
Puget Sound Gateway Project

SR 509, I-5 and SR 167 Funding and Phasing Study: Strategic Corridor Design Review



Appendix L: Revenue Projections and Methodology

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1. REVENUE PROJECTIONS AND METHODOLOGY

This appendix describes the assumptions, methodologies, and results of the net toll revenue analysis prepared for the Puget Sound Gateway Project.

2. ANNUAL GROSS AND NET REVENUE PROJECTIONS

The primary output of the travel demand modeling process is average weekday daily traffic (AWDT), which also serves as the starting point for estimating annual gross traffic and revenue. While daily estimates can provide useful information for comparing future traffic performance to historical performance or other facilities, annual projections are needed to assess the toll funding contribution that could potentially be supported from net toll revenues. The traffic demand modeling methodology is documented in Appendix J of the Final Report.

3. PROJECT SCOPE

The gross and net revenue projections described in this appendix document are based primarily on the Phase 1 scope of projects identified in Section K of the Puget Sound Gateway Project study, with one exception for I-5 Express Toll Lane (ETL) configuration between the SR 167 and SR 509 extensions. As envisioned, the Gateway Project would be implemented in two or more phases, the first of which would construct a single ETL on I-5 in each direction from SR 16 in Tacoma to I-90 in Seattle, and a later phase would construct an additional ETL in each direction between the proposed SR 167 and SR 509 extensions along with direct access connections to SR 167 and SR 509. Due to timeline constraints in the traffic and revenue analysis, modeling was underway and nearly completed for I-5 with two ETLs in each direction between SR 167 and SR 509 when the decision was made to focus on a lower cost, Phase 1 implementation using only single ETLs. The inclusion of a section of I-5 with dual ETLs in each direction results in higher gross traffic and revenue forecasts for the I-5 corridor, and thus higher net revenue. A simplified adjustment to account for building a single lane ETL system on I-5, and financial capacity results for both cases are presented in Appendix M.

In addition, a range of net toll revenues was considered to account for forecast uncertainty. The base forecast values were used as the “high” bookend and a 20 percent reduction to net revenues was applied to serve as a “low” bookend for assessing the Gateway Project’s range of toll financial capacity.

4. ANNUAL GROSS AND NET REVENUE PROJECTIONS

The travel demand modeling process utilizes the PSRC regional model and incorporates trip patterns, population and employment growth, network features, and user values of times to provide average weekday traffic forecasts for five time periods in two representative future years, 2016 (FY 2017) and 2030 (FY 2031). Daily revenues are estimated by multiplying traffic in each direction and time period by the respective toll rates modeled (see Appendix J). Average weekday daily toll traffic and gross revenue are expanded to their respective annual values for the two model years. Interpolation and extrapolation techniques are then used to project annual values over a 40 year forecast horizon from fiscal year (FY) 2021 through FY 2060. The basic

steps associated with the gross revenue estimation process for SR 167 and SR 509 (fully tolled facilities) are illustrated in Exhibit L- 1 and are described in further detail throughout this appendix.

Also described in this appendix is the process for estimating net toll revenues, otherwise referred to as the cash flow available for debt service (CFADS), which represents the revenue available to support debt financing after accounting for all revenue adjustments and operations and maintenance (O&M) costs associated with the roadway and toll collection. The basic steps of this process are illustrated in Exhibit L- 2 and are also described in further detail throughout this appendix.

4.1 Traffic and Revenue Annualization Process

The first step in estimating annual gross traffic and revenue is to establish assumptions for the number of weekdays and weekend days within a given year. For this analysis, each forecast year was assumed to include 110 weekend days (52 weeks × two weekend days, plus six non-weekend holidays), and 255 weekdays, totaling 365 total days. In cases where weekend daily traffic is projected to be the same as weekday daily traffic, the annual expansion factor would be 365. However, because traffic volumes are historically lower on weekends than weekdays, the expansion factor must be reduced.

For this analysis, historical traffic data indicated that weekend daily travel on the SR 167, SR 509 and I-5 corridors was approximately 70 to 80 percent of weekday daily traffic.

This information yields an expansion factor of 343 [255 weekdays + (110 weekend days × 80 percent)]; however, because these traffic data are based on toll-free travel, further adjustments must be applied to account for the potential of higher traffic diversion rates during off-peak weekday periods and weekends. To account for the increased opportunity to divert to uncongested alternatives on a weekend, an annual traffic expansion factor of 300 was used, which means that weekend toll traffic is projected to be 40 percent of weekday traffic.

