

# **SR-520 and I-90 Toll Feasibility Analysis Traffic and Revenue Forecasts Technical Memorandum**

**Prepared for: Washington State Department of Transportation**

**Prepared by: PB**

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## **Disclaimer and Limitations**

The traffic and revenue projections and related information herein were prepared by PB in accordance with an agreement with the Washington State Department of Transportation (WSDOT) and is meant to be considered as a whole. The outputs, assumptions and statements contained herein are based on information provided to PB by, and obtained from, WSDOT, the Puget Sound Regional Council, and other sources. PB has relied on the accuracy of the information provided – both written and oral – in conducting our analysis, and we have not independently verified all data provided.

In the preparation of these materials and the views contained herein, certain assumptions have been made in consideration of the compressed schedule for this analysis, and forecasts of future conditions have been made based upon interpretations or assessments of the best information available at the time. However, actual future events may differ from those assumed, and expected conditions are subject to change.

The assumptions and forecasts made within this analysis are for purposes of identifying the feasible SR-520 and I-90 net toll revenues available for project financing, and are not intended to reflect any official decisions regarding toll policy or toll implementation options. The gross and net toll revenues presented herein are provided for feasibility considerations and to enlighten further policy and financial planning discussions, and should not be construed as “investment-grade” projections.

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# Introduction and Summary

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The SR-520 Bridge serves as connection between I-5, the city of Seattle and the University of Washington on the west side, and I-405 plus the suburban communities of Bellevue, Redmond, and Kirkland across Lake Washington to the east. The existing cross-lake facility consists of a four-lane floating bridge structure and adjacent approaches. The Washington State Department of Transportation has determined that the bridge and its approaches are in need of replacement due to structural deficiencies and seismic and storm damage risks. In addition, the Washington State Legislature has mandated that the financial plan for the project encompass the full range of proposed improvements between I-5 and I-405.<sup>1</sup>

The SR-520 project recently published its Draft Environmental Impact Statement (DEIS).<sup>2</sup> Current estimates have the construction of a six lane replacement facility completed by mid-2018, with costs anticipated to exceed \$3 billion in year of expenditure (YOE) dollars. All of the "build" alternatives considered in the DEIS assume that the bridge will be tolled, and tolls are expected to be a major contribution to project funding; however, a significant funding gap still exists for this project.

A previous study explored tolling SR-520 to assess the potential toll revenues and project funding from two bookend tolling objectives. The study assumed the parallel I-90 bridge crossing to the south was toll-free.<sup>3</sup> This effort builds upon the previous work by updating the feasibility-grade toll traffic and revenue forecasts for a likely toll structure, and also investigates a second option to simultaneously toll the I-90 lake crossing.<sup>4</sup> In addition, this effort also made a preliminary examination of the additional revenue potential from tolling one or both bridges as early as mid-2010, or before and during construction of the replacement SR-520 bridge and improvements in the I-90 corridor (referred to as the Pre-Completion Phase).

It should be noted that this toll feasibility analysis was expedited at the request of the State, in order to provide annual net revenue estimates for a funding study being conducted by the Treasurer's Office. As such, it relies on available information that could be assembled under the time constraints, including the use of an interim update to the project's travel demand model. A subsequent section identifies and describes additional steps that could be undertaken to refine these projections if more time were available at a later date.

The updated travel demand modeling performed for this study shows that the introduction of tolls on a 6-lane SR-520 causes approximately 30% of daily traffic to divert away from the facility, with some portion of that diverted traffic using I-90 or routes around Lake Washington instead, and others forming carpools or switching to transit to use SR 520 toll-free. Tolling both crossings results in approximately 12% toll diversion on SR-520 and 18% toll diversion on I-90.

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<sup>1</sup> ESHB 2871, signed into law 3/29/06

<sup>2</sup> Washington State Department of Transportation. August 18, 2006. *Draft Environmental Impact Study: SR-520 Bridge Replacement and HOV Project.*

<sup>3</sup> Washington State Department of Transportation. April, 2004. *SR-520 Toll Feasibility Study.*

<sup>4</sup> A variable toll structure ranging from \$1.00 to \$5.00 each direction in 2018 dollars was tested with the objective to emphasize revenue generation during peak periods.

Exhibit 1 shows the annual gross revenue before operating and maintenance costs as well as the net revenues or cash flow available for financing of the tolling scenarios investigated.

**Exhibit 1: Select Year Toll Revenue Forecasts for Tolling the Lake Washington Crossings**

		Toll Revenue Forecasts							
		<i>SR 520 Revenue with I-90 Toll Free</i>		<i>SR 520 Revenue with I-90 Tolloed</i>		<i>I-90 Revenue with SR 520 Tolloed</i>		<i>SR 520 and I-90 Combined Toll Revenue</i>	
		<i>Gross</i>	<i>Net<sup>a, b</sup></i>	<i>Gross</i>	<i>Net<sup>a, b</sup></i>	<i>Gross</i>	<i>Net<sup>a, b</sup></i>	<i>Gross</i>	<i>Net<sup>a, b</sup></i>
<b>Pre-Completion</b>	<b>2011</b>	\$27M	\$19M	\$37M	\$30M	\$42M	\$33M	\$80M	\$63M
	<b>2018</b>	\$46M	\$37M	\$62M	\$52M	\$72M	\$60M	\$134M	\$113M
<b>Post-Completion</b>	<b>2019</b>	\$79M	\$66M	\$107M	\$94M	\$126M	\$111M	\$233M	\$204M
	<b>2029</b>	\$124M	\$109M	\$157M	\$140M	\$192M	\$170M	\$348M	\$311M
	<b>2039</b>	\$161M	\$142M	\$204M	\$183M	\$254M	\$225M	\$459M	\$408M
	<b>2049</b>	\$209M	\$184M	\$264M	\$237M	\$332M	\$293M	\$595M	\$529M
	<b>2058</b>	\$263M	\$231M	\$332M	\$298M	\$420M	\$370M	\$752M	\$668M

a - Revenue net of License Plate Billing expenses, uncollectible accounts, and bridge, roadway, and toll collection O&M.

b - Revenue totals shown are the year-end revenue forecasts.

Five report section and an Appendix follow this introduction and summary:

- **Toll Traffic Projections** presents a discussion of the travel demand modeling process and results;
- **Toll Rates and Toll Collection** provides a description of the toll rate structures that were developed for this analysis, and the methods of toll collection that were assumed for this project;
- **Gross Revenue Projections** summarizes the gross toll revenue generated under the various toll scenarios that were analyzed;
- **Net Revenues** presents the revenue available for repaying project debt after accounting for operations and maintenance expenditures and other deductions to toll revenue that would be incurred;
- **Study Limitations and Potential Refinements** summarizes the limitations of this study, due primarily to the constrained timeframe of the analysis; and
- The **Appendix** provides supplemental traffic and revenue information.

For information on the bond proceeds or level of project funding supported by the net revenue streams, please see the State of Washington document entitled: *Report on SR-520 Bridge Replacement and HOV Project Funding Alternatives*, dated March 28, 2007.<sup>5</sup>

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<sup>5</sup> Prepared by Seattle-Northwest Securities Corporation and Montague DeRose and Associates, LLC.

# 1. Toll Traffic Projections

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## 1.1 Project Need

The existing four lane SR-520 bridge and its east and west approaches are nearing the end of their useful life. Washington State Department of Transportation studies have shown that the spans of the Portage Bay and Evergreen Point structures are at risk of suffering damage, closure, or even failure when subjected to severe storm or seismic events. Additionally, the facility provides insufficient capacity to meet the current daily traffic levels of approximately 115,000 vehicles. There is significant congestion during peak periods which often extends well into midday. As a result, the State has determined that the SR-520 bridge is in need of replacement.

## 1.2 Travel Demand Modeling

The Puget Sound Regional Council's (PSRC) travel demand model is the underlying tool behind the demand estimation and toll traffic projections. The tailored version of the model used for the 2006 *SR 520 Bridge Replacement and HOV Project Draft Environmental Impact Statement* and the 2004 *SR-520 Toll Feasibility Study* is no longer current. PSRC is currently in the process of customizing and calibrating a new version of the model, but that version was not yet ready at the time of this analysis. As a result, this expedited effort borrowed the travel demand model configured for the Alaskan Way Viaduct and Seawall Project (AWV). As the best readily available analysis tool, the AWV version of the model was adapted for this effort by refining the network to include the SR-520 and I-90 improvements and by implementing tolling procedures.

## 1.3 Project and Network Definition

For the purpose of this analysis, WSDOT chose the most costly alternative under consideration for which to model traffic and revenues. The future SR-520 facility, projected to be opened in the summer of 2018, was assumed to be the 6-Lane Alternative with the Pacific Interchange Option, with two general-purpose and one HOV lanes in each direction. Differences in the west side options for the SR 520 Montlake/Portage Bay connections were viewed as not having a significant impact on revenues for a toll imposed mid-span on the bridge. The future I-90 facility is assumed to include the R&A improvements, which add an HOV lane to the three general purpose lanes of the outer roadway in each direction.<sup>6</sup> The existing I-90 center roadway was assumed to be unavailable for traffic to facilitate the construction of light rail.

Aside from the bridge improvements, the 2015 and 2030 future transportation networks were assumed to include only programmed and fully funded projects, such as Sound Transit's Sound Move investments (regional express buses, commuter rail, and light rail from the University District to the Seatac Airport). The networks do not include the Sound Transit Phase 2 investments or the Regional Transportation Investment District projects subject to voter approval later this year.

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<sup>6</sup> Central Puget Sound Regional Transit Authority. April, 2004. *I-90 Two-Way Transit and HOV Operations Final EIS*.

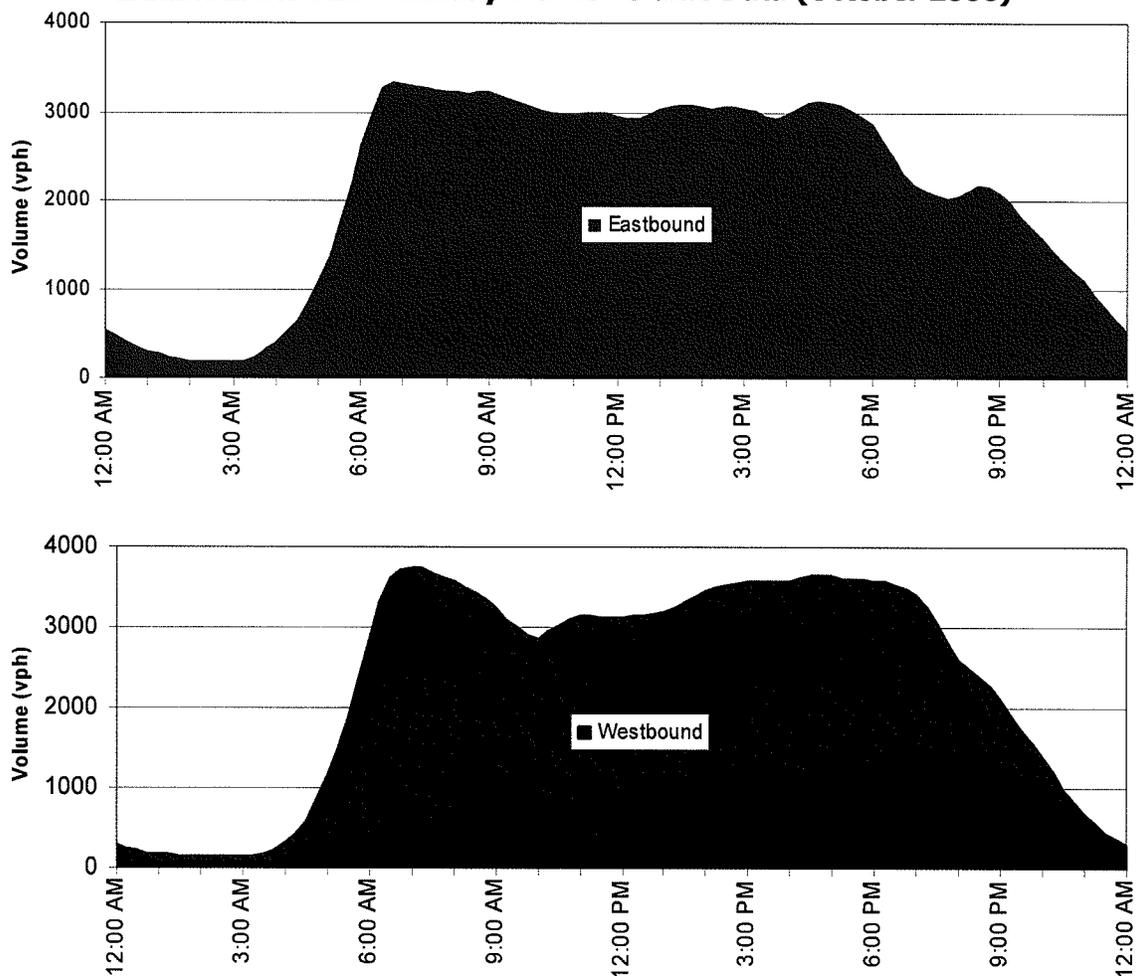
Cross-lake traffic volumes were projected for the horizon years 2015 and 2030 using the PSRC travel demand model. Year 2015 and 2030 weekday cross-lake traffic volumes by time period were estimated under the future network conditions for the following scenarios:

- Both bridges toll-free (toll-free base case)
- SR-520 tolled, I-90 toll-free
- Both bridges concurrently tolled

## 1.4 Traffic Projections

The PSRC model utilizes a representative 3-hour morning and afternoon peak periods and an 18-hour off-peak period. Because cross-lake travel exhibits a more varied pattern, including somewhat longer peak periods, existing weekday hourly traffic distributions were used to allocate the daily 2015 and 2030 traffic projections for SR-520 and I-90, with the variable toll rates ascending and descending according to these patterns.<sup>7</sup>

**Exhibit 2: SR-520 Weekday Traffic Volume Data (October 2006)**



<sup>7</sup> WSDOT SR 520 bridge traffic data from selected Tuesdays, Wednesdays & Thursdays in October, 2006.

