



Washington State  
Department of Transportation

# SR 509 Toll Feasibility Study



Prepared for Governor Chris Gregoire  
and the 2010 Washington State Legislature

September 2010



# Table Of Contents

<b>1. Executive Summary .....</b>	<b>3</b>
Background .....	3
Legislative directive .....	3
Options studied .....	3
Summary of findings .....	4
<b>2. SR 509 Extension Project Background .....</b>	<b>5</b>
Project scope and benefits .....	5
Project history .....	7
The regional context .....	8
<b>3. Legislative Proviso and Study Purpose .....</b>	<b>9</b>
Legislative proviso .....	9
Study purpose .....	9
<b>4. Study Approach and Assumptions .....</b>	<b>10</b>
Study organization .....	10
General assumptions .....	11
Analysis process .....	11
<b>5. Initial Toll Option and Analysis Findings .....</b>	<b>12</b>
Initial toll option description .....	12
Initial toll option analysis .....	13
Cost estimation .....	13
Traffic modeling .....	14
Financial analysis .....	14
<b>6. Additional Construction Phasing/Toll Analysis .....</b>	<b>16</b>
Additional construction phasing/toll description .....	16
Options 1 and 1a .....	16
Option 2 .....	17
Options 3 and 3a .....	17
Additional construction phasing/toll analysis .....	19
Cost estimate .....	19
Traffic modeling .....	20
Financial analysis .....	21
Traffic Simulation .....	22
<b>7. Findings and Next Steps .....</b>	<b>23</b>
<b>8. Stakeholders Input .....</b>	<b>24</b>



# 1. Executive Summary

## Background

The State Route (SR) 509 Extension and Interstate 5 Improvement Project was developed through many years of cooperative efforts between the Washington State Department of Transportation (WSDOT), the Port of Seattle, King County, and the cities of Sea-Tac, Des Moines and Kent. The project proposes critical freight and mobility improvements for SR 509 including completion of the planned SR 509 corridor extension, improvements on I-5 and more direct access to Sea-Tac International Airport and the Kent Valley.

Since 1998, numerous efforts have been made to fund the project's construction through statewide or regional revenue sources. To date, more than \$86 million of funds have been secured and invested in the project. With these funds, WSDOT has completed 30% of design, acquired 40% of right-of-way, and conducted some early environmental mitigation. Approximately \$930 million is still needed to acquire the remaining right-of-way and complete design and construction.

## Legislative Directive

In 2009, the Washington State Legislature directed WSDOT to evaluate the feasibility of administering tolls within the SR 509 corridor. Specifically, WSDOT was asked to examine the following:

- The potential for variable tolling to generate revenues for needed transportation facilities within the corridor.
- Maximizing the efficient operation of the corridor.
- Economic considerations for future system investments.

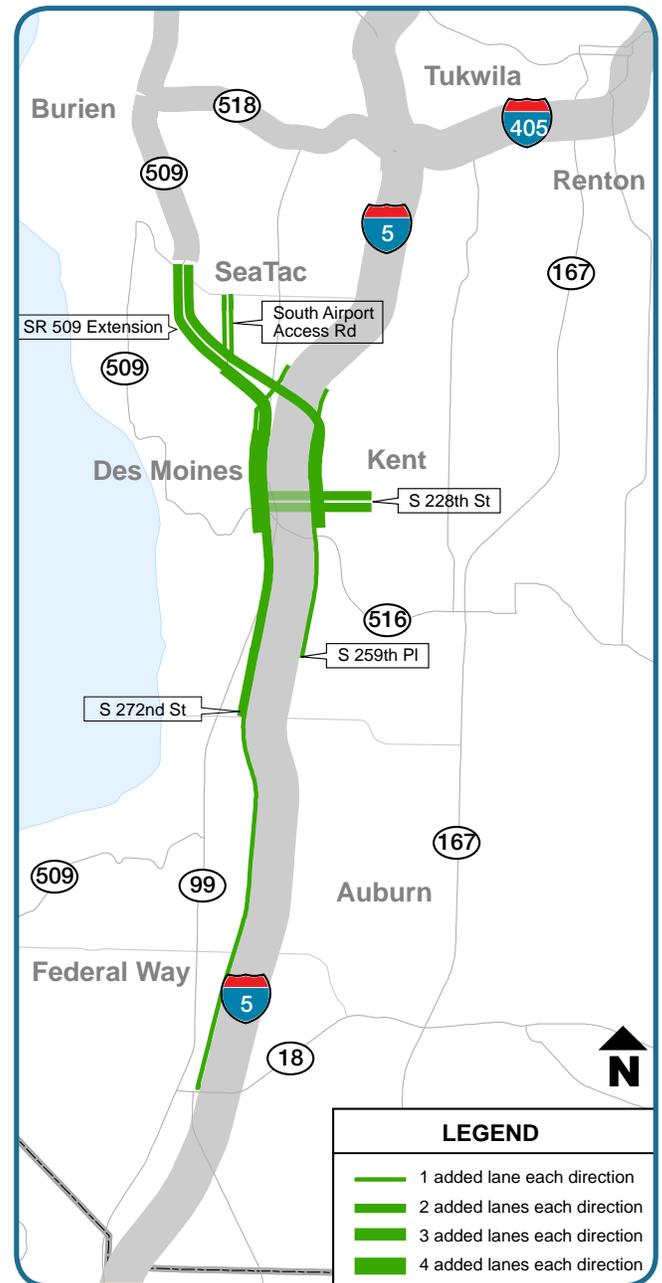
The Legislature directed WSDOT to report the feasibility study findings to the Washington State Transportation Commission (WSTC) periodically throughout the study process and to report the final findings to the Joint Transportation Committee (JTC) by Sept. 30, 2010.

## Options Studied

WSDOT worked closely with stakeholders from affected cities and jurisdictions, the Port of Seattle, the Puget Sound Regional Council, and the Federal Highway Administration to evaluate six different combinations of construction and tolling options. See sections 5 and 6 of the report for detail descriptions of these options.

For each option, the study estimated the amount of funding needed for construction, revenue generated through tolling, remaining funding gap, and effects on traffic using single-point tolling and segmented tolling.

SR 509 Extension and I-5 Improvement Project

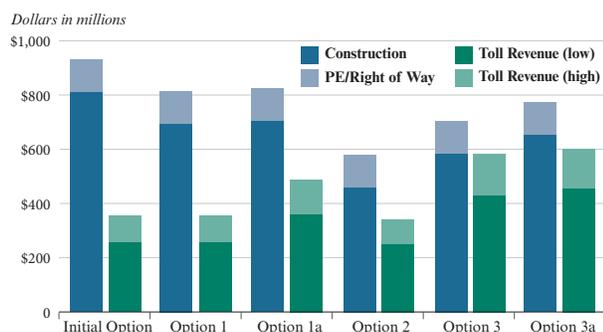


## Summary of findings

- Expected Toll Revenue
  - Tolling is expected to generate a significant amount of revenue to fund the project’s construction, ranging from approximately \$250 million to \$600 million.
  - The bonding capacity of the toll revenue is heavily dependent on financing assumptions, such as debt repayment options, the types of bonds used and market conditions at the time of bond issuance.
  - Segmented tolling, which spreads the same amount of tolls to several roadway segments, as opposed to placing all tolls at a single point is a more effective means of generating revenue. Single-point tolling tends to cause drivers to take alternate routes to avoid paying higher tolls.
- Maximize Operational Efficiency of the Corridor
  - Revenue focused tolling is expected to reduce traffic demand by about half compared to the toll free condition, creating opportunities to downsize or phase project construction. This improves corridor efficiency, reduces upfront construction cost and makes the project more feasible financially.
  - Construction phasing or downsizing should take freight mobility into consideration in order to maintain the original purpose of the project.
- Future Economic Considerations
  - Among all the options studied, additional revenue ranging from \$120 million to \$700 million is needed to fund the project depending on how construction is phased.
  - Right-of-way should be secured prior to bond issuance to minimize risk and financing cost.

Table 1-1 shows the project cost, expected revenue, and remaining funding gaps for the options studied.

**Table 1-1: Summary of project cost, revenue and funding gap**  
(In year of expenditure dollars assuming project completion by 2020)



Due to limited resources and time available to conduct this study, WSDOT did not conduct an open house or public workshop. Therefore, we do not have public input on the options studied and findings. WSDOT recommends conducting a comprehensive toll study that includes more refined assumptions for WSTC and legislative consideration. Further, the study should also provide opportunities for public input.