In the case of revenue, a different annual expansion factor must be used to account not only for different levels of traffic on weekends, but to also account for lower, off-peak weekend toll rates on SR 167 and SR 509 and lower dynamically determined tolls on the I-5 ETLs. To demonstrate the necessity of using a different factor, if an hour on a given weekend exhibits the same traffic volumes as the same time period on a weekday, less revenue will be collected during that hour on

Exhibit L- 1 Gross Toll Traffic and Revenue Estimation Process

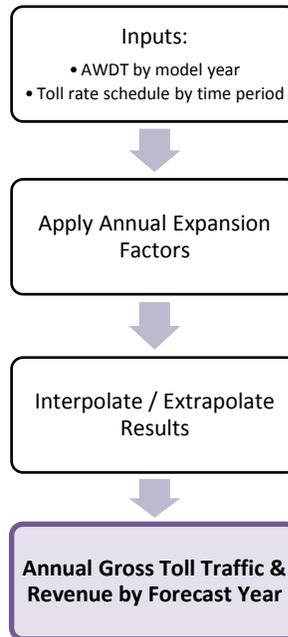
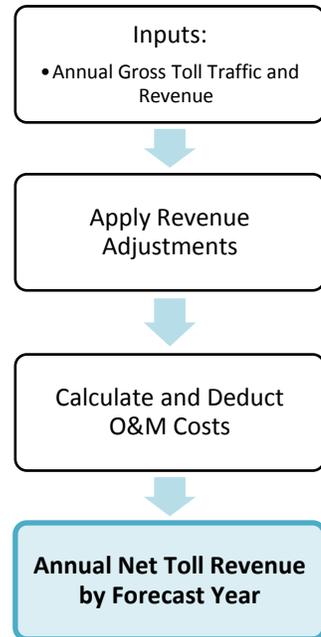


Exhibit L- 2 Net Toll Revenue Estimation Process



a weekend than a weekday due to lower toll rates. To account for this difference, a reduced expansion factor—weighted according to the proposed weekend toll schedule—is applied. For this analysis, a factor of 290 was assumed.

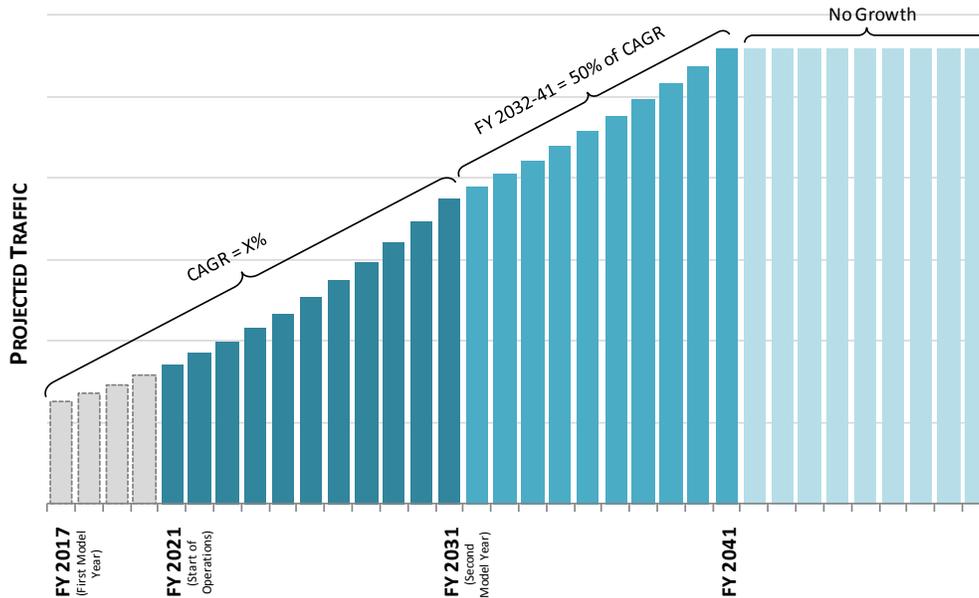
4.2 Traffic Interpolation / Extrapolation

As previously noted, the annual traffic and revenue forecasts for the two model years, 2016 / FY 2017 and 2030 / FY 2031 were used to interpolate and extrapolate projections over a 40-year forecast horizon.

