SR 520 BRIDGE

Investment Grade Traffic and Revenue Study Update

Floating Bridge, West Approach Bridge North, and Eastside Project

April 4, 2014

Photographs Courtesy Of WSDOT

CDM Smith

Washington State Department of Transportation

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Executive Summary

Financing to support implementation of the SR 520 Floating Bridge and HOV Program is an ongoing activity of the Washington State Department of Transportation (WSDOT). Some of the financing is being backed by tolls from the SR 520 Bridge. WSDOT began tolling the bridge in December 2011 prior to the construction of the replacement floating bridge. WSDOT continues collecting tolls during construction and plans to continue to collect tolls beyond completion of the project.

In order to make TIFIA loan withdrawals for the SR 520 Program and meet required current and possible future bond requirements, the 2011 SR 520 Bridge Investment Grade Traffic and Revenue Study was updated with information based on actual tolling experience of the SR 520 Bridge and other relevant changes such as changes in toll rates, shifts in traffic, and revisions to the underlying economic forecasting.

The focus of this update was to revisit a number of key assumptions including: bridge project and regional roadway configuration; bridge closures during construction; socio-economic forecast; and tolling schedule. Revised traffic and gross toll revenue potential forecasts are provided for FY 2014 through FY 2056.

Project Description

SR 520 connects I-5 in Seattle on the west side of Lake Washington to the east side of Lake Washington, downtown Bellevue (via I-405), Kirkland, and Redmond. The total length of the SR 520 corridor is approximately 12.8 miles. The main SR 520 bridge span across Lake Washington currently is 1.42 miles long, making it the longest floating bridge span in the world.

Figure ES-1 shows the assumed lane configurations for this study. At the time of the study SR 520 consisted of:

- I-5 to east side of Lake Washington (including the main bridge span): two general-purpose lanes in each direction.
- Lake Washington to I-405: two general-purpose lanes in each direction and one westbound outside transit/high occupancy vehicle lane with a 3+ occupancy requirement (HOV3+).
- I-405 to SR 202 in Redmond: two general-purpose lanes in each direction and one outside transit/HOV lane in each direction with a 2+ occupancy requirement.

This is the configuration assumed in the forecast until FY 2017 (July 1, 2016).

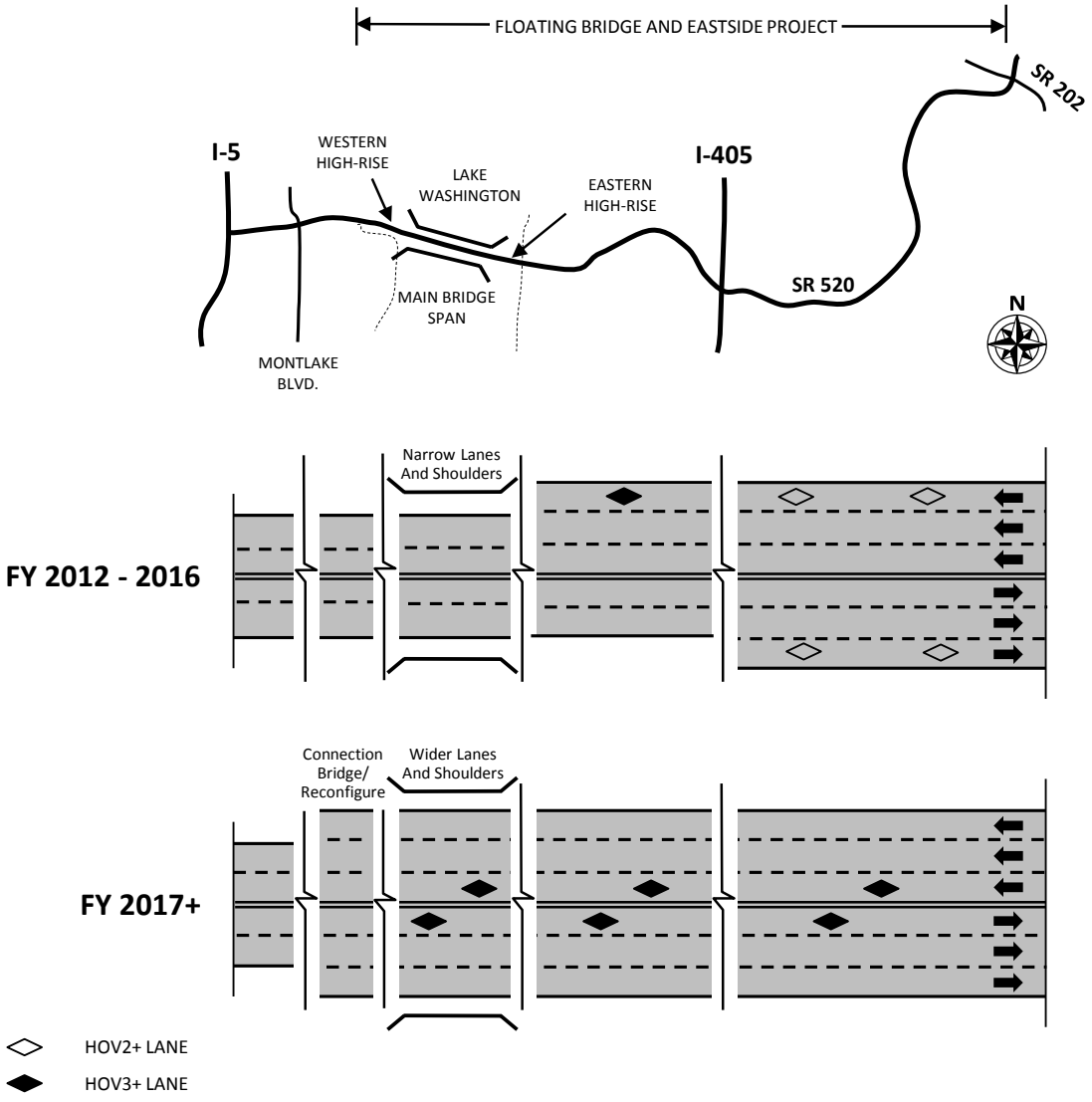
Replacement of the bridge is needed since it is structurally deficient and functionally obsolete. For purposes of this study, the following improvements are included:

- Replacement six-lane main span (two general-purpose and one inside transit/HOV 3+ lane in each direction) from west end of main span, across Lake Washington to the eastern shore
- Lake Washington to I-405: Addition of one eastbound lane from eastern shore of Lake Washington to I-405 resulting in three lanes in each direction (two general-purpose and one transit/HOV 3+ lane in each direction) with HOV lanes moved to the inside lanes

- I-405 to SR 202 in Redmond: Current configuration of two general-purpose lanes and one outside transit/HOV lane in each direction to two general-purpose lanes and one inside transit/HOV lane in each direction
- The replacement SR 520 bridge main span is planned to open in FY 2017 and carry three lanes (two general purpose and one HOV) across the lake to the west end of the western high rise. A three lane westbound west approach bridge north connector is planned to be completed shortly after the main span. This connector and reconfiguration of the existing four lane west approach bridge connector will result in three lanes in each direction to the Montlake Boulevard interchange (two general-purpose and one inside transit/HOV 3+ lane in each direction). The connection bridge and reconfiguration are new elements since the September 2011 study.

This is the configuration assumed from FY 2017 forward.

Figure ES-1: Assumed SR 520 Lane Configuration



Tolling Performance Review

CDM Smith examined the toll performance of SR 520 focusing primarily on the period January 2012 through June 2013. The results of actual tolling experience provide a valuable benchmark to help evaluate and adjust the long term traffic and revenue estimates. The primary assessment included calendar year 2012 and a preliminary analysis of tolling experience in the first six months of 2013, based on initial information available as of July 2013.

The performance review first examined the traffic impacts as a result of tolling. The focus was on comparing how traffic conditions (daily volumes, hourly profiles, and travel times) changed between 2011 (pre-tolling) and 2012 (post-tolling). Figure ES-2 shows the observed traffic volumes and the forecast traffic based on the 2011 Investment Grade study (referred to as the September 2011 forecast). Note that on this figure, the annual average daily traffic includes all traffic (non-revenue vehicles, overnight traffic, and weekend traffic) and is adjusted to exclude weekend closures due to construction.

As illustrated by Figure ES-2, the overall average daily traffic on SR 520 dropped by about 36 percent in 2012 from the prior year. The average daily traffic volume on the SR 520 bridge was 59,500 vehicles in the first six months of 2012, compared to 93,100 in 2011. The September 2011 forecast had anticipated a drop of traffic of about 48 percent. For FY 2013, the observed annual average daily traffic was about nine percent higher than the forecast (61,800 vehicles compared to a forecast value of 56,800 vehicles).

The toll performance review also covers: facility usage (total transactions); gross toll revenue potential; method of payment; average weekday and weekend day traffic volumes; and vehicle classification. When applicable, the performance data is compared to the forecast previously prepared by CDM Smith in September 2011.

Table ES-1 presents the difference between total annual forecast transactions and actual results available. Overall, the actual transactions exceeded the forecast by 9.8 percent in the first six months of 2012 and by 6.6 percent in FY 2013.

Figure ES-2: Impacts of Tolling on Traffic

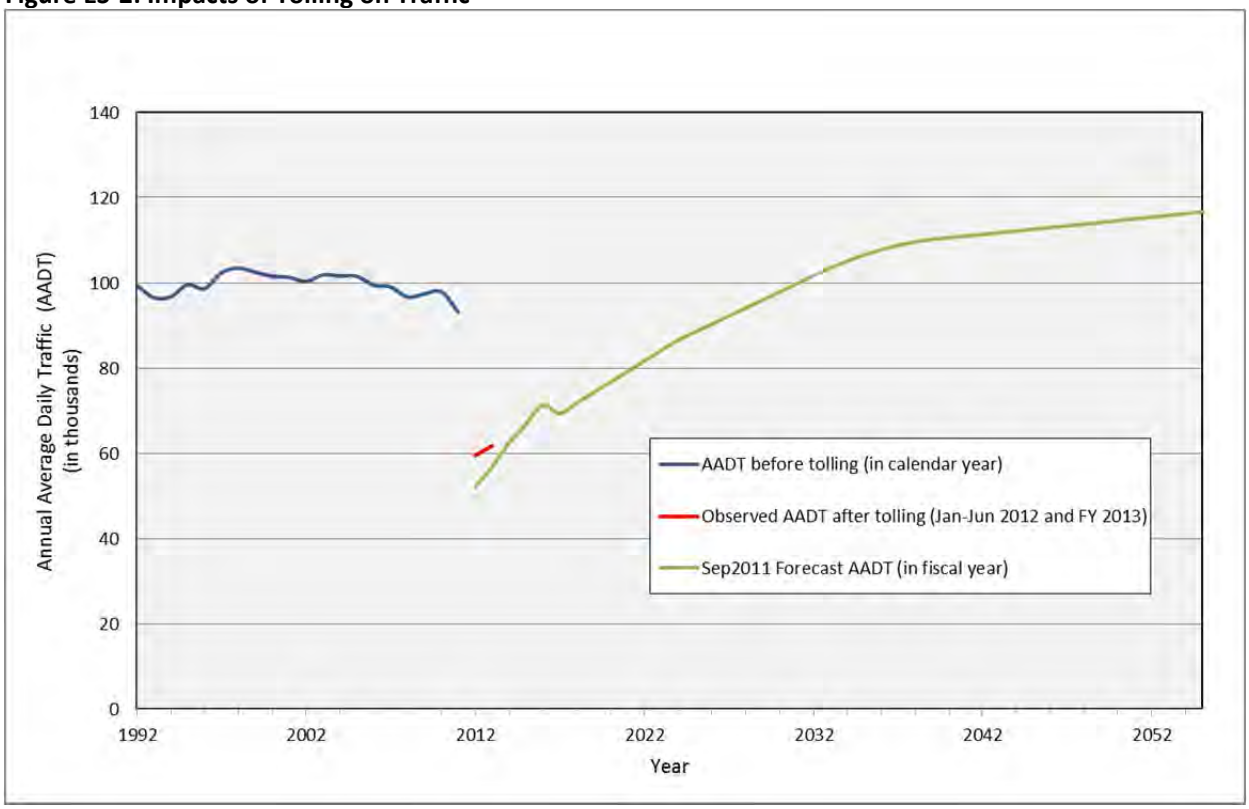


Table ES-1: Annual Transactions vs. Forecast

Transactions	Sep2011 Forecast[1]	Actuals[2,3]	Variance
Jan 2012-Jun 2012	8,659,000	9,507,553	9.8%
FY 2012[4]	**8,659,000**	**9,609,173**	**11.0%**
Jul 2012-Dec 2012	9,428,000	9,992,055	6.0%
Jan 2013-Jun 2013	9,545,000	10,228,546	7.2%
FY 2013	**18,973,000**	**20,220,601**	**6.6%**

1. Based on CDM Smith September 2011 forecast
2. For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13
3. For CY 2013, actuals are based on WSDOT monthly lane equipment data and adjustments by CDM Smith
4. Actuals include first three days of tolling which were in 2011; Forecast does not include these three days

Table ES-2 presents the difference between total annual forecast revenue potential and actual results available. The revenue potential reflects the toll rate increase implemented on July 1st, 2012. Overall, the actual revenue potential was very close to the forecast: 0.4 percent lower than forecasted in the first six months of 2012, and 0.8 percent lower than forecasted in FY 2013.

Table ES-2: Annual Gross Toll Revenue Potential vs. Forecast

Actual Gross Toll Revenue Potential	Sep2011 Forecast[1]	Actuals[2,3]	Variance
Jan 2012-Jun 2012	$27,840,000	$27,730,356	-0.4%
FY 2012[4]	**$27,840,000**	**$28,055,637**	**0.8%**
Jul 2012-Dec 2012	$30,713,000	$30,322,891	-1.3%
Jan 2013-Jun 2013	$31,097,000	$30,978,820	-0.4%
FY 2013	**$61,810,000**	**$61,301,711**	**-0.8%**

1. Based on CDM Smith September 2011 forecast
2. For FY 2012, actuals are based on WSDOT toll operations reports
3. For FY 2013, actuals are based on WSDOT toll operations reports and breakouts by CDM Smith
4. Actuals include first three days of tolling which were in 2011; Forecast does not include these three days

Economic Growth Review

The CDM Smith team developed independent economic forecasts of population and employment based on estimates of current socioeconomic variables and forecasts of future socioeconomic activity. These forecasts were updated in July 2013 to reflect newly available economic performance estimates, current regional economic forecasts, projected development in Seattle and Eastside King County communities, and current market conditions such as office occupancy rates and housing unit absorption trends.

The team produced base year traffic analysis zone (TAZ) estimates for 2010 drawing from current data published by State and regional government agencies and data providers. Forecasts include employment and population forecasts for 2013, 2016, 2017, 2020, 2030 and 2040, driven by data and published forecasts. The revised economic forecasts were incorporated into the tolling analysis model by changing overall trip demand in those geographic areas which heavily influence travel demand on SR 520 and in the cross Lake Washington corridor.

The updated economic forecasts are compared to economic forecasts used in the September 2011 traffic and revenue forecast. Overall, the population forecasts for King County and for the region as a whole were adjusted upwards. Within King County, Seattle, Kirkland, and Redmond are now expected to have higher populations to 2030, but the lower expected growth in Bellevue counteracts these gains, reducing this increase to nearly even by 2030 and slightly down by 2040. For employment, King County performs about the same as expected in the September 2011 forecast, and the region jobs were adjusted downwards. On a subarea basis, Bellevue and Redmond are now expected to perform worse, Kirkland about the same, and Seattle a little better. For the overall corridor, employment is expected to be about 1.3 percent lower by 2016, nearly even in 2020, and 0.5 percent down by 2040.

Tolling Operations

Tolling commenced on the existing SR 520 Bridge on December 29, 2011. Overall, the toll rates assumed in the 2011 study at the start of tolling were implemented. The WSTC has since raised the tolls approximately 2.5 percent on July 1, 2012 and July 1, 2013, consistent with the original 2011 study assumptions.

For FY 2014 through FY 2016, slight changes in the toll rate assumptions are all related to the nickel rounding strategy adopted by WSTC in May 2013:

- The maximum Good to Go! toll rate for 2-axle vehicles is $3.70 on weekdays and $2.30 on weekends in FY 2014. The toll rates have been rounded to the nearest $0.05.
- In FY 2014, Pay By Mail customers pay approximately $1.57 above the Good to Go! toll rates on average. The Pay By Mail rates are rounded to the nearest $0.05.
- At the beginning of FY 2015 and FY 2016 both weekday and weekend account-based tolls will increase by approximately 2.5 percent on average. It is assumed the tolls schedule reviewed by the WSTC in spring 2013 which included nearest $0.05 rounding for the FY 2015 and FY 2016 increases will be adopted by the WSTC and implemented.
- At the beginning of FY 2015 and FY 2016, it is assumed the differential for Pay By Mail customers will escalate by 2.5 percent and that the Pay By Mail rates will be rounded to the nearest $0.05.
- Tolls for multi-axle vehicles (those with more than two axles on the ground) will be determined by multiplying the number of axles by the per axle toll rate for two-axle vehicles using the same payment method and rounded to the nearest $0.05.

For FY 2017 and beyond, the toll rates assumed in the 2011 study, which were rounded to the nearest $0.05, remain unchanged.

Tolling Analysis Model Update

As part of the 2011 study, CDM Smith developed a tolling analysis model specific to the SR 520 corridor. A detailed description of the model structure and primary input is provided in the 2011 IG report. The tolling analysis model was revised by incorporating data gathered and analysis conducted in the tolling performance assessment, economic growth review, and revisions of toll rate assumptions.