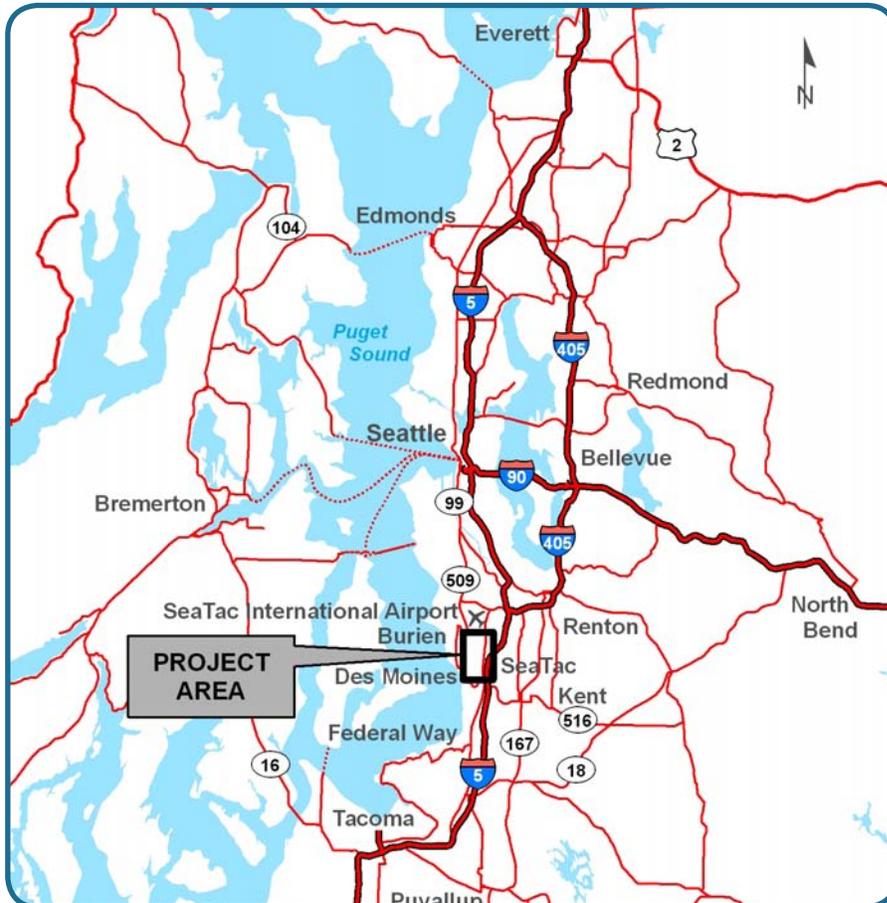
.....  
There is a high degree of uncertainty in toll revenue projections, especially for a road that doesn't exist today. Additional variation in the toll funding contribution projections will be a function of the type of debt instruments used, market conditions and interest rates at the time the debt is issued, and policy decisions regarding how the debt is structured.

The estimated assumptions used in this analysis may be somewhat optimistic because repayment of debt was tailored to the assumption that tolls will escalate at 2.5% annually to keep pace with inflation. The toll funding contribution would be somewhat lower if more conservative assumptions regarding toll escalation are adopted.  
.....

## 2. SR 509 Extension Project Background

Figure 2-1 shows the project location in the southcentral Puget Sound region. When built, the extension will provide a vital regional freeway link missing in south King County.

Figure 2-1: Vicinity map of the SR 509 Project



### Project scope and benefits

The original full scope of the project as defined in the 2003 Record of Decision includes the following major components as shown in Figure 2-2 and Figure 2-3:

- Complete SR 509 by building three miles of freeway connecting to I-5 with three lanes in each direction including two general purpose lanes and one high occupancy vehicle (HOV) lane (the HOV lanes and their direct access to I-5 were postponed to future phases in the most recent design to reduce project cost).
- Widen more than six miles of Interstate 5 from the SR 509 interchange south to SR 18 and rebuild several interchanges.
- A freeway connection to the planned South Airport Access Road for direct access from the south to Sea-Tac International Airport.
- A direct connection from I-5/SR 509 to the Kent Valley via S. 228th Street, a major freight corridor.

Figure 2-2: aerial view of the I-5/SR 509 Corridor Completion and Freight Improvement Project

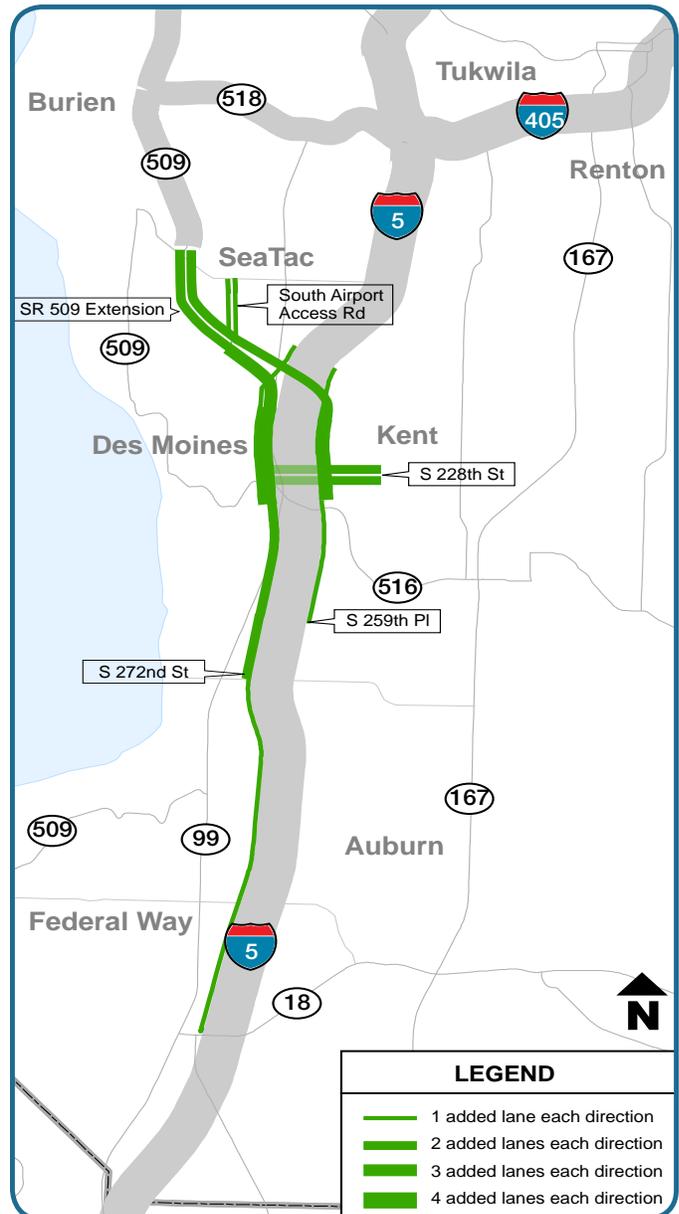


The project will provide clear and tangible benefits to multiple transportation modes including:

- Reduced congestion on I-5.
- Move freight faster, more safely and more economically. This is especially important in helping the marine port and Duwamish industrial center remain competitive given the increasingly intense competition from Canada, Mexico and the Panama Canal.
- Establishment of a direct freight route from the Port of Seattle to the fourth largest regional warehousing district in the country (Kent Valley).
- Improved access to Sea-Tac International Airport.
- Cost savings through reduced fuel consumption and improved travel times.
- Environmental benefits including reduced greenhouse gas emissions.
- Improved access to planned land development.

The extension of SR 509 to I-5 will facilitate a more efficient use of the existing SR 509 corridor serving Seattle, the Port of Seattle, and the south King County industrial and warehousing areas. The project also relieves congestion on I-5 and local arterials by adding a connection that shifts some through traffic to the new roadway and improves access to the airport from the south.

Figure 2-3: SR 509 Extension Project



## **Project history**

In 1992 cities and local jurisdictions in south King County led a cooperative effort to develop a regional solution to increasing congestion on the I-5 and SR 99 corridors. Improving access to Sea-Tac International Airport and freight mobility in the Kent valley were among the goals of this cooperative effort.