A compound annual growth rate (CAGR) was calculated between FY 2017 and FY 2031 and then used to interpolate results for each year in between. Because revenue operations are not assumed to begin until mid-2020 (FY 2021), values for FY 2017 through FY 2020 were excluded from the forecast.

From FY 2032 to FY 2041, traffic and revenue forecasts were extrapolated using 50 percent of the growth rate exhibited between FY 2017 and FY 2031. No growth in traffic was assumed beyond FY 2041. An illustration of this trend is provided in Exhibit L-3.

Exhibit L- 3 Illustration of Interpolation and Extrapolation Methodology

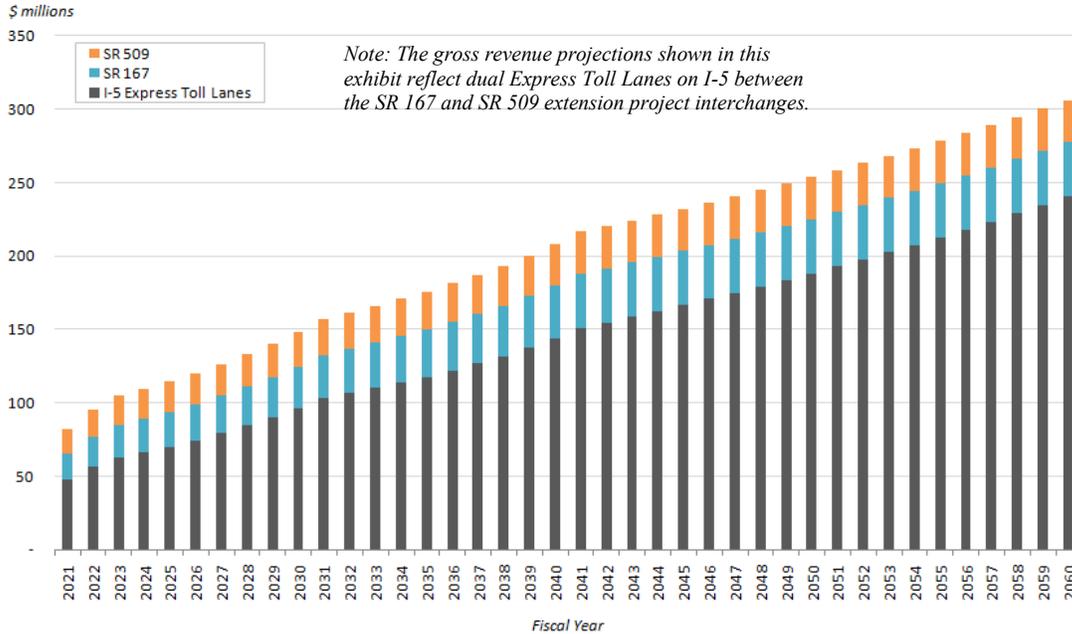


4.3 Annual Gross Revenue Projections

Note that zero growth in traffic after FY 2014 also means zero growth in revenue for SR 167 and SR 509. However, for the I-5 ETL system, revenue continues to grow even in the absence of traffic growth. This is due to general inflation causing travelers' values of time, and thus, willingness to pay tolls to save time, to gradually increase, and this trend can be seen in Exhibit L-4.

Gross toll revenues for the combined set of corridors are projected to be \$82 million in the first year of operations, growing to \$157 million by FY 2031, and \$217 million by FY 2042. Over the 40-year forecast horizon, it is projected that 71 percent of gross revenue will be generated by the I-5 Express Toll Lanes, while SR 509 and SR 167 are projected to generate 13 percent and 16 percent, respectively. A chart illustrating the gross revenue projections by fiscal year and corridor is provided in Exhibit L-4 below.