Specific toll model and forecasting revisions for the current forecast include:

- **Model calibration –** The SR 520 toll model was calibrated to toll transaction derived from the toll performance analysis and to total bridge traffic crossing Lake Washington.
- **Proportion of payment –** The share of Good To Go! account-based transactions have been revised based on the review of 2012 data. Also, the review showed weekday and weekend shares are different, and the forecast was revised accordingly.
- **Toll vehicle classification –** The performance data indicates a much lower share of trucks than what was assumed in prior forecasts. Consequently, the new forecast is based on lower share of trucks.
- **Weekend closures due to construction –** As the SR 520 reconstruction project has evolved, the number of planned weekend closures has been revised by WSDOT.
- **Socioeconomic growth –** The revised socioeconomic growth review is incorporated into the new forecast.

- **Time-shifting –** the September 2011 forecast assumed up to 20 percent time shifting away from peak periods in response to higher tolls. This was based on the stated preference survey. Analysis of 2012 toll performance indicates there has been virtually no shift, therefore time shifting is removed in the new forecast.
- **Weekend traffic –** Weekend toll transactions are raised up for FY 2013 through FY 2016 due to the adjustment of toll diversion behavior to reflect tolling experience through June 2013. The growth in FY 2017 and forward years was already fairly robust and thus no changes are made.
- **Toll rates –** The revised toll rate structure reflecting the latest decisions by WSTC are incorporated into the model.

Summary of Assumptions

A summary of the assumptions used for the updated forecast is shown in Table ES-3.[1]

Table ES-3: October 2013 Traffic and Gross Revenue Forecast Assumptions

General Assumptions
Improvements in the Puget Sound Regional Council's current regional transportation plan, *Transportation 2040*, will be implemented as planned. No new competitive toll-free facilities or additional capacity will be constructed during the projection period other than those assumed in the plan.
The percentage of payment types will be consistent with the ranges assumed for this study. The percentage of potential bridge users in the Good to Go! account-based program is assumed to increase from 82% in FY 2014 to 86% in FY2024.
Economic growth in the project study area will occur as forecasted herein based in part on forecasts from the Puget Sound Regional Council, Conway Pederson April 2013 forecasts, and the independent socioeconomic consultant.
The facility will continue to be well maintained, efficiently operated, effectively signed, and promoted to encourage maximum usage.
Inflation will average 2.5% annually over the forecast horizon. This figure is based on an approximately 10 year historic CPI up to 2009. While current inflation forecasts are somewhat lower for the state overall (2.0% long term), the greater Seattle region and the SR 520 primary market corridor are growing at a significant pace implying the original 2.5% assumption from the Sep2011 forecast should be kept.
Motor fuel will remain in adequate supply and no national or regional emergency will arise that would abnormally restrict the use of motor vehicles. The per gallon price for passenger car gasoline is assumed to be $4.06 in FY 2014, rising to $4.37 in FY 2017, $4.52 in FY 2024, $5.06 in FY 2031, and $9.39 in FY 2056 resulting in a long term annual growth assumption of 2.0 % similar to WSDOT's June 2013 long term forecast.
The value of time for work trips ranges from $9.60 per hour for the lowest income group to $22.80 per hour for the highest income group. The value of time for non-work passenger car trips is $13.80 per hour. Truck trip value of time reaches $36.00 per hour for heavy trucks. All values are in 2010 dollars.

(table continued)

[1] The forecast presented in this report was generated and reviewed in the summer and fall of 2013. It is prepared in conjunction with other financing reports that are collectively referred to as the October 2013 forecast.

Table ES-3: October 2013 Traffic and Gross Revenue Forecast Assumptions (Continued)

SR 520 Configuration
Bridge Configuration: FY 2014 - FY 2016: Two narrow general-purpose lanes and shoulders in each direction.
Bridge Configuration FY 2017 and onward: Two wider general-purpose lanes in each direction, one HOV/transit lane in each direction, and wider shoulders in each direction on replacement span. A new west approach bridge north connection from the western high rise to Montlake Blvd. interchange such that three standard lanes and full shoulders are provided between the floating span and Montlake Blvd utilizing the current bridge connection and new north bridge connection. West of Montlake Blvd., SR 520 will remain in its current two-lane per direction configuration.
SR 520 Configuration East of Bridge to I-405 FY 2014 - FY 2016: Two general-purpose lanes in each direction and one outside HOV lane (with three person occupancy requirement HOV3+) westbound as exists currently.
SR 520 Configuration East of Bridge to I-405 FY 2017 and onward: Two general-purpose lanes in each direction and one inside HOV/transit lane in each direction (with three person occupancy requirement HOV3+).
Construction Closures
Full weekend closure (or equivalent) of SR 520 from the Montlake Interchange to I-405 including the tolled section will occur nine times in FY 2014, five times in FY 2015, and two times in FY2017. Closure will be from 11 PM on Friday to 5 AM on Monday.
Ramp-Up
No ramp-up is included in the current forecast horizon (FY2014 through FY2056)
Toll Collection
Tolls will be collected at a single point on the eastern high-rise of the main span while traffic remains on the existing bridge and at a single point on the eastern shore when traffic moves to the repalcement bridge.
Toll rates will be the same for either direction on the bridge.
The toll collection is all electronic; there will be no manual toll collection.
FY 2014 - FY 2016: no night time tolling (11pm - 5am). FY 2017 and beyond: tolls will be charged during all 24 hours.

(table continued)

Table ES-3: October 2013 Traffic and Gross Revenue Forecast Assumptions (Continued)

Toll Rates	
Toll Rates FY 2014 - FY 2016	
	The maximum Good to Go! toll rate for 2-axle vehicles is $3.70 on weekdays and $2.30 on weekends in FY 2014 as adopted by the Washington State Transportation Commission. The toll rates have been rounded to the nearest $0.05.
	In FY 2014, Pay By Mail customers pay approximately $1.57 above the Good to Go! toll rates on average. The Pay By Mail rates are rounded to the nearest $0.05.
	At the beginning of FY 2015 and FY 2016 both weekday and weekend account-based tolls will increase by approximately 2.5% on average. It is assumed the tolls schedule reviewed by the WSTC in spring 2013, which included nearest $0.05 rounding for the FY 2015 and FY 2016 increases, will be adopted by the WSTC and implemented.
	At the beginning of FY 2015 and FY 2016, it is assumed the differential for Pay By Mail customers will escalate by 2.5 percent and that the Pay By Mail rates will be rounded to the nearest $0.05.
	Through the end of FY 2016, High occupancy vehicles (HOVs) will pay the same toll as single-occupant vehicles (SOVs).
	Toll exemptions as outlined by the Washington State Transportation Commission (the largest of which is the transit buses, private regular route buses such as the Microsoft Connector, and WSDOT sanctioned vanpools) are assumed.
	Tolls for multi-axle vehicles (those with more than two axles on the ground) will be determined by multiplying the number of axles by the per axle toll rate for two-axle vehicles using the same payment method and rounded to the nearest $0.05. The maximum rate is the six-axle rate, regarless of additional axles.
Toll Rates FY 2017 and beyond	
	Weekday account-based tolls will increase approx. 15% on average from FY 2016 to FY 2017 (i.e. on July 1, 2016).
	Weekend account-based tolls will increase approx. 2.5% on average from FY 2016 to FY 2017 (i.e. on July 1, 2016).
	The Pay By Mail toll differential will increase 2.5% from FY 2016 to FY 2017 (i.e. on July 1, 2016).
	All toll rates will be rounded to the nearest $0.05
	Toll exemptions as noted above are continued.
	HOVs with three or more occupants will be exempt from paying tolls; HOVs with two occupants will pay the same toll as single occupant vehicles (SOVs).
	Tolls for multi-axle vehicles will continue to be factored by the number of axles as noted above.
	No toll rate escalation is assumed after FY 2017.

Updated Traffic and Gross Toll Revenue Potential

Taking into account the tolling experience to date, revised independent economic forecast, and revised bridge configuration assumptions including closures, updated baseline estimates of traffic and gross toll revenue potential were developed for FY 2014 through FY 2056, shown in Table ES-4.

Initially, annual growth is expected to be strong due to increasing demand and congestion on competing facilities. Revenue grows somewhat faster than transactions due to the planned toll increases in FY 2015 and FY 2016. In FY 2017, the large increase in toll rates results in very small transaction growth, but a significant increase in annual revenue due to the toll rate increase. After FY 2017 toll rates are assumed not to change which, with inflation, makes the real value of the toll decline. This effect along with regional growth fuels continued increase usage of the facility. Post FY 2017, the growth rates of both transactions and revenue gradually decline to very modest levels.

Table ES-4: SR 520 Annual Traffic and Gross Toll Revenue Potential Updated Forecast

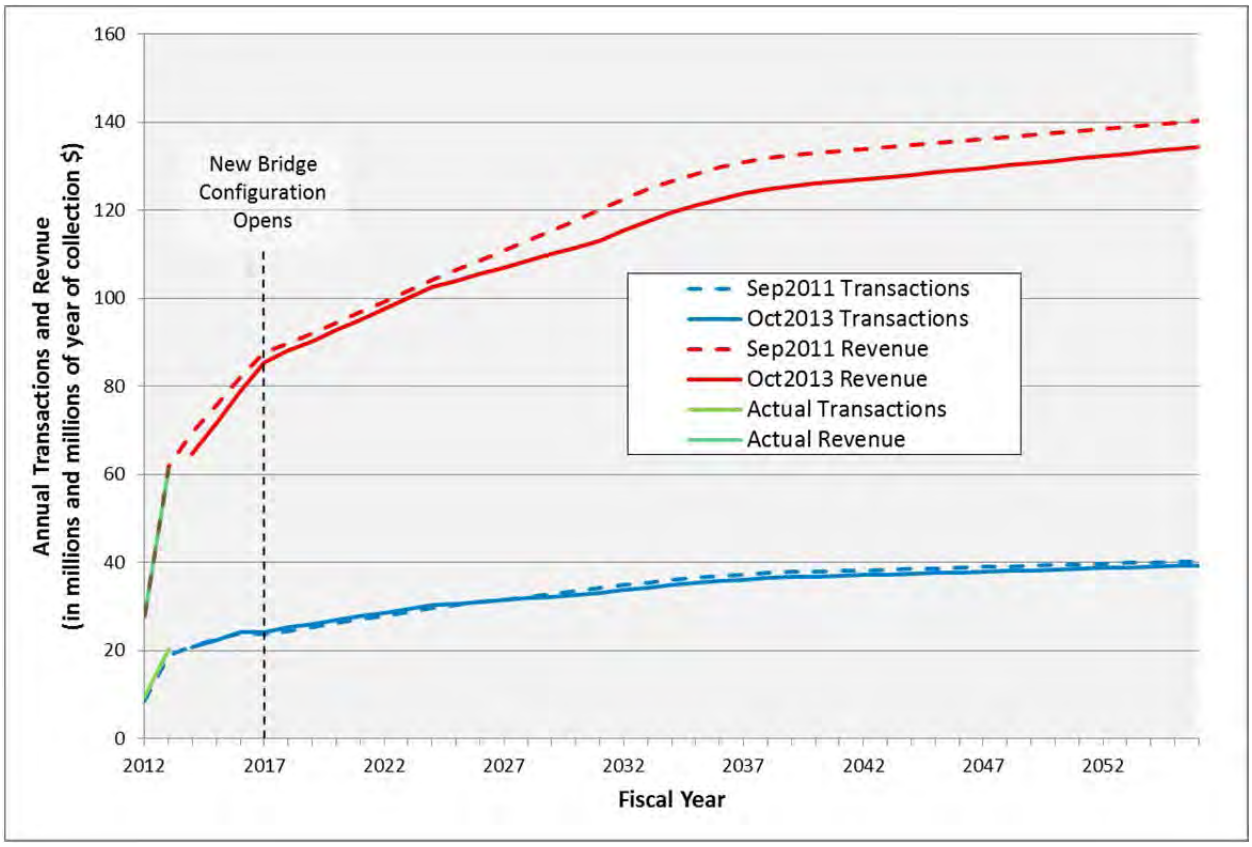
Fiscal Year	Transactions (millions)	Annual Growth	Gross Toll Revenue Potential (millions of year of collection $)	Annual Growth
2014	20.727	--	$64.656	--
2015	22.384	8.0%	71.373	10.4%
2016	24.168	8.0%	78.712	10.3%
2017	24.245	0.3%	85.338	8.4%
2018	25.253	4.2%	88.046	3.2%
2019	26.079	3.3%	90.308	2.6%
2020	26.907	3.2%	92.628	2.6%
2021	27.734	3.1%	95.008	2.6%
2022	28.562	3.0%	97.448	2.6%
2023	29.388	2.9%	99.952	2.6%
2024	30.216	2.8%	102.520	2.6%
2025	30.617	1.3%	104.005	1.4%
2026	31.020	1.3%	105.500	1.4%
2027	31.421	1.3%	107.005	1.4%
2028	31.824	1.3%	108.520	1.4%
2029	32.225	1.3%	110.043	1.4%
2030	32.628	1.3%	111.574	1.4%
2031	33.029	1.2%	113.114	1.4%
2032	33.703	2.0%	115.416	2.0%
2033	34.318	1.8%	117.517	1.8%
2034	34.873	1.6%	119.410	1.6%
2035	35.364	1.4%	121.085	1.4%
2036	35.790	1.2%	122.535	1.2%
2037	36.149	1.0%	123.755	1.0%
2038	36.439	0.8%	124.740	0.8%
2039	36.659	0.6%	125.487	0.6%
2040	36.809	0.4%	125.995	0.4%
2041	36.960	0.4%	126.505	0.4%
2042	37.112	0.4%	127.017	0.4%
2043	37.264	0.4%	127.532	0.4%
2044	37.417	0.4%	128.049	0.4%
2045	37.571	0.4%	128.568	0.4%
2046	37.725	0.4%	129.090	0.4%
2047	37.880	0.4%	129.614	0.4%
2048	38.036	0.4%	130.141	0.4%
2049	38.192	0.4%	130.670	0.4%
2050	38.350	0.4%	131.202	0.4%
2051	38.507	0.4%	131.736	0.4%
2052	38.666	0.4%	132.271	0.4%
2053	38.826	0.4%	132.810	0.4%
2054	38.986	0.4%	133.352	0.4%
2055	39.146	0.4%	133.896	0.4%
2056	39.307	0.4%	134.442	0.4%

Figure ES-3 shows the comparison of the forecasts over the entire study period. For the pre-completion tolling period (FY 2014 through FY 2016) the revised forecast shows transactions declining by 1.1 percent in FY 2014, down by 0.3 percent in FY 2015, and increasing by 0.9 percent in FY 2016. Gross toll revenue potential decreases by 6.8 percent for FY 2014, 5.5 percent for FY 2015, and 3.9 percent for FY 2016.

From FY 2017 to FY 2024, transactions are forecast to start 2.7 percent higher in FY 2017, 3.2 percent higher in FY 2018, and then slowly this increase fades to 2.0 percent in FY 2024. During this period, gross toll revenue potential is shown to decrease compared to the September 2011 forecast, with the decrease starting at 2.6 percent in FY 2017 and slowly declining to 1.6 percent in FY 2024.

For outer years FY 2031 and FY 2056, the forecast transactions are lower than the September 2011 forecast, reaching a maximum low of 3.2 percent less in FY 2031, and then moderating to 2.4 percent less by the end of the forecast period. The forecast gross toll revenue potential from FY 2024 and beyond is lower than the September 2011 forecast, reaching a maximum low of 5.9 percent less in FY 2031, and then moderating to 4.2 percent less by the end of the forecast period.

Figure ES-3: Traffic and Gross Revenue Potential – Updated Forecast and Comparison



Sensitivity Tests

In order to evaluate the impact of possible changes in input parameters and their effect on traffic and revenue, several sensitivity tests were performed, involving variations in the following parameters and assumptions:

- Toll rate sensitivity
- Regional growth
- Account-based participation rate.

Toll Rate Sensitivity

A range of toll rates was modeled using the tolling analysis model for FY 2017. For each toll rate, the corresponding revenue was computed to develop toll sensitivity curves for AM peak, midday and PM peak periods on weekdays.

The FY 2017 selected peak period toll rate of $4.35 is estimated to generate 82 and 79 percent of the maximum revenue during the AM and PM peak periods, respectively. During the off-peak (midday) period in FY 2017, the selected toll rate of $2.90 is estimated to generate 90 percent of the maximum revenue.

Regional Growth

Using the downside economic forecast, the tolling analysis model was run to determine transactions and grow toll revenue potential under lower economic growth conditions. For FY 2024, under an approximately 8 and 11 percent economic downside scenario for population and employment respectively, transactions and revenue are expected to be about 13 percent lower. For FY 2031, under an approximately 11 and 13 percent economic downside scenario for population and employment respectively, transactions and revenue are expected to be about 15 percent lower.

Account-based Participation Rate

This test examined the difference in transactions and revenue for account-based participation rates differing from those assumed in the baseline scenario. In the baseline scenario, the Good To Go! market input share was assumed to be 86 percent on weekdays and 76 percent on weekends in FY 2024 and FY 2031. The resulting overall output transaction Good To Go! share is 86 percent for both FY 2024 and FY 2031.

The high sensitivity test evaluated a change to 96 percent weekday and 86 percent weekend input market share in FY 2024 and FY 2031. The low sensitivity test evaluated a change to 81 percent weekday and 71 percent weekend input market share in FY 2024 and FY 2031.

The higher account-based participation rate resulted in transactions increasing by 1 to 2 percent and revenue decreasing by 3 percent for both FY 2024 and FY 2031 respectively. The effect was reversed for lower account-based participation rate, with transactions decreasing by less than 1 percent, and revenue increasing by up to 2 percent.

