SR 518 shows a moderate number of crashes between 51st Ave S and SR 99 and higher crash rates near SR 509 interchange.
- Improving signage (active or passive) and updating lane markings would reduce crash potential within the SR 518 corridor.
- The included strategies scored an average of 3.72 in the strategy evaluation process.

This package combines several signage strategies on WB SR 518 focused on guiding drivers to/from several ramps, including the S 154th St/SR 99, the Des Moines Memorial Drive S ramp and the SR 518/SR 509 interchange. These complements each other by providing supplemental information to drivers.

Strategies included:

- #18: Lane Markings/Signage: Delineation WB towards Airport exit
- #19: Marking/Signage: Signal Ahead - WB approaching SR 518/509 Signal
- #20: Marking/Signage: Lane Ends - WB approaching Des Moines Memorial Drive S Off-Ramp

Total cost estimate: $100,000-1,000,000

8.1.4 TSMO: Active Transportation Improvements

- Pedestrian and bicycle connections on and across vehicular corridors are critical components of WSDOT's Practical Solutions framework. Strategies that could address existing pedestrian or bicycle conflict areas and improve connectivity were explored and identified.
- Decreasing the potential for pedestrian crashes at ramp termini benefits both active transportation users as well as overall SR 518 mobility and access.
- The included strategies scored an average of 3.73 in the strategy evaluation process.

The two strategies in this package describe active transportation improvements at ramp termini locations. WSDOT completed work on the EB SR 518 off-ramp to Des Moines Memorial Drive S in January 2019, which provides crossing infrastructure for active transportation users. This strategy suggests expanding this ramp infrastructure to the remainder of the interchange at Des Moines Memorial Drive S as well as SR 99.

Strategies included:

- #12: Active transportation improvements at SR 99 ramps
- #13: Active transportation improvements at Des Moines Memorial Drive S

Total cost estimate: $250,000-1,000,000

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5 Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

8.1.5 TSMO: ITS/ATMS

- Corridor congestion on SR 518, especially between SR 99 and I-5, is largely attributed to ramp merging friction and lane-based speed differences between ramp junctions
- Upgrading the road network to expand/leverage current traffic management technologies would establish a strong data infrastructure foundation and improve corridor-level traffic operations and data collection.
- Incorporating ITS along the corridor is considered a compatible strategy with future improvements related to operations, crash reduction, and access.
- The included strategies scored an average of 3.58 in the strategy evaluation process.

Intelligent Transportation Systems (ITS) and Active Traffic Management Systems (ATMS) together would provide a strong data collection and traffic management foundation, which can inform day-to-day operations as well as provide data for evaluation of the system on a long-term basis. Implementation of additional data loops in conjunction with ramp metering would allow the freeway network to respond in real-time to changes in the traffic environment, including intense congestion periods; and travel-time signs could improve driver decision making and route choice. ITS would also benefit transit through improvements such as transit signal priority, which provides targeted transit capacity to improve bus speed and reliability. Overall, this package represents a variety of strategies that address the use of technology within the study corridor, to benefit multimodal mobility and operations, and support long-term planning efforts.

Strategies included:

- #1: Ramp Metering: SR 99 to EB 518 All Lanes
- #2: Ramp Metering: 51st Ave S to WB 518
- #3: ATMS: Travel Time Signs on NAE - Seattle via SR 509 or I-5
- #5: Complete ITS throughout corridor and add ATMS Bidirectional on SR 518 near SR 509
- #6: Transit Signal Priority on SR 99

Total cost estimate: $6,000,000-12,000,000

8.1.6 Transportation Demand Management (TDM)

- Several options exist to reduce congestion and accommodate commute traffic through trip reduction strategies which benefit all users of a corridor and provide environmental benefits without major capital investment.
- These strategies aim to address corridor congestion by providing incentives for alternative transportation modes that reduce vehicular demand on SR 518.
- The included strategies scored an average of 3.64 in the strategy evaluation process, but varied from 3.12 to 3.83.

This package combines several of the identified strategies related to trip reduction, using various mechanisms, such as pricing, incentives, and information.