Exhibit L- 4 Annual Gross Toll Revenue Projections

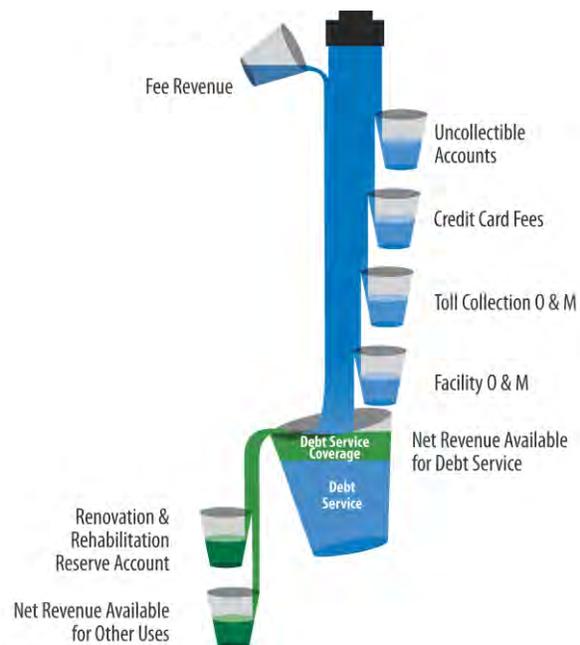


4.4 Net Toll Revenue Projections

Gross toll revenue estimates for each corridor within the Gateway Project were used as the basis for calculating net revenues. Reductions for uncollectible accounts, credit card fees, and operations and maintenance (O&M) costs were incorporated into a separate net revenue forecast model to calculate total net revenue for I-5, SR 167, and SR 509. The methodology used in the analysis employed similar assumptions as previous WSDOT toll studies, with some updates to reflect recent experiences on SR 520 and the Tacoma Narrows Bridge.

In Exhibit L- 5, the flow of gross toll revenues to net toll revenues are depicted as water

Exhibit L- 5 Allocation of Gross Toll Revenues



leaving the tap and filling various buckets representing the revenue adjustments as well as fixed and variable costs associated with tolling the Gateway corridors. The items in the flow correspond columns shown in the traffic and revenue tables at the end of this appendix (toll collection O&M costs are disaggregated into three columns, columns 9-11 in these tables).

The first bucket in the flow capture a positive adjustment that would occur from collecting re-billing fees associated with second invoice mailings on pay by mail transactions. The second bucket is for uncollectible accounts, which represents revenue that will not be collected for reasons describe below. The application of re-billing fees received and deductions for uncollectible revenue yields the measure of adjusted gross toll revenue. The adjusted gross toll revenue provides the basis for deducting operational costs and other expenses to calculate net revenue.

Credit card fees, estimated as a percentage of adjusted gross toll revenue, are incurred for the convenience of allowing customers to fund their accounts or pay their tolls using debit and credit cards. These estimates also include a factor for fees related to refunds, in the event that a customer does not utilize all funds in a prepaid toll account and requests the balance to be refunded. Credit card fees are incurred as a charge by the processing vendor and banks, and appear as a reduction to revenue in the net revenue projections.

O&M costs are allocated to two sub-categories representing toll collection and facility related costs. Toll collection O&M consists of state operations costs, customer service center (CSC) vendor costs and toll collection system (TCS) vendor costs. State operation costs reflect each corridor's share of system-wide back office costs, inclusive of accounting, management, and marketing functions. Cost allocations for CSC and TCS are inclusive of costs for toll transaction processing, back office operations and toll collection equipment.

The following sections provide further information on how each cost element was derived to calculate total net toll revenues. Costs are adjusted by a set rate of 2.5 percent annual inflation unless otherwise noted.

4.4.1 Uncollectible Revenue

Uncollectible accounts or uncollectible revenue represents an adjustment attributable to toll evasion, electronic toll collection errors, or insufficient information about the vehicle owner from which to send a toll invoice. Forecasts for uncollectible revenue have been developed using an activity-based workflow, which estimates the probability that a toll transaction will become uncollectible under a variety of scenarios. These scenarios include:

- Insufficient account balance
- Unreadable license plates
- Insufficient information about vehicle owner and their mailing address
- Toll evasion/non-payment of mailed toll invoices

In the case of the I-5 Express Toll Lanes, an additional allowance for vehicle occupancy violations is included in the uncollectible forecast. Under current modeling assumptions, vehicles with three or more (3+) occupants will be exempt from tolls in the I-5 Express Toll Lanes.