This multi-jurisdictional endeavor to find regional transportation solutions was undertaken by agencies that were likely to be affected. Two committees helped guide this effort – an executive committee and a steering committee. The executive committee — consisting of elected officials and agency executive management, is the decision making body for the project. Guidance on technical and process direction is provided by the steering committee which is comprised of senior professionals representing each agency, as well as the Federal Highway Administration, the Federal Aviation Administration and the public.

The Environmental Impact Statement (EIS) with preliminary design was completed and a Record of Decision (ROD) was issued in 2003. Since 2003, the Washington State Legislature has invested \$86 million to further design and preserve the corridor by purchasing critical right-of-way and completing some advanced environmental mitigation. From 2002 to 2007 the King, Pierce and Snohomish county councils developed a ballot measure intended to fund a package of regionally significant roadway expansion projects through the formation of a Regional Transportation Investment District (RTID). The I-5/SR 509 Corridor Completion and Freight Improvement Project was one of the projects included in the RTID ballot measure.

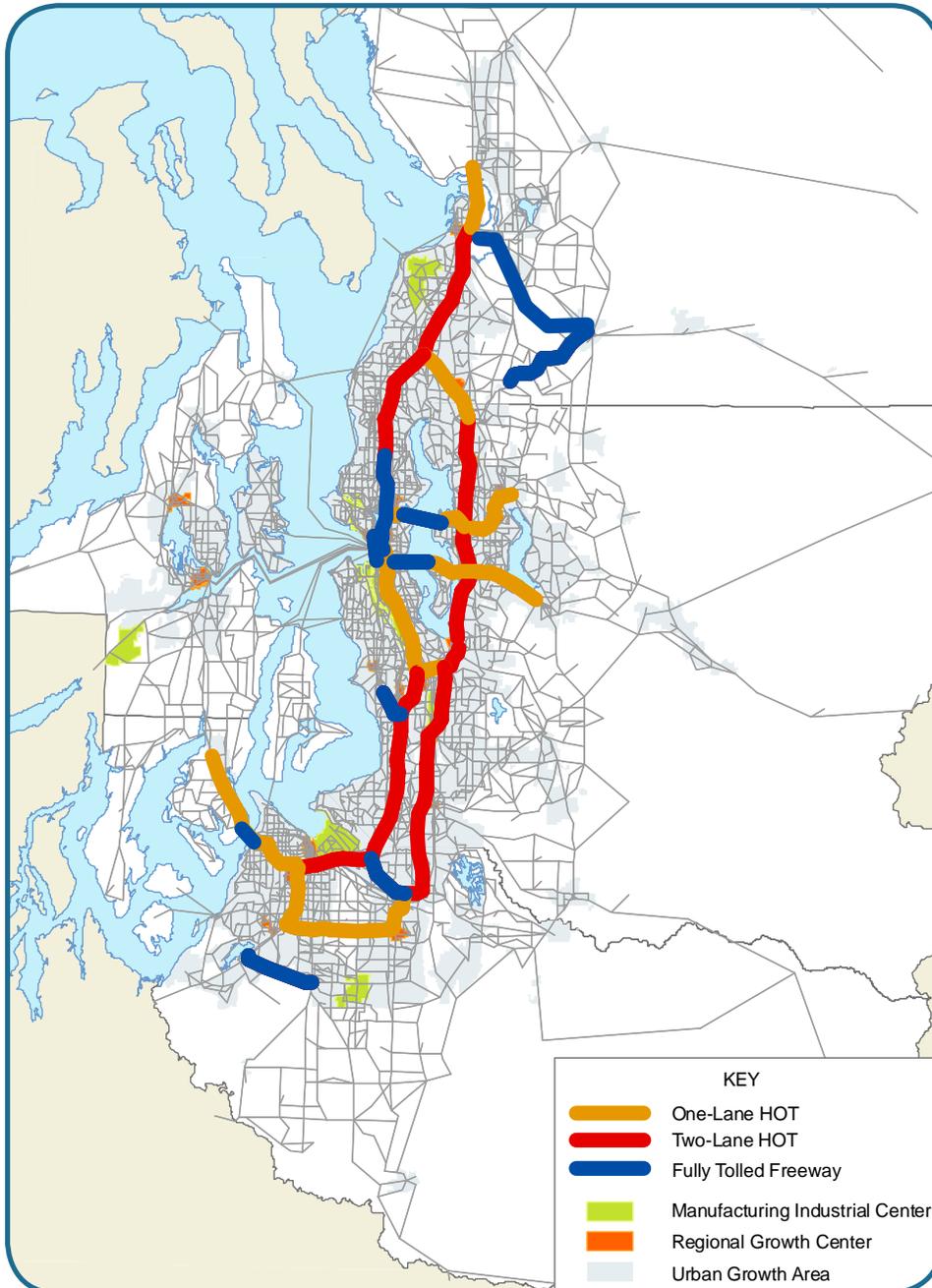
The RTID investment package was put on the 2007 ballot in combination with a regional transit funding proposal and was known as Proposition 1. The ballot measure did not pass and the project remains unfunded.

### The regional context

The Puget Sound Regional Council's recently adopted regional Transportation Plan (Transportation 2040) envisions transitioning from existing revenue sources to user fees to fund future transportation improvements. The council's financial strategy starts with developing high occupancy toll (HOT) lanes and moves to tolling individual highway and bridge projects in their entirety as they are implemented. The plan calls for full highway system tolls throughout King, Pierce and Snohomish counties by 2040.

The plan identifies the SR 509 extension as a fully tolled segment. Figure 2-4 illustrates a HOT lane network and selected facility tolling by 2030 as envisioned in the plan. The regional HOT lane network was used as a basis in developing additional tolling concepts evaluated in this study.

Figure 2-4: Tolling Envisioned in the Transportation 2040



Source: Puget Sound Regional Council

# 3. Legislative Proviso and Study Purpose

## Legislative proviso

In 2009, the Washington State Legislature directed WSDOT to determine the feasibility of administering tolls within the SR 509 corridor. Specifically, WSDOT was asked to examine the following:

- Potential for variable tolling to generate revenues for needed transportation facilities within the corridor.
- Maximizing the efficient operation of the corridor.
- Economic considerations for future system investments.

The Legislature directed WSDOT to report the feasibility study findings to the Washington State Transportation Commission (WSTC) periodically throughout the study process and to report the final findings to the Joint Transportation Committee by Sept. 30, 2010.

## Study purpose

To meet the legislative intent, this study was carried out to provide insights into the following:

- Potential revenues and corresponding financial capacity that can be generated from variable tolling to fund the planned SR 509 extension projects.
- How variable tolling may reduce the traffic demand, and consequently the number of new lanes needed within the corridors and affected areas.
- Estimated additional revenues needed to implement the options studied.

The information generated from this study will be used to inform the state Legislature, WSTC and stakeholders about funding decisions to move the project forward.

# 4. Study Approach and Assumptions

Generally, there are two main types of toll studies - feasibility study and comprehensive study.

- **Feasibility study** is a data driven technical analysis that focuses on traffic and financial modeling, operations and cost estimate with limited or no public and stakeholder involvement. WSDOT conducted a feasibility study for this report.
- **Comprehensive study** is a technical analysis combined with extensive public and stakeholder engagement to address impacts and equity issues, in addition to traffic and revenue modeling.
- Immediately prior to financing, a final study is prepared. It involves updating the traffic and revenue projections conducted in the comprehensive study for evaluation by credit rating agencies just before the bond issuance. This is commonly referred to as investment-grade study.