Strategies included:

- #27: Parking Management Strategies
- #28: Airport Transportation Management Association
- #29: Prioritize/incentivize vanpools for employees
- #30: Employee commuter trip reduction strategies
- #31: First/last mile services
- #32: Carpool Incentives Program for airport travelers

Total cost estimate: $4,000,000-5,000,000

8.1.7 Capital Improvement: SR 518 Ramps

- SR 99/International Boulevard in the cities of SeaTac and Tukwila is one of the most important connecting arterials along the corridor for commuters, airport access and freight.
- Either strategies #15 or #16 provide a much-needed WB SR 518 connection for Air Cargo Road and truck-centric generators north of SR 518, while #59 improves access to S 154th Street from WB SR 518 by relocating the off-ramp termini with an existing adjacent intersection.
- The combination of #15 and #59 scored an average of 3.22 in the evaluation process, while the combination of #16 and #59 scored an average of 3.20.

This package lists several strategies addressing ramp improvements near SR 99, which is an important connection to SR 518 and surrounding residences, retail and industry.

Strategies included:

- #15: 152nd On-ramp to WB SR 518 (CD roadway)
- #16: 154th On-Ramp Roundabout to allow EB to WB left movement
- #59: Relocation of WB SR 518 Off-Ramp from SR 99 to 32nd Ave S vicinity

Total cost estimate: $34,000,000-$49,000,000

- #15: $15,000,000-$20,000,000
- #16: $11,000,000-$15,000,000
- #59: $19,000,000-29,000,000
- Source: WSDOT Planning-Level Cost Estimation Tool

8.2 Mid-Term Strategy Packages

8.2.1 Capital Improvement: Eastbound SR 518

- EB congestion on SR 518 is heavily influenced by the interchange at I-5/I-405 and congestion on the adjacent I-405 corridor.
- To improve operations at the I-5/I-405/SR 518 interchange, additional through movement capacity would likely be required in the future. A second eastbound lane from SR 518 to I-405 could potentially reduce travel times from the Airport to I-5 interchange by 65-70 percent in 2045
- As an interim solution, less intensive widening to accommodate an auxiliary lane on SR 518 could reduce eastbound travel times by approximately 8 percent.
- The included strategies scored 3.02 on average in the evaluation process.

Phasing of the two identified widening options could allow for an initial investment to alleviate near term merging conflicts and friction at the SR99/NAE EB on-ramp by allowing additional merge/weave space toward I-5. The larger investment of a second EB through lane from SR 518 onto I-405 (extending to the SR 167 interchange) would substantially alleviate queues on EB SR 518 and ease congestion on I-405.

This package suggests a phased approach by first adding an auxiliary lane from SR 99 to the 51st Avenue S exit to increase capacity along SR 518 and allow additional merge/weave distance. To achieve greater mobility benefits, this should be combined with adding an additional eastbound lane from SR 518 to I-405 at the I-5 interchange. The greatest benefit would be realized if both strategies are constructed concurrently.

The strategies scored slightly lower overall, primarily due to the cost as well as their proximity to sensitive environmental areas. However, they were shown to provide significant operational and crash reduction benefits to the corridor overall. If either strategy were to move forward, they should be evaluated with focused attention on fish passable sites, as described in the Existing Conditions and Future Baseline Assessment.

Strategies included:

- #50: Auxiliary Lane Widening of EB SR 518 from SR 99 to Klickitat Curve/51st Ave S exit
- #37: 2nd EB lane on SR 518 to I-405, including improvements to I-405 to accommodate demand

Total cost estimate: $190,000,000-$244,000,000

- #50: $31,000,000-$42,000,000
- #37: $159,000,000-$212,000,000

The following table shows the modeled travel time reductions with the introduction of Strategy #50 and Strategy #37 respectively:

Table 13 Strategy #50 2030 and 2045 Baseline Comparison

ID	Start	End	Distance	Free Flow TT (mins)	2030 Baseline (mins)	2030 Strategy #50 TT (mins)	2030 Strategy #50 %Δ	2045 Baseline (mins)	2045 Strategy #50 TT (mins)	2045 Strategy #50 %Δ
1	SR 509: East of 1st Avenue	I-5 at Interchange	3.4	4.0	7.5	7.9	5.3%	8.8	9.5	8.0%
1A	SR 509: East of 1st Avenue	North Airport Expressway: to SB Ramp	2.0	2.0	2.7	2.7	0.0%	2.7	2.7	0.0%
1B	NAE, at Sea-Tac Terminal: South of 170th	I-5 at Interchange	2.6	3.0	9.3	8.3	-10.8%	12.2	10.7	-12.3%
1C	I-5: from NB mainline to SR 518	SR 167 at interchange via I-405	3.5	4.0	8.0	7.9	-1.3%	14.5	14.3	-1.4%
2	SR 509: East of 1st Avenue	SR 167 at interchange: via I-405	5.7	6.0	12.8	13.2	3.1%	14.6	15.2	4.1%
2A	I-5 at Interchange	SR 167 at interchange: via I-405	2.3	3.0	5.0	5.0	0.0%	5.3	5.3	0.0%
3	I-5 from SB ramp: To SR 518	SR 509: East of 1st Avenue	3.4	4.0	4.5	4.5	0.0%	5.0	5.0	0.0%
3A	I-5 from SB ramp: To SR 518	North Airport Expressway: To SB Ramp	1.8	3.0	2.2	2.2	0.0%	2.9	3.0	3.4%
3B	North Airport Expressway: NB ramp to WB SR 518	SR 509: East of 1st Avenue	2.7	4.0	3.8	3.6	-5.3%	4.1	3.6	-12.2%
3C	I-5 (from NB mainline to SR 518)	North Airport Expressway: to SB Ramp	3.4	4.0	4.3	4.2	-2.3%	9.8	9.7	-1.0%
3D	I-5 (from NB mainline to SR 518)	SR 509: East of 1st Avenue	4.7	6.0	6.6	6.5	-1.5%	11.9	11.8	-0.8%
4	SR 167 at interchange: via I-405	SR 509: East of 1st Avenue	5.7	6.0	8.9	9.0	1.1%	11.8	11.7	-0.8%
4A	SR 167 at interchange: via I-405	I-5 at Interchange	2.3	3.0	4.2	4.3	2.4%	7.1	7.1	0.0%

Table 14 Strategy #37 2030 and 2045 Baseline Comparison

ID	Start	End	Distance	Free Flow TT (mins)	2030 Baseline (mins)	2030 Strategy #37 TT (mins)	2030 Strategy #37 %Δ	2045 Baseline (mins)	2045 Strategy #37 TT (mins)	2045 Strategy #37 %Δ
1	SR 509: East of 1st Avenue	I-5 at Interchange	3.4	4.0	7.5	4.5	-40.0%	8.8	4.5	-48.9%
1A	SR 509: East of 1st Avenue	North Airport Expressway: to SB Ramp	2.0	2.0	2.7	2.7	0.0%	2.7	2.8	3.7%
1B	NAE, at Sea-Tac Terminal: South of 170th	I-5 at Interchange	2.6	3.0	9.3	3.8	-59.1%	12.2	3.8	-68.9%
1C	I-5: from NB mainline to SR 518	SR 167 at interchange via I-405	3.5	4.0	8.0	4.1	-48.8%	14.5	4.1	-71.7%
2	SR 509: East of 1st Avenue	SR 167 at interchange: via I-405	5.7	6.0	12.8	7.0	-45.3%	14.6	7.0	-52.1%
2A	I-5 at Interchange	SR 167 at interchange: via I-405	2.3	3.0	5.0	2.6	-48.0%	5.3	2.6	-50.9%
3	I-5 from SB ramp: To SR 518	SR 509: East of 1st Avenue	3.4	4.0	4.5	4.5	0.0%	5.0	5.4	8.0%
3A	I-5 from SB ramp: To SR 518	North Airport Expressway: To SB Ramp	1.8	3.0	2.2	2.2	0.0%	2.9	3.6	24.1%
3B	North Airport Expressway: NB ramp to WB SR 518	SR 509: East of 1st Avenue	2.7	4.0	3.8	3.4	-10.5%	4.1	3.5	-14.6%
3C	I-5: from NB mainline to SR 518	North Airport Expressway: to SB Ramp	3.4	4.0	4.3	4.0	-7.0%	9.8	4.6	-53.1%
3D	I-5: from NB mainline to SR 518	SR 509: East of 1st Avenue	4.7	6.0	6.6	6.3	-4.5%	11.9	6.6	-44.5%
4	SR 167 at interchange: via I-405	SR 509: East of 1st Avenue	5.7	6.0	8.9	9.0	1.1%	11.8	11.9	0.8%
4A	SR 167 at interchange: via I-405	I-5 at Interchange	2.3	3.0	4.2	4.3	2.4%	7.1	7.1	0.0%