However, to receive this exemption, the driver would be required to declare the vehicle's occupancy using a "switchable" Good To Go! transponder. In some cases, the driver of a single or double-occupant may intentionally or unintentionally declare a higher occupancy, which could lead to an improper toll exemption (currently enforced as an HOV violation). To account for the possibility of lost revenue from incorrect occupancy declarations, an additional allowance for occupancy violations is included in the I-5 ETL net revenue forecast.

4.4.2 Credit Card and Banking Fees

After removing uncollectable accounts from the total gross revenue, the resulting adjusted gross revenue is used as a basis to calculate variable credit card and banking fees. WSDOT will accept credit and debit cards for the payment of tolls on all corridors, as well as for the purchase of Good to Go! transponders. WSDOT's experience at the Tacoma Narrows Bridge has been that 85 percent of revenue transactions are collected via credit and debit cards. For forecasting purposes, this study uses a slightly higher assumption of 90 percent, reflecting higher Good to Go! usage. The fee rate associated with this form of payment is assumed to be 2.5 percent of the amount collected by credit card, plus a small allowance for account refunds.

4.4.3 Toll Collection O&M

Toll collection O&M costs include all administrative and technical functions required for processing toll transactions and collecting revenue from customers. Beginning with the task of identifying a transaction on the roadway, to recording the transaction, to ultimately collecting payment, the toll collection process requires involvement and coordination by three distinct operating units:

- The WSDOT Toll Division (state operations);
- The Customer Service Center (CSC) vendor; and
- The Toll Collection System (TCS) vendor.

Costs associated with the state and CSC services are incurred on a state-wide basis, and will be allocated according to the share of total toll transactions at each facility. In addition to potential tolling of the I-5 Express Toll Lanes, SR 167 extension, and SR 509 extension, three other Washington State corridors are currently tolled: the SR 167 HOT lanes, Tacoma Narrows Bridge (TNB), and SR 520.

Support for these corridors is overseen by the WSDOT Toll Division. Current toll transaction forecasts for planning and operational estimation purposes yield a projected distribution of costs between existing and planned projects. The TNB share is less than that for SR 520 because TNB tolls are only collected in one direction. SR 167 is a single high-occupancy-toll (HOT) lane facility adjacent to two, toll-free general-purpose lanes in each direction. As such, the facility has a relatively low share of toll transactions.

TCS vendor costs are not allocated on a state-wide basis, and are not subject to this distribution.

4.4.3.1 State Operations

Oversight functions performed by state staff include the following activities:

Management

The WSDOT Toll Division will provide leadership and operations oversight. Duties include monitoring vendor operations, coordinating staff, and reporting to the Legislature, Transportation Commission, and WSDOT executives.

Accounting/Audit/Finance

Accounting and finance staff will oversee the reporting of costs and revenues associated with the SR 167 tolling operations, and will also track trends in the general financial health of the facility. Staff will work with the customer service center back office to ensure state accounting systems properly interface with the CSC system. Routine audits will also be conducted to verify revenues and ensure costs have been properly categorized.

Marketing

Communications staff will primarily help SR 167 corridor users understand tolling, choose the appropriate payment option, and provide support for toll rate-setting efforts.

In addition to staffing for management, accounting, and marketing, state operations costs also include standard business expenses for rent, office supplies, computers, and communication equipment. In addition, the state will also incur all printing and postage costs.

Customer Service Center and Toll Collection Systems Vendor Costs

In addition to direct state operations, customer service center and the toll collection systems are operated and maintained by external vendors.

Customer Service Center (CSC)

The Customer Service Center is responsible for all front-end functions, including operation of Good To Go! walk-in centers, websites, and email/telephone support. In addition, the CSC is also responsible for processing all account and non-account based toll transactions (i.e., Good To Go! and Pay By Mail).

The primary driver in forecasting CSC vendor costs is the total volume of toll transactions that will be processed by the CSC, which also serves as proxy for the second driver, which is the expected volume of Good To Go! customer accounts.

For the purpose of forecasting, CSC vendor costs are estimated on an average cost per-transaction basis, where each transaction is multiplied by an average unit cost and then totaled for the given forecast year. In practice, CSC vendors may choose to price contracts according to different transaction or account tiers, where unit prices may decline as the volume of transactions increases.

This potential for economies of scale is also captured in the Gateway forecasts by assuming a single back-office vendor will be responsible for processing all toll transactions across WSDOT's toll facilities. For the purpose of this analysis, the system of facilities was assumed to include the Tacoma Narrows Bridge, SR 520, the SR 167 HOT lanes, and all corridors in the Gateway Project.