Chapter 1
Introduction

Financing to support implementation of the SR 520 Floating Bridge and HOV Program is an ongoing activity of the Washington State Department of Transportation (WSDOT). Some of the financing is being backed by tolls from the SR 520 Bridge. WSDOT began tolling the bridge in December 2011 prior to the construction of the replacement floating bridge. WSDOT continues collecting tolls during construction and plans to continue to collect tolls beyond completion of the project.

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The focus of this update is to revisit a number of key assumptions including: bridge project and regional roadway configuration; bridge closures during construction; socio-economic forecast; and tolling schedule. Revised traffic and gross revenue forecasts are provided for FY 2014 through FY 2056.

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SR 520 connects I-5 in Seattle on the west side of Lake Washington to the east side of Lake Washington, downtown Bellevue (via I-405), Kirkland, and Redmond. The total length of the SR 520 corridor is approximately 12.8 miles. The main SR 520 bridge span across Lake Washington currently is 1.42 miles long, making it the longest floating bridge span in the world.

At the time of this analysis, SR 520 consisted of:

- I-5 to east side of Lake Washington (including the main bridge span): two general-purpose lanes in each direction.
- Lake Washington to I-405: two general-purpose lanes in each direction and one westbound outside transit/high occupancy vehicle lane with a 3+ occupancy requirement (HOV3+).
- I-405 to SR 202 in Redmond: two general-purpose lanes in each direction and one outside transit/HOV lane in each direction with a 2+ occupancy requirement.

This is the configuration assumed in the forecast until FY 2017 (July 1, 2016).

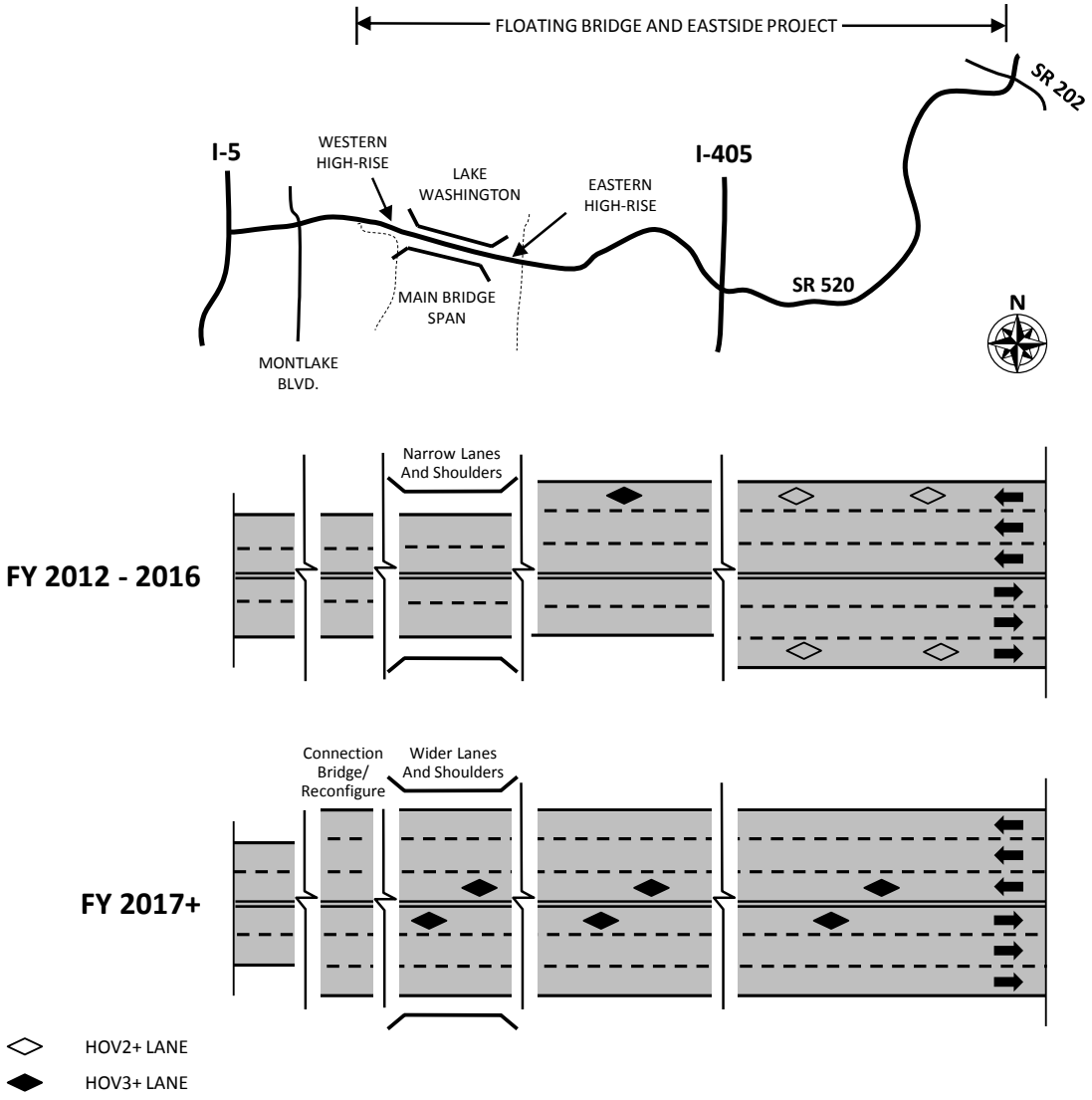
Replacement of the bridge is needed since it is structurally deficient and functionally obsolete. For purposes of this study, the following improvements are included:

- Replacement six-lane main span (two general-purpose and one inside transit/HOV 3+ lane in each direction) from west end of main span, across Lake Washington to the eastern shore
- Lake Washington to I-405: Addition of one eastbound lane from eastern shore of Lake Washington to I-405 resulting in three lanes in each direction (two general-purpose and one transit/HOV 3+ lane in each direction) with HOV lanes moved to the inside lanes

- I-405 to SR 202 in Redmond: Current configuration of two general-purpose lanes and one outside transit/HOV lane in each direction to two general-purpose lanes and one inside transit/HOV lane in each direction
- The replacement SR 520 bridge main span is planned to open in FY 2017 and carry three lanes (two general purpose and one HOV) across the lake to the west end of the western high rise. A three lane westbound west approach bridge north connector is planned to be completed shortly after the main span. This connector and reconfiguration of the existing four lane west approach bridge connector will result in three lanes in each direction to the Montlake Boulevard interchange (two general-purpose and one inside transit/HOV 3+ lane in each direction). The connection bridge and reconfiguration are new elements since the September 2011 study.

This is the configuration assumed from FY2017 forward. Figure 1-1 shows the assumed lane configurations for this study.

Figure 1-1: Assumed SR 520 Lane Configuration



Bond Financing Context

Several different debt instruments are being used to finance the SR 520 Corridor program. A combination of triple pledge bonds (backed by toll revenue, fuel tax, and the full faith and credit of the state), toll revenue bonds, Federal Highway Grant Anticipation Revenue (GARVEE) bonds, and a loan from the Transportation Infrastructure Finance and Innovation Act (TIFIA) are being considered to finance the program.

To date, four bonds have been issued under the two master bond resolutions that govern the municipal financing provided to the project, including: (1) triple pledge bonds in October 2011; (2) GARVEE bonds in June 2012; (3) TIFIA bond in the form of a draw down loan in October 2012; and (4) GARVEE bonds in September 2013. Additional bonds may be issued in the form of triple pledge, and/or toll revenue backed bonds.

Traffic and Revenue Forecasting History

CDM Smith produced the initial investment grade study for SR 520, completed in late summer 2011. This study produced annual gross revenue estimates from the assumed start of tolling (January 1, 2012) through 2056. The study was conducted at a level of detail sufficient for use in support of project financing and resulted in the September 2011 investment grade traffic and revenue forecast.[1] The estimates were prepared based on a study work program which included:

- Traffic Count Data Collection – including review of WSDOT annual traffic reports, as well as independent traffic count data collection.
- Travel Pattern Surveys – Mail-back surveys were sent to SR 520 users in the fall of 2009. The survey requested information on origin and destination travel, trip frequency, travel time of day, trip purpose, vehicle occupancy, vehicle class, and SR 520 entrance and exit points.
- Travel Time Surveys – Travel time surveys were performed along SR 520 and on important routes that could be potential alternatives.
- Stated Preference Surveys – Stated preference surveys were conducted in the fall of 2009 to measure the responses of current bridge users to tolling of SR 520. Possible changes in travel behavior included using alternative routes, changing destinations, combining trips, not making a trip, changing travel times, and/or changing travel mode. The results were used to develop a travel choice model which was used to forecast future travel behavior under tolled conditions including values of time, trip suppression, and mode shift.
- Tolling Analysis Model Development – The model development process included compiling and converting the Puget Sound Regional Council (PSRC) regional model data sets to the toll forecast model. The model was calibrated to match existing observed conditions based on traffic counts and speeds. Once calibrated, the traffic assignment model was developed, incorporating tolling algorithms with the assignment process. CDM Smith also incorporated

[1] The report containing the September 2011 traffic and revenue forecast was dated August 29, 2011. It was prepared in conjunction with other financing reports that are collectively referred to as the September 2011 forecast.

the results of the travel patterns surveys, stated preference survey, independent corridor growth review, and travel time surveys.

- Independent Corridor Growth Analysis – an independent review was conducted to update the PSRC data. This review utilized independent regional forecasts which account for the major recession and overall economic downturn, data on economic and real estate activity, and a review of area development plans as the basis for revised population and employment forecasts for the region.

- Traffic and Revenue Analysis – CDM Smith utilized the toll analysis model to analyze several preliminary toll structures, as requested by WSDOT. The final investment grade traffic and revenue scenario was based on the FY 2012 adopted tolling structure and the future year tolling structure in the financing plan reviewed by the Washington State Transportation Commission (WSTC).

- Sensitivity Tests – Several sensitivity tests were performed to determine the revenue impacts associated with variations in the following parameters and assumptions: regional growth, values of time, account-based participation rate, motor fuel cost, trip suppression and mode shift, and possible tolling of the I-90 bridge.

Tolling started on the bridge on December 29, 2011. In September 2012, CDM Smith provided a revised forecast based on limited tolling experience in the first six months of 2012, a revised socio-economic basis, and revised project construction schedule. The resulting updated revenue forecast differed only modestly from the September 2011 forecast. From 2013 through 2021 the updated revenue forecast was generally slightly higher than the original forecast. From 2022 and beyond the revenue forecast was slightly lower mostly as a result of lower longer term population and employment growth forecasts.

In late 2012 and early 2013, CDM Smith provided analysis of a series of alternative toll rate scenarios requested by the Washington State Transportation Commission (WSTC). A traffic and revenue forecast was produced for the nickel rounding alternative ultimately adopted by WSTC in May 2013. In this alternative, toll rates for account-based (Good To Go!) and Pay By Mail transactions in FY 2014 through FY 2016 were rounded to the nearest $0.05. (Toll rates from FY 2017 onward were rounded to the nearest $0.05 in the original 2011 study and continued to be so in the later studies.)

Traffic and Revenue Study Approach

The primary tasks leading to the development of this report and the revised forecast are summarized in this section. These tasks are described in detail in subsequent chapters of the report.

Tolling Performance Review

CDM Smith examined the toll performance of SR 520 focusing primarily on the period January 2012 through June 2013. The results of actual tolling experience provide a valuable benchmark to help evaluate and adjust the long term traffic and revenue estimates. The primary assessment included calendar year 2012 and a preliminary analysis of tolling experience in the first six months of 2013, based on initial information available as of July 2013.

The toll performance review covers: facility usage (total transactions); gross toll revenue potential; method of payment; average weekday and weekend day traffic volumes; and vehicle classification. When applicable, the performance data is compared to the September 2011 forecast.

CDM Smith also conducted an analysis of recent traffic and transit performance data on SR 520 and surrounding facilities to help compare pre- and post-tolling traffic conditions. The following information is reviewed: average traffic volumes; toll traffic vs. count station data; time-of-day traffic variations; travel times and speeds; vehicle occupancy; and transit performance. The focus is on comparing how traffic performances changed between 2011 (pre-tolling) and 2012 (post-tolling). In addition, a brief analysis of 2013 traffic volume data (covering the period January through June) was prepared.

Economic Growth Review

The CDM Smith team developed independent economic forecasts of population and employment based on estimates of current socioeconomic variables and forecasts of future socioeconomic activity. These forecasts were updated in July 2013 to reflect newly available economic performance estimates, current regional economic forecasts, projected development in Seattle and Eastside King County communities, and current market conditions such as office occupancy rates and housing unit absorption trends.

The team produced base year traffic analysis zone (TAZ) estimates for 2010 drawing from current data published by State and regional government agencies and data providers. Forecasts include employment and population forecasts for 2013, 2016, 2017, 2020, 2030 and 2040, driven by data and published forecasts. The revised economic forecasts were incorporated into the tolling analysis model by changing overall trip demand in those geographic areas which heavily influence travel demand on SR 520 and in the cross Lake Washington corridor.

For comparative purposes, the updated economic forecasts are compared to forecasts used in the previous September 2011 SR 520 traffic and revenue forecast.

Tolling Operations

Tolling commenced on the existing SR 520 bridge on December 29, 2011. Overall, the toll rates assumed in the 2011 study at the start of tolling were implemented. The WSTC has since raised the tolls approximately 2.5 percent on July 1, 2012 and July 1, 2013, consistent with the original 2011 study assumptions.

For FY 2014 through FY 2016, slight changes in the toll rate assumptions are all related to the nickel rounding strategy adopted by WSTC in May 2013:

- The maximum Good to Go! toll rate for 2-axle vehicles is $3.70 on weekdays and $2.30 on weekends in FY 2014. The toll rates have been rounded to the nearest $0.05.
- In FY 2014, Pay By Mail customers pay approximately $1.57 above the Good to Go! toll rates on average. The Pay By Mail rates are rounded to the nearest $0.05.
- At the beginning of FY 2015 and FY 2016 both weekday and weekend account-based tolls will increase by approximately 2.5 pecent on average. It is assumed the tolls schedule reviewed by the WSTC in spring 2013 which included nearest $0.05 rounding for the FY 2015 and FY 2016 increases will be adopted by the WSTC and implemented.

- At the beginning of FY 2015 and FY 2016, it is assumed the differential for Pay By Mail customers will escalate by 2.5 percent and that the Pay By Mail rates will be rounded to the nearest $0.05.
- Tolls for multi-axle vehicles (those with more than two axles on the ground) will be determined by multiplying the number of axles by the per axle toll rate for two-axle vehicles using the same payment method and rounded to the nearest $0.05.

For FY 2017 and beyond, the toll rates assumed in the 2011 study, which were rounded to the nearest $0.05, remain unchanged.

Toll Model Update

As part of the 2011 study, CDM Smith developed a tolling analysis model specific to the SR 520 corridor. A detailed description of the model structure and primary input is provided in the 2011 report. The tolling analysis model was revised by incorporating data gathered and analysis conducted in the tolling performance assessment, economic growth review, and revisions of toll rate assumptions.

Specific toll model and forecasting revisions include:

- **Model calibration –** The SR 520 toll model was calibrated to toll transaction derived from the toll performance analysis and to total bridge traffic crossing Lake Washington.
- **Proportion of payment –** The share of Good To Go! account based transactions has been revised based on the review of 2012 data. Also, the review showed weekday and weekend shares are different, and the forecast was revised accordingly.
- **Toll vehicle classification –** The performance data indicates a much lower share of trucks than what was assumed in prior forecasts. Consequently, the new forecast is based on lower share of trucks.
- **Weekend closures due to construction –** As the SR 520 reconstruction project has evolved, the number of planned weekend closures has been revised by WSDOT.
- **Time-shifting –** The September 2011 forecast assumed up to 20percent time shifting away from peak periods in response to higher tolls. This was based on the stated preference survey. Analysis of 2012 toll performance indicates there has been virtually no shift, therefore time shifting is removed in the new forecast.
- **Socioeconomic growth –** The revised socioeconomic growth review is incorporated into the new forecast.
- **Weekend traffic –** Weekend toll transactions are raised up for FY 2013 through FY 2016 due to the adjustment of toll diversion behavior to reflect tolling experience through June 2013. The growth in FY 2017 and forward years was already fairly robust and thus no changes are made.
- **Toll rates –** The revised toll rate structure reflecting the latest decisions by WSTC are incorporated into the model.

Traffic and Revenue Analysis

The revised tolling analysis model was used to generate new traffic and gross revenue forecasts. The first step was to run the model to evaluate traffic and revenue impacts on an average weekday for key

analysis years: FY 2016, FY 2017, FY 2024, and FY 2031. Both FY 2016 and FY 2017 were directly modeled because the bridge lane configuration is assumed to change during that time,

The model results were then annualized taking into account weekend traffic and toll rates. The process generated a baseline traffic and gross revenue forecast from FY 2014 to FY 2056.

Sensitivity Tests

In order to evaluate the impact of possible changes in input parameters and their effect on traffic and revenue, several sensitivity tests were performed, involving variations in the following parameters and assumptions:

- Toll rate sensitivity
- Regional growth
- Account-based participation rate.

Report Structure

The remainder of this report is organized as follows:

- Chapter 2 presents a review of tolling performance with key comparisons to the September 2011 forecast.
- Chapter 3 covers the economic growth analysis and revised economic forecast. It includes comparisons to the 2011 study economic forecast.
- Chapter 4 discusses the assumptions related to toll structure and toll rates. It includes a discussion of vehicle classes and toll exemptions, methods of payment, and estimated market share by payment type.
- Chapter 5 presents the traffic and revenue forecasting approach. It includes an overview of the tolling analysis model, a description of the revisions made to the model and forecast process, and a summary of major forecasting assumptions.
- Chapter 6 includes the results of traffic and gross revenue analysis in the form of an estimated annual traffic and gross toll revenue potential stream for the period from FY 2014 through FY 2056.[2]
- Chapter 7 contains the results of sensitivity testing of key model parameters and assumptions.