## ***Travel Demand Model Outputs***

Exhibit 3 summarizes the updated toll traffic projections by scenario for the two model analysis years.<sup>8</sup>

**Exhibit 3: Travel Demand Model Outputs for Future Years 2015 and 2030**

<i>Scenario</i>		Lake Washington Crossing Average Daily Traffic								
		<i>SR 520 Midspan</i>			<i>I-90 Main Bridge</i>			<i>I-90 East Bridge</i>		
		<i>Toll<sup>a</sup></i>	<i>HOV 3+</i>	<i>Total</i>	<i>Toll<sup>a</sup></i>	<i>HOV 3+</i>	<i>Total</i>	<i>Toll<sup>a</sup></i>	<i>HOV 3+</i>	<i>Total</i>
<b>2015</b>	Toll-Free Base Case	117,100	5,500	122,600	129,200	2,900	132,100	144,100	3,300	147,400
	SR 520 Tolled / I-90 Toll Free	80,600	6,500	87,100	146,900	3,000	149,900	161,700	3,500	165,200
	SR 520 Tolled / I-90 Tolled	102,500	6,700	109,200	107,300	3,400	110,700	122,100	3,900	126,000
<b>2030</b>	Toll-Free Base Case	122,600	6,400	129,000	145,600	3,600	149,200	158,700	4,100	162,800
	SR 520 Tolled / I-90 Toll Free	85,200	8,600	93,800	161,500	4,200	165,700	174,600	4,900	179,500
	SR 520 Tolled / I-90 Tolled	107,700	8,700	116,400	119,900	4,800	124,700	132,900	5,500	138,400

a-LOV (Low Occupancy Vehicle) total consists of SOVs (Single Occupancy Vehicles) and HOV 2; HOV3+ are free

The travel demand outputs shown in Exhibit 3 form the basis for the toll revenue projections before adjustments for ramp-up effects, toll-free periods, etc. which are discussed in the next section.

### ***Demand Growth Assumptions***

Results from the 2015 and 2030 travel demand model runs were used to determine travel demand over the Post-Completion phase from July 1, 2018 (FY 2019) through June 30, 2058 (FY 2058). Through 2030, total cross-lake traffic is projected to grow at the rate of 0.5 to 0.6% per year, depending on tolling scenario.

From 2030 to 2040, the 2015-2030 annual average rates of growth in demand were reduced by half to be consistent with the dampened growth in the PSRC's longer term land use forecasts. From 2041 onward, expected demand growth was reduced by half again in response to the additional future uncertainty.

Model results were also used to extrapolate backward to mid-2010 (FY 2011) to preliminarily assess Pre-Completion toll traffic demands on the unimproved facilities. As discussed in Section 2, the toll rates during this period were accordingly adjusted downward to offset the expected demand impacts of reduced capacity and/or construction conditions prior to the replacement of SR-520 and improvements to I-90. The existing facilities overlaid with the new construction were not explicitly modeled under this expedited effort.

As only typical weekday traffic was modeled for this exercise, it was necessary to estimate weekend traffic volumes under the various scenarios. Analysis of historical traffic counts show that the weekend share of weekday traffic has varied from 60% up to 75%. For conservancy, it

<sup>8</sup> Traffic forecasts prepared here prepared here for revenue purposes represent different tolling assumptions and a revised travel demand model from those used in the 2006 SR-520 Draft Environmental Impact Statement.

was estimated that typical weekend volumes would be 64% of weekday traffic on both I-90 and SR-520 under all tolling scenarios.

### ***Toll Diversion***

Introducing tolls to previously toll-free facilities causes some of the pre-toll bridge users to divert to un-tolled or lower-cost alternatives. Toll diversion can exhibit a number of different forms:

- Route diversion: shift to a toll-free route
- Mode shift: move to an alternative mode of travel, such as transit or a carpool
- Time shift: shift trip to an un-tolled or lower-tolled time of day
- Change of destination: choose a similar or related destination that does not require traversing tolled facility
- Frequency of use/trip elimination: reducing the incidence of a trip, combining multiple trips, or eliminating the trip altogether

Some diversion, such as mode or time shifting, is not necessarily undesirable. These types of diversion can, among other benefits, help to reduce peak-period congestion. Other diversion, however, may be viewed less favorably. For example, route diversion will often put traffic on arterial or local streets that are not suited to the increase in traffic. Usually, alternative routes are longer than the tolled route, resulting in increased travel time, increased vehicle operating costs, and increased vehicle emissions.

For this analysis, cross-lake travel patterns in terms of trip distribution and destination choices were held fixed. Under this assumption, the travel demand model captures toll diversion primarily as route diversion and mode shift impacts.

Diversion is measured in gross and net terms. *Gross Toll Diversion* is an accounting of the total decrease in vehicular traffic caused by the introduction of tolls. Determining *Net Toll Diversion* requires adding back travelers that diverted by shifting modes.

**When only the 6-lane SR-520 Bridge is tolled**, the toll traffic forecasts indicate gross toll diversion from SR-520 of about 29% on a daily basis, with an overall decrease in cross-lake travel of 8%. During the morning and afternoon peak periods, the share of diverted traffic is less (approximately 20%) and is correspondingly higher during off-peak travel times. I-90 daily traffic demand is expected to increase by 14% initially, declining to a 10% increase by 2030.

Note that some of the diverted traffic represents travelers that still use the SR-520 crossing, either in a transit bus or in a toll-free HOV with three or more occupants. The latter HOV mode shift represents three percentage points of the 29% daily diversion, resulting in net daily toll diversion of 26% after accounting for additional 3+ HOVs.

Exhibit 4 summarizes the predicted diversion impacts for the 2015 model analysis year (as if the bridge improvements were fully completed). Note that this analysis assumes that all travel continues to be made when the bridge is tolled, but does not assess the full diversion impacts beyond 3+ HOV formation and route diversion to I-90.

**Exhibit 4: Diversion Impacts with Only SR-520 Tolled (2015)**

	Toll Free Volume	Toll Impacts	Tolled Volume	
SR-520	GP <sup>1</sup>	117,100 - 36,500	= 80,600	
	HOV 3+ <sup>2</sup>	5,500 + 1,000	= 6,500	HOV 3+ <sup>2</sup> : + 1,000
	<b>Net Diversion = -29%</b>			GP <sup>3</sup> : - 36,500
I-90	GP <sup>1</sup>	129,200 + 17,700	= 146,900	GP <sup>3</sup> : + 17,700
	HOV 3+ <sup>2</sup>	2,900 + 200	= 3,100	HOV 3+ <sup>2</sup> : + 200
	<b>Net Attraction = 14%</b>			
<b>TOTAL CROSS LAKE TRAVEL</b>	GP <sup>1</sup>	246,300 - 18,800	= 227,500	<b>Net Diversion = -7%</b>
	HOV 3+ <sup>2</sup>	8,400 + 1,200	= 9,600	

1: General Purpose Vehicles

2: High Occupancy Vehicles with three or more occupants

3: General Purpose vehicle diversion includes route, mode, destination, and frequency shift.

**When both bridges are tolled**, the toll traffic forecasts predict gross cross-lake toll diversion of approximately 14% overall. This reflects approximately 12% gross toll diversion away from SR-520 and 16% from I-90. Accounting for the increase in toll-free 3+ HOV traffic, net toll diversion is somewhat lower than gross diversion. Note that the diversion rates discussed here are the average rates predicted over the course of the day; toll diversion would be less in the peak periods and higher in the off-peak periods.

**Exhibit 5: Diversion Impacts with SR-520 and I-90 Tolled (2015)**

	Toll Free Volume	Toll Impacts	Tolled Volume	
SR-520	GP <sup>1</sup>	117,100 - 14,600	= 102,500	
	HOV 3+ <sup>2</sup>	5,500 + 1,200	= 6,700	
	<b>Net Diversion = -11%</b>			
I-90	GP <sup>1</sup>	129,200 - 21,800	= 107,400	
	HOV 3+ <sup>2</sup>	2,900 + 500	= 3,400	
	<b>Net Diversion = -16%</b>			
<b>TOTAL CROSS LAKE TRAVEL</b>	GP <sup>1</sup>	246,300 - 36,400	= 209,900	<b>Net Diversion = -14%</b>
	HOV 3+ <sup>2</sup>	8,400 + 1,700	= 10,100	

1: General Purpose Vehicles

2: High Occupancy Vehicles with three or more occupants

3: General Purpose vehicle diversion includes route, mode, destination, and frequency shift.

## 2. Toll Rates and Toll Collection

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### 2.1 Toll Rates

Previous consideration of SR-520 tolls for revenue purposes assumed a variable toll rate structure by time of day, differing for weekends and weekdays.<sup>9</sup> The same approach was employed for this update. Input was provided by the State regarding the minimum and maximum levels for a 2018 weekday schedule, which in turn were used as inputs to average morning and afternoon peak toll rates as well as the average off-peak rate for the modeling described in the previous section. Within these parameters, toll rate schedules were developed to mirror the varying travel demand observed throughout the day and expected shifts in demand due to tolling. The resulting toll schedule has higher rates during the expected peak demand periods and lower rates during other times expected to have less demand, when alternative routes would be more attractive and/or transit alternatives less available.

As discussed previously, the following two toll phases were examined:

- Tolling prior to the completion of the SR-520 project improvements (Pre-Completion, FY 2011 - 2018) and
- Tolling immediately following the completion of the project's improvements (Post-Completion, FY 2019 - 2058).

#### ***Post-Completion Toll Rates***

Post-Completion weekday one-way tolls were capped at \$4.00 during the morning peak period and \$5.00 during the afternoon peak period. One-way tolls were capped at \$2.00 on weekends. A rate floor of \$1.00 was assumed for both weekday and weekend off-peak periods.<sup>10</sup> The toll rates for the remainder of the weekday were established within these bounds, with the one-way tolls collected in both directions. Exhibit 6 depicts weekday and weekend toll schedules by time of day.

By way of comparison, the peak period toll rates approach those identified as revenue-maximizing in the 2004 toll feasibility study when compared in equivalent year dollars; however this analysis did not provide an updated assessment of the toll schedule that would maximize revenues.<sup>11</sup>

Because of the limited timeframe of this analysis, only one set of Post-Completion toll schedules was considered for all scenarios, regardless of whether only SR-520 or both bridges are tolled. Similarly, this analysis considered a set of toll schedules that were also symmetric by direction of travel, reflecting the time-of-day balanced directional flows on SR-520 and the nearly balanced projected directional flows for all cross-lake travel.

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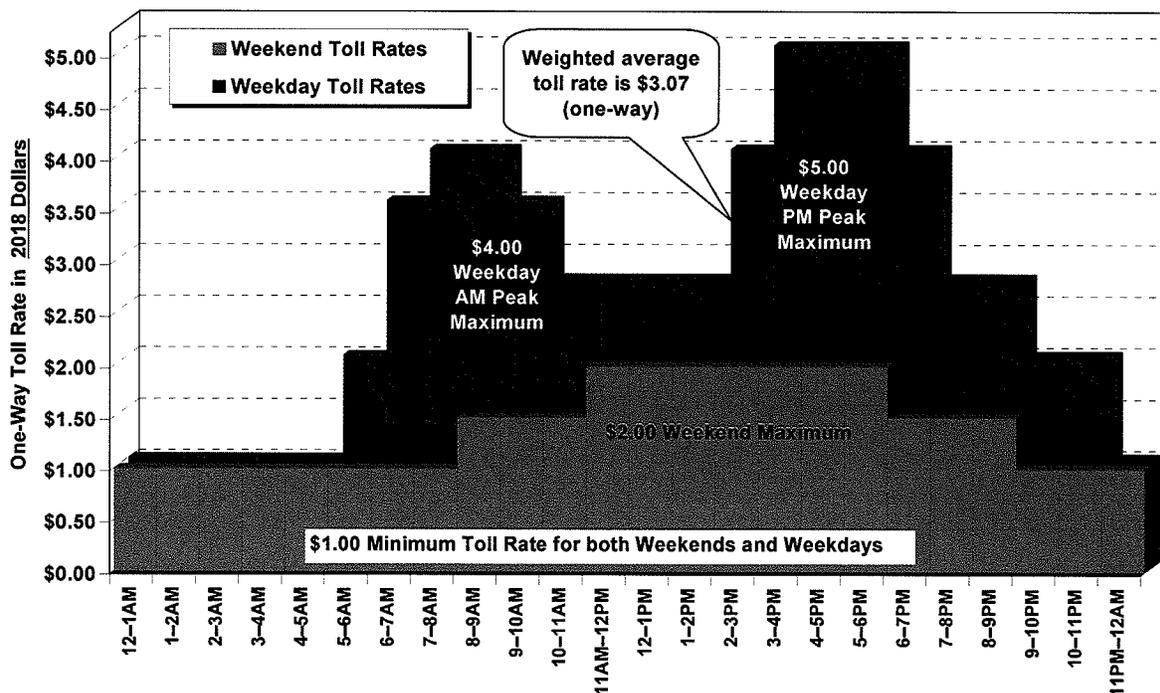
<sup>9</sup> Washington State Department of Transportation. April, 2004. *SR-520 Toll Feasibility Study*.