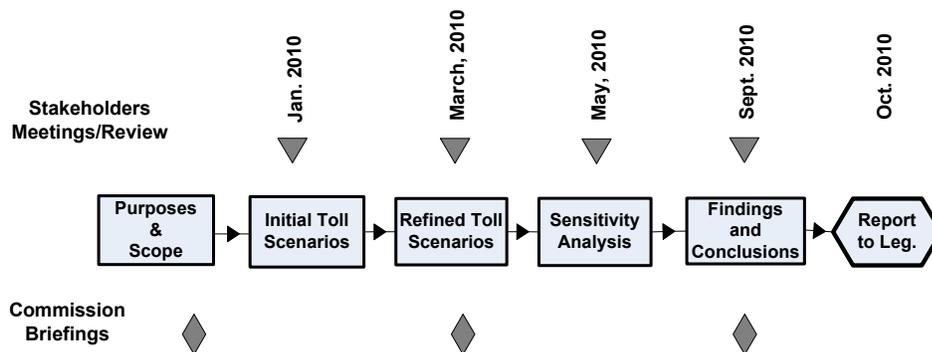
## Study organization

This study was a data driven technical analysis (feasibility study with no public involvement). The study was carried out by WSDOT with the assistance of consultants specialized in financial analysis and traffic simulation. A stakeholder committee consisting of representatives from regional and local jurisdictions along the corridors was assembled to serve as a sounding board. The stakeholder committee included senior managerial staff from the following jurisdictions/agencies:

- Port of Seattle
- City of Sea-Tac
- City of Federal Way
- City of Burien
- City of Des Moines
- City of Kent
- King County
- Puget Sound Regional Council
- Washington State Department of Transportation
- Federal Highway Administration

The stakeholder committee met bimonthly throughout the course of the study to provide input and review draft results (Figure 4-1). The draft study findings were periodically presented to the Transportation Commission.

Figure 4-1: stakeholder meetings and commission briefing schedule and topics



## General assumptions

In order to perform the analysis, a number of assumptions were made, including:

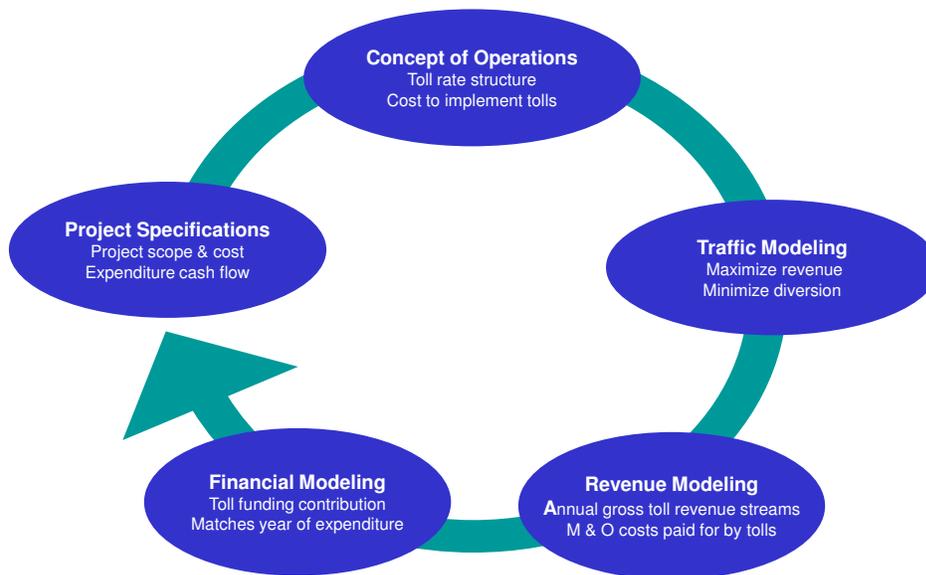
- Corridor construction will start in 2016 and be complete in 2020.
- Toll collection will start in 2020 and continue through 2050.
- All vehicles except transit will pay a toll.
- Toll rates are fixed by time of day based on the level of congestion.
- Trucks pay higher tolls based on the number of axles similar to what is done on the Tacoma Narrows Bridge.

For detailed assumptions and analysis methodologies, please refer to Chapter 1 in the technical appendix.

## Analysis process

The options included in this study were developed through an iterative process. Single-point tolling of the current design (see detailed project scope description in Section 5.1) was analyzed first. This was the basis for the initial toll concept. Several scaled-back construction options were developed and analyzed based on the initial findings that revenue-focused tolling could reduce traffic by about half compared to the toll free condition. Each construction option was tailored to the traffic demand under various toll concepts aimed at maximizing revenue and minimizing construction cost. The construction options ranged from one lane in each direction on SR 509 with minimum improvements on I-5, to two lanes in each direction of SR 509 with auxiliary and collector/distributor lanes of various lengths on I-5. Each analysis cycle involved activities as depicted in the following diagram.

Figure 4-2: Technical analysis process

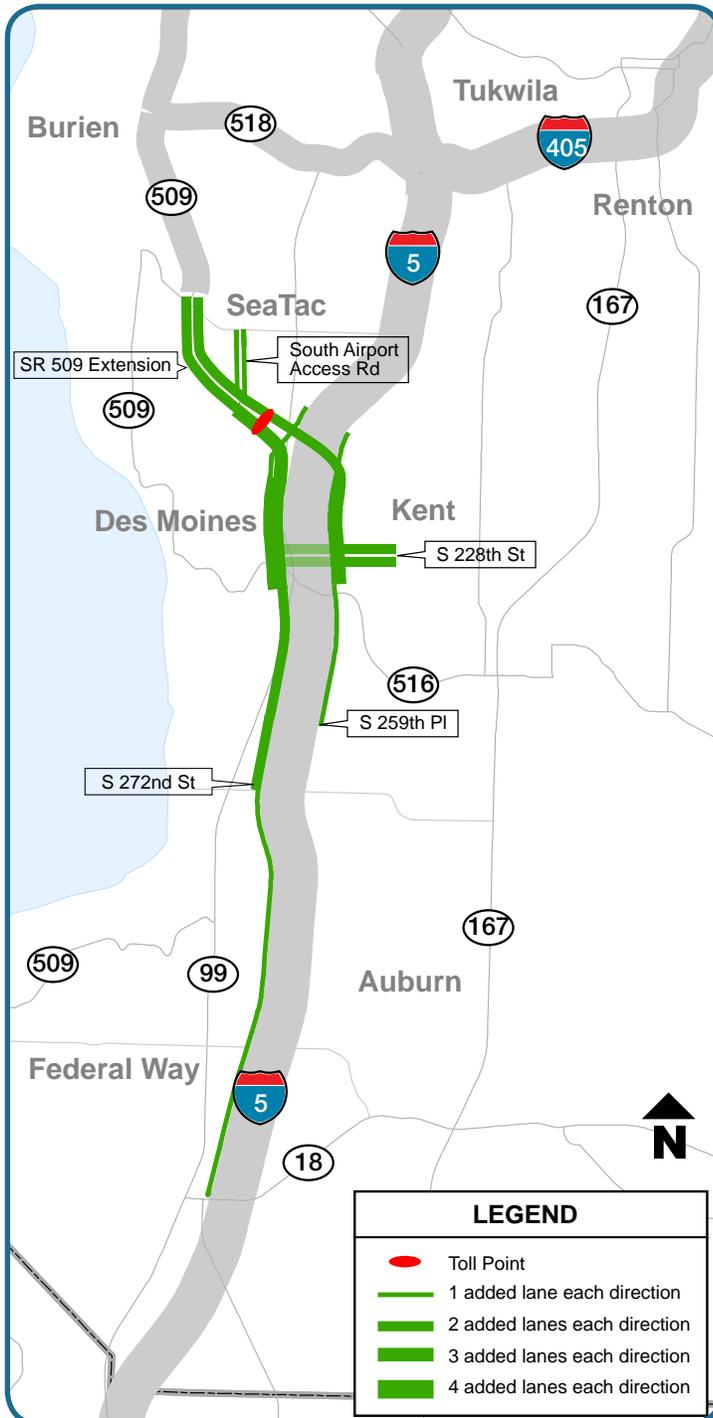


# 5. Initial Toll Option and Analysis Findings

## Initial toll option description

The initial toll option was developed based on the project as currently designed. It includes two lanes in each direction on the SR 509 extension with an auxiliary lane from the 24th/26th avenues south interchange to I-5 (Figure 5-1). It includes connections to the planned South Airport Access Road and S. 228th Street. It also includes auxiliary lanes and collector/distributor lanes on I-5 through the city of Federal Way. HOV lanes and their direct access to I-5 included in the original project scope were assumed to be postponed to future phases.

Figure 5-1: Initial toll option and project scope



## Initial toll option analysis

The initial toll option went through cost estimation, traffic and revenue modeling, and financial analysis.

### Cost estimation

In 2009/2010, WSDOT updated a previous cost estimate of \$1.185 million, developed in 2006, to reflect changes in local and international construction market conditions for construction labor and materials. The updated cost was \$930 million in year-of-expenditure dollars. The updated estimate included tolling equipment but excluding the dollar amount already spent (\$86 million). Cost estimation details are documented in Chapter 2 of the Technical Appendix.