8.2.2 Capital Improvement: Airport South Link Access

- With the airport being the largest traffic generator in the study corridor and intense growth in airport demand expected over the next decade, additional access routes outside of the SR 518 corridor could potentially ease congestion on SR 518 itself by providing an alternate pathway for travelers to/from the south.
- This strategy scored a total of 3.36 in the evaluation process.

This strategy would improve south airport access by replacing the existing S 182nd Street airport entry with a new connection via S 188th Street at 28th Ave S. This new access, known as South Link, would better integrate the 24th Ave S/28th Ave S alignment from the future SR 509 extension.

Strategies included:

- #52: Airport South Link Access

Total cost estimate: TBD

8.2.3 Capital Improvement: SR 518/SR 509 Interchange

- The SR 518/SR 509 interchange currently experiences moderate to high levels of congestion with a crash profile that reflects many rear-end crashes.
- Improvements to the interchange could improve connectivity between SR 509 and SR 518 and reduce crashes at the ramps and SR 518 interchange approaches.
- This strategy scored a total of 3.44 in the evaluation process.

In the 2002 Route Development Plan, a 3/4 Single Point Urban was proposed as the best solution for transforming the connection between the two highways into a full system with an interchange in place of the existing signal. This is still of interest to stakeholders, as it would benefit movements between the two highways. Other interchange configurations could also be considered for this location that could similarly address capacity and potential for crashes.

Strategies included:

- #54: SR 518/SR 509 Interchange

Total cost estimate: $50,000,000-$70,000,000

- Source: Estimated cost range
- RDP Cost-Estimate: $41,221,541 ($2016)
- This cost estimate is based on the cost estimate from the 2002 Route Development Plan and calculated from 2001-dollars to 2016-dollars. It has been adjusted up with respect to recent costs of similar projects

8.2.4 Capital Improvement: Widening of Westbound SR 518

- WB SR 518 congestion west of I-5 is expected to increase in the future largely due to airport demand and background growth in SR 518 trips. The bridge constraint at 42nd Ave S will likely limit throughput and result in backups approaching the NAE and SR 99.
- Widening WB SR 518 at the 42nd Ave S bridge (to 4 lanes) could result in a 35 percent reduction in the travel time between the I-5 SB ramp and North Airport Expressway.
- This strategy scored a total of 2.90 during the evaluation process.

This strategy suggests full-standard widening of WB SR 518 from the I-5 interchange and the SB I-5 on-ramp. This would add an additional travel lane as well as full-standard shoulder for the road segment, with a focus on increasing capacity between I-5 and WB SR 518.