Toll Collections Systems (TCS)

Toll collections systems include all equipment and software required for identifying a toll transaction and transmitting data about that transaction to the customer service center for processing. Sometimes referred to as “lane systems,” this equipment includes transponder readers, cameras, and other communication devices that need regular maintenance to ensure the system is functioning properly. WSDOT has provided the fixed annual cost estimates for TCS costs that include but are not limited to the following duties:

- Aligning and/or recalibrating transponder readers and cameras;
- Cleaning camera lenses;
- Maintaining equipment connections; and
- Monitoring/auditing equipment performance.

Vendor contract costs are anticipated to be substantially higher for I-5 due to the length of the facility and the assumed number of toll points in the corridor. The high number of toll points reflects an operational assumption of “continuous access,” which allows drivers to enter and exit the I-5 Express Lanes more frequently than traditional express lanes projects. However, to ensure tolls are collected from all customers entering the lanes, gantries must be placed short distances from each other. For this analysis, an average gantry distance of 0.75 miles was assumed.

4.4.3.2 Facility (Roadway and Structures) Operations and Maintenance

Routine operation and maintenance (O&M) of the corridor is critical to providing continuous, uninterrupted toll revenue generation. Proper maintenance of the facility also ensures that the expected level of service is provided to motorists. Typically, facility O&M activities include:

- Paving and patching repair;
- Maintaining drainage systems, culverts and slopes;
- Roadside and landscape maintenance;
- Weed control;
- Snow and ice control;
- Disaster maintenance including road closures, detours and emergency repair not involving major construction; and
- Maintenance of pavement striping and markings, guardrails, highway lighting systems, traffic signs, lane restriping, pothole repair, traffic operations, signage, and litter pickup.

Facility O&M cost estimates for the Gateway Project were prepared by WSDOT, and derived from historical maintenance costs in each of the corridor as well as other similar facilities. These activities help to preserve safety and travel reliability along the corridor.

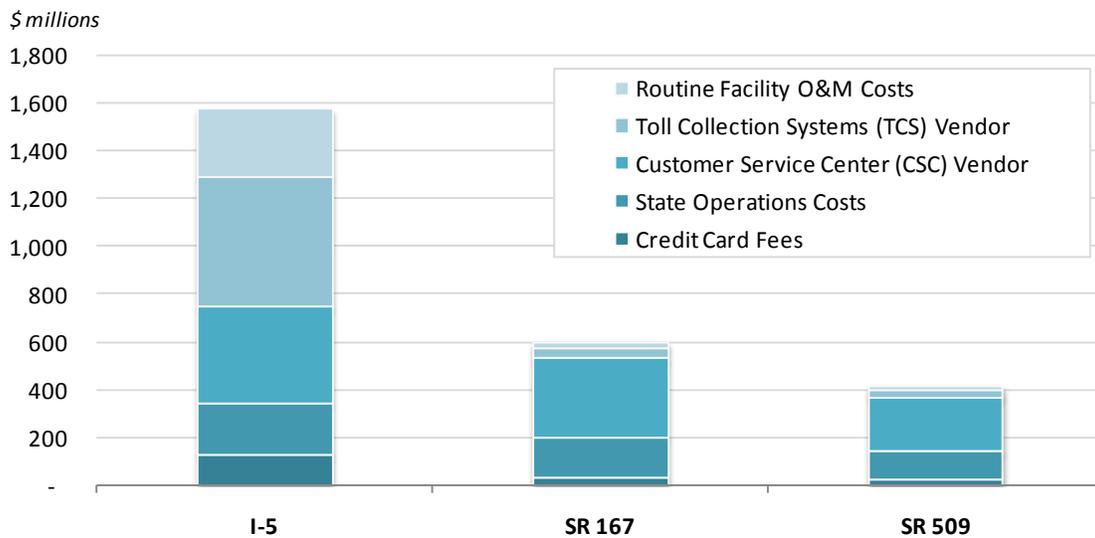
For the purpose of this analysis, it was assumed that toll revenues would fund only the portion of costs associated with the tolled corridor. On I-5, this was determined by taking the number of express lanes and dividing by the total number of lanes for a given segment of roadway. So, for a segment with one ETL and four general purpose (GP) lanes, the ETL share was assumed to be one-fifth, or 20 percent.