The roadway operation and maintenance (O&M) cost estimate is based on past O&M expenditures on similar roadways in the project vicinity with the following assumptions:

- O&M cost of pavement ranges from \$7,400/lane-mile/year to \$10,000/lane-mile/year depending on type of roadway and traffic volume
- O&M cost of bridges is based on \$35,700/lane-mile/year
- No pavement rehabilitation is needed along I-5 for the following 30 years because the concrete pavement is expected to last beyond the 30 year financial analysis period; however, the cost of asphalt pavement rehabilitation (\$275,000/lane-mile every 14 years) is considered along SR 509

The total project cost, including preliminary engineering (PE), right of way (ROW) acquisition, construction (CN), roadway O&M, and initial toll equipment capital and installation cost are shown in Table 5-1 below.

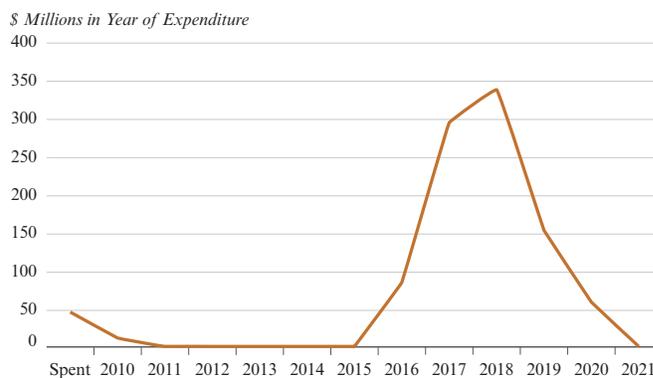
Table 5-1: Initial Option Costs Estimate

Items	Cost in \$ Millions
ROW, PE and CN	\$ 923
Roadway Annual O&M Cost	\$ 0.3
Repaving cost every 14 years	\$ 3.9
Initial toll capital & const. cost	\$ 7.1

Non-recurring costs are in year of expenditure dollars.  
Recurring costs are in 2010 dollars.

For estimating project expenditure cash flow, this study assumed all right-of-way is acquired by 2016 and the project is constructed with a design build contract. Figure 5-2 shows the cash flow assumptions. Project expenditures increase annually as construction progresses, peaking during the 2017-2018 timeframe and then drops until project completion in 2020.

Figure 5-2: Initial option expenditure cash flow assumption



## Traffic modeling

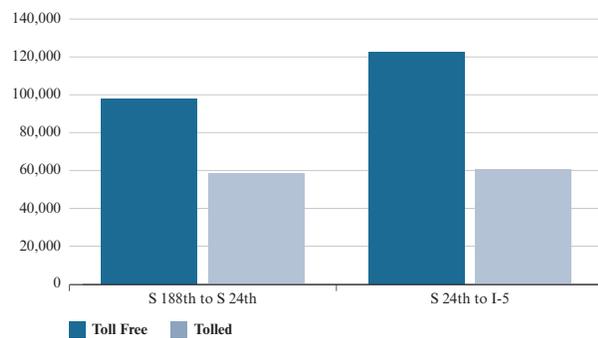
The initial toll option was designed to test single-point tolling with a toll gantry placed on the SR 509 extension between the planned South Airport Access Road and I-5. This single tolling location captures all trips to and from I-5 using the new SR 509 extension. All vehicles except transit pay tolls. To explore the potential for revenue generation, a series of toll rates ranging from \$1.00 to \$7.00 were tested using the regional travel demand forecasting model. It was found that the toll rates shown in Table 5-2 are close to yielding the highest revenue.

Table 5-2: Initial Option Revenue Focused Toll Rates (in 2008 dollars)

Time periods	Off Peak Direction	Peak Direction
AM Peak	\$ 1.00	\$ 2.00
Midday	\$ 1.50	\$1.50
PM Peak	\$ 2.00	\$ 4.00
Evening	\$ 1.00	\$ 2.00
Night	\$ 1.00	\$ 1.00

Traffic analysis indicated that under revenue-focused tolling, traffic demand could decrease by as much as half compared to the toll-free condition (Figure 5-3). Reduced demand creates an opportunity to phase construction of the project, thereby reducing initial construction cost and improving the ratio of toll funding contribution.

Figure 5-3: Initial toll option 2030 average daily traffic forecast



## Financial analysis

The financial analysis included three major steps: gross revenue forecast, net revenue forecast and financial capacity analysis. The analysis assumptions were built on and consistent with recently completed toll studies such as SR 520 bridge replacement, I-405 express toll lanes and Alaskan Way Viaduct replacement.

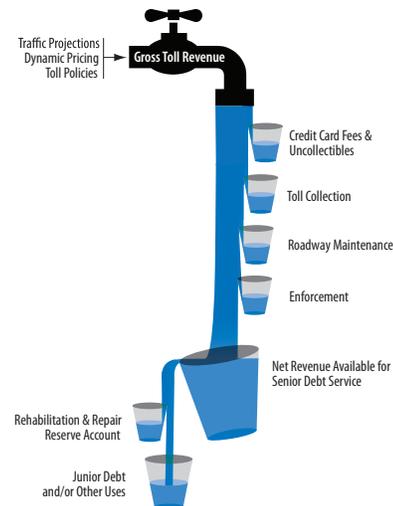
The regional travel demand forecast model was used to estimate gross revenues for each of the study options. The model is designed to approximate traffic congestion and people's willingness to:

- Pay a toll to avoid congestion.
- Choose to travel during less congested times and pay a lower toll.
- Choose other travel options (i.e., transit).
- Choose a different route to avoid the toll altogether.

The gross revenues were estimated for 2020, 2030 and 2040, three horizon years from which an annual gross revenue stream was extrapolated for a 30-year financing period. Some of the key assumptions include:

- All vehicles except transit will pay a toll.
- Toll rates are variable by time of day and are applied 24 hours per day.
- All-electronic tolling is assumed. Users will either pay through transponders or by mail.
- Pay-by-mail transactions are subject to a surcharge to cover the additional costs attributed to the transactions. For the purposes of this analysis surcharge revenue is assumed to equal pay-by-plate processing costs, making this surcharge revenue neutral.
- Adjusted gross revenue includes revenues from tolls and pay-by-plate surcharge as well as the deduction for credit card fees and uncollectible toll revenues.

Figure 5-4 shows factors considered in the financial analysis.



Net revenue, or cash flow available for debt service, is estimated by deducting O&M costs from gross revenues. These costs include everything needed to maintain and operate the toll system and the facility over the life of the facility. This report assumes toll revenues will be used to maintain the SR 509 extension and new lanes added on I-5. These costs were estimated using several sources, including existing WSDOT roadway maintenance costs, projections created for the SR 520 project and operating assumptions from the existing SR 167 HOT Lanes Pilot Project. Detailed information on operating and maintenance assumptions and costs can be found in the cost estimation section of the Technical Appendix.

Financial capacity analysis is performed based on a set of assumptions that were selected from those used in planning work for other WSDOT projects. The assumptions include:

- Toll rates would increase by 2.5% per year to keep up with inflation.
- Maximum bond maturity of 30 years.
- Bonds were assumed to tailor debt service repayment to a growing revenue stream.
- 1.50x debt service coverage.
- Average interest rate of 7.0% and 7.75%.
- Annual bond issuances are assumed through the construction period.

The financial analysis results (Table 5-3) indicated that the potential financial capacity of this option is expected to be between \$255 and \$355 million, or 31% to 44% of the project design and construction costs.

Table 5-3: Initial toll option financial analysis results (in \$ millions)

Funding Needs (YOE) \$s			Toll Funding Contribution		Total Remaining Funding Gap
Total	Upfront ROW	Design/Build	Net Toll Funding Range	% of Design Build	
\$930	\$120	\$810	\$255 - \$355	31% - 44%	\$575 - \$675

Note: all values are in year-of-expenditure dollars.

**Initial toll option analysis findings**

- Revenue focused, single-point tolling could reduce traffic by 40%-60% compared to the toll free condition.
- Single-point tolling could generate 31%-44% of the funding needed for project design and construction.
- In general, tolling reduces traffic demand which opens the door to phasing the project to reduce initial project construction cost.