Strategies included:

- #51: Widening of WB SR 518

Total cost estimate: $33,000,000-$45,000,000

- This cost-estimate is based on the WSDOT Planning Level Cost Estimation Tool

The following table lists the modeling results for this strategy package:

Table 15 Strategy #51 2030 and 2045 Baseline Comparison

ID	Start	End	Distance	Free Flow TT (mins)	2030 Baseline (mins)	2030 Strategy #51 TT (mins)	2030 Strategy #51 %Δ	2045 Baseline (mins)	2045 Strategy #51 TT (mins)	2045 Strategy #51 %Δ
1	SR 509: East of 1st Avenue	I-5 at Interchange	3.4	4.0	7.5	7.4	-1.3%	8.8	8.7	-1.1%
1A	SR 509: East of 1st Avenue	North Airport Expressway: to SB Ramp	2.0	2.0	2.7	2.7	0.0%	2.7	2.7	0.0%
1B	NAE, at Sea-Tac Terminal: South of 170th	I-5 at Interchange	2.6	3.0	9.3	9.3	0.0%	12.2	11.9	-2.5%
1C	I-5: from NB mainline to SR 518	SR 167 at interchange via I-405	3.5	4.0	8.0	7.7	-3.8%	14.5	14.5	0.0%
2	SR 509: East of 1st Avenue	SR 167 at interchange: via I-405	5.7	6.0	12.8	12.6	-1.6%	14.6	14.5	-0.7%
2A	I-5 at Interchange	SR 167 at interchange: via I-405	2.3	3.0	5.0	4.9	-2.0%	5.3	5.3	0.0%
3	I-5 from SB ramp: To SR 518	SR 509: East of 1st Avenue	3.4	4.0	4.5	4.4	-2.2%	5.0	4.5	-10.0%
3A	I-5 from SB ramp: To SR 518	North Airport Expressway: To SB Ramp	1.8	3.0	2.2	1.9	-13.6%	2.9	1.9	-34.5%
3B	North Airport Expressway: NB ramp to WB SR 518	SR 509: East of 1st Avenue	2.7	4.0	3.8	3.8	0.0%	4.1	4.0	-2.4%
3C	I-5: from NB mainline to SR 518	North Airport Expressway: to SB Ramp	3.4	4.0	4.3	4.0	-7.0%	9.8	9.3	-5.1%
3D	I-5: from NB mainline to SR 518	SR 509: East of 1st Avenue	4.7	6.0	6.6	6.5	-1.5%	11.9	11.8	-0.8%
4	SR 167 at interchange: via I-405	SR 509: East of 1st Avenue	5.7	6.0	8.9	8.9	0.0%	11.8	11.7	-0.8%
4A	SR 167 at interchange: via I-405	I-5 at Interchange	2.3	3.0	4.2	4.2	0.0%	7.1	7.2	1.4%

8.2.5 Capital Improvement: Improvements at SR 518 Ramp Termini

- Analysis has shown that several of our main study intersection fail level of service standards by 2030 and 2045 impacting travel both onto and off the SR 518 corridor.
- Different ramp termini treatments were investigated and the proposed strategies demonstrated clear delay reduction and crash reduction benefits.
- On average these strategies scored 3.7 in the evaluation process.

The evaluation of intersection performance within the study area identified 11 intersections that will fail to perform adequately in future baseline years and could thus benefit from intersection control or geometric improvements. Though not directly on SR 518, improving performance at ramp intersections within the study area is considered a practical solution that could improve overall corridor performance. The following locations are considered for a signal or roundabout improvement:

- ID 8: Des Moines Memorial Drive S/SR 518 WB Off-Ramp
- ID 9: Des Moines Memorial Drive S/SR 518 EB On/Off-Ramp
- ID 14: SR 518 EB Off-Ramp to S 154th S
- ID 17: 30th Ave S/S 154th St
- ID 18: 32nd Ave S/S 154th St
- ID 19: SR 518 WB Off-Ramp to 154th St at SR 99
- ID 28: Host Road/SR 518 On-Ramp/S 160th St
- ID 29: Air Cargo Rd/S 160th St
- ID 31: Klickitat Drive/SR 518 Off-Ramp
- ID 32: I-405 WB Off-Ramp to Southcenter Blvd
- ID 36: I-5 NB Off-Ramp/Southcenter Pkwy

The following locations are considered for channelization or timing improvements:

- ID 6: 1st Ave S/SW 148th St
- ID 21: Pacific Hwy S/S 152nd St
- ID 23: Pacific Hwy S/S 154th St
- ID 38: Interurban Ave S/Fort Dent Way
- ID 39: Interurban Ave S/Southcenter Blvd
- ID 41: Rainier Ave S/S Grady Way