<sup>10</sup> Throughout this document, basis year dollars are in year-end terms; for example, toll rates expressed as given in 2018 dollars represent toll rate values on December 31, 2018. Similarly, 2018 project expenditures would be assumed to occur at the end of CY 2018.

<sup>11</sup> Washington State Department of Transportation. April, 2004. *SR-520 Toll Feasibility Study*.

Note that toll rates were assumed to escalate 2.5% annually, in step with expected inflation. In all cases, HOV 3+ traffic is assumed to travel toll-free when utilizing HOV lanes.<sup>12</sup> Additionally, medium and heavy trucks are assumed to pay higher tolls which, on average, were assumed to be three times the passenger vehicle rates.

**Exhibit 6: Post-Completion Toll Rate Schedules for SR-520 & I-90 (FY 2019 - 2058)**



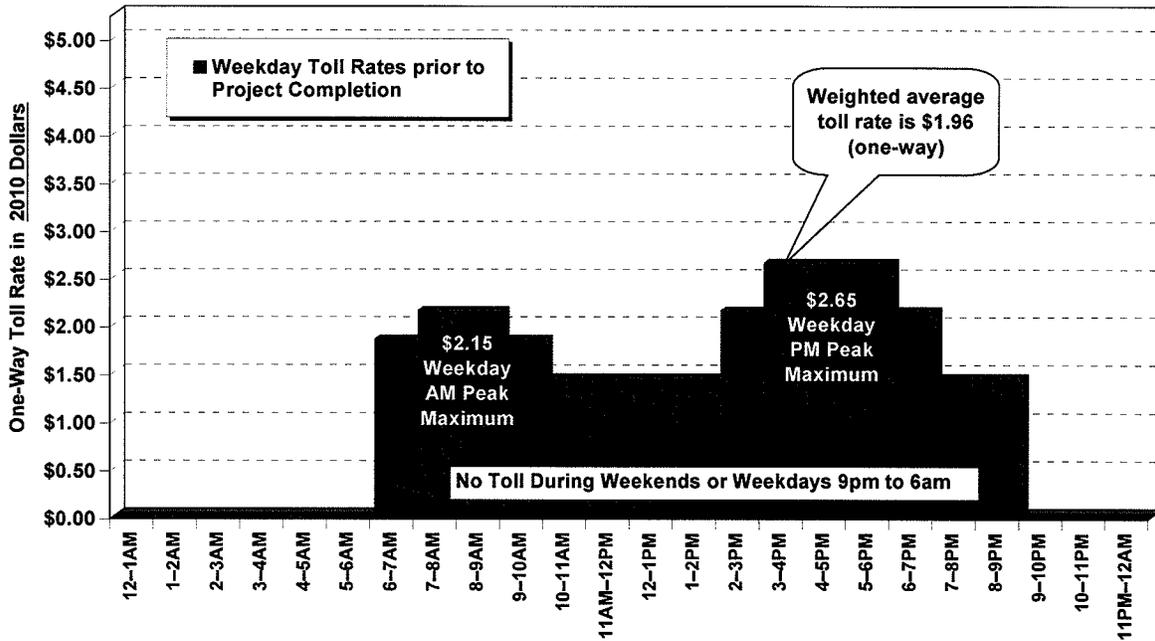
### ***Pre-Completion Toll Rates***

The Pre-Completion tolls were set to approximately two-thirds of the Post-Completion tolls during the daytime on weekdays. It is assumed, however, that cross-lake travel during the Pre-Completion phase will be toll free during nights and weekends when construction activities may impact facility capacity and/or operations. Toll rates are expressed as one-way amounts in year end 2010 dollars for the Pre-Completion phase (FY 2011-18), and are collected in both directions. During the Pre-Completion phase, toll rates are assumed to escalate at 2.5% annually.

As with the Post-Completion phase, HOV 3+ traffic is assumed to travel toll-free when utilizing HOV lanes. Additionally, medium and heavy trucks are assumed to pay higher tolls that are, on average, three times the passenger vehicle rates shown.

<sup>12</sup> This assumption is consistent with the 2004 SR-520 Toll Feasibility Study and the 2006 SR-520 DEIS.

**Exhibit 7: Pre-Completion Toll Rate Schedules for SR-520 and I-90 (FY 2011 - 2018)**



## 2.2 Toll Collection

It is assumed that toll collection will be fully automated by electronic means. This assumption is consistent with industry trends and with previous work. The primary toll collection method will be the use of transponders, with license plate video recognition – “pay-by-plate” – as both a higher cost alternative and as an enforcement mechanism. Since the vast majority of cross-lake traffic will be frequent or repeat traffic, it has been assumed that the transponder use rate will reach 90% for SR-520 after an initial ramp-up period. I-90 transponder use is expected to be somewhat less, as I-90 has a higher share of non-local and infrequent travelers. As such, I-90 transponder use is assumed to stabilize at 80%.

Travelers without a transponder would have their license plate image digitally recorded for pre- or post-travel payment arrangements. Potential options for this could include paying via a website, calling 511, using a convenience store kiosk, and/or billing by mail. A surcharge equal to \$0.90 (in 2018 dollars) is added to the pay-by-plate toll. This surcharge is assessed to directly offset the additional cost of collection from users without a transponder and is assumed to be sized to be equal to this additional cost of collection such that it is net revenue neutral.<sup>13</sup> As with the base tolls, this surcharge is assumed to escalate at 2.5% annually.

<sup>13</sup> Billing by mail may involve an additional administrative fee if this option is provided prior to a violation notice. This analysis is not intended to propose a “pay-by-plate” policy.

### 3. Gross Revenue Projections

Gross toll revenue was determined by combining the projected weekday travel demand with the weekday toll rate schedule for each tolling scenario. Similar action was taken for weekend demand and toll schedules. The average number of weekend days in a year was estimated to be 110 (52 weeks X 2 weekend days, plus six non-weekend holiday days), with the remaining 255 days per year allocated as weekdays. Weekday and weekend toll revenue were then multiplied by these factors to determine annual revenue.

The predicted travel demand was adjusted in the initial years of the Pre-Completion phase to account for "ramp-up" effects, when potential users explore travel alternatives, become accustomed to paying tolls, and become more comfortable with electronic toll collection. Similar ramp-up effects would be seen in the first years of the Post-Completion phase when 24/7 tolling is implemented and the toll rates are significantly increased. As shown in Exhibit 8, the ramp-up is anticipated to be more pronounced when SR-520 is tolled alone versus when tolled in concert with I-90 as SR-520 users divert to the parallel, toll-free I-90 as a travel alternative. The ramp-up assumptions are based on industry experience and professional judgment, and may be viewed as an adjustment that could reflect either revenues or costs initially not meeting their expected targets.

**Exhibit 8: Demand Ramp-Up Assumptions**

	<i>Year of Operation</i>	<b>Expected Share of Modeled Demand</b>	
		<i>Tolling SR 520 Only</i>	<i>Tolling SR 520 and I-90</i>
<b>Pre-Completion</b>	FY 2011	75%	80%
	FY 2012	85%	90%
	FY 2013	95%	100%
	FY 2014	100%	100%
<b>Post-Completion</b>	FY 2019	85%	90%
	FY 2020	95%	100%
	FY 2021	100%	100%

The gross revenue projections also include estimates for the share of traffic represented by medium and heavy trucks and the higher toll rates that these vehicles are subject to. Weekday truck traffic as a percentage of total tolled travel volume is shown in Exhibit 9. The weekend truck traffic percentage share of total traffic was assumed to be one-half the weekday rate, in the absence of data to support an alternative assumption.

**Exhibit 9: Percentage of Medium and Heavy Truck Traffic**

<i>Route</i>	<b>Truck Share of Total Travel Volume</b>	
	<i>Tolling SR 520 Only</i>	<i>Tolling SR 520 and I-90</i>
<b>SR 520</b>	7.7%	7.8%
<b>I-90</b>	5.8%	6.2%

A point of clarification on the truck shares is warranted. As shown in Exhibit 9, the share of truck traffic on I-90 is higher when I-90 is tolled than when it is not; this may seem counterintuitive, as one would rightly expect some trucks to divert from SR-520 to I-90 when only SR-520 is tolled, resulting in higher total truck volumes on I-90. Similarly, when I-90 is also tolled, little to no truck diversion would occur from SR-520 to I-90. The important distinction is that the numbers shown in the table are the percentage shares of the total traffic seen in each of those tolling scenarios. So, while the percentage of trucks relative to the total traffic volume increases on I-90 when tolls are introduced on I-90, the overall traffic volume is actually lower, resulting in a higher share of trucks relative to total vehicles, but a lower truck volume than would be the case if I-90 was toll-free.

Finally, the pay-by-plate surcharge assessed to users without transponders is added to the gross revenue projections. The amount of the surcharge, \$0.90 in 2018, is sized to offset the additional incremental cost of processing the pay-by-plate transactions, discussed in the next section.

Gross revenue projections for SR-520 and I-90 under each of the tolling scenarios are available in the Appendix.

## 4. Net Revenues

This section presents the net revenues after operating expenses and deductions. As is customary in toll road financing, it is assumed that the bond covenants would stipulate that the tolled facilities' operations and maintenance (O&M) be funded by toll revenues prior to debt service payments. This would ensure that the facilities and related assets are well-maintained and continue to provide an acceptable level of service to facility users. Providing funding for toll collection, routine bridge and roadway operations and maintenance as well as periodic repairs and rehabilitation also helps to minimize the risk of facility closure or other events that could interrupt the toll revenue stream. Other revenue sources and expenses are added and subtracted, respectively, to determine the net revenues available for debt service, as shown in Exhibit 10.

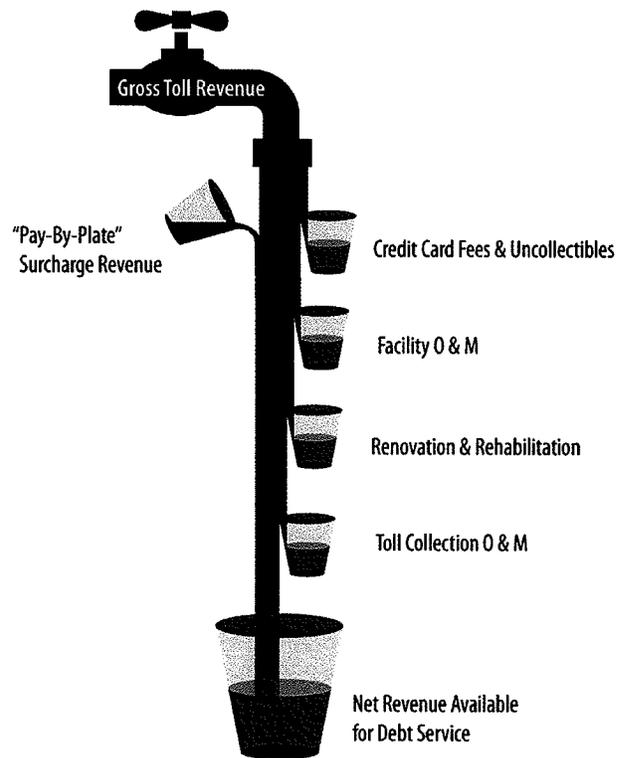
### 4.1 Fixed O&M Costs

#### *Post-Completion Phase*

Fixed O&M costs are defined here to include those expenditures related to toll collection, routine maintenance of the bridge structures, roadway surfaces, and other capital elements of the facilities that do not vary significantly with marginal changes in traffic. Fixed O&M costs also include estimates for periodic major rehabilitation and repair (R&R) expenses.<sup>14</sup> While the R&R costs were allocated as annual amounts, it is understood that many of these costs, such as the periodic pavement overlays, would actually occur relatively infrequently.

Fixed O&M costs were segregated into two categories: facility O&M costs and toll collection O&M costs. A summary of the facility O&M costs including the annual R&R amounts that are assumed to be covered by toll revenues is shown in Exhibit 11. These estimates apply to the Post-Completion phase. Facility O&M costs were derived from the actual costs associated with maintaining the Homer Hadley I-90 Bridge from 2004 through 2006. The values used in this report are preliminary and will be refined as part of subsequent work under the SR-520 Bridge Replacement and HOV Project.

**Exhibit 10: Revenue "Waterfall"**



<sup>14</sup> Excepting costs associated with bridge pontoon R&R, which were not available at the date of writing.

**Exhibit 11: SR-520 and I-90 Facility O&M Costs**

<b>Annual Facility Operations &amp; Maintenance Costs (\$000)<sup>a</sup></b>			
<b>Categories</b>		<b>SR 520</b>	<b>I-90<sup>b</sup></b>
Tunnel and Lid Facilities		0	1,331
Structure and Bridge Operations		611	272
Electrical Services and Highway Lighting		157	35
3rd Party Damages		74	47
Roadway Surface		71	0
Electrical Equipment		55	29
Other O&M Costs		45	55
General Roadside		26	32
Drainage Facilities		25	0
Training/General Work Activities		24	0
Annual IRT Cost		691	691
Landscape		0	137
Total Routine Annual Facility O&M Costs (2004 \$000)		1,779	2,629
Total Routine Annual Facility O&M Costs (2018 \$000)		2,514	3,715
Annual Allocation for Periodic R&R Costs (2006 \$000)		1,281	2,323

a - O&M estimate prepared by WSDOT

b - I-90 O&M costs would only be applied to the project under the the tolled I-90 scenarios

Exhibit 11 also presents the gross revenue deductions for periodic, capital re-investment expenditures for renovation and rehabilitation (R&R). These values were provided as annual amounts and were deducted from gross revenues in every year of the Post-Completion phase. These annual amounts represent contributions to an account that would then fund these periodic, major repairs as they are anticipated to arise over the term of the debt. Note that the R&R amounts exclude pontoon rehabilitation, as estimates were not available at the time of writing.