# 6. Additional Construction Phasing/ Toll Options Analysis

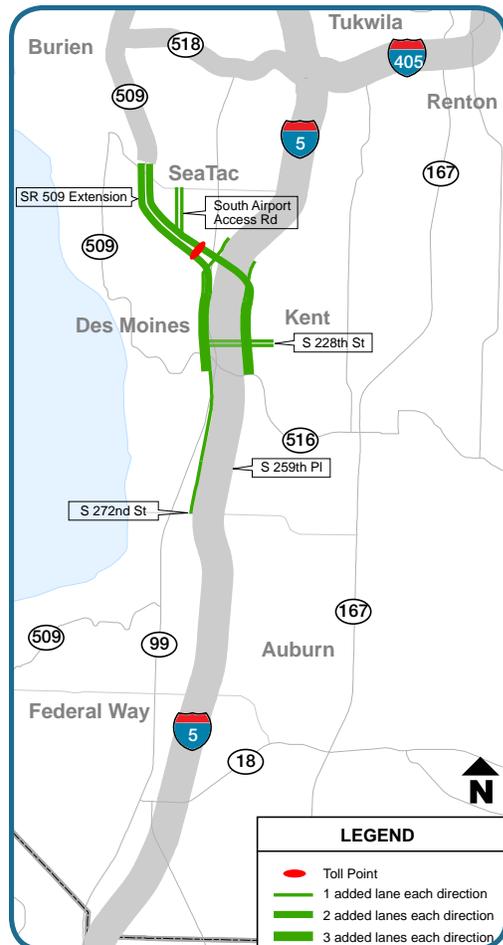
Several construction phasing options and tolling concepts were developed and analyzed, based on the findings from evaluating the initial toll option that revenue-focused tolling could reduce travel demand by about half. The construction options ranged from one lane in each direction on the SR 509 extension with minimum improvements on I-5; to two lanes in each direction with varying length and number of auxiliary and collector/distributor lanes on I-5. The detailed construction options and their associated toll concepts are described below.

## Additional construction phasing options/ toll description

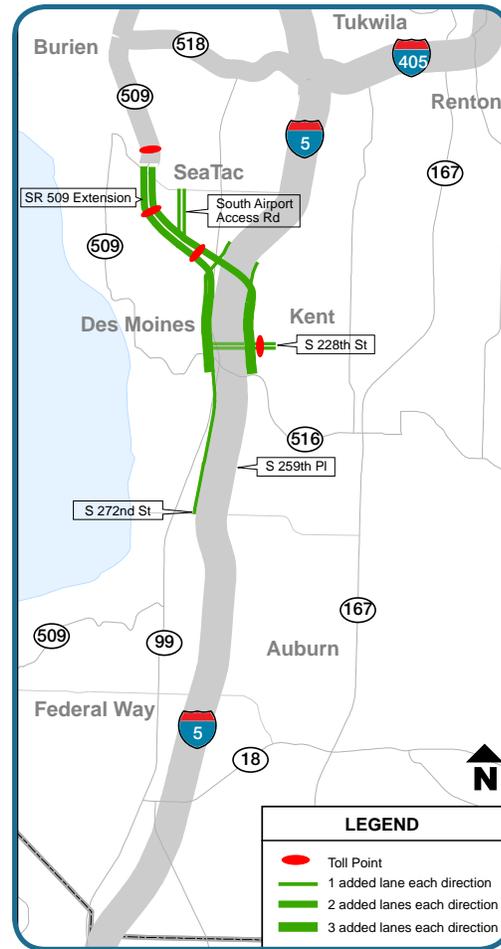
### Options 1 and 1a

Option 1 reduced the scope of construction on I-5 compared to the initial toll option. Specifically, option 1 included a four lane extension (two lanes in each direction) of SR 509. Southbound I-5 improvements would stop at S. 272nd St. Northbound I-5 improvements would start at SR 516 and end at SR 509. Connections from SR 509 to the planned South Airport Access Road and S. 228th Street are also included in this option. Two different toll concepts were analyzed: option 1 assumed single-point tolling, while option 1a assumed segmental tolling as shown in Figure 6-1.

Figure 6-1: Geometric and tolling configurations.  
Option 1 - Single point tolling



Option 1a - Segmental tolling



## Option 2

Option 2 further reduced the scope of the project to include one lane in each direction of SR 509 (Figure 6-2). The lanes would connect to the center of I-5 and merge into the high occupancy toll (HOT) lanes (converted from the existing HOV lanes) during off-peak period. During peak periods on I-5, expanded left shoulders would be operated as HOT lanes, along with an additional HOT lane converted from HOV, to form a two-lane HOT lane corridor between the SR 509 extension and the direct access ramps at S. 317th Street. The planned South Airport Access Road, S. 228th Street connection and other improvements would be postponed to future construction phases. Single-point tolling between I-5 and S. 188th Street is assumed on the extension.

Due to the current weight restriction on the left lane of limited access highways<sup>1</sup>, heavy trucks would not be able to use the extension under this option.

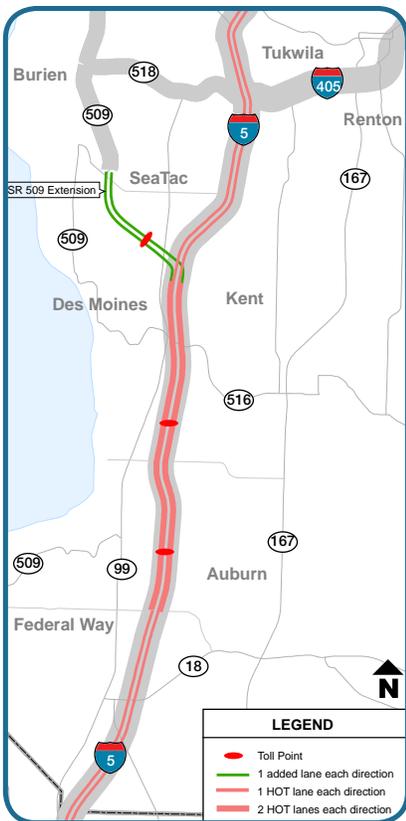
## Options 3 and 3a

Option 3 is the combination of options 1 and 2. It assumed one lane in each direction of the SR 509 extension between S. 188th Street and S. 24th Avenue/S. 28th Avenue, and two lanes each direction between 24th/26th avenues south to I-5 (Figure 6-2). It included both inside and outside connections to I-5. The inside connection would merge to the existing HOT lanes during the off-peak period. In the peak periods, the I-5 left shoulders would be used as HOT lanes in conjunction with the converted HOV lanes, to form a two-lane HOT lane corridor south to the direct access ramps at S. 317th Street.

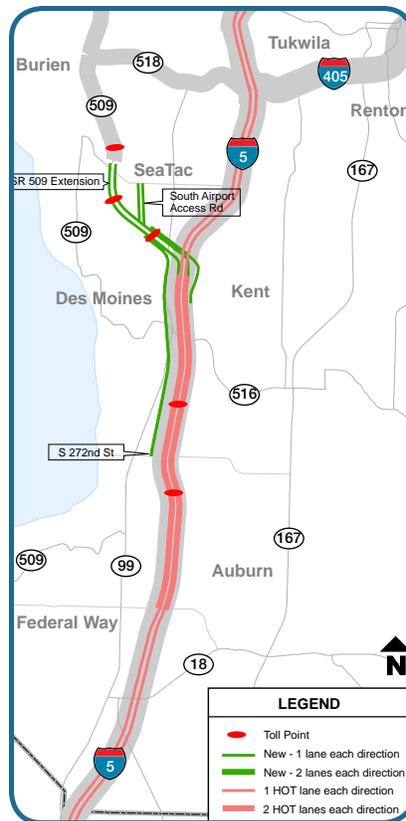
Option 3a includes all of option 3 plus the S. 228th Street connection that provides direct movement into and out of the Kent Valley. See Figure 6-2 for toll concepts.