[2] The forecast presented in this report was generated and reviewed in the summer and fall of 2013. Similar to the September 2011 forecast, it is prepared in conjunction with other financing reports that are collectively referred to as the October 2013 forecast.

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Chapter 2

Review of Tolling Performance

CDM Smith examined the traffic and tolling performance of SR 520 between January 2012 and June 2013. The results of actual tolling experience provide valuable information to help evaluate and adjust the long term traffic and revenue estimates.

The traffic performance review examines the traffic impacts as a result of tolling. The focus is on comparing how traffic conditions (daily volumes, hourly profiles, and travel times) changed between 2011 (pre-tolling) and 2012 (post-tolling).

The tolling performance review covers the following elements: transactions; gross toll revenue potential; method of payment; average weekday and weekend day transactions; transactions by time period; and vehicle classification. When applicable, the performance data (actuals) are compared to the September 2011 forecast prepared by CDM Smith.

The results presented here are based on transactions resolution as of July 2013, the latest dataset available at the time the forecasts were updated. Not all of the transactions had reached final resolution by this time; therefore additional adjustments to transactions and revenue are likely over time as more transactions reach final resolution. The analysis of tolling experience in the first six months of 2013 in particular has been adjusted based on experience with resolved transactions in 2012.

Traffic Impacts as a Result of Tolling

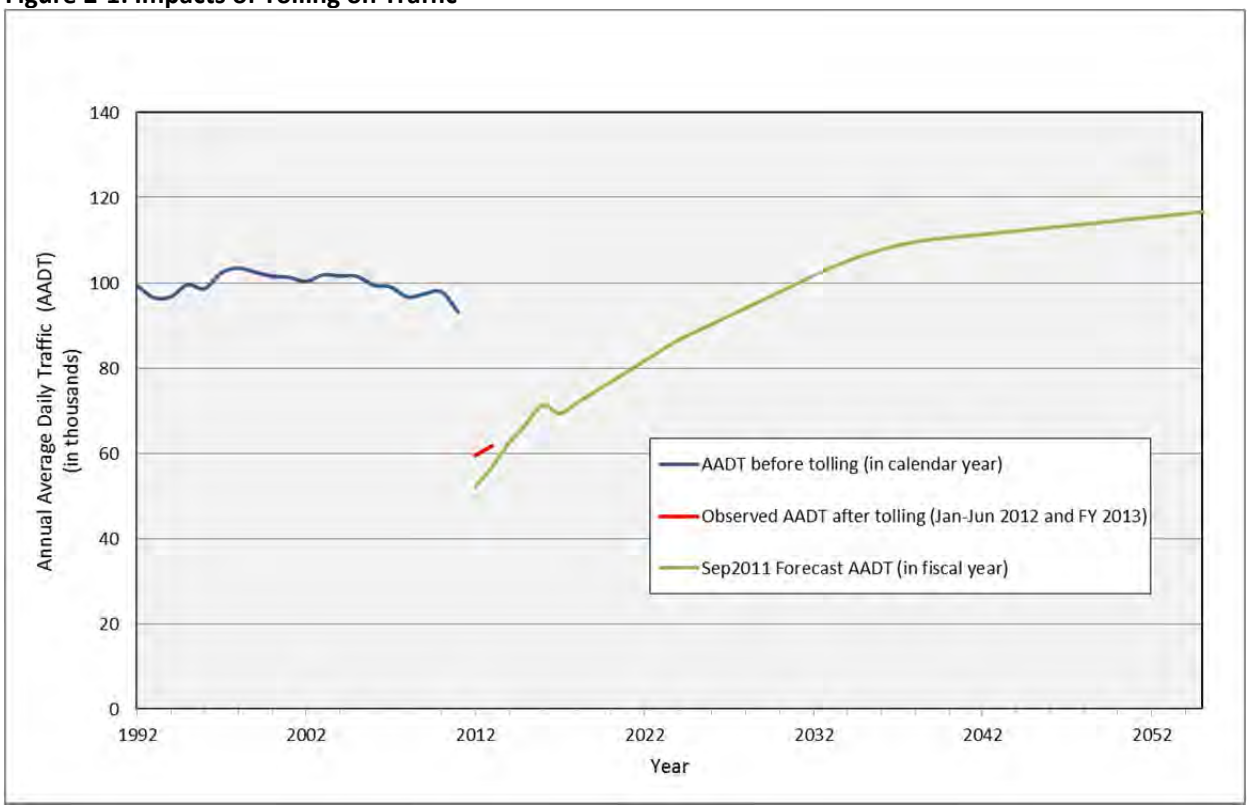
Traffic data provided by WSDOT was used to review traffic variations on SR 520 prior to and after tolling started.

Traffic Volumes

Figure 2-1 shows the observed traffic volumes and the forecast traffic based on the September 2011 study. Note that on this figure, the annual average daily traffic includes all traffic (non-revenue vehicles, overnight traffic, and weekend traffic) and is adjusted to exclude weekend closures due to construction.

The average daily traffic volume on the SR 520 bridge was 59,500 vehicles in the first six months of 2012, compared to 93,100 in 2011 a drop of 36 percent. The September 2011 forecast had anticipated a drop of traffic of about 48 percent. For FY 2013, the observed annual average daily traffic was about nine percent higher than the forecast (61,800 vehicles compared to a forecast value of 56,800 vehicles).

Figure 2-1: Impacts of Tolling on Traffic



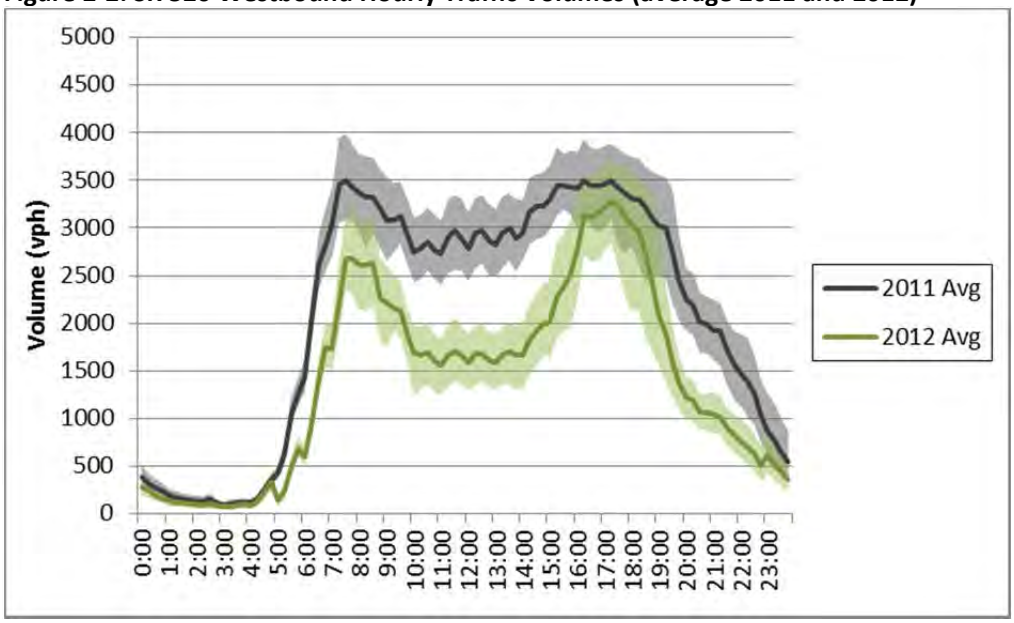
Weekday data shows the average weekday traffic volume on SR 520 decreased to 66,800 vehicles in 2012, about a 33 percent drop. Average weekday traffic on I-90 grew by approximately 10 percent in the post-tolling period (2012) over the pre-tolling period (2011) to about 152,600. The cross lake traffic (combining SR 520 and I-90 traffic volumes) for an average weekday dropped by approximately 20,000 vehicles, representing an eight percent reduction.

Hourly Traffic Variations on Weekdays

On SR 520 (see Figures 2-2 and 2-3), the reduction of traffic volume occurred predominantly during off-peak periods (midday and late evening). During the peak periods, traffic is closer to pre-tolling levels. During the PM peak period, westbound traffic reached near 2011 levels. During the AM peak period, eastbound traffic reached near 2011 levels.

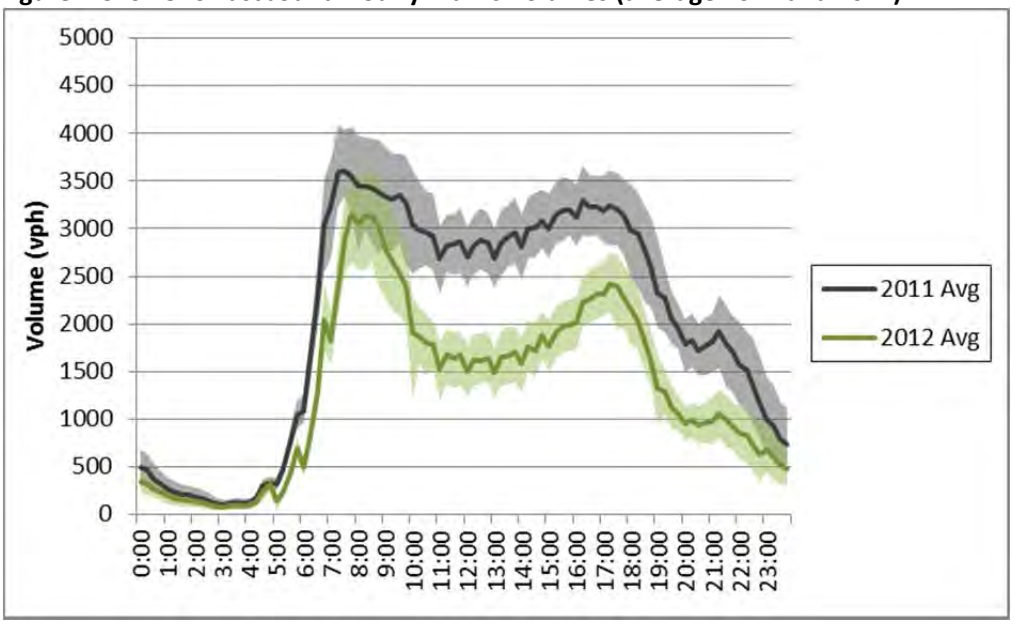
On I-90 (see Figures 2-4 and 2-5), the growth in traffic volume occurred predominantly during off-peak periods (midday and late evening), when additional roadway capacity is available. During peak periods, 2012 hourly traffic volumes are similar to those observed in 2011.

Figure 2-2: SR 520 Westbound Hourly Traffic Volumes (average 2011 and 2012)



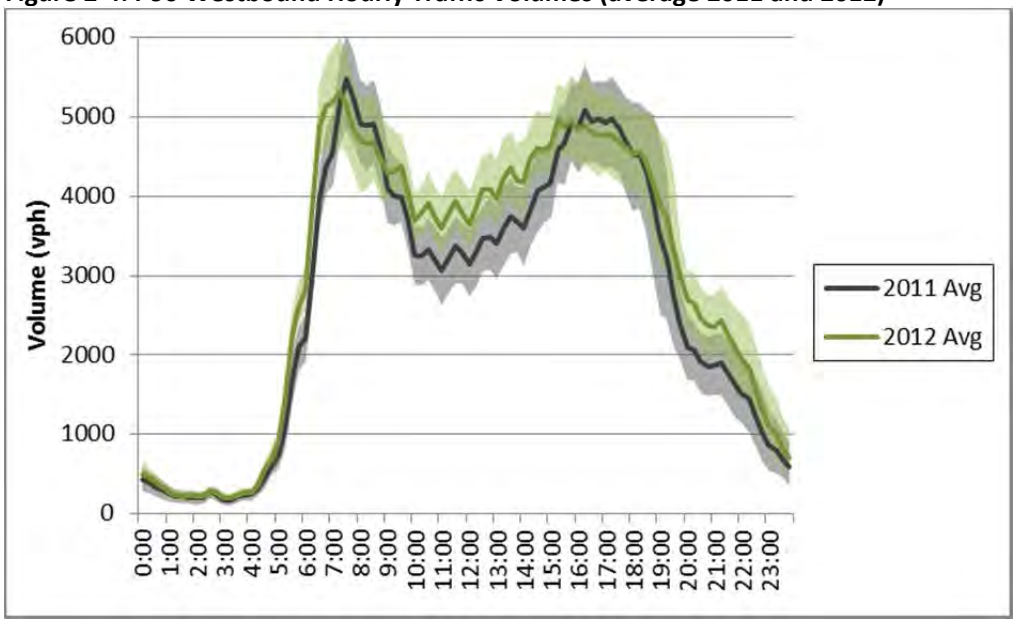
Source: WSDOT

Figure 2-3: SR 520 Eastbound Hourly Traffic Volumes (average 2011 and 2012)



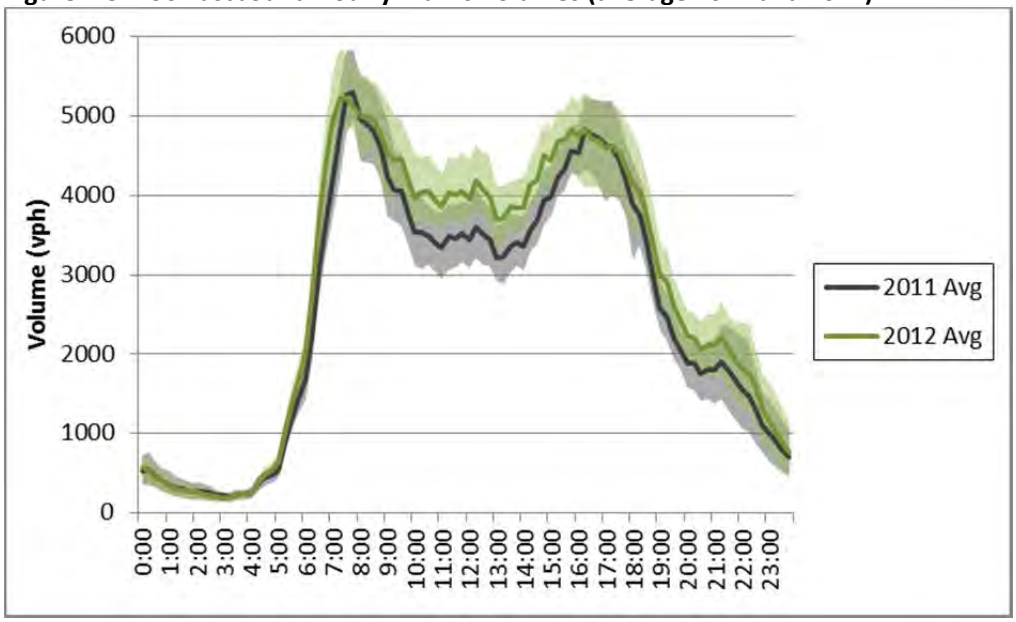
Source: WSDOT

Figure 2-4: I-90 Westbound Hourly Traffic Volumes (average 2011 and 2012)



Source: WSDOT

Figure 2-5: I-90 Eastbound Hourly Traffic Volumes (average 2011 and 2012)



Source: WSDOT

Speeds and Travel Times

Speed and travel time information available for review came from various sources, including a survey conducted by CDM Smith and data provided by WSDOT which summarized changes in average weekday travel times on key routes between 2011 and 2012.

As part of the travel time and speed survey performed by CDM Smith in May 2013, data was collected along five corridors in the region:

- Seattle – Bellevue using SR 520 bridge
- Seattle – Bellevue using I-90 bridge
- Seattle – Woodinville using SR 522
- Bellevue – Woodinville using I-405
- Seattle – Bellevue using I-5 and I-405 (south of Lake Washington).

The surveys were conducted on May 28th, 29th and 30th, 2013. Morning surveys were performed from approximately 6:00 am to 10:00 am and evening surveys from approximately 3:00 pm to 7:00 pm. Figures 2-6 through 2-9 show travel speeds captured via GPS using probe vehicles.

SR 520 – Eastbound

The eastbound morning speed map (Figure 2-6) indicates that eastbound SR 520 is operating under free-flow conditions between I-5 and the bridge, and on the bridge itself. On the east side of the bridge, travel slows downs to speeds ranging between 15 and 45 mph all the way to Bellevue Way, and then again approaching I-405 southbound.

During the afternoon peak (Figure 2-7), the entire section of SR 520 between I-5 and I-405 is operating under free-flow conditions, with speeds at or above speed limits. Speeds start to slow down just before the junction with I-405.

SR 520 – Westbound

During the morning peak period, the entire section of SR 520 between I-405 and I-5 is operating under free-flow conditions, with speeds at or above speed limits (Figure 2-8). Speeds start to slow down just before the junction with I-5.

Travel in the westbound direction during the afternoon peak is congested from east of Bellevue Way to the SR 520 bridge (Figure 2-9). On the bridge itself and all the way to I-5, traffic is free-flowing.

SR 522

SR 522 is a signal-controlled arterial with speed limits ranging from 30 to 45 mph. In the morning peak eastbound direction, the route contains no sections of prolonged delays, and speeds are generally in the 30 to 45 mph range. During the afternoon peak, the eastbound route is more congested with many sections operating in the 15 to 30 mph range.

The westbound direction is more congested than the eastbound direction, both during the morning and afternoon peak periods.