Strategies included:

- #42: Ramp Terminal Treatments – Signal or Roundabout
- #43: Ramp Terminal Treatments - Revised Channelization

Total cost estimate: $200,000-5,000,000 per location

- Signalized Option: $1,500,000-$2,000,000 per location
- Roundabout Option: $1,000,000-$5,000,000 per location
- Channelization: Less than $1,000,000 per location
- Source: PLCE and estimates cost range

The traffic modeling results found the following intersection delay reductions with signal installation at the targeted ramp intersections. Roundabouts were not explicitly modeled for this effort, but would likely provide similar benefits to signalization and would therefore also be considered through WSDOT's Intersection Control Evaluation (ICE) process.

Table 16 Intersection improvement with signalization, 2030 and 2045

ID	Intersection	Control	Standard	2030 Baseline Delay (s/veh)	2030 Baseline LOS	2030 Mitigated Delay (s/veh)	2030 Mitigated LOS	2045 Baseline Delay (s/veh)	2045 Baseline LOS	2045 Mitigated Delay (s/veh)	2045 Mitigated LOS
8	Des Moines Memorial Drive S/ SR 518 Off-Ramp	TWSC	D	178	F	20	B	109	F	18	B
9	Des Moines Memorial Drive S/ SR 518 On-Ramp	None	D	52	F	6	A	146	F	6	A
14	SR 518 Off-Ramp/ S 154th St	TWSC	D	>200	F	16	B	>200	F	16	B
17	30th Ave S/ S 154th St	Stop-Controlled	E	49	E	-	-	77	F	28	C
18	32nd Ave S/ S 154th St	Stop-Controlled	E	>200	F	25	C	>200	F	29	C
19	SR 518 Off-Ramp/ S 154th St near SR 99	TWSC	E	>200	F	13	B	>200	F	12	B
28	Host Road/SR 518 On-Ramp/ S 160th St	Stop-Controlled	E	112	F	5	A	187	F	5	A
29	Air Cargo Rd/ S 160th St	Stop-Controlled	E	64	F	43	D	91	F	59	E
31	Klickitat Drive/ SR 518 Off-Ramp	TWSC	D	184	F	44	D	>200	F	48	D
32	I-405 Off-Ramp/ Southcenter Blvd	TWSC	E	>200	F	7	A	>200	F	7	A
36	I-5 Off-Ramp/ Southcenter Pkwy	None	D	100	F	17	B	169	F	21	C

Notes:
Signalized and stop-controlled intersections are analyzed in Synchro, Version 10. Results are based on Highway Capacity Manual (HCM) 2000

TWSC: Two-way stop control. Shaded cells indicate intersections that fail to meet agency LOS standards.

For two-way stop-controlled intersections, the worst delay for the minor street movements was used to report the intersection LOS.

Intersections with no reported V/C or delay are locations with an intersection control configuration not supported by HCM 2000.

^LOS Standard "E-Mitigated" is defined by the Puget Sound Regional Council for Tier 1 regionally significant state highways. An "E-Mitigated" standard requires the highway to operate at LOS "E" after mitigating through transit, demand management, and transportation system management strategies

Table 17 Intersection improvement with timing or channelization, 2030 and 2045

ID	Intersection	Control	Standard	2030 Baseline Delay (s/veh)	2030 Baseline LOS	2030 Mitigated Delay (s/veh)	2030 Mitigated LOS	2045 Baseline Delay (s/veh)	2045 Baseline LOS	2045 Mitigated Delay (s/veh)	2045 Mitigated LOS
6	1st Ave S/ SW 148th St	Signalized	D	49	D	40	D	58	E	40	D
21	Pacific Hwy S/ S 152nd St	Signalized	E	57	E	41	D	129	F	49	D
23	Pacific Hwy S/ S 154th St	Signalized	E-Mitigated^	102	F	59	E	110	F	76	E
38	Interurban Ave S/ Fort Dent Way	Signalized	E	106	F	77	E	118	F	80	E
39	Interurban Ave S/ Southcenter Blvd	Signalized	E	75	E	61	E	128	F	80	E
41	Rainier Ave S/ S Grady Way	Signalized	E-Mitigated^	100	F	74	E	142	F	76	E

Notes:

Signalized and stop-controlled intersections are analyzed in Synchro, Version 10. Results are based on Highway Capacity Manual (HCM) 2000

TWSC: Two-way stop control. Shaded cells indicate intersections that fail to meet agency LOS standards.