It was similarly assumed that toll revenues would fund only the portion of facility O&M expenses attributable to the new SR 509 and SR 167 extensions. The existing roadways would continue to be funded by other state sources.

5. SUMMARY OF COSTS AND NET REVENUE AVAILABLE FOR FINANCING

Over the 40-year period from FY 2021 to FY 2060, I-5 is expected to generate the largest share of net revenues among the Gateway Project corridors, and will also have the most O&M costs. This is due in part to its scale (over 30 miles), multiple toll gantries, and dynamic pricing with tolls that effectively escalate with both growing demand and congestion in the corridor as well as for inflation in travelers' values of time, which increases their willingness to pay tolls. As illustrated in Exhibit L-6, total O&M costs for the baseline net revenue projections over 40 years are estimated to be approximately \$1,575 million, \$600 million, and \$415 million for I-5, SR 167, and SR 509, respectively. Of the categories shown, expenses related to the customer service center represent the single largest cost component, totaling about \$960 million for all corridors combined. The next largest expense, at \$625 million, is projected to be toll collection system O&M, the bulk of which is attributable to I-5, where a much higher volume of toll points required to ensure revenue collection from all vehicles entering the lanes.

Exhibit L- 6 Comparison of Total Forecasted Costs by Category and Facility



Deducting O&M costs and credit card fees from the adjusted gross toll revenue by fiscal year provides an annual estimate of net toll revenues. As illustrated in Exhibit L-7, the net revenue stream assumed for Gateway financing (depicted as a solid line) is projected to generate nearly \$40 million in the first year of operations, growing to approximately \$150 million by FY 2060.