Figure 2-6: Observed Average Travel Speed – Eastbound AM Peak

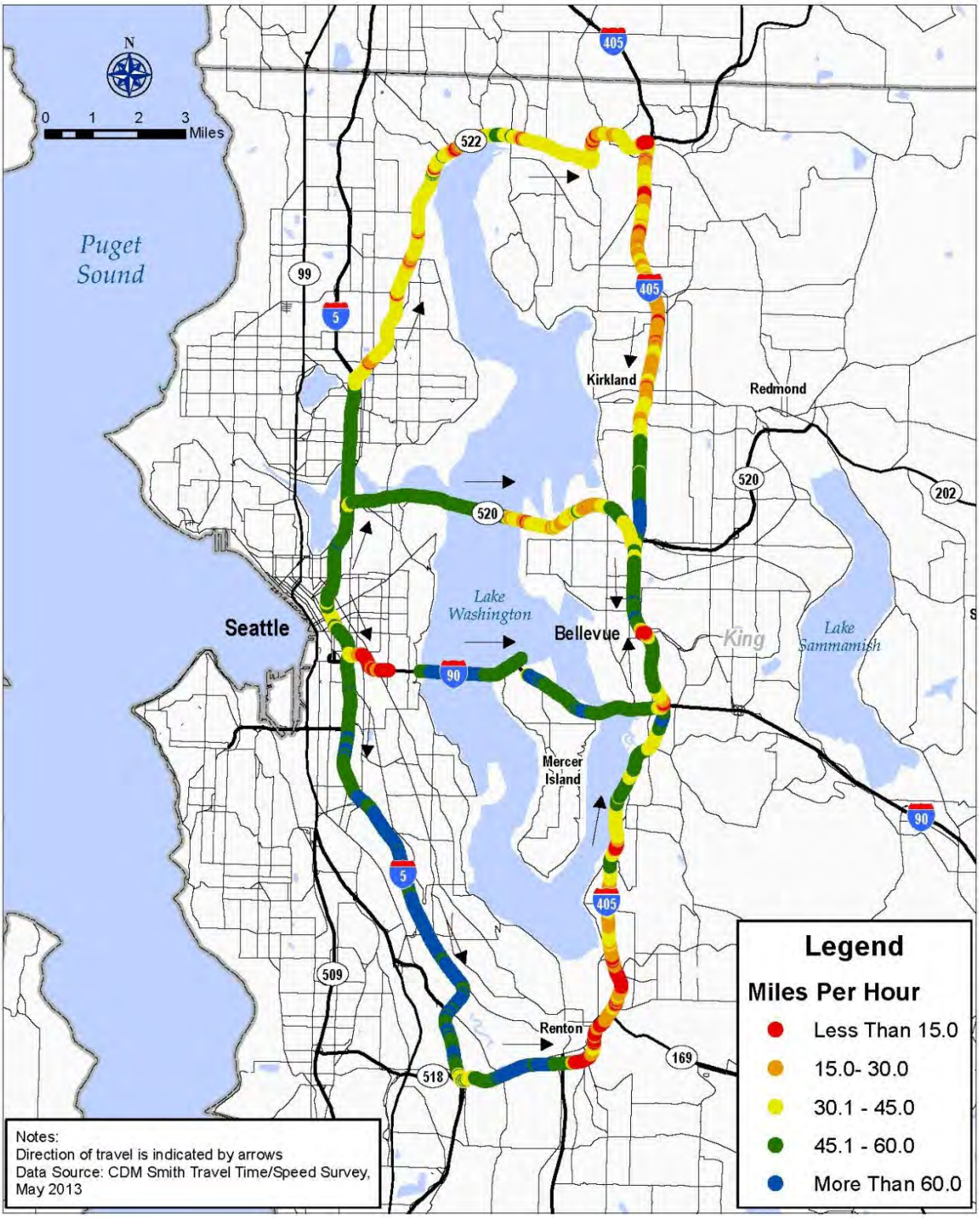


Figure 2-7: Observed Average Travel Speed – Eastbound PM Peak

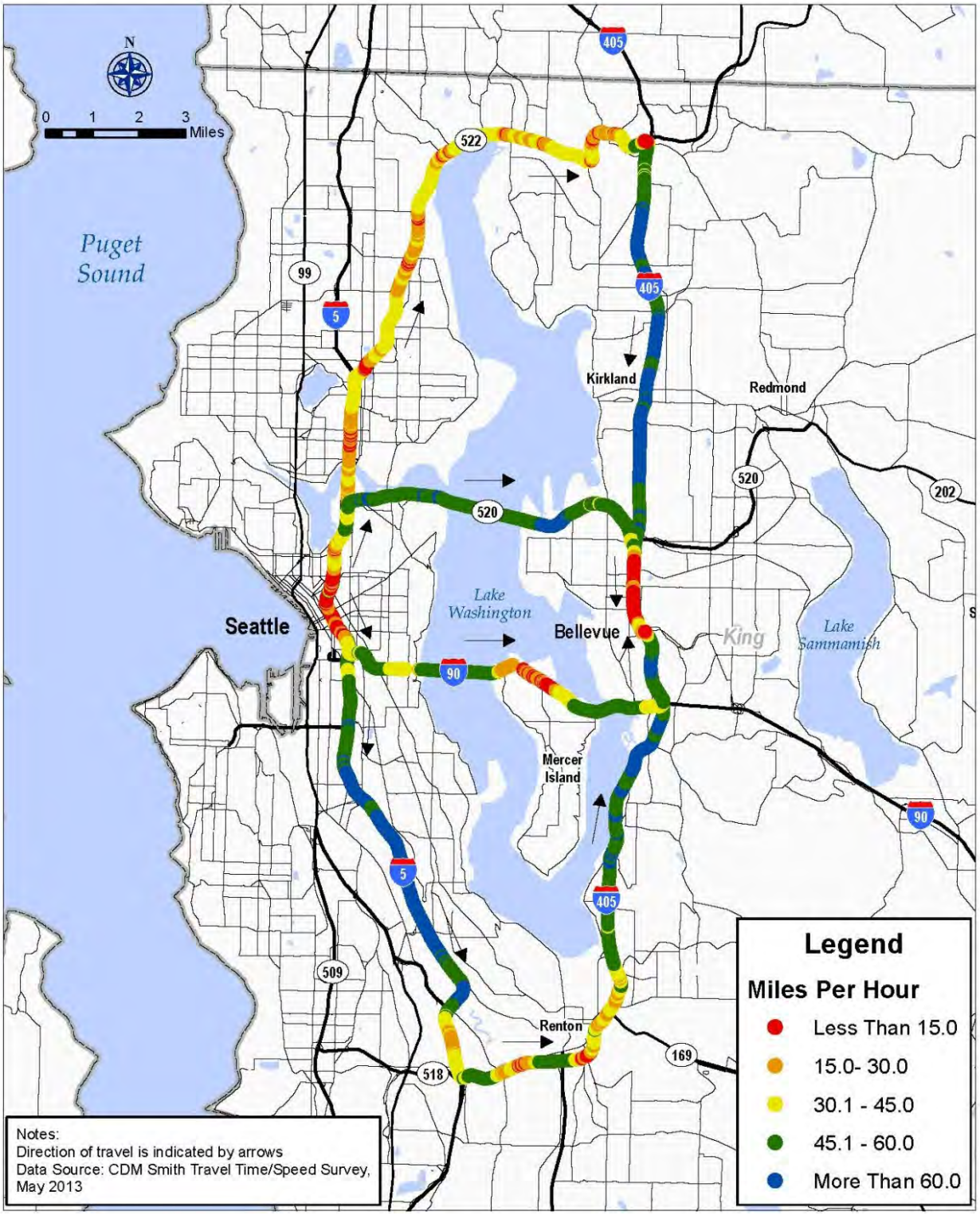


Figure 2-8: Observed Average Travel Speed – Westbound AM Peak

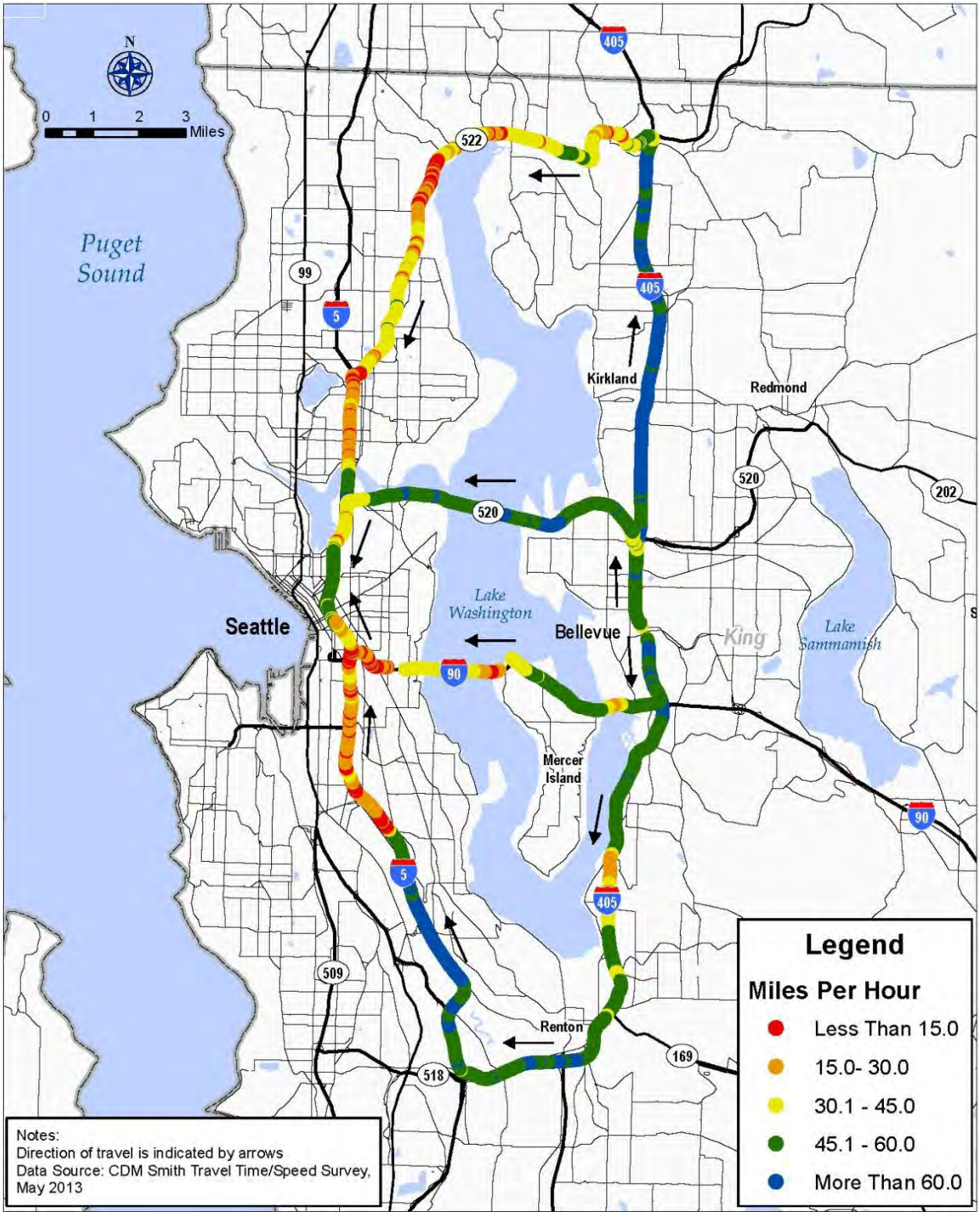
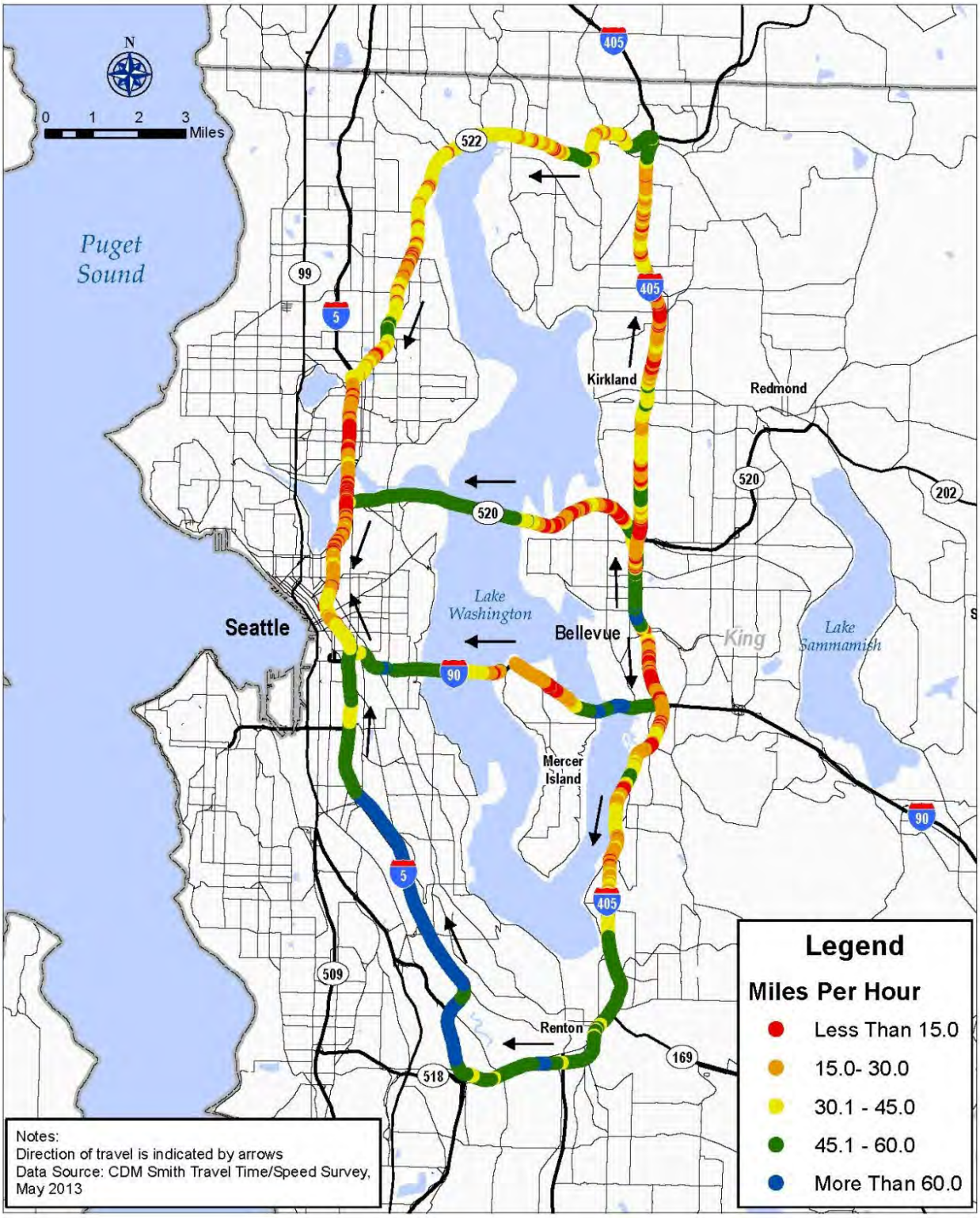


Figure 2-9: Observed Average Travel Speed – Westbound PM Peak



I-90 – Eastbound

The section of I-90 eastbound between I-5 and the Mt Baker Tunnel is congested during the morning peak period. There is also some limited congestion at the access to northbound I-405.

During the afternoon peak period, congestion conditions are encountered at several locations: approaching the Mt Baker Tunnel (congestion at this bottleneck is less severe than in the morning); through Mercer Island (with speeds dropping below 15 mph); and at the merge with I-405.

I-90 – Westbound

In the morning peak westbound direction, the I-5 bottleneck typically backs up to the Mount Baker Tunnel. Speeds in the 15 to 45 mph range are also observed on the floating bridge, and through Mercer Island.

During the afternoon peak period, the westbound direction is also congested through Mercer Island and on the floating bridge.

Cross-Lake Travel Times

Cross-lake travel times (between I-5 and I-405) derived from the May 2013 survey are shown in Table 2-1. The table also presents average weekday travel times provided by WSDOT.

Table 2-1: Weekday Cross-Lake Travel Times (in minutes)

Period	Direction	2011 Avg Weekday[1]	2012 Avg Weekday[1]	May 2013[2]
SR 520 between I-5 and I-405				
AM Peak	WB	10.78	7.66	7.63
AM Peak	EB	11.33	8.21	8.05
PM Peak	WB	17.12	10.93	10.57
PM Peak	EB	9.66	7.22	7.40
I-90 between I-5 and I-405				
AM Peak	WB	7.62	9.20	10.12
AM Peak	EB	8.68	8.34	9.92
PM Peak	WB	11.39	13.70	10.92
PM Peak	EB	9.57	9.23	9.55

1. WSDOT travel time estimates from loops (data provided on 7/17/13)
2. From CDM Smith field survey
Sources: WSDOT and CDM Smith

WSDOT provided information on changes in average weekday travel times on key routes between 2011 and 2012, based on data from loop detectors (for I-90 and SR 520) and from license matching using video detection (for SR 522). The data is available for three routes across Lake Washington for the AM and PM peak period.

Based on data from WSDOT, the average travel times on SR 520 during peak periods in 2012 have consistently been faster than pre-tolling conditions. Travel time differences vary significantly by direction and month. The more significant travel time reductions have been observed in the westbound direction during the PM peak, at six minutes on average. During the AM peak, travel times

in the eastbound direction are about three minutes faster on average. During these same time periods, westbound I-90 evening travel times have increased over two minutes and eastbound I-90 morning travel times have declined slightly. Travel times on SR 522, an arterial immediately north of Lake Washington, have increased in the westbound direction by about three minutes during the afternoon.