For two-way stop-controlled intersections, the worst delay for the minor street movements was used to report the intersection LOS.

Intersections with no reported V/C or delay are locations with an intersection control configuration not supported by HCM 2000.

^LOS Standard "E-Mitigated" is defined by the Puget Sound Regional Council for Tier 1 regionally significant state highways. An "E-Mitigated" standard requires the highway to operate at LOS "E" after mitigating through transit, demand management, and transportation system management strategies

8.2.6 Capital Improvement: Active Transportation Bridge Connections

- Pedestrian travel near the corridor and within the study area, especially to/from major transit hubs on SR 99, is compromised in many locations where arterial traffic volumes are high and active transportation infrastructure is inadequate.
- Removing critical pedestrian and vehicular barriers and conflicts could significantly improve pedestrian crash reduction potential and connectivity along SR 99.
- This strategy scored 3.26 in the evaluation process.

This strategy suggests expanding the pedestrian and bicycle transit-oriented crossing infrastructure on or near SR 99 by constructing three or more bridges crossing or parallel to SR 99 at three key locations: S 154th Street, S 182nd Street and Angle Lake Station. A study of an Angle Lake pedestrian connection was completed by the City of SeaTac in 2015 so this strategy would build on the findings of that work.

Strategies included:

- #40: E-W Pedestrian and Bicycle Bridge Connections across SR 99 at 154th, 182nd and Angle Lake Station

Total cost estimate: $5-10 million

8.3 Long-Term Strategy Packages

8.3.1 Capital Improvement: Full Rebuild of the I-5/I-405/SR 518 Interchange

- The I-5/I-405/SR 518 interchange is a major bottleneck in the highway system which impacts travel reliability and congestion on EB SR 518 corridor and has resulted in a challenging environment in terms of crash frequency and severity.
- A redesign or reconstruction of the I-5/I-405/SR 518 interchange is beyond the scope of this study. However, the interchange was duly identified as a key constraint for the study corridor.
- This strategy scored 3.09 in the evaluation process.

This strategy covers a full interchange rebuild of the I-5/I-405/SR 518 interface. This is not currently a planned or programmed project but is being considered as part of the on-going I-5 Partnership long range planning effort. When the Partnership resumes in the future, it will likely explore reconfiguration and reconstruction of this interchange to tackle several issues and deficiencies related to freight movement, airport access, transit reliability, community development and crash reduction.

Strategies included:

- #55: Full Interchange Rebuild I-5/I-405/SR 518

Total cost estimate: TBD

8.3.2 Capital Improvement: Managed Lanes on SR 518

- Robust congestion management measures on SR 518 through capital investments will be needed in the future to address intense traffic periods, travel delays and crash potential issues related to general corridor travel, commuting and airport demand.

- Managed lanes have been successfully used by WSDOT throughout the region to encourage HOV and transit use and provide additional corridor capacity that emphasizes person movement over vehicular movement.
- This strategy scored 2.91 in the evaluation process.

This strategy suggests the implementation of managed lanes on SR 518, either as HOV, tolled facilities or through other measures. The strategy was originally presented as an express toll lane concept, but feedback from stakeholders indicated a desire to maintain flexibility of any lane additions for future planning efforts in the event the strategy was carried forward into the recommendation phase. Managed lanes allow for better capacity utilization and service levels throughout the corridor, while supporting the regional desire to increase the share of high-occupancy riders or to create revenue from the use of roads. The managed lanes would likely extend through the corridor between I-5 and SR 509 and connect to planned and programmed managed lane facilities nearby on I-405.