Figure 6-2: Options 2, 3 and 3a configurations and toll concepts

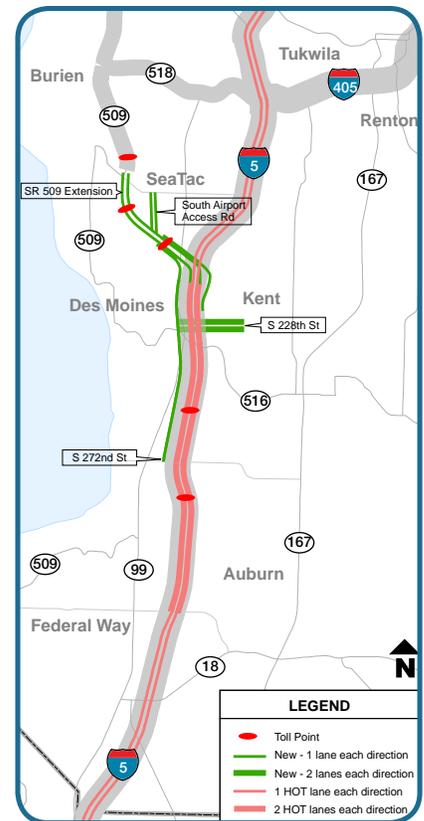
Option 2



Option 3



Option 3a



<sup>1</sup> RCW 46.61.100(3) mandates that no vehicle towing a trailer or no vehicle or combination over 10,000 lb. may use the left lane of limited access roadways having three or more lanes in one direction, and that a high occupancy vehicle (HOV) lane is not considered the left hand lane of a roadway. Within this section, 10,000 lb. means 10,000 lb. gross vehicle weight (G.V.W.).

## Additional construction options/toll analysis

The additional construction options and toll concepts went through cost estimation, traffic and revenue modeling, and financial analysis three main steps: gross revenue forecast, net revenue forecast, financial capacity analysis.

### Cost estimate

The cost estimates for right-of-way (ROW), project engineering (PE) and construction (CN), annual operation and maintenance (O&M), periodical pavement rehabilitation and toll equipment and installation are summarized in Table 6-1 below (information for the initial option is also included for comparison).

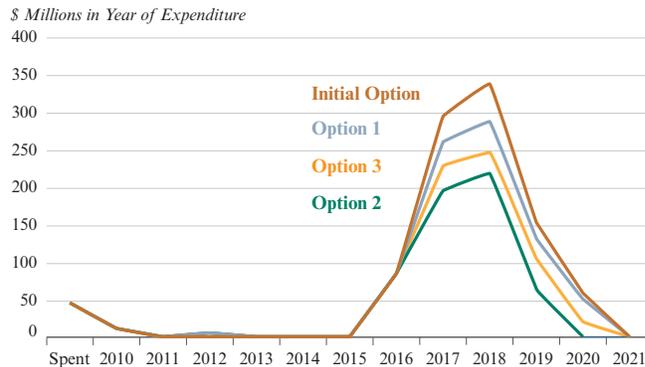
Table 6-1: Cost estimates for all options (in \$ millions)

Cost Items	Initial Option	Option 1	Option 1a	Option 2	Option 3	Option 3a
ROW, PE and CN	\$ 923	\$ 809	\$ 809	\$ 557	\$ 680	\$ 745
Roadway Annual O&M Cost	\$ 0.3	\$ 0.2	\$ 0.3	\$ 0.4	\$ 0.6	\$ 0.6
Repaving cost every 14 years	\$ 3.9	\$ 3.6	\$ 7.5	\$ 1.8	\$ 6.2	\$ 6.2
Initial toll capital & construction cost	\$ 7.1	\$ 6.1	\$ 16.0	\$ 23.3	\$ 25.0	\$ 28.0

Note: ROW, PE and CN and toll capital costs are in year-of-expenditure dollars. Annual O&M and periodical repaving costs are in 2010 dollars.

Consistent with the assumptions used in analyzing the initial option, all construction phasing options were assumed to start construction in 2016 and be completed in 2020. The expenditure cash-flow of the analyzed options is shown in Figure 6-3.

Figure 6-3: Expenditure Cashing Flow Assumptions



Note: Option 3a has similar curve as Option 3.

## Traffic modeling

Consistent with modeling analysis of the initial toll option, a series of toll rate sensitivity tests were conducted using the regional travel demand forecasting model. Table 6-2 shows toll rates that are found to yield the highest gross revenues. For options 1a, 3 and 3a, the toll rates shown are the total of all the segments combined.

Table 6-2: Revenue focused toll rates for passenger cars (in 2008 dollars)

Time Periods	Option 1	Option 1a	Option 2	Option 3/3a	
				509 Extension	228th St
AM Peak	\$1.00-\$2.00	\$1.50 - \$2.00	\$1.00 - \$3.50	\$1.50 - \$3.50	\$0.50
Midday	\$1.50	\$1.75	\$2.25	\$2.00	\$0.25
PM Peak	\$2.00-\$4.00	\$2.00 - \$4.00	\$1.00 - \$3.00	\$2.00 - \$5.00	\$0.50
Evening	\$1.00 - \$2.00	\$1.50 - \$2.00	\$1.00 - \$3.00	\$1.50 - \$3.00	\$0.25
Night	\$1.00	\$1.50	\$1.00	\$1.50	\$0.25

Note: Toll rates are in 2008 dollars. The high and low range of the toll rates are for peak and off peak directions, respectively. Truck toll rates are higher based on the number of axles.

The charts below (Figure 6-4) show projected 2030 daily traffic volumes under various construction phasing/tolling options on the extension between S. 188th Street and S. 24th Avenue and the extension between S. 24th St. and I-5 (Figure 6-5). The traffic volumes associated with the initial option are toll free.

Figure 6-4: 2030 Daily traffic forecast: toll free versus tolled (S. 188th Street to 24th/26th avenues south)

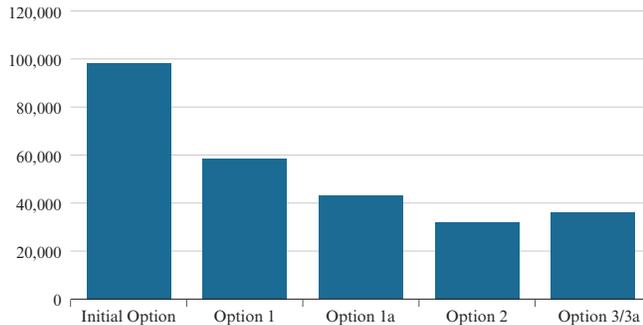
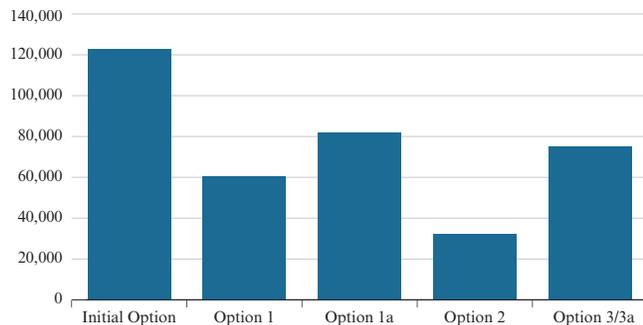


Figure 6-5: 2030 Daily traffic forecast: toll free versus tolled (24th/26th avenues south to I-5)



## Financial analysis

Figure 6.6 and Table 6-3 summarize the cost, financial analysis results and projected remaining funding gaps for all the options.

Figure 6-6: Financial analysis results

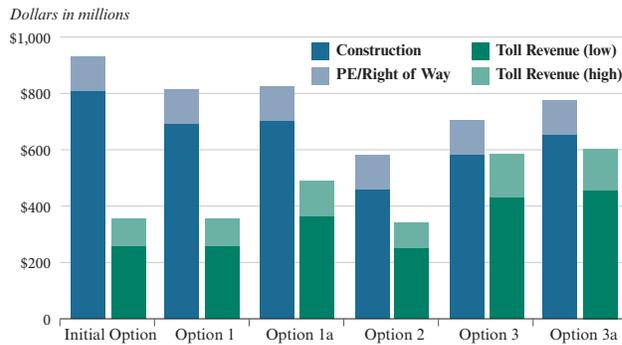


Table 6-3: Financial analysis results (in \$ millions)

Options	Funding Needs (YOE \$s)			Toll Funding Contribution		Total Remaining Funding Gap
	Total	Upfront ROW	Design/Build	Net Toll funding Range	% of Design/Build	
Initial Option	\$930	\$120	\$810	\$255 - \$355	31% - 44%	\$575 - \$675
Option 1	\$815	\$120	\$695	\$255 - \$355	37% - 51%	\$460 - \$560
Option 1a	\$825	\$120	\$705	\$360 - \$490	51% - 70%	\$335 - \$465
Option 2	\$580	\$120	\$460	\$250 - \$340	54% - 74%	\$240 - \$330
Option 3	\$705	\$120	\$585	\$430 - \$585	74% - 100%	\$120 - \$275
Option 3a	\$773	\$120	\$653	\$455 - \$605	70% - 93%	\$168 - \$318

Note: all funding needs and projected revenues are in year of expenditure dollars, in this case from construction start in 2016 to project completion by 2020.