Toll Transactions and Gross Toll Revenue Potential

The primary tolling data available for review from WSDOT are reports from transactions processed by the Customer Service Center (CSC). The dataset provided to CDM Smith in May 2013 contained toll transaction information for January 2012 through December 2012 broken down by date, hour, day, class, and type of toll transaction. The breakout of Good To Go! (GTG) account-based vs. Pay By Mail (PBM) reflects the tracing of transactions from lane equipment through processing within the CSC. The dataset reflects any adjustments that occur such as a license plate read transaction later changed to account-based Pay By Plate. The data is generally thought to be at a level appropriate to derive the actual gross toll revenue potential comparable to the forecasts.

In spring 2013, WSDOT made additional adjustments for exempt vehicles (particularly transit vehicles) that were not fully represented in the original dataset; a second dataset reflecting additional non-revenue adjustments was delivered to CDM Smith in July 2013, and the analysis reported here reflects these additional adjustments.

For January 2013 through June 2013, the CSC dataset was not available. Instead, the actual transactions were estimated based on WSDOT's data from toll lane equipment first adjusted for estimated non-revenue vehicles and further adjusted for duplicates and CSC transaction processes; and the actual gross toll revenue potential was derived from WSDOT's unbilled transaction report adjusted for estimated non-revenue vehicles and FY 2013 toll operations reports. The resulting "estimated actual" number of monthly transactions and revenue potential are considered the best estimates at the date this analysis was produced; the actual experience may be revised as more information becomes available and reconciled reports are generated.

Transactions

Table 2-2 shows the actual number of transactions by month over the 18-month performance review period (January 2012 through June 2013).

Table 2-2 indicates that over the first six months of 2013, transactions have increased by 7.6 percent compared to the first six months of 2012. The large increase in January's transactions is likely due to the combination of normal growth and recovery from the depressed levels the prior year which were affected by a severe winter storm.

Table 2-3 presents the difference between total annual forecast transactions and actual results available. Overall, the actual transactions exceeded the forecast by 9.8 percent in the first six months of 2012 and by 6.6 percent in FY 2013. Note that forecasts excluded transit buses and other toll-exempt vehicles; the datasets of actual transactions may not fully account for non-revenue vehicles, which may contribute to some of the difference between actuals and forecasts. The toll system is still maturing and further reporting refinement is expected in the next year.

Table 2-2: Monthly Actual Transactions

Actual Transactions	2012[1]	2013[2]	Percent Change
January	1,275,306	1,697,451	33.1%
February	1,505,263	1,537,817	2.2%
March	1,667,299	1,794,438	7.6%
April	1,579,205	1,651,778	4.6%
May	1,800,544	1,843,724	2.4%
June	1,679,936	1,703,339	1.4%
July	1,634,862	--	--
August	1,748,279	--	--
September	1,605,673	--	--
October	1,780,703	--	--
November	1,595,208	--	--
December	1,627,330	--	--
January-June	**9,507,553**	**10,228,546**	**7.6%**
July-December	**9,992,055**	**--**	**--**

1. For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13
2. For CY 2013, actuals are based on WSDOT monthly lane equipment data and adjustments by CDM Smith

Table 2-3: Annual Transactions vs. Forecast

Transactions	Sep2011 Forecast[1]	Actuals[2,3]	Variance
Jan 2012-Jun 2012	8,659,000	9,507,553	9.8%
FY 2012[4]	**8,659,000**	**9,609,173**	**11.0%**
Jul 2012-Dec 2012	9,428,000	9,992,055	6.0%
Jan 2013-Jun 2013	9,545,000	10,228,546	7.2%
FY 2013	**18,973,000**	**20,220,601**	**6.6%**

1. Based on CDM Smith September 2011 forecast
2. For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13
3. For CY 2013, actuals are based on WSDOT monthly lane equipment data and adjustments by CDM Smith
4. Actuals include first three days of tolling which were in 2011; Forecast does not include these three days

Gross Toll Revenue Potential

For purposes of this analysis, the gross toll revenue potential is defined as the revenue that would be collected if every vehicle crossing the bridge paid exactly the published toll rate based on time of crossing, vehicle class, payment method, and applicable exemptions. The gross toll revenue potential does not include any fee revenue or short term account discounts.

Table 2-4 shows the actual gross toll revenue potential by month over the 18-month performance review period. Over the first six months of 2013, revenue potential increased by 11.7 percent compared to the first six months of 2012. As mentioned earlier, the strong growth in January is likely due to low January 2012 transactions due to a major snow storm plus normal growth.

Table 2-5 presents the difference between total annual forecast revenue potential and actual results available. The revenue potential reflects the toll rate increase implemented on July 1st, 2012. Overall, the actual revenue potential was very close to the forecast: 0.4 percent lower than forecasted in the first six months of 2012, and 0.8 percent lower than forecasted in FY 2013.

Table 2-4: Monthly Actual Gross Toll Revenue Potential

Actual Gross Toll Revenue Potential	2012[1,2]	2013[2]	Percent Change
January	$3,753,917	$5,138,969	36.9%
February	4,462,654	4,686,538	5.0%
March	4,887,942	5,364,149	9.7%
April	4,596,628	5,075,045	10.4%
May	5,172,209	5,574,437	7.8%
June	4,857,006	5,139,682	5.8%
July	4,976,772	--	--
August	5,398,814	--	--
September	4,836,775	--	--
October	5,459,692	--	--
November	4,853,751	--	--
December	4,797,087	--	--
January-June	**$27,730,356**	**$30,978,820**	**11.7%**
July-December	**$30,322,891**	**--**	**--**

1. For FY 2012, actuals are based on WSDOT toll operations reports broken out to monthly results using CSC data
2. For FY 2013, actuals are based on WSDOT toll operations reports broken out to monthly results using interim financial reports and adjustments by CDM Smith

Table 2-5: Annual Gross Toll Revenue Potential vs. Forecast

Actual Gross Toll Revenue Potential	Sep2011 Forecast[1]	Actuals[2,3]	Variance
Jan 2012-Jun 2012	$27,840,000	$27,730,356	-0.4%
FY 2012[4]	**$27,840,000**	**$28,055,637**	**0.8%**
Jul 2012-Dec 2012	$30,713,000	$30,322,891	-1.3%
Jan 2013-Jun 2013	$31,097,000	$30,978,820	-0.4%
FY 2013	**$61,810,000**	**$61,301,711**	**-0.8%**

1. Based on CDM Smith September 2011 forecast
2. For FY 2012, actuals are based on WSDOT toll operations reports
3. For FY 2013, actuals are based on WSDOT toll operations reports and breakouts by CDM Smith
4. Actuals include first three days of tolling which were in 2011; Forecast does not include these three days

Payment Share

Table 2-6 presents the breakdown of transactions by payment type. Actuals for calendar year 2012 are based on the CSC datasets, while actuals for calendar year 2013 were estimated based on WSDOT's lane equipment data summaries.

The Pay By Mail category includes transactions in-process, billed, and paid. "In-process" and "billed" may include transactions that will later be deemed Good To Go! or non-revenue.

Table 2-6: Payment Share

Payment Type Transaction Share	Sep2011 Forecast[1]				Actuals[2,3]			
	Good To Go! Tag	Good To Go! Pay By Plate	Good To Go! Total	Pay By Mail, Unbillable, NOCP	Good To Go! Tag	Good To Go! Pay By Plate	Good To Go! Total	Pay By Mail, Unbillable, NOCP
Jan 2012-Jun 2012	60.5%	11.3%	71.8%	28.2%	71.1%	11.6%	82.7%	17.3%
FY 2012[4]	60.5%	11.3%	71.8%	28.2%	71.1%	11.6%	82.7%	17.3%
Jul 2012-Dec 2012	63.4%	10.8%	74.1%	25.9%	69.7%	13.1%	82.8%	17.2%
Jan 2013-Jun 2013	63.4%	10.8%	74.1%	25.9%	69.7%	14.1%	83.8%	16.2%
FY 2013	63.4%	10.8%	74.1%	25.9%	69.7%	13.6%	83.3%	16.7%

1. Based on CDM Smith September 2011 forecast
2. For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13
3. For CY 2013, actuals are based on WSDOT Toll Business Reports and adjustments by CDM Smith
4. Does not include first three days of tolling which were in 2011

The total proportion of actual Good To Go! transactions (82.7 percent for FY 2012 and 83.3 percent for FY 2013) was significantly higher than projected in the Sep2011 study (71.8 percent for FY 2012 and 74.1 percent for FY 2013), implying high familiarity with the roadway as a toll road.

The higher proportion of account-based transactions than forecasted (which have a lower revenue per transaction than Pay By Mail transactions) and a lower proportion of trucks than forecasted (which have a higher revenue per transaction than cars) explain the dichotomy of actual transactions being higher than forecast while gross expected revenue potential is very close to forecast.

Average Weekday and Weekend Day Transactions

Table 2-7 shows a comparison of observed average weekday and average weekend day traffic to the forecast. Adjustments were made to account for bridge closure weekends and major holidays to provide comparable data. For the first six months of 2012, weekday transactions were running about 12 percent above forecasts and weekend transactions were running about 36 percent above forecasts. For the second half of the 2012 calendar year, weekday transactions were running about one percent above forecasts and weekend transactions were running about 27 percent above forecasts. For the first six months of 2013, weekday transactions were running about four percent above forecasts and weekend transactions were running about 29 percent above forecasts.

Table 2-7: Average Weekday and Average Weekend Transactions vs. Forecast

Transactions	Sep2011 Forecast[1]	Actuals[2,3]	Variance
Weekdays			
Jan 2012-Jun 2012	55,808	62,719	12.4%
FY 2012[4]	**55,808**	**62,719**	**12.4%**
Jul 2012-Dec 2012	62,688	63,463	1.2%
Jan 2013-Jun 2013	62,688	65,251	4.1%
FY 2013	**62,688**	**64,350**	**2.7%**
Weekend Days[5]			
Jan 2012-Jun 2012	27,561	37,404	35.7%
FY 2012[4]	**27,561**	**37,404**	**35.7%**
Jul 2012-Dec 2012	30,375	38,455	26.6%
Jan 2013-Jun 2013	30,375	39,324	29.5%
FY 2013	**30,375**	**38,904**	**28.1%**

1. Based on CDM Smith September 2011 forecast
2. For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13
3. For CY 2013, actuals are based on WSDOT monthly lane equipment data and adjustments by CDM Smith
4. Does not include first three days of tolling which were in 2011
5. Weekends the facility was closed are not included in forecast and actuals

Transactions by Time Period

Observed transactions by time period for average weekdays in 2012 were examined and compared to forecasts. The time periods used in this analysis correspond to the time periods of the toll rates (which are different on weekdays and weekends). Table 2-8 shows the number of actual transactions per weekday toll period, the payment method proportion, and the share of transactions by time period (observed versus assumed in the September 2011 forecast).

The share of Good To Go! transactions tend to be higher during the morning commute peak period, with a ratio of 90 percent between 5:00 am and 9:00 am. The share of weekday transactions by toll period in 2012 has followed the 2011 forecast amounts very closely.

Table 2-8: Average Weekday Toll Period Transactions and Payment Shares CY 2012

Toll Period	Actual Transactions[1]	Good To Go![2] (% of Txns)	Pay By Mail[3] (% of Txns)	2012 Observed[4]	Sep2011 Forecast Model Share[5]
05:00-05:59	742	90%	10%	1%	1%
06:00-06:59	2,274	90%	10%	4%	3%
07:00-08:59	10,512	90%	10%	17%	18%
09:00-09:59	4,681	87%	13%	7%	7%
10:00-13:59	13,257	80%	20%	21%	22%
14:00-14:59	3,572	80%	20%	6%	6%
15:00-17:59	14,963	84%	16%	24%	24%
18:00-18:59	4,692	85%	15%	7%	6%
19:00-20:59	5,051	83%	17%	8%	7%
21:00-22:59	3,356	80%	20%	5%	6%
Total	**63,100**	**84%**	**16%**	**100%**	**100%**

1. Weekdays January 16-20, 2012 were removed due to snow storm
2. Includes transponder and Pay By Plate
3. Includes NOCP Toll and un-billable leakage
4. Observed proportion of transactions by time period
5. Proportion of transactions by time period assumed in the Sep2011 forecast

Source: WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13

Vehicle Classification

Table 2-9 indicates how the observed proportion of trucks compares to the forecast, in terms of share of transactions and share of gross toll revenue potential.

The table shows that the observed truck percentage in the toll transactions is significantly lower than what was assumed in the September 2011 forecast. This difference in the share of transactions (between actuals and forecast) produces an even higher difference in the share of gross toll revenue potential, due to the fact that trucks pay higher toll rates.

Table 2-9: Truck Percentages – Actuals vs. Forecast

Transactions	Sep2011 Forecast1	Actuals[2,3]	Variance
Truck Share of Transactions[4]			
Jan 2012-Jun 2012	4.8%	1.0%	-3.8%
FY 2012[5]	**4.8%**	**1.0%**	**-3.8%**
Jul 2012-Dec 2012	5.1%	1.0%	-4.1%
Jan 2013-Jun 2013	5.1%	0.8%	-4.3%
FY 2013	**5.1%**	**0.9%**	**-4.2%**
Truck Share of Potential Revenue[4]			
Jan 2012-Jun 2012	9.1%	2.2%	-6.9%
FY 2012[5]	**9.1%**	**2.2%**	**-6.9%**
Jul 2012-Dec 2012	9.6%	1.9%	-7.7%
Jan 2013-Jun 2013	9.6%	1.5%	-8.1%
FY 2013	**9.6%**	**1.7%**	**-7.9%**

1. Based on CDM Smith September 2011 forecast
2. For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13
3. For CY 2013, actuals are based on WSDOT monthly lane equipment data and adjustments by CDM Smith
4. Trucks defined as three or more axles
5. Does not include first three days of tolling which were in 2011

Overview of Original Travel Pattern Survey and Stated Preference Survey

As part of the original September 2011 study, CDM Smith performed a travel survey and a stated preference survey. A brief overview of these surveys is provided in this section.

Travel Pattern Survey

CDM Smith conducted a travel survey of existing bridge users in September 2009. Based on nearly 6,000 acceptable responses, the survey results indicated:

- AM peak (6:00 to 9:00 am) travel and PM peak (3:00 to 6:00 pm) travel each account for approximately 18 percent of total trips; midday trips account for approximately 36 percent of total trips
- Trip purpose results show 85 percent of AM peak and 62 percent of PM peak trips are for work commuting; midday trips are dominated by company business, personal business/medical trips, and people going to jobs with later start times
- About half of all peak trips are made five times a week
- West end origins and destinations are almost all in Seattle, while east end origins and destinations are dominated by Bellevue, Redmond, and Kirkland.

The results showed the strong use of the SR 520 bridge for commuting in both directions across Lake Washington.

Stated Preference Survey

The CDM Smith team conducted a stated preference survey in November 2009 to help assess current bridge users' willingness to pay tolls. This is measured in value of time, which is the monetary value an individual places on saving a certain increment of travel time. The survey also provided data to estimate changes in travel behavior in response to tolls. Changes in travel behavior include combining or forgoing trips, choosing a different destination, shifting to alternative modes including transit, and/or changes in the time of travel.

Value of time results from the 2009 stated preference survey were demonstrably lower than value of time results from a similar stated preference survey of SR 520 users in 2003. The survey results also revealed respondents have a relatively high median household income of about $125,000. While the range of values from the 2009 survey fell within the average range for the region estimated from other sources, the higher income of travelers in this corridor suggested that the value of time estimates should be higher than the regional average. Accordingly, analytical methods were used to re-benchmark value of time estimates to bring them into alignment with average hourly wages.

Chapter 3

Economic Growth Analysis

Economic growth is an important factor in evaluating the expected revenue from a toll facility. CDM Smith retained Community Attributes Inc. (CAI) to provide an updated independent economic forecast. CAI is the same firm who provided the economic forecasts for the September 2011 traffic and revenue forecast.

Future levels of population and employment in the bridge market area are important because they are an indication of cross-lake demand as well as a determinant of highway congestion levels influencing the attractiveness of alternatives to the SR 520 bridge. The CDM Smith team developed independent economic forecasts of population and employment based on estimates of current socioeconomic variables and forecasts of future socioeconomic activity. The forecasts were developed for the region which includes King, Snohomish, Pierce, and Kitsap counties. These forecasts were updated in July 2013 to reflect current economic estimates, forecasts, projected development in Seattle and Eastside King County communities, and current market conditions such as office occupancy rates and housing unit absorption trends.

The updated economic forecasts are compared to economic forecasts used in the September 2011 traffic and revenue forecast.

Methodology

CAI provided updated socioeconomic forecasts for use in the revised toll revenue forecast. The update benefited from newly released population and employment data from Washington State Office of Financial Management (OFM); the regional planning organization, the Puget Sound Regional Council (PSRC); and the US Census.

The analysis followed methods similar to those used in the September 2011 study. The approach included reviewing current estimates and forecasts of socioeconomic measures for the overall region and employment sectors, and sub-regional differences in estimated population and employment growth. From this, a Baseline Scenario for regional growth was developed covering the Central Puget Sound Region. Then, utilizing this baseline information along with other adjustments, such as estimates of new building growth absorption, detailed estimates and forecasts at a finer geographic scale were developed. This finer geographic scale was compatible with the main regional travel demand model from PSRC, which was used as the basis for the tolling analysis model developed for this study.

Methods used leveraged existing regional and national resources, along with primary data gathered expressly for this analysis, such as real estate development pipeline and market data. The latest data from PSRC was used for estimates of current population and employment. PSRC provided Census-based estimates of population and households at the Traffic Analysis Zone (TAZ) level for the year 2010, and income-based population distributions. Employment baseline data were drawn from PSRC total employment estimates at the TAZ level for 2010 and total sector-based employment at the Forecast Analysis Zone (FAZ) level for 2010. The revised forecast then had the benefit of more

accurate geocoding of 2010 employment data for a better understanding of the distribution of jobs by TAZ in 2010.