Additional fixed annual O&M expenses would be incurred for toll operations and the maintenance of the electronic toll collection systems, detailed in Exhibit 12. Because toll systems are largely proprietary, maintenance services are usually contracted with component equipment suppliers or the original system installer for the life of the contract.

**Exhibit 12: SR-520 and I-90 Toll Collection O&M Costs<sup>15</sup>**

<b>Annual Toll Collection Operations &amp; Maintenance Costs (\$000)</b>	
<b>Categories</b>	<b>All Tolling Scenarios</b>
Project Labor for Administration	480
Travel	4
Office Supplies	1
Dues and Memberships	10
Training and Conferences	2
Telephone Service	2
Automatic Voice Tel Sys	3
Postage Courier	15
Legal Support	5
Marketing	20
Vehicle lease, fuel, maint	12
Outside auditor	50
Banking	5
Office & Furn Lease/Maintenance	100
Utilities	5
Police	40
Licenses/Permits	2
Forms	2
Security System Maint	1
Independent Engineer Review	50
Admin computers/software	5
Pagers/Cell Phones	1
Insurance	200
Toll Collection System Maintenance	240
Total SR 520 Toll Collection O&M Costs (2006 dollars)	1,255
Incremental Cost for Adding I-90 Bridge to Tolling	545
Total Toll Collection O&M Costs (2006 dollars)	1,800
Total Toll Collection O&M Costs (2018 dollars)	2,421

***Pre-Completion Phase***

During construction of the replacement SR-520 bridge and the improvements to I-90, it is conceivable that certain maintenance functions will either be deferred, foregone or capitalized as part of the construction expenditures. As a result, the maintenance portion of the routine annual facility O&M expenditures for the existing bridges (about 15% of total routine facility O&M) were excluded as a deduction from gross revenues during the Pre-Completion phase.

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<sup>15</sup> Toll collection O&M costs were derived from estimates completed for a similar 100% ETC toll feasibility study in the San Francisco Bay area.

While the annual allocation for R&R expenditures during construction could also conceivably be omitted as a deduction from gross revenues for the same reasons, it is more conservative to assume that they would need to be covered from toll revenues, at least in the case of I-90.<sup>16</sup>

All other Pre-Completion gross revenue deductions mirror those of the Post-Completion phase.

## **4.2 Variable O&M Costs**

Variable O&M costs are defined here to include those expenditures related to toll collection and related customer service and enforcement activities that vary directly with marginal changes in traffic or are generally expressed as a rate per vehicle toll transaction.

Each electronic transaction has associated with it a cost to the toll collection agency. The incremental cost of processing each transponder payment, based on the total number of expected transactions, is estimated to be \$0.18 (in 2018 dollars). The additional cost of processing each of the pay-by-plate transaction for users without transponders is estimated to be \$0.90 (in 2018 dollars), for a total incremental cost of \$1.08.<sup>17</sup> It is noted that the surcharge added to the pay-by-plate transaction is sized to be the same as this incremental cost, so that pay-by-plate surcharge revenue and expenses are revenue-neutral.

## **4.3 Non-Recurring Operations Costs**

In order to achieve the target transponder market penetration, a promotional marketing campaign is expected. Costs for this effort include advertisement and transponder distribution, and are expected to occur primarily in FY 2011 – 2012 and FY 2019 – 2021 to coincide with the beginnings of the Pre-Completion and Post-Completion tolling phases, respectively.

## **4.4 Revenue Deductions**

An additional deduction totaling 5% of the gross revenues in each year was made to capture a variety of impacts that are anticipated to reduce the toll revenue potential. Approximately 2% represents the deduction to account for credit card fees, assuming that the vast majority of travelers will have transponder accounts that are linked to credit cards (or debit cards used in a credit card transaction) or would otherwise pay by a credit card.

The remaining 3% deduction to gross revenues was made to account for uncollectible accounts, intentional toll evasion, and/or electronic collection errors such as unreadable license plate images.

## **4.5 Net Revenue Available for Debt Service**

Net revenue for selected representative years is graphically presented in Exhibit 13. The Pre-Completion period, FY 2011 – 18, is represented by amounts for year 2014. By 2014, demand ramp-up effects will have been fully realized, and pre-completion operations will be as stable as could be expected. The Post-Completion period is represented by FY 2021, FY 2030, and FY

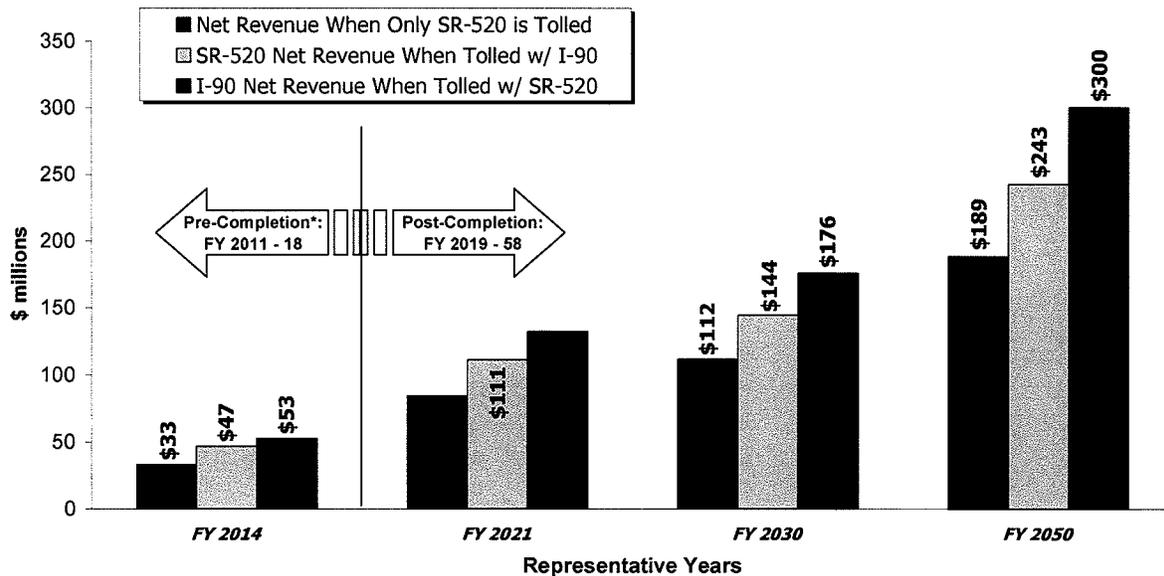
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<sup>16</sup> Note that the R&R annual allocations are called out as a separate item in the Appendix traffic and revenue tables to allow them to be included or omitted as a gross revenue deduction

<sup>17</sup> Cost estimates provided by WSDOT.

2050. FY 2021 results are provided to show what net revenues will be early in the Post-Completion period in a year when ramp-up effects are complete and stable operations prevail. FY 2030 and 2050 results are shown to provide forward snapshots of the yearly net revenue available for debt service.

**Exhibit 13: Net Revenue Available for Project Funding by Selected Years**



\* Pre-Completion toll rates are approximately one-half the future Post-Completion rates, and nights and weekends are toll-free. As such, net revenues are markedly lower in the Pre-Completion period.

Detailed net revenue projections for SR-520 and I-90 under each of the tolling scenarios are available in the Appendix. Exhibit 14 through Exhibit 17 present the progression from gross toll revenues to net toll revenues available for project financing for SR-520 when tolled alone (Exhibit 14) and for each of the bridges when tolled in tandem (Exhibit 15 for SR-520 and Exhibit 16 for I-90). A fourth table (Exhibit 17) also summarizes the total cross-lake toll revenues when both bridges are tolled. The net toll revenues can be interpreted as the cash flow available for debt service.

Similarly, Exhibit 18 through Exhibit 21 portray the gross and net revenue trends for SR-520 when tolled alone (Exhibit 18) and for the two bridges when tolled in tandem (Exhibit 19 through Exhibit 21).

## 5. Study Limitations and Potential Refinements

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The compressed schedule for this effort necessitated an expedited approach to preparing updated feasibility-grade toll traffic and revenue estimates for the SR-520 and initial estimates for the I-90 lake crossings. This approach relied heavily on available information with limited independent verification. An extended schedule would allow for more in-depth analysis and modeling of toll traffic demand forecasts, a more refined assessment of gross revenues, and facilitate the development of updated and tailored estimates for toll and facility O&M costs as well as the other revenue deductions. Additionally, a newly revised travel forecasting model and more refined source data will be available in the next few months, which will allow for more accurate and descriptive travel demand modeling outputs.

### 5.1 Travel Demand Modeling and Analysis Refinements

The directionally balanced cross-lake travel by time of day observed on SR-520 warrants a variable toll schedule that is the same in both directions. Since the overall cross-lake traffic is, in aggregate, also fairly balanced, this symmetrical toll schedule was applied to the I-90 traffic as well. Given that traffic on I-90 by itself is not as directionally balanced by time of day as SR-520, additional analysis of alternative toll structures for I-90 would be warranted when time permits to determine if an asymmetrical toll schedule that is shaped to more accurately conform to actual travel demand would be appropriate.

In addition, it would be advantageous to iteratively test a range of toll rates on both bridges to identify, for the cases of one and both bridges tolled, the shape of the revenue curve and the point at which toll revenues are maximized to help inform further discussion of toll structure and policies.

Further toll structure analysis may be best postponed until an updated version of the SR-520 project's travel demand model is available. The newly updated PSRC model that will be used for future travel forecasting analysis of the SR-520 Bridge and HOV Replacement Project is currently undergoing a mini-validation analysis for the SR-520 corridor. The validation schedule currently calls for the 2030 results (for toll-free and tolled cases) to be available in the summer of 2007. The new PSRC model databases that will then be available are expected to be better suited to performing detailed toll modeling analyses for the SR-520 and I-90 facilities.

Additionally, relative to the previous versions, the new PSRC model is expected to be superior, specifically for toll modeling analysis. Key features include:

- A new mode choice model;
- The application of five daily time periods instead of three;
- A time of day component that allows trips to react to tolls by shifting the time of travel to lower cost times of day (rather than a constant factor system wide as is in the old PSRC model);
- The option to vary the value of travel time (VOT) by income group for work trips;

- The latest land use forecasts (version 2006); and
- Updated zonal parking costs with more refined real growth rates over time.

Finally, additional time would allow for a more in-depth analysis and understanding of the model-predicted toll diversion impacts by the various types of diversion behavior (e.g., mode shift, alternate route, and time of travel, etc.). This additional analysis would allow for quantification of the impacts of diversion to not only the tolled facilities but to the rest of the area transportation network.

## **5.2 Gross Revenue Projection Refinements**

For this exercise, only one toll structure was examined, providing for each tolling scenario only one point of reference. In conjunction with an expanded range of modeled toll rates/structures, additional revenue scenarios and targeted sensitivity tests could be conducted. This could involve a feedback loop with the ongoing discussion of toll policies and objectives, including the identification of toll schedules of particular interest, such as the revenue maximization toll schedule, or the schedules that yield particular traffic management results.

Additional sampling and analysis of existing traffic data would also allow for a more refined allocation of traffic by time of day and customization of the variable toll schedule as well as the assessment of variable toll demand and diversion impacts

## **5.3 Net Revenue Available for Debt Service and Financial Capacity**

This study relied on existing facility O&M costs for similar facilities/situations combined with some preliminary estimates for the variable and fixed costs of toll collection that borrowed heavily from other studies.

In order to further refine the estimates of net revenue available for debt service, more detailed, project-specific estimates for both facility and toll collection O&M functions are needed. For toll collection O&M costs, new estimates will need to reflect current toll payment and enforcement policies emerging in Washington State.

A comparative analysis of the results of the 2004 study and the results presented here would be a useful next step in this process. This analysis should focus on an examination of the differences in the inputs and reported outcomes, including travel demand and financial assumptions and parameters, travel demand estimates, gross toll revenue, O&M expenses and other revenue deductions, and net toll revenue. The goal of this analysis would be to determine what elements had the greatest influence on differences in the two studies' outcomes, and then to review those elements to determine what adjustments, if any, may be needed to move forward to improve forecasting capabilities.