Strategies included:

- #58: Managed Lanes on SR 518

Total cost estimate: $150,000,000-$200,000,000

9 Conclusion

The SR 518 Corridor Planning Study completed WSDOT's Practical Solutions planning phases as outlined in Figure 10. This information is used to demonstrate needs, ideas, and strategies considered, as well as to evaluate and select strategy packages and solutions, including performance criteria. This document will also be used to support next steps towards refining solutions, pursuing and justifying funding, and implementing solutions. Based on existing and anticipated future deficiencies along the study corridor, the project team worked closely with stakeholders to prepare the recommended packages of solutions.

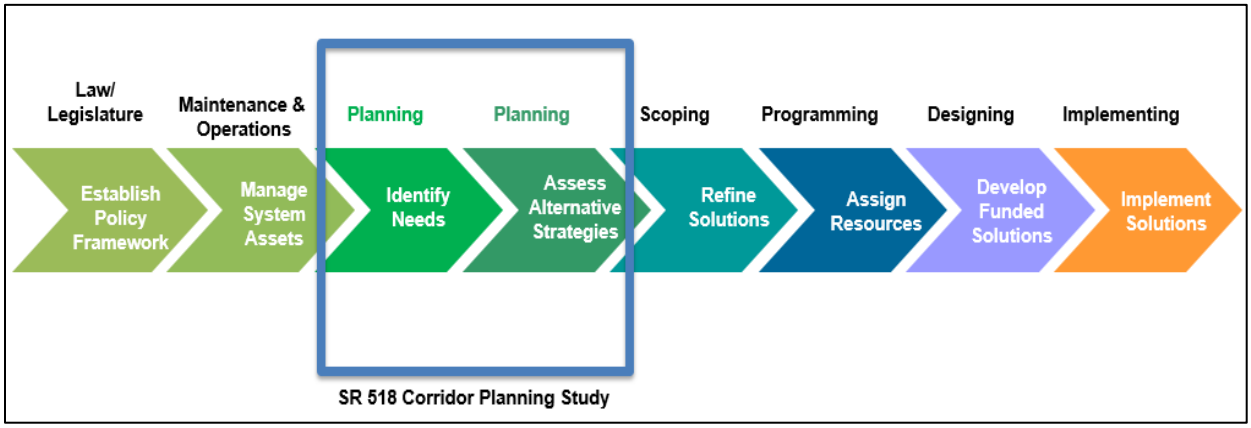

Figure 10 Practical solutions phases

WSDOT will continue working with stakeholders and partners to fund and implement near-term lower-cost strategies. In addition, WSDOT will follow through with stakeholders on pursuing the mid-term and long-term solutions for the corridor. The recommended solutions must be incorporated into state, regional, and local plans to position the proposed improvements for future funding and implementation.

9.1 Next Steps

The improvement strategies recommended in the SR 518 Corridor Planning Study will enable WSDOT and partner agencies to address identified performance issues and gaps on the SR 518 corridor. Currently, there is no funding identified for the recommended strategies packages in this study, so it will be incumbent upon WSDOT and study partners to determine priorities for moving strategies forward into implementation. Grants, partnerships, and other funding sources will need to be pursued for immediate priorities that are unfunded and/or do not screen through statewide prioritization.

The initial identification and suggested action plan for addressing fish-passage barriers on and along the SR 518 corridor is an important outcome for the SR 518 Corridor Planning Study. This should be a priority focus for WSDOT, The Muckleshoot Indian Tribe, and study partners. WSDOT is operating under a Supreme Court mandate to address numerous fish-passage barriers statewide. An initial environmental screening review of this study has identified six (6) unaddressed fish-passage barriers that must be retrofitted as part of this injunction mandate.

WSDOT will continue to work closely with SR 518 Stakeholders and agency partners to implement cost-effective operational and transportation-demand management strategies recommended for near, mid-, and long-term implementation in this study. The recommended strategies must be consistent with state, regional, and local planning efforts. None of the identified improvement options recommended in this study have any funding identified to move them into implementation.

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