The population forecasts relied heavily on Conway-Pedersen regional forecasts published in April 2013, which cover the entire four-county region. Conway Pedersen reports are widely recognized to be one of the best forecasts of the regional situation in the greater Seattle area and have been so for many years. Employment forecasts by macro-sector were made based on a combination of PSRC and Conway Pedersen region and county-based forecasts. Once allocated to TAZs, additional development pipeline information was used to further refine the forecast. The resulting population and employment data by forecast years are used as direct input to the traffic forecasting process.

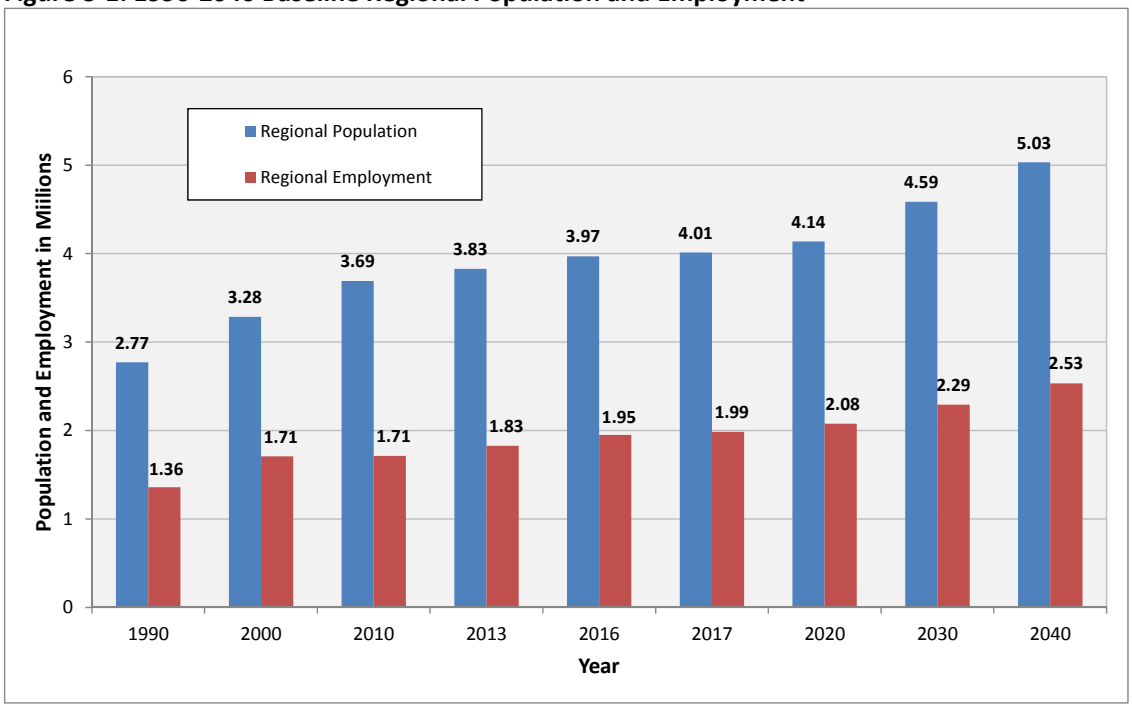
Regional Population and Employment Baseline Forecasts

The baseline scenario relies on countywide forecasts of population and employment and region-wide employment estimates by sector from Conway Pedersen Economics. Conway Pedersen's published forecasts run through 2023. Trend line analysis of implicit growth rates from these estimates was used to arrive at county and sector forecast totals for 2030 and 2040. The analysis then utilized local area employment data, real estate trends, and anticipated real estate development to allocate the countywide forecasts to small areas along the corridor.

Baseline population in the Central Puget Sound Region is expected to grow steadily from 3.7 million people in 2010 to over 5 million by 2040, a compounded annual growth rate of 1.0 percent. Annual regional population growth is anticipated to be 1.2 percent through 2016, then to slightly decrease to 1.0 percent through 2030. Figure 3-1 shows the population forecast, and Figure 3-2 shows the corresponding average annual changes.

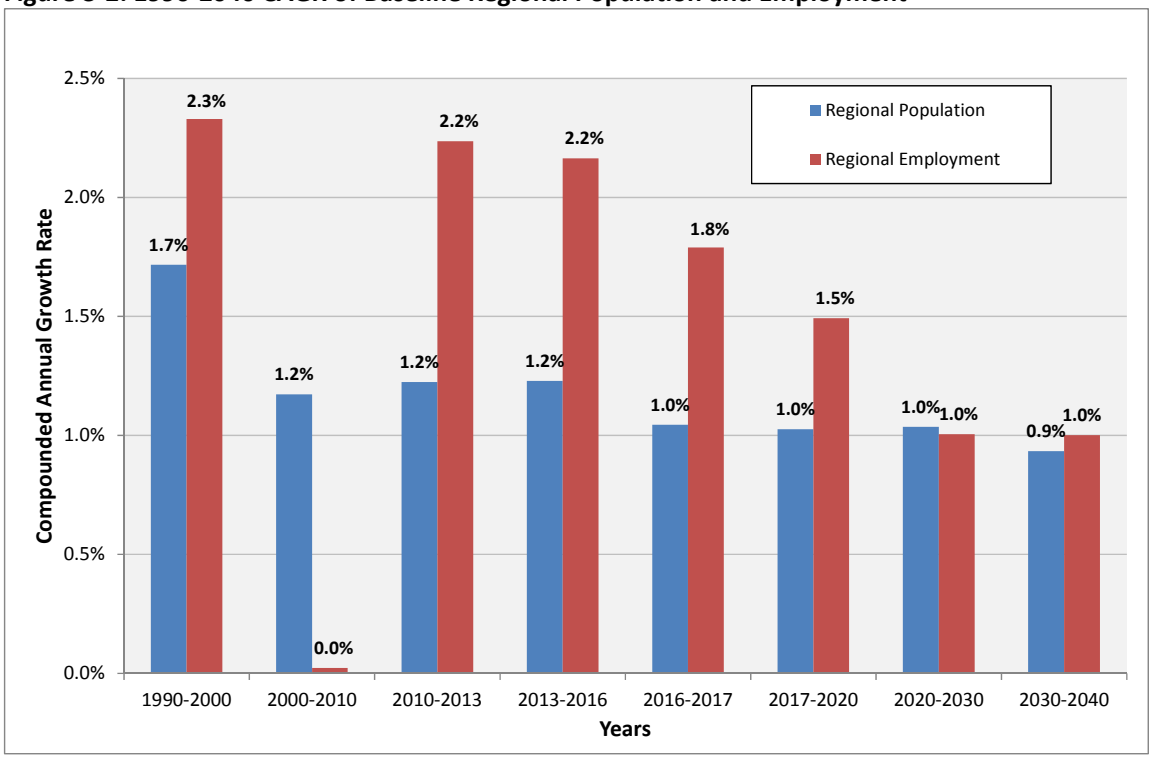
Regional employment is expected to grow from 1.8 million jobs in 2010 to 2.5 million in 2040, a compounded annual growth rate of 1.3 percent. Annual regional employment growth is anticipated to be 2.2 percent through 2016, then decline to 1.8 percent from 2016 to 2017, and then decline 1.5 percent from 2017 to 2020. Beyond 2020, the annual employment growth rate is anticipated to be steady at 1.0 percent. Figure 3-1 shows the employment forecast, and Figure 3-2 shows the corresponding average annual changes (compounded annual growth rate).

Figure 3-1: 1990-2040 Baseline Regional Population and Employment



Source: Conway Pedersen Economics, Community Attributes Inc., 2013

Figure 3-2: 1990-2040 CAGR of Baseline Regional Population and Employment



Source: Conway Pedersen Economics, Community Attributes Inc., 2013

Traffic Analysis Zone (TAZ) Level

The unit of analysis and projection in this study are Traffic Analysis Zones (TAZ). TAZ sizes are from a fraction of a square mile to several square miles based on the development density. Forecasts by TAZ are developed by allocation of the countywide forecasts. The allocations utilize core information from PSRC and data analyzed regarding real estate conditions (occupancy rates), development pipeline projections provided by private vendors and municipalities along the corridor, and economic events reported in local media such as Amazon.com absorption plans for South Lake Union and development plans for the Bel-Red Road area in Bellevue.

An important difference compared with previous studies is PSRC's adoption of a new method for allocating its macroeconomic forecast by TAZ. The 2013 PSRC regional forecast serves as a first iteration of employment and population estimates at the TAZ level controlled to forecasts county totals for each forecast year. However, in departure from the PSRC's previous forecasts, the PSRC 2013 forecast utilizes a capacity-constraint model for estimating TAZ-level distributions. The UrbanSim model uses parcel data to determine where projected growth may occur, bringing a higher degree of precision over previous PSRC TAZ-level estimates.

The near term projections were mainly driven by the Conway Pederson forecast through 2023. Average annual growth rates were calculated from this forecast and applied on a county-wide basis to baseline data. To arrive at TAZ-level estimates, PSRC TAZ-level distributions were applied to the Conway Pedersen county control totals. Growth forecasts by economic sector were integrated with real-estate development pipeline and absorption calculations and pertinent local economic news. Beyond 2020, trend line analysis was employed based on historic and Conway Pedersen forecast estimates to derive 2030 and 2040 estimates.

Near-Term Forecasts in Areas of Interest

Growth within the Central Puget Sound Region is not expected to be uniform, and the baseline forecast shows variations among the cities and neighborhoods that make up the area. Table 3-1 shows the near-term population and employment forecast by subareas, focusing on King County and the cities of Seattle, Bellevue, Kirkland and Redmond.

King County population is expected to grow slower than the region during the 2010 to 2020 decade, and to account for 36 percent of the regional population growth. The annual population growth in Seattle is forecasted to be 0.5 percent, while cities on the Eastside are expected to grow at an annual rate of 0.9 percent or higher. Overall, the cities of Seattle, Bellevue, Kirkland and Redmond are expected to account for 36 percent of the population growth in King County population over the decade.

King County is expected to outpace regional employment growth over the 2010 to 2020 period, and to account for 70 percent of the regional employment growth. The annual employment growth in Seattle is forecasted to be 2.0 percent, while cities on the Eastside are expected to grow at an annual rate of 2.2 percent or higher. Overall, the cities of Seattle, Bellevue, Kirkland and Redmond are expected to account for 65 percent of the employment growth in King County employment over the decade.

Table 3-1: Near-term Population and Employment Forecasts in Areas of Interest

	2010	2013	2016	2017	2020	2010-2020 CAGR[1]
Population						
Four Major Cities	**856,200**	**874,300**	**894,200**	**899,300**	**914,400**	**0.7%**
Seattle	*608,400*	*618,900*	*630,600*	*633,300*	*640,700*	*0.5%*
Bellevue	*124,700*	*127,800*	*131,300*	*132,100*	*136,000*	*0.9%*
Kirkland	*51,100*	*52,700*	*54,300*	*55,600*	*56,700*	*1.0%*
Redmond	*72,000*	*74,900*	*78,000*	*78,300*	*81,000*	*1.2%*
King County	**1,930,900**	**1,979,600**	**2,029,400**	**2,044,600**	**2,090,300**	**0.8%**
Region	**3,690,900**	**3,828,100**	**3,971,000**	**4,012,500**	**4,137,300**	**1.1%**
Employment						
Four Major Cities	**710,200**	**759,800**	**816,200**	**826,500**	**875,900**	**2.1%**
Seattle	*483,300*	*511,800*	*547,100*	*549,600*	*591,200*	*2.0%*
Bellevue	*113,900*	*126,000*	*137,700*	*142,700*	*143,400*	*2.3%*
Kirkland	*30,700*	*32,500*	*34,900*	*36,600*	*39,200*	*2.5%*
Redmond	*82,300*	*89,500*	*96,500*	*97,600*	*102,100*	*2.2%*
King County	**1,134,900**	**1,221,900**	**1,305,300**	**1,329,100**	**1,389,900**	**2.0%**
Region	**1,711,500**	**1,828,900**	**1,950,200**	**1,985,100**	**2,075,300**	**1.9%**

1. Compounded annual growth rate

Source: Community Attributes Inc., 2013

Comparison with September 2011 Socioeconomic Forecasts

Comparison of the subarea forecasts with the September 2011 Investment Grade subarea forecasts are presented in Tables 3-2 and 3-3, respectively for population and employment.

In both forecasts for population and employment, subarea differences can be explained primarily by three important changes:

1. The new forecasts are based on PSRC's 2013 forecast (made available prior to official publication) which includes a re-benchmarking of actual results;

2. PSRC's shift to UrbanSim for TAZ-based allocations, which are reflected in the PSRC's 2013 forecasts by TAZ; and

3. A larger project development pipeline in the updated forecast, reflecting more recent announcements of major long-term projects in the region. The updated forecast assumed that county totals adequately captured these projects; pipeline data were thus used for TAZ-level population and employment allocation adjustments, rather than adding to county totals.

Table 3-2 shows the September 2011 and revised population forecast for the SR 520 corridor. Overall, the population forecasts for King County and for the region as a whole were adjusted upwards. Within King County, Seattle, Kirkland, and Redmond are now expected to have higher populations to 2030, but the lower expected growth in Bellevue counteracts these gains, reducing this increase to nearly even by 2030 and slightly down by 2040

Table 3-2: Population Forecast – Comparison with September 2011 Forecast

	2010	2013	2016	2017	2020	2030	2040
2013 Revised Forecast							
Four Major Cities	**856,200**	**874,300**	**894,200**	**899,300**	**914,400**	**980,400**	**1,036,500**
Seattle	*608,400*	*618,900*	*630,600*	*633,300*	*640,700*	*676,600*	*704,800*
Bellevue	*124,700*	*127,800*	*131,300*	*132,100*	*136,000*	*153,400*	*166,500*
Kirkland	*51,100*	*52,700*	*54,300*	*55,600*	*56,700*	*60,000*	*66,200*
Redmond	*72,000*	*74,900*	*78,000*	*78,300*	*81,000*	*90,400*	*99,000*
King County	**1,930,900**	**1,979,600**	**2,029,400**	**2,044,600**	**2,090,300**	**2,291,800**	**2,485,800**
Region	**3,690,900**	**3,828,100**	**3,971,000**	**4,012,500**	**4,137,300**	**4,586,400**	**5,033,100**
2011 IG Study							
Four Major Cities	**837,900**	*n/a*	**883,700**	*n/a*	**907,500**	**980,600**	**1,051,900**
Seattle	*588,100*	*n/a*	*617,200*	*n/a*	*629,800*	*667,300*	*712,400*
Bellevue	*129,400*	*n/a*	*140,300*	*n/a*	*148,400*	*174,600*	*191,600*
Kirkland	*46,600*	*n/a*	*48,800*	*n/a*	*49,700*	*52,800*	*54,700*
Redmond	*73,800*	*n/a*	*77,400*	*n/a*	*79,600*	*85,900*	*93,200*
King County	**1,919,600**	**n/a**	**2,012,200**	**n/a**	**2,069,200**	**2,229,200**	**2,395,700**
Region	**3,683,700**	**n/a**	**3,916,000**	**n/a**	**4,082,200**	**4,471,700**	**4,908,100**
Absolute Difference							
Four Major Cities	**18,300**	**n/a**	**10,500**	**n/a**	**6,900**	**(200)**	**(15,400)**
Seattle	*20,300*	*n/a*	*13,400*	*n/a*	*10,900*	*9,300*	*(7,600)*
Bellevue	*(4,700)*	*n/a*	*(9,000)*	*n/a*	*(12,400)*	*(21,200)*	*(25,100)*
Kirkland	*4,500*	*n/a*	*5,500*	*n/a*	*7,000*	*7,200*	*11,500*
Redmond	*(1,800)*	*n/a*	*600*	*n/a*	*1,400*	*4,500*	*5,800*
King County	**11,300**	**n/a**	**17,200**	**n/a**	**21,100**	**62,600**	**90,100**
Region	**7,200**	**n/a**	**55,000**	**n/a**	**55,100**	**114,700**	**125,000**
Percentage Difference							
Four Major Cities	**2.2%**	**n/a**	**1.2%**	**n/a**	**0.8%**	**0.0%**	**-1.5%**
Seattle	*3.5%*	*n/a*	*2.2%*	*n/a*	*1.7%*	*1.4%*	*-1.1%*
Bellevue	*-3.6%*	*n/a*	*-6.4%*	*n/a*	*-8.4%*	*-12.1%*	*-13.1%*
Kirkland	*9.7%*	*n/a*	*11.3%*	*n/a*	*14.1%*	*13.6%*	*21.0%*
Redmond	*-2.4%*	*n/a*	*0.8%*	*n/a*	*1.8%*	*5.2%*	*6.2%*
King County	**0.6%**	**n/a**	**0.9%**	**n/a**	**1.0%**	**2.8%**	**3.8%**
Region	**0.2%**	**n/a**	**1.4%**	**n/a**	**1.3%**	**2.6%**	**2.5%**