# Appendix

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**Exhibit 14 — SR 520 Bridge Toll Traffic and Revenue Projections with I-90 Bridge Toll-Free**

Fiscal Year	Weighted Average Toll Rate (one-way) <sup>1</sup>	Maximum Weekday Toll Rate (one-way)	Minimum Weekend Toll Rate (one-way)	Annual Toll Transactions (millions) <sup>2</sup>	Passenger Car Equivalent (PCE) Annual Volumes (millions) <sup>3</sup>	Toll-Free 3+ HOV Annual Volumes (Millions)	Gross Toll Revenue Potential (\$ millions) <sup>4</sup>	Plus:			Less:			Net Revenue Available for Debt Service (\$ millions)
								Pay-by-Plate <sup>5</sup>	Surcharge Revenue for	Uncollectible Accounts/ Credit Fees (\$ millions) <sup>7</sup>	Annualized Repair Costs (\$ millions)	Routine Facility O&M Costs (\$ millions)	Toll Collection O&M Costs (\$ millions)	
2011	\$1.96	\$2.65	\$1.45*	12.08	13.94	0.83	27.30	2.42	(0.55)	(1.41)	(1.78)	(6.91)	19.07	
2012	\$2.01	\$2.72	\$1.49*	14.99	17.30	0.85	34.73	2.31	(0.69)	(1.45)	(1.82)	(6.69)	26.38	
2013	\$2.06	\$2.78	\$1.52*	16.82	19.41	0.87	39.93	1.77	(0.80)	(1.49)	(1.87)	(5.16)	32.38	
2014	\$2.11	\$2.85	\$1.56*	16.88	19.48	0.89	41.08	1.82	(0.82)	(1.52)	(1.91)	(5.31)	33.33	
2015	\$2.16	\$2.93	\$1.60*	16.94	19.55	0.91	42.26	1.87	(0.85)	(1.56)	(1.96)	(5.45)	34.31	
2016	\$2.22	\$3.00	\$1.64*	17.00	19.62	0.93	43.47	1.92	(0.87)	(1.60)	(2.01)	(5.61)	35.31	
2017	\$2.27	\$3.07	\$1.68*	17.07	19.69	0.95	44.72	1.98	(0.89)	(1.64)	(2.06)	(5.76)	36.34	
2018	\$2.33	\$3.15	\$1.72*	17.13	19.77	0.97	46.01	2.04	(0.92)	(1.68)	(2.11)	(5.92)	37.41	
2019	\$3.07	\$5.00	\$1.00	22.62	25.73	1.00	79.05	2.76	(1.58)	(1.72)	(2.51)	(10.17)	65.83	
2020	\$3.15	\$5.13	\$1.03	25.38	28.86	1.02	90.89	3.17	(1.82)	(1.77)	(2.58)	(10.32)	77.59	
2021	\$3.23	\$5.25	\$1.05	26.81	30.49	1.04	98.43	3.43	(1.97)	(1.81)	(2.64)	(10.98)	84.46	
2022	\$3.31	\$5.38	\$1.08	26.91	30.60	1.07	101.26	3.53	(2.03)	(1.86)	(2.71)	(9.36)	88.85	
2023	\$3.39	\$5.52	\$1.10	27.01	30.72	1.09	104.17	3.63	(2.08)	(1.90)	(2.78)	(9.62)	91.43	
2024	\$3.48	\$5.66	\$1.13	27.11	30.83	1.12	107.17	3.74	(2.14)	(1.95)	(2.84)	(9.89)	94.08	
2025	\$3.56	\$5.80	\$1.16	27.21	30.94	1.14	110.26	3.84	(2.21)	(2.00)	(2.92)	(10.17)	96.81	
2026	\$3.65	\$5.94	\$1.19	27.31	31.06	1.17	113.43	3.95	(2.27)	(2.05)	(2.99)	(10.46)	99.62	
2027	\$3.74	\$6.09	\$1.22	27.41	31.17	1.20	116.69	4.07	(2.33)	(2.10)	(3.06)	(10.75)	102.51	
2028	\$3.84	\$6.24	\$1.25	27.51	31.29	1.22	120.05	4.19	(2.40)	(2.15)	(3.14)	(11.05)	105.49	
2029	\$3.93	\$6.40	\$1.28	27.61	31.40	1.25	123.50	4.31	(2.47)	(2.21)	(3.22)	(11.36)	108.55	
2030	\$4.03	\$6.56	\$1.31	27.71	31.52	1.28	127.06	4.43	(2.54)	(2.26)	(3.30)	(11.68)	111.70	
2031	\$4.13	\$6.72	\$1.34	27.76	31.57	1.29	130.47	4.55	(2.61)	(2.32)	(3.38)	(11.99)	114.72	
2032	\$4.24	\$6.89	\$1.38	27.81	31.63	1.31	133.98	4.67	(2.68)	(2.38)	(3.47)	(12.31)	117.82	
2033	\$4.34	\$7.06	\$1.41	27.86	31.69	1.32	137.58	4.80	(2.75)	(2.44)	(3.55)	(12.64)	121.00	
2034	\$4.45	\$7.24	\$1.45	27.92	31.75	1.34	141.28	4.93	(2.83)	(2.50)	(3.64)	(12.98)	124.27	
2035	\$4.56	\$7.42	\$1.48	27.97	31.81	1.35	145.08	5.06	(2.90)	(2.56)	(3.73)	(13.32)	127.63	
2036	\$4.68	\$7.61	\$1.52	28.02	31.87	1.37	148.98	5.19	(2.98)	(2.62)	(3.83)	(13.67)	131.08	
2037	\$4.79	\$7.80	\$1.56	28.07	31.93	1.39	152.99	5.33	(3.06)	(2.69)	(3.92)	(14.04)	134.62	
2038	\$4.91	\$7.99	\$1.60	28.12	31.98	1.40	157.10	5.48	(3.14)	(2.76)	(4.02)	(14.41)	138.25	
2039	\$5.03	\$8.19	\$1.64	28.17	32.04	1.42	161.33	5.62	(3.23)	(2.82)	(4.12)	(14.79)	141.99	
2040	\$5.16	\$8.40	\$1.68	28.23	32.10	1.43	165.67	5.78	(3.31)	(2.89)	(4.22)	(15.19)	145.83	
2041	\$5.29	\$8.61	\$1.72	28.25	32.13	1.44	169.97	5.93	(3.40)	(2.97)	(4.33)	(15.58)	149.62	
2042	\$5.42	\$8.82	\$1.76	28.28	32.16	1.45	174.38	6.08	(3.49)	(3.04)	(4.44)	(15.98)	153.51	
2043	\$5.56	\$9.04	\$1.81	28.30	32.19	1.46	178.90	6.24	(3.58)	(3.12)	(4.55)	(16.39)	157.50	
2044	\$5.70	\$9.27	\$1.85	28.33	32.22	1.47	183.54	6.40	(3.67)	(3.20)	(4.66)	(16.82)	161.60	
2045	\$5.84	\$9.50	\$1.90	28.36	32.25	1.48	188.30	6.57	(3.77)	(3.27)	(4.78)	(17.25)	165.80	
2046	\$5.98	\$9.74	\$1.95	28.38	32.28	1.48	193.19	6.74	(3.86)	(3.36)	(4.90)	(17.69)	170.11	
2047	\$6.13	\$9.98	\$2.00	28.41	32.31	1.49	198.20	6.91	(3.96)	(3.44)	(5.02)	(18.15)	174.54	
2048	\$6.29	\$10.23	\$2.05	28.44	32.34	1.50	203.35	7.09	(4.07)	(3.53)	(5.14)	(18.62)	179.08	
2049	\$6.44	\$10.49	\$2.10	28.46	32.37	1.51	208.62	7.27	(4.17)	(3.61)	(5.27)	(19.10)	183.73	
2050	\$6.61	\$10.75	\$2.15	28.49	32.40	1.52	214.03	7.46	(4.28)	(3.71)	(5.41)	(19.59)	188.51	
2051	\$6.77	\$11.02	\$2.20	28.51	32.43	1.53	219.59	7.66	(4.39)	(3.80)	(5.54)	(20.10)	193.42	
2052	\$6.94	\$11.29	\$2.26	28.54	32.46	1.54	225.29	7.85	(4.51)	(3.89)	(5.68)	(20.62)	198.45	
2053	\$7.11	\$11.58	\$2.32	28.57	32.49	1.54	231.13	8.06	(4.62)	(3.99)	(5.82)	(21.15)	203.61	
2054	\$7.29	\$11.87	\$2.37	28.59	32.52	1.55	237.13	8.27	(4.74)	(4.09)	(5.97)	(21.69)	208.90	
2055	\$7.47	\$12.16	\$2.43	28.62	32.55	1.56	243.28	8.48	(4.87)	(4.19)	(6.12)	(22.25)	214.34	
2056	\$7.66	\$12.47	\$2.49	28.65	32.58	1.57	249.59	8.70	(4.99)	(4.30)	(6.27)	(22.83)	219.91	
2057	\$7.85	\$12.78	\$2.56	28.67	32.61	1.58	256.07	8.93	(5.12)	(4.40)	(6.43)	(23.42)	225.63	
2058	\$8.05	\$13.10	\$2.62	28.70	32.64	1.59	262.71	9.16	(5.25)	(4.51)	(6.59)	(24.02)	231.50	
Totals FY 2011-18				128.91	148.76	7.21	319.50	16.11	(6.39)	(12.36)	(15.52)	(46.81)	254.53	
Totals FY 2019-58				1113.07	1265.93	54.50	6003.73	230.25	(132.07)	(116.16)	(169.46)	(612.40)	5803.88	

**Footnotes**

<sup>1</sup> Reflects the average revenue per passenger car based on the variable weekday and weekend time-of-day toll structures.

<sup>2</sup> Annual volume of vehicles subject to tolls in each travel direction after ramp up adjustment; includes SOVs, HOV2s, and trucks.

<sup>3</sup> Conversion of trucks to their passenger car equivalent (PCE) where trucks, on average, pay 3x the auto toll (1 truck = 3 cars).

<sup>4</sup> Excludes toll surcharge revenue assessed to customers without transponders for pay-by-plate (video tolling/license plate list).

<sup>5</sup> Pay-by-plate toll surcharge revenue assessed to customers (without transponders) for pay-by-plate (video tolling/license plate list).

<sup>6</sup> Ramp-up includes initial demand reductions as customers get accustomed to tolls and electronic toll collection gains acceptance.

<sup>7</sup> 5% Deduction for credit card fees and revenue loss due to the net effects of evasion, processing errors and uncollectible accounts.

**General Notes**

- \* Nights & weekends are toll-free in Fiscal Years 2011-2018
- All dollar amounts in year of collection / year of expenditure
- Toll rate escalation / O&M inflation projected at 2.5% per year
- 3+ HOVs travel toll-free in HOV lanes
- 1-90 toll traffic volumes reflect equivalent cross-lake trips
- Weekend daily demand equals 64% of weekday demand
- Weekend truck share of traffic equals 1/2 of the weekday share