Exhibit L- 7 Comparison of Net Revenue Forecasts by Corridor

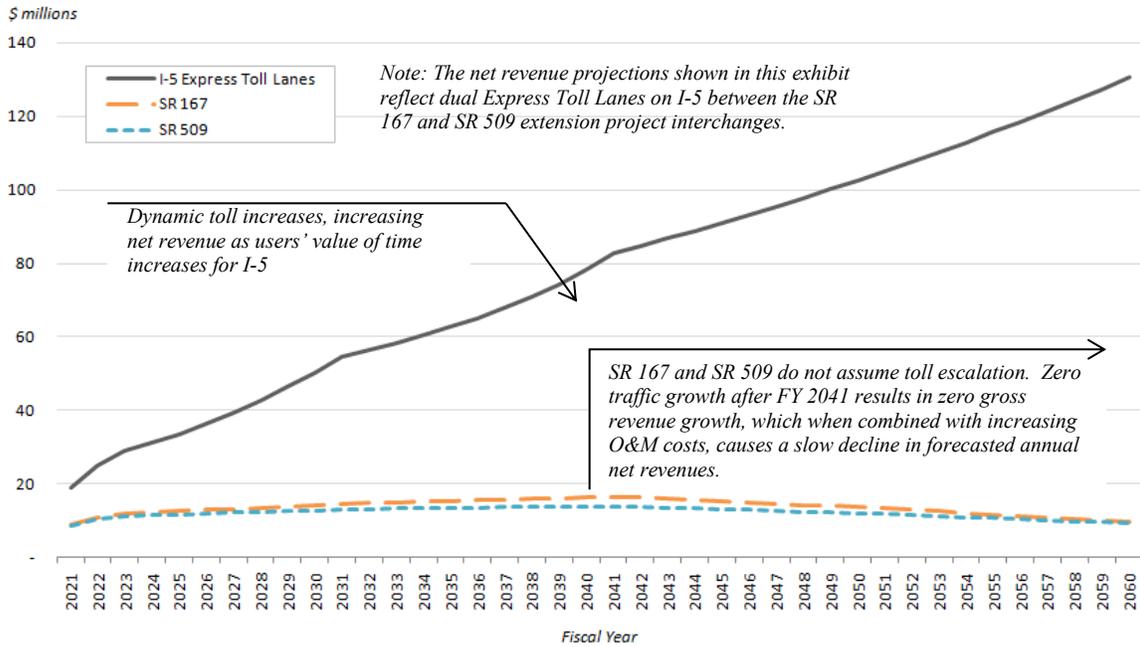
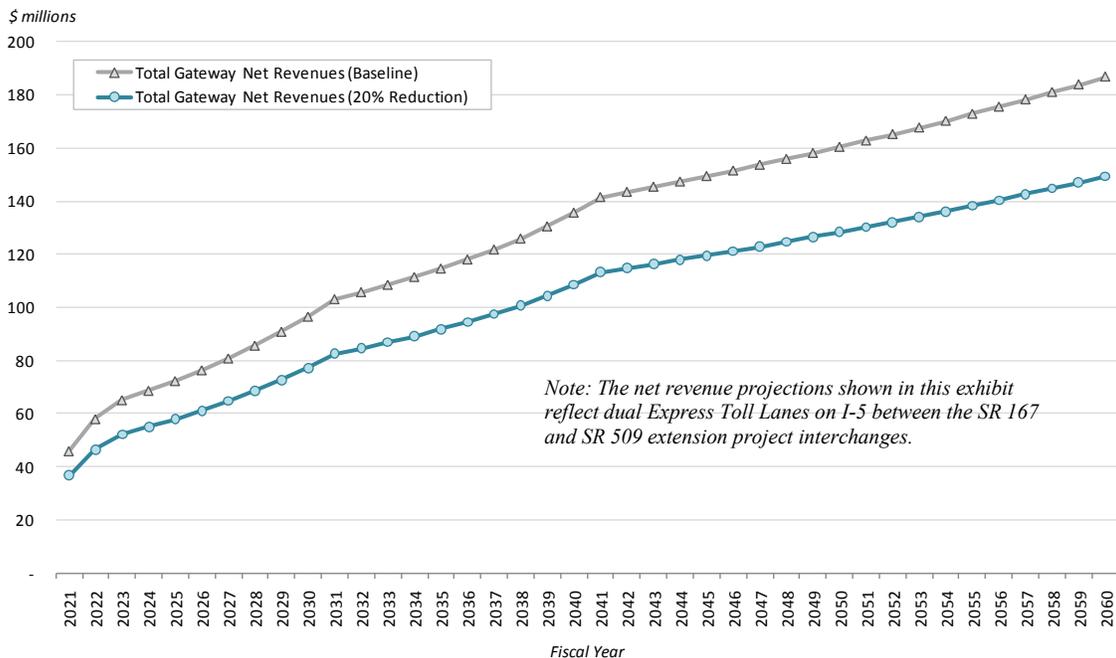


Exhibit L-8 illustrated the projected net revenues as a range of values in which the high end of the range is the base forecast and the low end of the range reflects a 20 percent reduction in net revenues to account for uncertainty in these preliminary forecasts. The net revenue range is used in the financial capacity analysis documented in Appendix M.

Exhibit L- 8 Net Revenue Forecast Range



As previously noted, the travel demand modeling, traffic projections, and gross plus net revenue forecasts were prepared under the assumption that the I-5 ETL system would include dual priced lanes in each direction between SR 167 and SR 509, and a single lane in each direction between SR 16 in Tacoma and SR 167 as well as between SR 509 and I-90 in Seattle. However, a first phase would likely include only a single lane in each direction for all of I-5. Without conducting additional travel demand modeling, a sensitivity test was conducted in which it was assumed that the changing the dual lane section to a single lane only would result in 25 percent of the dual lane section revenue. Put another way, a 75 percent gross revenue deduction was applied to account for downsizing the dual lane section to a single lane.

Under this initial phase assumption, the I-5 single ETL system from Tacoma to Seattle is still projected to yield over 50 percent of the gross toll revenue projected for I-5 modeled as a partial dual lane system. This conclusion also applies when scaled to the net revenues from an all single lane I-5 system, in that the net revenues would be anticipated to meet or exceed 50 percent of the modeled net revenues for the partial dual lane I-5 system.

The financial capacity results presented in Appendix M also include results for this sensitivity test in which the single lane I-5 system was estimated to provide a toll funding contribution of one-half that of I-5 modeled as a partial dual lane system, based on the net revenue relationship and given that the size of the toll funding contribution that can be leveraged is driven by net revenues.

The tables on the following pages present the detailed annual traffic projections, gross revenue forecasts, expenditure and deductions, and resulting net revenue forecasts for each of the three Gateway project corridors.

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