In the table above, all values are in year-of-expenditure dollars (YOE). SR 509 extension construction options have funding needs ranging from \$580 million (option 2) to \$930 million (initial option) excluding amounts that have already been spent for preliminary engineering and ROW acquisition. It is estimated that \$120 million worth of additional ROW would need to be acquired and funding secured before the sale of new bonds. This amount is the same for all options as it is assumed that the full project would eventually be built.

In the toll funding contribution column – the projected net toll funding is expressed in a range. The high range is tied to the number of transactions as projected by the regional model. The lower range is calculated by taking a 20% reduction from the gross revenue to convey uncertainty in the traffic forecast.

As projected by the regional model based on the assumptions described earlier, the net toll revenue is expected to be somewhere between \$255 million for the initial option, to about \$600 million for option 3a which accounts for the revenues from tolling the extension, as well as revenues from the HOT lanes on I-5 from the extension to the S. 317th Street direct access ramps. The projected HOT lane revenue is about \$50 million, or about 10% of total construction cost of Option 3.

The Percentage of Construction Cost column shows the projected net toll funding contribution as a percentage of construction cost, or design and build in this case. The analysis results indicate that the toll could generate revenue to fund about 30% (initial option) to more than 90% of the project construction cost (options 3 and 3a), depending on the project scope and toll concepts assumed.

The last column of the table summarizes the remaining funding gap. None of the toll concepts tested are expected to generate enough revenue to fully fund the construction options. Additional revenues from other sources are needed for project implementation.

**Traffic Simulation**

The SR 509 phasing alternatives were modeled using a traffic micro-simulation modeling tool (VISSIM) and evaluated for potential impacts. The study area covered I-5 from SR 518 to SR 18, SR 509 from 188th Street to the SR 509/I-5 junction as well as collector-distributor lanes along I-5. Vehicle types modeled included single-occupancy vehicles, high-occupancy vehicles, trucks and high-occupancy toll lane vehicles. The models were developed for a three-hour PM peak demand period for the year of 2035. Alternatives were evaluated based on a number of performance criteria such as travel time, throughput and level of service (LOS). The network configuration, entry-exit volumes and traffic operational performances are shown in Chapter 5 of the Technical Appendix.

Due to the limited resources, the simulation focused on the PM peak period for three of the six options: initial option, option 1 and option 3. On the extension, the simulation focused on southbound SR 509, the peak direction. The simulation analysis revealed that option 1 is expected to underperform compared to the initial option and option 3 is expected to perform equally well or slightly better than the initial option. The table below summarizes average travel time results from the traffic simulation.

Table 6-4. Traffic simulation summary results for the SR 509 Extension and I-5

Corridor	Direction	Travel Time (MM:SS)		
		Initial Option	Option 1	Option 3
I-5	SB	20:12	23:25	19:35
I-5	NB	12:40	12:13	11:43
SR-509	SB to SR 516	3:32	7:59	3:31
SR-509	SB to I-5	3:44	13:28	3:32

.....  
 There is a high degree of uncertainty in toll revenue projections, especially for a road that doesn't exist today. Additional variation in the toll funding contribution projections will be a function of the type of debt instruments used, the market conditions and interest rates at the time the debt is issued, and policy decisions regarding how the debt is structured.

The assumptions used in this analysis may be somewhat optimistic because repayment of debt was tailored to the assumption that tolls will escalate at 2.5% annually to keep pace with inflation. The toll funding contribution would be somewhat lower if more conservative assumptions regarding toll escalation are adopted.  
 .....

# 7. Findings and Next Steps

Based on input from stakeholders from local jurisdictions, the Port of Seattle and regional transportation agencies, WSDOT developed and evaluated six scenarios with varying roadway configurations and tolling concepts. Through traffic and revenue modeling and analysis, the study found that:

- Expected Toll Revenue
  - Tolling is expected to generate a significant amount of revenue to fund the project construction, ranging from approximately \$250 million to \$600 million, making the project financially more feasible.
  - The financial capacity of the toll revenue is heavily dependent on financing assumptions, such as debt repayment options, the types of bonds used and market conditions at the time of bond issuance.
  - Segmented tolling, which spreads the same amount of tolls to several roadway segments is a more effective means of generating revenue. Single-point tolling (placing all tolls at one point) tends to cause drives to take alternate routes to avoid paying higher tolls.
- Maximize Operational Efficiency of the Corridor
  - Revenue focused tolling is expected to reduce traffic demand by about half compared to the toll free condition, creating the opportunities to downsize or phase the project. Tolling not only makes the corridor operation more efficiently, but also makes the project more financially feasible by reducing upfront construction cost.
- Future Economic Considerations
  - Among all the options studied, additional revenue ranging from \$120 million to \$700 million is needed to fund the project depending on how the project is phased.
  - ROW needs to be secured prior to bond issuance to minimize risk and financing cost.

Due to the limited resources and time available to conduct this study, WSDOT did not conduct an open house or public workshop. Therefore, we do not have public comments or input on the options studied and findings. It is recommended that a comprehensive toll study that includes more refined assumptions should be conducted for WSTC and legislative consideration. Furthermore, the study should provide opportunities for public input.

The next steps include making collaborative decisions regarding the following:

- How to scale and phase project construction.
- When to build the project.
- How to finance the project.
- How to collect tolls, and what toll rates to set.
- In addition to involving local jurisdictions, the regional transportation planning organization, FHWA, WSODT, and other stakeholders, the study should also offer opportunities for public review and inputs.

# 8. Stakeholders Input



South County Area Transportation Board  
MS: KSC-TR-0814  
201 South Jackson Street  
Seattle, WA 98104-3856

---

Phone: (206) 263-4710 Fax: (206) 684-2111

August 10, 2010

The Honorable Mary Margaret Haugen  
Chair, Senate Transportation Committee  
304 15th Avenue Southwest  
Olympia, WA 98504-0001

The Honorable Judy Clibborn  
Chair, House Transportation Committee  
429B Legislative Bldg.  
PO Box 40600  
Olympia, WA 98504-0600

Dear Senator Haugen and Representative Clibborn:

The South King County Area Transportation Board (SCATBd) is a collaborative effort of sixteen cities in South King County, King County, Pierce County, the Port of Seattle and transportation agencies committed to improving the transportation system. As elected officials, we meet regularly to educate ourselves about transportation needs in our area and seek solutions to address our region's transportation problems. As the home of the largest economic engine in Washington state, we take this responsibility very seriously.

For many years, the SCATBd has identified completion of the SR 509 corridor as a high priority. We believe these improvements are necessary for general mobility, freight and economic growth and continued vitality in this region. We are pleased that Washington State Department of Transportation (WSDOT) has completed environmental requirements and continues to refine the design and acquire right of way despite the financial constraints facing the project.

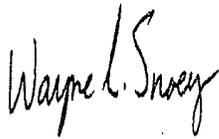
SCATBd supports the efforts to consider tolling as part of the ongoing strategy for funding completion of the project. We have recently been briefed on the options that WSDOT has studied. Based on this preliminary information, we have determined that Option 3a, which includes a connection with S. 228<sup>th</sup> Street in Kent, appears to best serve the needs of freight mobility and general purpose traffic in the region.

Mary Margaret Haugen and Judy Clibborn  
August 10, 2010  
Page 2

We understand that the full report is expected in the next few months and that additional work, including the tolling locations, is needed to refine this option. We also understand that environmental documentation will need to be re-evaluated if tolling is pursued as a financing option, but wanted to convey our general support for this option. We look forward to providing additional input when more detailed information is available.

We hope it is helpful to you to understand SCATBd's position, and urge you to continue to seek ways to complete this vital link. Thank you for your consideration.

Sincerely,



Wayne Snoey  
Chair



Dave Hill  
Vice Chair

South County Area Transportation Board

Cc: Paula Hammond, Secretary, Washington State Department of Transportation