**Exhibit 15 — SR 520 Bridge Toll Traffic and Revenue Projections with I-90 Bridges Tolloed**

Fiscal Year	Weighted Average Toll Rate (one-way) <sup>1</sup>	Maximum Weekday Toll Rate (one-way)	Minimum Weekday Toll Rate (one-way)	Annual Toll Transactions (millions) <sup>2</sup>	Passenger Car Equivalent (PCE)	Passenger Car Toll-Free 3+ HOV Annual Volumes (millions) <sup>3</sup>	Gross Toll Revenue Potential (\$ millions) <sup>4</sup>	Plus: Surcharge Revenue for Pay-by-Plate <sup>5</sup>	Less: Uncollectible Accounts/ Credit Fees (\$ millions) <sup>7</sup>	Less: Annualized Rehab & Repair Costs (\$ millions)	Less: Routine Facility O&M Costs (\$ millions)	Less: Toll Collection O&M Costs (\$ millions)	Net Revenue Available for Debt Service (\$ millions)
2011	\$1.96	\$2.65	\$1.45*	16.43	19.00	0.86	37.20	3.29	(0.74)	(1.41)	(1.78)	(6.64)	29.91
2012	\$2.01	\$2.72	\$1.49*	20.23	23.39	0.87	46.95	3.11	(0.94)	(1.45)	(1.82)	(6.84)	39.01
2013	\$2.06	\$2.78	\$1.52*	22.55	26.08	0.89	53.65	2.37	(1.07)	(1.49)	(1.87)	(6.03)	45.57
2014	\$2.11	\$2.85	\$1.56*	22.62	26.16	0.91	55.17	2.44	(1.10)	(1.52)	(1.91)	(6.19)	46.87
2015	\$2.16	\$2.93	\$1.60*	22.70	26.25	0.93	56.73	2.51	(1.13)	(1.56)	(1.96)	(6.37)	48.22
2016	\$2.22	\$3.00	\$1.64*	22.77	26.33	0.95	58.34	2.58	(1.17)	(1.60)	(2.01)	(6.54)	49.60
2017	\$2.27	\$3.07	\$1.68*	22.85	26.42	0.97	60.00	2.65	(1.20)	(1.64)	(2.06)	(6.73)	51.02
2018	\$2.33	\$3.15	\$1.72*	22.92	26.50	0.99	61.70	2.72	(1.23)	(1.68)	(2.11)	(6.91)	52.48
2019	\$3.07	\$5.00	\$1.00	30.43	34.67	1.01	106.55	3.71	(2.13)	(1.72)	(2.51)	(10.39)	93.50
2020	\$3.15	\$5.13	\$1.03	33.92	38.65	1.03	121.75	4.24	(2.43)	(1.77)	(2.58)	(11.16)	108.04
2021	\$3.23	\$5.25	\$1.05	34.03	38.78	1.06	125.20	4.36	(2.50)	(1.81)	(2.64)	(11.48)	111.12
2022	\$3.31	\$5.38	\$1.08	34.14	38.90	1.08	128.75	4.48	(2.57)	(1.86)	(2.71)	(10.83)	115.26
2023	\$3.39	\$5.52	\$1.10	34.25	39.03	1.10	132.40	4.61	(2.65)	(1.90)	(2.84)	(11.14)	118.55
2024	\$3.48	\$5.66	\$1.13	34.37	39.16	1.13	136.16	4.74	(2.72)	(1.95)	(2.92)	(11.45)	121.93
2025	\$3.56	\$5.80	\$1.16	34.48	39.29	1.15	140.02	4.87	(2.80)	(2.00)	(3.06)	(11.77)	125.41
2026	\$3.65	\$5.94	\$1.19	34.59	39.42	1.17	143.99	5.01	(2.88)	(2.05)	(3.14)	(12.10)	128.98
2027	\$3.74	\$6.09	\$1.22	34.71	39.55	1.20	148.07	5.15	(2.96)	(2.10)	(3.22)	(12.44)	132.66
2028	\$3.84	\$6.24	\$1.25	34.82	39.68	1.22	152.27	5.30	(3.05)	(2.15)	(3.30)	(12.79)	136.45
2029	\$3.93	\$6.40	\$1.28	34.93	39.81	1.25	156.59	5.45	(3.13)	(2.21)	(3.38)	(13.15)	140.34
2030	\$4.03	\$6.56	\$1.31	35.05	39.94	1.28	161.03	5.60	(3.22)	(2.26)	(3.46)	(13.51)	144.34
2031	\$4.13	\$6.72	\$1.34	35.11	40.00	1.29	165.33	5.75	(3.31)	(2.32)	(3.54)	(13.87)	148.21
2032	\$4.24	\$6.89	\$1.38	35.22	40.07	1.30	169.74	5.91	(3.39)	(2.38)	(3.62)	(14.24)	152.17
2033	\$4.34	\$7.06	\$1.41	35.22	40.13	1.32	174.27	6.06	(3.49)	(2.44)	(3.70)	(14.62)	156.24
2034	\$4.45	\$7.24	\$1.45	35.28	40.20	1.33	178.92	6.23	(3.58)	(2.50)	(3.78)	(15.01)	160.43
2035	\$4.56	\$7.42	\$1.48	35.34	40.27	1.35	183.70	6.39	(3.67)	(2.56)	(3.86)	(15.40)	164.72
2036	\$4.68	\$7.61	\$1.52	35.40	40.33	1.36	188.60	6.56	(3.77)	(2.62)	(3.94)	(15.81)	169.13
2037	\$4.79	\$7.80	\$1.56	35.45	40.40	1.37	193.63	6.74	(3.87)	(2.69)	(4.02)	(16.23)	173.65
2038	\$4.91	\$7.99	\$1.60	35.51	40.46	1.39	198.80	6.92	(3.98)	(2.76)	(4.10)	(16.66)	178.30
2039	\$5.04	\$8.19	\$1.64	35.57	40.53	1.40	204.10	7.10	(4.08)	(2.82)	(4.18)	(17.10)	183.07
2040	\$5.16	\$8.40	\$1.68	35.63	40.60	1.42	209.55	7.29	(4.19)	(2.89)	(4.26)	(17.56)	187.97
2041	\$5.29	\$8.61	\$1.72	35.66	40.63	1.43	214.96	7.48	(4.30)	(2.97)	(4.34)	(18.01)	192.84
2042	\$5.42	\$8.82	\$1.76	35.69	40.66	1.43	220.52	7.67	(4.41)	(3.04)	(4.42)	(18.47)	197.83
2043	\$5.56	\$9.04	\$1.81	35.72	40.70	1.44	226.22	7.87	(4.52)	(3.12)	(4.50)	(18.95)	202.95
2044	\$5.70	\$9.27	\$1.85	35.75	40.73	1.45	232.06	8.07	(4.64)	(3.20)	(4.58)	(19.44)	208.20
2045	\$5.84	\$9.50	\$1.90	35.78	40.76	1.46	238.06	8.28	(4.76)	(3.27)	(4.66)	(19.94)	213.59
2046	\$5.99	\$9.74	\$1.95	35.80	40.80	1.47	244.21	8.50	(4.88)	(3.36)	(4.74)	(20.45)	219.12
2047	\$6.14	\$9.98	\$2.00	35.83	40.83	1.47	250.52	8.72	(5.01)	(3.44)	(4.82)	(20.98)	224.79
2048	\$6.29	\$10.23	\$2.05	35.86	40.86	1.48	257.00	8.94	(5.14)	(3.53)	(4.90)	(21.52)	230.61
2049	\$6.45	\$10.49	\$2.10	35.89	40.90	1.49	263.64	9.17	(5.27)	(3.61)	(5.00)	(22.07)	236.58
2050	\$6.61	\$10.75	\$2.15	35.92	40.93	1.50	270.45	9.41	(5.41)	(3.71)	(5.08)	(22.64)	242.70
2051	\$6.77	\$11.02	\$2.20	35.95	40.97	1.50	277.44	9.65	(5.55)	(3.80)	(5.16)	(23.22)	248.98
2052	\$6.94	\$11.29	\$2.26	36.01	41.00	1.51	284.61	9.90	(5.69)	(3.89)	(5.24)	(23.82)	255.42
2053	\$7.12	\$11.58	\$2.32	36.04	41.03	1.52	291.96	10.16	(5.84)	(3.99)	(5.32)	(24.44)	262.03
2054	\$7.29	\$11.87	\$2.37	36.07	41.07	1.53	299.51	10.42	(5.99)	(4.09)	(5.40)	(25.07)	268.82
2055	\$7.48	\$12.16	\$2.43	36.07	41.10	1.54	307.25	10.69	(6.14)	(4.19)	(5.48)	(25.71)	275.77
2056	\$7.66	\$12.47	\$2.49	36.10	41.13	1.54	315.19	10.97	(6.30)	(4.30)	(5.56)	(26.37)	282.91
2057	\$7.85	\$12.78	\$2.56	36.13	41.17	1.55	323.33	11.25	(6.47)	(4.40)	(5.64)	(27.05)	290.23
2058	\$8.05	\$13.10	\$2.62	36.16	41.20	1.56	331.69	11.54	(6.63)	(4.51)	(5.72)	(27.75)	297.75
<b>Totals FY 2011-18</b>		173.06		1409.74	200.13	7.38	429.75	21.66	(8.59)	(12.36)	(15.52)	(52.26)	362.67
<b>Totals FY 2019-58</b>					1606.34	54.10	8368.01	291.16	(167.36)	(116.16)	(169.46)	(704.60)	7501.59

**Footnotes**

<sup>1</sup> Reflects the average revenue per passenger car based on the variable weekday and weekend time-of-day toll structures.

<sup>2</sup> Annual volume of vehicles subject to tolls in each travel direction after ramp up adjustment; includes SOVs, HOV2s, and trucks.

<sup>3</sup> Conversion of trucks to their passenger car equivalent (PCE) where trucks, on average, pay 3x the auto toll (1 truck = 3 cars).

<sup>4</sup> Excludes toll surcharge revenue assessed to customers without transponders for pay-by-plate (video tolling/license plate list).

<sup>5</sup> Pay-by-plate toll surcharge revenue assessed to capture the additional collection costs of video tolling/license plate list payment.

<sup>6</sup> Ramp-up includes initial demand reductions as customers get accustomed to tolls and electronic toll collection gains acceptance.

<sup>7</sup> 5% deduction for credit card fees and revenue loss due to the net effects of evasion, processing errors and uncollectible accounts.

**General Notes**

- \* Nights & weekends are toll-free in Fiscal Years 2011-2018
- All dollar amounts in year of collection / year of expenditure
- Toll rate escalation / O&M inflation projected at 2.5% per year
- 3+ HOVs travel toll-free in HOV lanes
- I-90 toll traffic volumes reflect equivalent cross-lake trips
- Weekend daily demand equals 64% of weekday demand
- Weekend truck share of traffic equals 1/2 of the weekday share

**Exhibit 16 — I-90 Bridges Toll Traffic and Revenue Projections with SR-520 Bridge Tolloed**

Fiscal Year	Weighted Average Toll Rate (one-way) <sup>1</sup>	Maximum Weekday Toll Rate (one-way)	Minimum Weekday/Weekend Toll Rate (one-way)	Annual Toll Transactions (millions) <sup>2</sup>	Passenger Car Equivalent (PCE) Annual Volumes (millions) <sup>3</sup>	Toll-Free 3+ HOV Annual Volumes (Millions)	Gross Toll Revenue Potential (\$ millions) <sup>4</sup>	Plus: Surcharge Revenue for Pay-by-Plate <sup>5</sup>	Less: Uncollectible Accounts/ Credit Fees (\$ millions) <sup>7</sup>	Less: Annualized Rehab & Facility O&M Repair Costs (\$ millions)	Less: Routine O&M Costs (\$ millions)	Net Revenue Available for Debt Service (\$ millions)
2011	\$2.02	\$2.65	\$1.45*	18.72	21.05	1.13	42.43	5.62	(0.85)	(2.56)	(2.76)	32.94
2012	\$2.07	\$2.72	\$1.49*	23.12	26.00	1.16	53.72	5.93	(1.07)	(2.63)	(2.82)	43.53
2013	\$2.12	\$2.78	\$1.52*	25.86	29.08	1.19	61.58	5.43	(1.23)	(2.69)	(2.89)	51.16
2014	\$2.17	\$2.85	\$1.56*	26.02	29.26	1.21	63.52	5.60	(1.27)	(2.76)	(2.97)	52.82
2015	\$2.23	\$2.93	\$1.60*	26.19	29.45	1.24	65.53	5.78	(1.31)	(2.83)	(3.04)	54.54
2016	\$2.28	\$3.00	\$1.64*	26.36	29.64	1.28	67.60	5.96	(1.35)	(2.90)	(3.12)	56.31
2017	\$2.34	\$3.07	\$1.68*	26.53	29.83	1.31	69.74	6.15	(1.39)	(2.97)	(3.20)	58.14
2018	\$2.40	\$3.15	\$1.72*	26.70	30.03	1.34	71.95	6.35	(1.44)	(3.05)	(3.28)	60.02
2019	\$3.30	\$5.00	\$1.00	34.47	38.29	1.37	126.40	8.40	(2.53)	(3.12)	(3.71)	110.63
2020	\$3.38	\$5.13	\$1.03	38.54	42.82	1.41	144.89	9.52	(2.90)	(3.20)	(3.81)	128.29
2021	\$3.47	\$5.25	\$1.05	38.79	43.10	1.44	149.47	9.71	(2.99)	(3.28)	(3.90)	132.30
2022	\$3.55	\$5.38	\$1.08	39.04	43.38	1.48	154.20	9.90	(3.08)	(3.36)	(4.00)	137.39
2023	\$3.64	\$5.52	\$1.10	39.30	43.66	1.51	159.08	10.10	(3.18)	(3.45)	(4.10)	141.69
2024	\$3.73	\$5.66	\$1.13	39.55	43.94	1.55	164.12	10.31	(3.28)	(3.53)	(4.20)	146.12
2025	\$3.83	\$5.80	\$1.16	39.81	44.23	1.59	169.31	10.52	(3.39)	(3.62)	(4.31)	150.69
2026	\$3.92	\$5.94	\$1.19	40.07	44.52	1.63	174.67	10.74	(3.49)	(3.71)	(4.42)	155.41
2027	\$4.02	\$6.09	\$1.22	40.33	44.80	1.67	180.20	10.96	(3.60)	(3.81)	(4.53)	160.28
2028	\$4.12	\$6.24	\$1.25	40.59	45.10	1.71	185.91	11.19	(3.72)	(3.90)	(4.64)	165.31
2029	\$4.23	\$6.40	\$1.28	40.85	45.39	1.75	191.88	11.42	(3.84)	(4.00)	(4.75)	170.49
2030	\$4.33	\$6.56	\$1.31	41.12	45.69	1.80	197.88	11.66	(3.96)	(4.10)	(4.87)	175.84
2031	\$4.44	\$6.72	\$1.34	41.26	45.83	1.82	203.49	11.87	(4.07)	(4.20)	(5.00)	180.74
2032	\$4.55	\$6.89	\$1.38	41.39	45.98	1.84	209.25	12.09	(4.19)	(4.31)	(5.12)	185.78
2033	\$4.66	\$7.06	\$1.41	41.52	46.13	1.87	215.19	12.31	(4.30)	(4.41)	(5.25)	190.97
2034	\$4.78	\$7.24	\$1.45	41.66	46.29	1.89	221.29	12.54	(4.43)	(4.52)	(5.38)	196.30
2035	\$4.90	\$7.42	\$1.48	41.93	46.44	1.91	227.56	12.77	(4.55)	(4.64)	(5.51)	201.78
2036	\$5.02	\$7.61	\$1.52	41.93	46.59	1.94	234.01	13.01	(4.68)	(4.75)	(5.65)	207.42
2037	\$5.15	\$7.80	\$1.56	42.07	46.74	1.96	240.64	13.26	(4.81)	(4.87)	(5.79)	213.22
2038	\$5.28	\$7.99	\$1.60	42.21	46.89	1.98	247.47	13.51	(4.95)	(5.00)	(5.94)	219.18
2039	\$5.41	\$8.19	\$1.64	42.35	47.05	2.01	254.48	13.77	(5.09)	(5.12)	(6.09)	225.32
2040	\$5.54	\$8.40	\$1.68	42.48	47.20	2.03	261.70	14.04	(5.23)	(5.25)	(6.24)	231.63
2041	\$5.68	\$8.61	\$1.72	42.55	47.28	2.05	268.68	14.29	(5.37)	(5.38)	(6.39)	237.71
2042	\$5.83	\$8.82	\$1.76	42.62	47.36	2.06	275.85	14.54	(5.52)	(5.51)	(6.55)	243.95
2043	\$5.97	\$9.04	\$1.81	42.69	47.43	2.07	283.21	14.80	(5.66)	(5.65)	(6.72)	250.36
2044	\$6.12	\$9.27	\$1.85	42.76	47.51	2.08	290.77	15.07	(5.82)	(5.79)	(6.89)	256.93
2045	\$6.27	\$9.50	\$1.90	42.83	47.59	2.10	298.52	15.35	(5.97)	(5.94)	(7.06)	263.69
2046	\$6.43	\$9.74	\$1.95	42.90	47.67	2.11	306.49	15.64	(6.13)	(6.08)	(7.23)	270.63
2047	\$6.59	\$9.98	\$2.00	42.97	47.75	2.12	314.66	15.93	(6.29)	(6.24)	(7.42)	277.75
2048	\$6.76	\$10.23	\$2.05	43.04	47.82	2.14	323.06	16.22	(6.46)	(6.39)	(7.60)	285.06
2049	\$6.92	\$10.49	\$2.10	43.12	47.90	2.15	331.68	16.53	(6.63)	(6.55)	(7.79)	292.57
2050	\$7.10	\$10.75	\$2.15	43.19	47.98	2.16	340.53	16.84	(6.81)	(6.72)	(7.99)	300.27
2051	\$7.27	\$11.02	\$2.20	43.26	48.06	2.18	349.62	17.17	(6.99)	(6.88)	(8.19)	308.19
2052	\$7.46	\$11.29	\$2.26	43.33	48.14	2.19	358.94	17.50	(7.18)	(7.06)	(8.39)	316.31
2053	\$7.64	\$11.58	\$2.32	43.40	48.22	2.20	368.52	17.84	(7.37)	(7.23)	(8.60)	324.66
2054	\$7.83	\$11.87	\$2.37	43.47	48.30	2.22	378.35	18.18	(7.57)	(7.41)	(8.81)	333.22
2055	\$8.03	\$12.16	\$2.43	43.54	48.38	2.23	388.45	18.54	(7.77)	(7.60)	(9.04)	342.02
2056	\$8.23	\$12.47	\$2.49	43.61	48.45	2.25	398.81	18.91	(7.98)	(7.79)	(9.26)	351.05
2057	\$8.44	\$12.78	\$2.56	43.68	48.53	2.26	409.46	19.28	(8.19)	(7.98)	(9.49)	360.32
2058	\$8.65	\$13.10	\$2.62	43.76	48.61	2.27	420.38	19.67	(8.41)	(8.18)	(9.73)	369.84
<b>Totals FY 2011-18</b>				199.51	224.34	9.85	496.08	46.83	(9.92)	(22.40)	(24.07)	409.46
<b>Totals FY 2019-58</b>				1667.87	1853.03	77.02	10419.01	555.90	(208.38)	(210.54)	(250.36)	9211.30

**Footnotes**

<sup>1</sup> Reflects the average revenue per passenger car based on the variable weekday and weekend time-of-day toll structures.

<sup>2</sup> Annual volume of vehicles subject to tolls in each travel direction after ramp up adjustment; includes SOVs, HOV2s, and trucks.

<sup>3</sup> Conversion of trucks to their passenger car equivalent (PCE) where trucks, on average, pay 3x the auto toll (1 truck = 3 cars).

<sup>4</sup> Excludes toll surcharge revenue assessed to customers without transponders for pay-by-plate (video tolling/license plate list).

<sup>5</sup> Pay-by-plate toll surcharge revenue assessed to customers (without transponders for pay-by-plate (video tolling/license plate list) payment).

<sup>6</sup> Ramp-up includes initial demand reductions as customers get accustomed to tolls and electronic toll collection gains acceptance.

<sup>7</sup> 5% deduction for credit card fees and revenue loss due to the net effects of evasion, processing errors and uncollectible accounts.

**General Notes**

- \* Nights & weekends are toll-free in Fiscal Years 2011-2018
- All dollar amounts in year of collection / year of expenditure
- Toll rate escalation / O&M inflation projected at 2.5% per year
- 3+ HOVs travel toll-free in HOV lanes
- I-90 toll traffic volumes reflect equivalent cross-lake trips
- Weekend daily demand equals 64% of weekday demand
- Weekend truck share of traffic equals 1/2 of the weekday share

**Exhibit 17 — SR 520 & I-90 Bridges Combined Toll Traffic and Revenue Projections**

Fiscal Year	Weighted Average Toll Rate (one-way) <sup>1</sup>	Maximum Weekday Toll Rate (one-way)	Minimum Weekday Toll Rate (one-way)	Annual Toll Transactions (millions) <sup>2</sup>	Passenger Car Equivalent (PCE) Annual Volumes (millions) <sup>3</sup>	Toll-Free 3+ HOV Annual Volumes (Millions)	Gross Toll Revenue Potential (\$ millions) <sup>4</sup>	Plus: Surcharge Revenue for Pay-by-Plate <sup>5</sup>	Less: Uncollectible Accounts/ Credit Fees (\$ millions) <sup>7</sup>	Less: Annualized Rehab & Facility Repair Costs (\$ millions)	Less: Routine O&M Costs (\$ millions)	Less: Toll Collection O&M Costs (\$ millions)	Net Revenue Available for Debt Service (\$ millions)
2011	\$1.99	\$2.65	\$1.45*	35.15	40.05	1.98	79.64	8.90	(1.59)	(3.98)	(4.53)	(15.58)	62.86
2012	\$2.04	\$2.72	\$1.49*	43.35	49.39	2.03	100.68	9.04	(2.01)	(4.08)	(4.65)	(16.44)	82.54
2013	\$2.09	\$2.78	\$1.52*	48.41	55.15	2.08	115.23	7.80	(2.30)	(4.18)	(4.76)	(15.06)	96.73
2014	\$2.14	\$2.85	\$1.56*	48.65	55.42	2.13	118.69	8.04	(2.37)	(4.28)	(4.88)	(15.50)	99.69
2015	\$2.20	\$2.93	\$1.60*	48.89	55.70	2.18	122.27	8.29	(2.45)	(4.39)	(5.00)	(15.96)	102.75
2016	\$2.25	\$3.00	\$1.64*	49.13	55.97	2.23	125.95	8.54	(2.52)	(4.50)	(5.13)	(16.43)	105.91
2017	\$2.31	\$3.07	\$1.68*	49.38	56.25	2.28	129.74	8.80	(2.59)	(4.61)	(5.26)	(16.92)	109.16
2018	\$2.36	\$3.15	\$1.72*	49.62	56.53	2.33	133.64	9.07	(2.67)	(4.73)	(5.39)	(17.42)	112.51
2019	\$3.19	\$5.00	\$1.00	64.89	72.96	2.39	232.95	12.11	(4.66)	(4.85)	(6.23)	(25.19)	204.13
2020	\$3.27	\$5.13	\$1.03	72.46	81.47	2.44	266.63	13.75	(5.33)	(4.97)	(6.38)	(27.38)	236.32
2021	\$3.35	\$5.25	\$1.05	72.82	81.87	2.50	272.82	14.06	(5.49)	(5.09)	(6.54)	(28.18)	243.42
2022	\$3.44	\$5.38	\$1.08	73.19	82.28	2.56	282.95	14.38	(5.66)	(5.22)	(6.71)	(27.09)	252.65
2023	\$3.52	\$5.52	\$1.10	73.55	82.69	2.62	291.48	14.71	(5.83)	(5.35)	(6.88)	(27.90)	260.23
2024	\$3.61	\$5.66	\$1.13	73.92	83.10	2.68	300.27	15.04	(6.01)	(5.48)	(7.05)	(28.73)	268.05
2025	\$3.70	\$5.80	\$1.16	74.29	83.52	2.74	309.33	15.39	(6.19)	(5.62)	(7.22)	(29.59)	276.10
2026	\$3.80	\$5.94	\$1.19	74.66	83.93	2.80	318.66	15.75	(6.37)	(5.76)	(7.40)	(30.47)	284.39
2027	\$3.89	\$6.09	\$1.22	75.03	84.35	2.87	328.28	16.11	(6.57)	(5.91)	(7.59)	(31.38)	292.94
2028	\$3.99	\$6.24	\$1.25	75.41	84.77	2.94	338.18	16.49	(6.76)	(6.05)	(7.78)	(32.32)	301.75
2029	\$4.09	\$6.40	\$1.28	75.79	85.20	3.00	348.39	16.87	(6.97)	(6.20)	(7.97)	(33.29)	310.83
2030	\$4.19	\$6.56	\$1.31	76.17	85.62	3.07	358.91	17.27	(7.18)	(6.36)	(8.17)	(34.28)	320.19
2031	\$4.30	\$6.72	\$1.34	76.36	85.84	3.11	368.82	17.63	(7.38)	(6.52)	(8.38)	(35.22)	328.95
2032	\$4.40	\$6.89	\$1.38	76.55	86.05	3.15	379.00	18.00	(7.58)	(6.68)	(8.59)	(36.19)	337.96
2033	\$4.51	\$7.06	\$1.41	76.75	86.27	3.18	389.46	18.38	(7.79)	(6.85)	(8.80)	(37.18)	347.21
2034	\$4.63	\$7.24	\$1.45	76.94	86.48	3.22	400.21	18.77	(8.00)	(7.02)	(9.02)	(38.20)	356.72
2035	\$4.74	\$7.41	\$1.48	77.13	86.70	3.26	411.25	19.17	(8.23)	(7.20)	(9.25)	(39.25)	366.50
2036	\$4.86	\$7.61	\$1.52	77.33	86.92	3.30	422.61	19.58	(8.45)	(7.38)	(9.48)	(40.33)	376.55
2037	\$4.98	\$7.80	\$1.56	77.52	87.14	3.33	434.27	20.00	(8.69)	(7.56)	(9.71)	(41.44)	386.87
2038	\$5.11	\$7.99	\$1.60	77.72	87.36	3.37	446.26	20.43	(8.93)	(7.75)	(9.96)	(42.58)	397.49
2039	\$5.24	\$8.19	\$1.64	77.92	87.58	3.41	458.59	20.87	(9.17)	(7.94)	(10.21)	(43.74)	408.39
2040	\$5.37	\$8.40	\$1.68	78.11	87.80	3.45	471.25	21.33	(9.42)	(8.14)	(10.46)	(44.95)	419.60
2041	\$5.50	\$8.61	\$1.72	78.21	88.02	3.49	483.64	21.76	(9.67)	(8.34)	(10.72)	(46.12)	430.54
2042	\$5.64	\$8.82	\$1.76	78.31	88.24	3.53	496.37	22.21	(9.93)	(8.55)	(10.99)	(47.33)	441.78
2043	\$5.78	\$9.04	\$1.81	78.41	88.13	3.51	509.43	22.68	(10.19)	(8.77)	(11.27)	(48.58)	453.30
2044	\$5.92	\$9.27	\$1.85	78.51	88.24	3.53	522.83	23.15	(10.46)	(8.99)	(11.55)	(49.85)	465.14
2045	\$6.07	\$9.50	\$1.90	78.61	88.35	3.56	536.58	23.63	(10.73)	(9.21)	(11.84)	(51.16)	477.28
2046	\$6.23	\$9.74	\$1.95	78.71	88.46	3.58	550.70	24.13	(11.01)	(9.44)	(12.13)	(52.50)	489.74
2047	\$6.38	\$9.98	\$2.00	78.81	88.58	3.60	565.19	24.64	(11.30)	(9.68)	(12.44)	(53.88)	502.54
2048	\$6.54	\$10.23	\$2.05	78.91	88.69	3.62	580.06	25.17	(11.60)	(9.92)	(12.75)	(55.29)	515.67
2049	\$6.70	\$10.49	\$2.10	79.01	88.80	3.64	595.32	25.70	(11.91)	(10.17)	(13.06)	(56.74)	529.14
2050	\$6.87	\$10.75	\$2.15	79.11	88.91	3.66	610.98	26.25	(12.22)	(10.42)	(13.39)	(58.23)	542.97
2051	\$7.04	\$11.02	\$2.20	79.21	89.02	3.68	627.05	26.82	(12.54)	(10.68)	(13.73)	(59.76)	557.17
2052	\$7.22	\$11.29	\$2.26	79.31	89.14	3.70	643.55	27.40	(12.87)	(10.95)	(14.07)	(61.33)	571.74
2053	\$7.40	\$11.58	\$2.32	79.41	89.25	3.72	660.48	28.00	(13.21)	(11.22)	(14.42)	(62.93)	586.69
2054	\$7.59	\$11.87	\$2.37	79.51	89.36	3.75	677.86	28.61	(13.56)	(11.50)	(14.78)	(64.59)	602.04
2055	\$7.78	\$12.16	\$2.43	79.61	89.48	3.77	695.70	29.23	(13.91)	(11.79)	(15.15)	(66.28)	617.79
2056	\$7.97	\$12.47	\$2.49	79.71	89.59	3.79	714.00	29.87	(14.28)	(12.09)	(15.53)	(68.02)	633.96
2057	\$8.17	\$12.78	\$2.56	79.81	89.70	3.81	732.79	30.53	(14.66)	(12.39)	(15.92)	(69.80)	650.56
2058	\$8.37	\$13.10	\$2.62	79.92	89.82	3.83	752.07	31.21	(15.04)	(12.70)	(16.32)	(71.64)	667.59
Totals FY 2011-18				372.57	424.47	17.23	925.83	68.48	(18.32)	(34.75)	(39.59)	(129.32)	772.13
Totals FY 2019-58				3077.61	3459.36	131.11	18787.02	847.06	(375.74)	(326.70)	(419.82)	(1798.94)	16712.89

**Footnotes**

<sup>1</sup> Reflects the average revenue per passenger car based on the variable weekday and weekend time-of-day toll structures.

<sup>2</sup> Annual volume of vehicles subject to tolls in each travel direction after ramp up adjustment; includes SOVs, HOV2s, and trucks.

<sup>3</sup> Conversion of trucks to their passenger car equivalent (PCE) where trucks, on average, pay 3x the auto toll (1 truck = 3 cars).

<sup>4</sup> Excludes toll surcharge revenue assessed to customers without transponders for pay-by-plate (video tolling/license plate list).

<sup>5</sup> Pay-by-plate toll surcharge revenue assessed to customers to capture the additional collection costs of video tolling/license plate payment.

<sup>6</sup> Ramp-up includes initial demand reductions as customers get accustomed to tolls and electronic toll collection gains acceptance.

<sup>7</sup> 5% deduction for credit card fees and revenue loss due to the net effects of evasion, processing errors and uncollectible accounts.

**General Notes**

- \* Nights & weekends are toll-free in Fiscal Years 2011-2018
- All dollar amounts in year of collection / year of expenditure
- Toll rate escalation / O&M inflation projected at 2.5% per year
- 3+ HOVs travel toll-free in HOV lanes
- I-90 toll traffic volumes reflect equivalent cross-lake trips
- Weekend daily demand equals 64% of weekday demand
- Weekend truck share of traffic equals 1/2 of the weekday share

**Exhibit 18 — SR 520 Gross & Net Toll Revenues with I-90 Toll-Free**

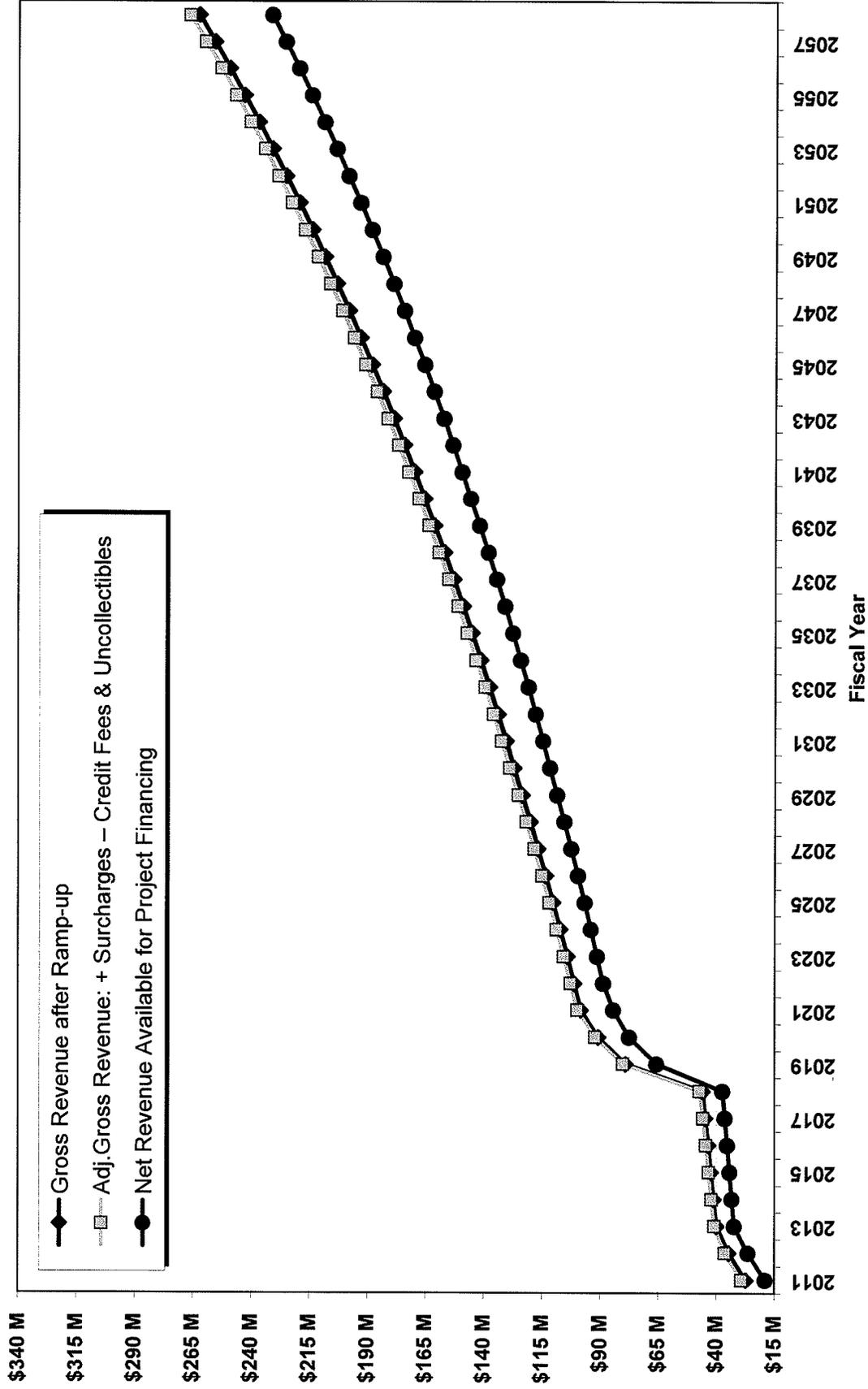
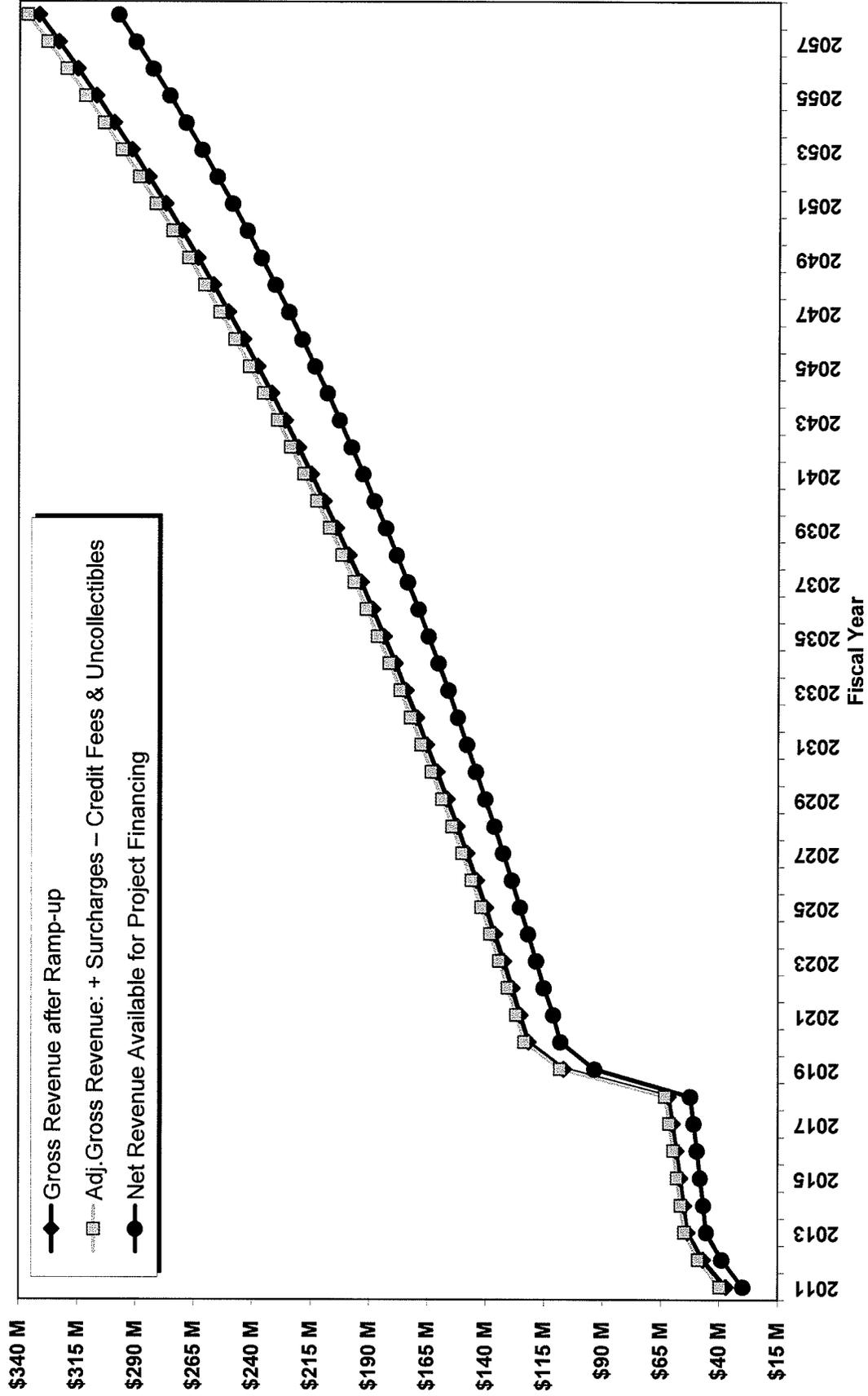
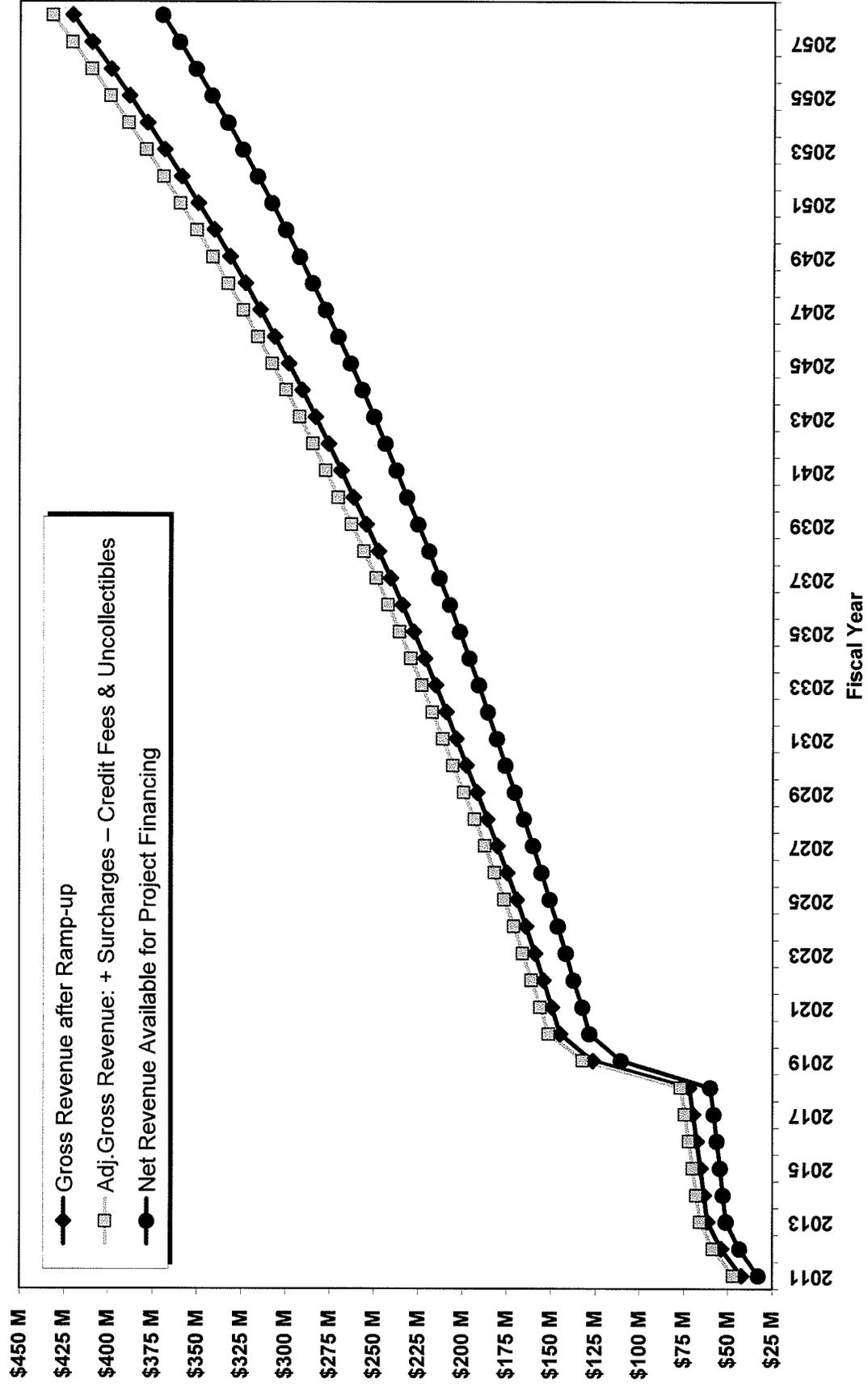


Exhibit 19 — SR 520 Gross & Net Toll Revenues with I-90 Tolloed



**Exhibit 20 — I-90 Gross & Net Toll Revenues with SR 520 Tolloed**



**Exhibit 21 — SR 520 & I-90 Combined Gross & Net Toll Revenues**