Source: Community Attributes Inc.,2013

Table 3-3: Employment Forecast – Comparison with September 2011 Forecast

	2010	2013	2016	2017	2020	2030	2040
2013 Revised Forecast							
Four Major Cities	**710,200**	**759,800**	**816,200**	**826,500**	**875,900**	**964,300**	**1,042,000**
Seattle	*483,300*	*511,800*	*547,100*	*549,600*	*591,200*	*643,300*	*688,100*
Bellevue	*113,900*	*126,000*	*137,700*	*142,700*	*143,400*	*165,300*	*182,100*
Kirkland	*30,700*	*32,500*	*34,900*	*36,600*	*39,200*	*40,400*	*48,000*
Redmond	*82,300*	*89,500*	*96,500*	*97,600*	*102,100*	*115,300*	*123,800*
King County	**1,134,900**	**1,221,900**	**1,305,300**	**1,329,100**	**1,389,900**	**1,523,700**	**1,676,800**
Region	**1,711,500**	**1,828,900**	**1,950,200**	**1,985,100**	**2,075,300**	**2,293,500**	**2,533,700**
2011 IG Study							
Four Major Cities	**727,300**	*n/a*	**827,000**	*n/a*	**874,900**	**967,600**	**1,047,700**
Seattle	*478,500*	*n/a*	*535,400*	*n/a*	*562,500*	*610,600*	*661,100*
Bellevue	*128,100*	*n/a*	*149,500*	*n/a*	*160,000*	*186,600*	*201,900*
Kirkland	*29,100*	*n/a*	*35,400*	*n/a*	*38,200*	*43,600*	*48,700*
Redmond	*91,600*	*n/a*	*106,700*	*n/a*	*114,200*	*126,800*	*136,000*
King County	**1,140,100**	**n/a**	**1,289,200**	**n/a**	**1,364,000**	**1,533,800**	**1,710,200**
Region	**1,770,000**	**n/a**	**1,996,500**	**n/a**	**2,115,500**	**2,393,200**	**2,700,100**
Absolute Difference							
Four Major Cities	**(17,100)**	**n/a**	**(10,800)**	**n/a**	**1,000**	**(3,300)**	**(5,700)**
Seattle	*4,800*	*n/a*	*11,700*	*n/a*	*28,700*	*32,700*	*27,000*
Bellevue	*(14,200)*	*n/a*	*(11,800)*	*n/a*	*(16,600)*	*(21,300)*	*(19,800)*
Kirkland	*1,600*	*n/a*	*(500)*	*n/a*	*1,000*	*(3,200)*	*(700)*
Redmond	*(9,300)*	*n/a*	*(10,200)*	*n/a*	*(12,100)*	*(11,500)*	*(12,200)*
King County	**(5,200)**	**n/a**	**16,100**	**n/a**	**25,900**	**(10,100)**	**(33,400)**
Region	**(58,500)**	**n/a**	**(46,300)**	**n/a**	**(40,200)**	**(99,700)**	**(166,400)**
Percentage Difference							
Four Major Cities	**-2.4%**	**n/a**	**-1.3%**	**n/a**	**0.1%**	**-0.3%**	**-0.5%**
Seattle	*1.0%*	*n/a*	*2.2%*	*n/a*	*5.1%*	*5.4%*	*4.1%*
Bellevue	*-11.1%*	*n/a*	*-7.9%*	*n/a*	*-10.4%*	*-11.4%*	*-9.8%*
Kirkland	*5.5%*	*n/a*	*-1.4%*	*n/a*	*2.6%*	*-7.3%*	*-1.4%*
Redmond	*-10.2%*	*n/a*	*-9.6%*	*n/a*	*-10.6%*	*-9.1%*	*-9.0%*
King County	**-0.5%**	**n/a**	**1.2%**	**n/a**	**1.9%**	**-0.7%**	**-2.0%**
Region	**-3.3%**	**n/a**	**-2.3%**	**n/a**	**-1.9%**	**-4.2%**	**-6.2%**

Source: Community Attributes Inc.,2013

Table 3-3 shows the September 2011 and revised employment forecast for the SR 520 corridor. Overall, King County performs about the same as expected in the September 2011 forecast, and the region jobs were adjusted downwards. On a subarea basis, Bellevue and Redmond are now expected to perform worse, Kirkland about the same, and Seattle a little better. For the overall corridor, employment is expected to be about 1.3 percent lower by 2016, nearly even in 2020, and 0.5 percent down by 2040.

In both tables it is important to note the growth rate changes as the new PSRC baseline has resulted in re-benchmarking of the 2010 basis.

Downside Alternative Scenario

In order to provide input for sensitivity analysis of the traffic and revenue estimates a downside alternative scenario forecast was also developed. It should be noted that the downside alternative scenario depicts a situation that is not likely to occur. The sources for population and employment forecasts in the baseline and downside alternative scenarios are as follows:

- **Baseline Scenario:** Conway Pedersen Economics control totals for population and employment
- **Downside Alternative Scenario:** Employment and population growth rates cut in half or more from the baseline scenario.

To develop this downside scenario, individual employment sectors' growth rates were reduced. The FIRES and retail sector growth rates were reduced by half, WTU sector was reduced by more than half based on the heavy dependence on the Ports of Tacoma and Seattle, and the Government sector growth rate reduced about 30 percent. Consequently, the population growth rate was also halved. These effects were applied at the regional level and then the same process as the baseline forecast was used to get detailed TAZ level forecasts.

The results of the baseline scenario and the downside alternative are summarized for the entire region in Tables 3-4 (regional population) and 3-5 (regional employment), and shown graphically in Figures 3-3 (regional population) and 3-4 (regional employment). These tables and figures also include the latest (as of June 2013) PSRC forecast as an additional comparator.

The downside regional forecast would result in regional population falling from a baseline forecast of 5,033,100 residents in 2040 to just 4,306,900 (a 14.4 percent decrease). Regional employment would fall from a baseline forecast of 2,533,700 jobs in 2040 to just 2,129,100 (a 16 percent decrease).

Note that this downside scenario is not considered likely but was considered for the purposes of sensitivity testing. Since both population and employment affect travel demand, the effect of lower population and/or employment growth is considered a downside risk for toll revenues. Lower growth rates and resulting lower travel demand was one of the risk factors evaluated in the sensitivity analysis presented in Chapter 7 of this report.

Table 3-4: Comparison of Regional Population Forecasts

	2010	2013	2016	2017	2020	2030	2040
Regional Population (millions)							
PSRC 2013	3.69	3.81	3.92	3.97	4.14	4.55	5.00
Baseline Scenario	**3.69**	**3.83**	**3.97**	**4.01**	**4.14**	**4.59**	**5.03**
Downside Alternative	3.69	3.75	3.81	3.83	3.89	4.09	4.31
Percentage Difference from Baseline							
PSRC 2013	0.0%	-0.4%	-1.2%	-1.1%	0.2%	-0.8%	-0.8%
Baseline Scenario	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Downside Alternative	0.0%	-2.1%	-4.1%	-4.6%	-6.1%	-10.8%	-14.4%

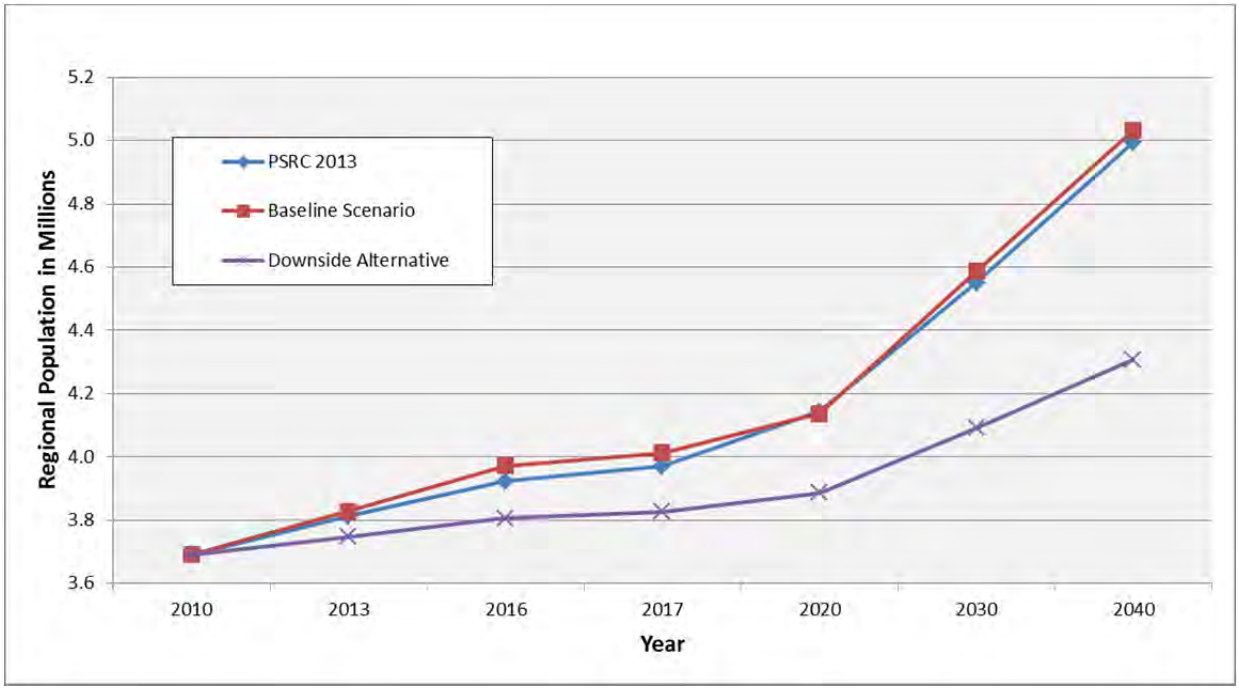
Source: Community Attributes Inc.,2013

Table 3-5: Comparison of Regional Employment Forecasts

	2010	2013	2016	2017	2020	2030	2040
Regional Employment (millions)							
PSRC 2013	1.71	1.73	1.90	1.99	2.17	2.41	2.81
Baseline Scenario	**1.71**	**1.83**	**1.95**	**1.99**	**2.08**	**2.29**	**2.53**
Downside Alternative	1.71	1.80	1.83	1.84	1.88	2.00	2.13
Percentage Difference from Baseline							
PSRC 2013	0.0%	-5.1%	-2.6%	0.0%	4.6%	5.3%	10.9%
Baseline Scenario	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Downside Alternative	0.0%	-1.7%	-6.2%	-7.2%	-9.6%	-13.0%	-16.0%

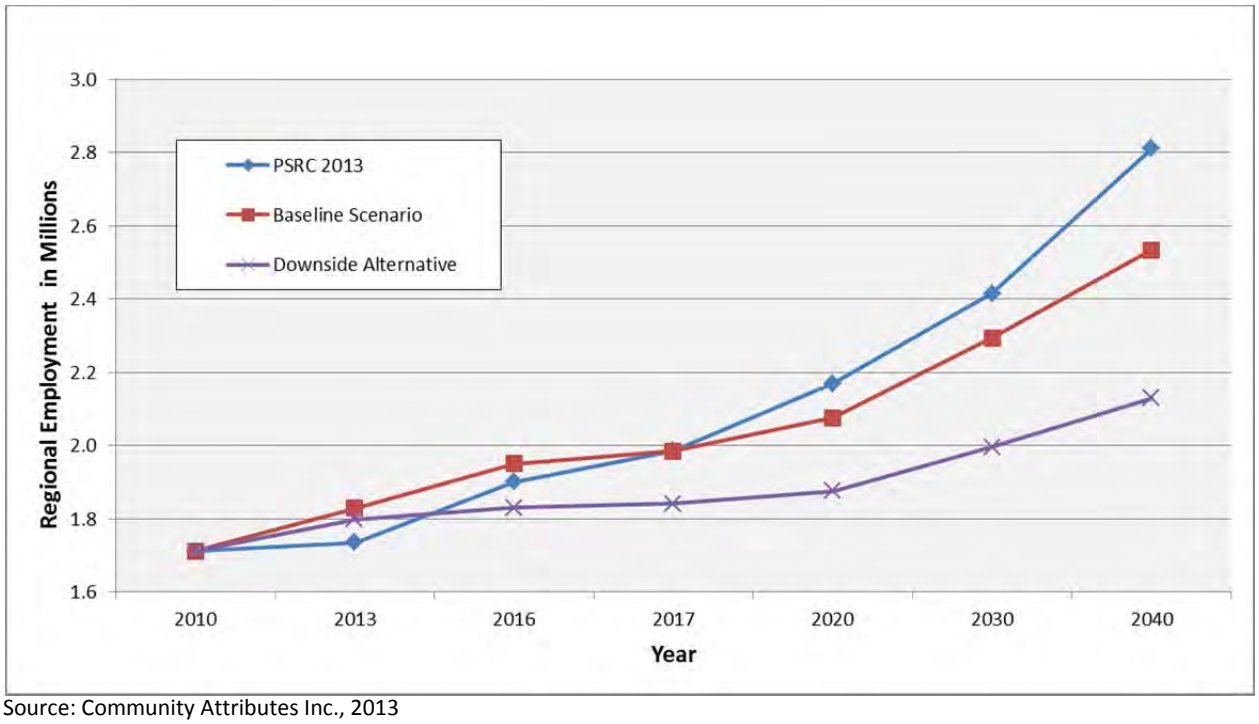
Source: Community Attributes Inc.,2013

Figure 3-3: 2010-2040 Comparison of Regional Population Forecasts



Source: Community Attributes Inc., 2013

Figure 3-4: 2010-2040 Comparison of Regional Employment Forecasts



Source: Community Attributes Inc., 2013

Chapter 4
Tolling Operations

Tolling on the SR 520 bridge commenced on December 29, 2011 in advance of the construction of the replacement bridge. Tolls will also be collected on the replacement bridge span which is anticipated to open to traffic in 2016.

WSDOT has chosen to implement a variably-priced, cashless tolling system on the SR 520 bridge. The all-electronic approach allows vehicles to travel through the corridor at highway speeds without stopping to pay the toll, while minimizing right-of-way requirements, and allowing faster construction and installation compared to conventional toll plazas. Until the new bridge opens, tolls are being collected at the east high-rise section of the SR 520 bridge. Once the new bridge opens, tolls will be collected at a location on the eastern shore of Lake Washington. Tolls are collected in both directions via electronic toll collection and video collection systems.

Toll rates vary by time of day and day of week (weekday versus weekend day) with higher tolls during peak demand periods. The variable pricing allows for better traffic operations management of the facility during peak periods.

Two payment types are available: account-based (pre-paid) and Pay By Mail (post-paid). Account-based toll payment, branded as "Good To Go!" provides two options – via transponder or registered license plate. The first option requires motorists to establish a prepaid account and obtain a Good To Go! transponder. The second option requires motorists to establish a prepaid account and register their vehicle license plate, known as Pay By Plate. Pay By Mail toll payments also provide two options – through customer-initiated payments and following receipt of an invoice in the mail. Different costs of toll collection are associated with each payment type including processing costs and revenue losses.

In the September 2011 forecast, initial estimated payment proportions for the market of potential bridge users were 72 percent Good To Go! account-based for FY 2012 and 74 percent for FY 2013. Actual results show 83 percent Good To Go! account-based for both FY 2012 and FY 2013. (See table 2-6 Payment Share for details.)

On the existing SR 520 floating bridge, a weekday toll schedule applies to all weekdays, and a separate weekend toll schedule applies to both weekend days. Major holidays that fall on weekdays use the weekend toll schedule. Similarly, from FY 2017 onwards, toll collection on the replacement bridge is assumed to be based on weekday and weekend day toll schedules.

During the ongoing construction period, tolls are not collected during the overnight period (defined as 11:00 pm to 5:00 am) on the existing bridge. Once construction of the replacement bridge is complete, from FY 2017 onwards, it is assumed tolls will be collected over the entire day.

Vehicles are tolled according to vehicle classes by number of axles. The toll rates for multiple-axle vehicles are based on the axle multiple of the appropriate two-axle vehicle base toll rate for primary payment types: account-based Good To Go! and Pay By Mail.

A variety of toll exemptions have been implemented on the SR 520 bridge. Some are being initiated by State policy while others are by agreement between the State and Federal Highway Administration. These exemptions include:

- Agency-owned and branded transit vehicles
- Privately-owned transit vehicles which operate on a fixed route and regular schedule
- Agency-sanctioned vanpools
- State Police vehicles
- Bridge maintenance vehicles
- Emergency vehicles
- Tow trucks while responding to SR 520 calls
- Vehicles owned or operated by a foreign government.

After the new bridge span opens, it is assumed high occupancy passenger vehicles with three or more occupants (HOV3+) will also be exempt from paying tolls when traveling in the high occupancy vehicle (HOV) lane. Because the existing bridge lacks HOV lanes needed for HOV enforcement, all passenger car vehicles including HOVs are tolled on the current bridge.

The original toll schedule plan assumed in the 2011 study has been implemented. In accordance with this plan, the Washington State Transportation Commission (WSTC) has raised the tolls approximately 2.5 percent on July 1, 2012 (FY 2013) and July 1, 2013 (FY 2014), consistent with the September 2011 traffic and revenue forecast assumptions. These toll rate increases support the finance plan for SR 520, which include four annual 2.5 percent rate increases planned through FY 2016 and an increase of approximately 15 percent in FY 2017.

For FY 2014 through FY 2016, slight changes in the toll rate assumptions are all related to the nickel rounding strategy adopted by WSTC in May 2013:

- The maximum Good to Go! toll rate for 2-axle vehicles is $3.70 on weekdays and $2.30 on weekends in FY 2014. The toll rates have been rounded to the nearest $0.05.
- In FY 2014, Pay By Mail customers will be paying approximately $1.57 above the Good to Go! toll rates on average. The Pay By Mail rates are rounded to the nearest $0.05.
- At the beginning of FY 2015 and FY 2016 both weekday and weekend account-based tolls will increase by approximately 2.5 percent on average. It is assumed the tolls schedule reviewed by the WSTC in spring 2013 which included nearest $0.05 rounding for the FY 2015 and FY 2016 increases will be adopted by the WSTC and implemented.
- At the beginning of FY 2015 and FY 2016, it is assumed the differential for Pay By Mail customers will escalate by 2.5 percent and that the Pay By Mail rates will be rounded to the nearest $0.05.

- Tolls for multi-axle vehicles (those with more than two axles on the ground) will be determined by multiplying the number of axles by the per axle toll rate for two-axle vehicles using the same payment method and rounded to the nearest $0.05.

For FY 2017 and beyond, the toll rates assumed in the 2011 study, which were rounded to the nearest $0.05, remain unchanged.

The resulting assumed toll rates by fiscal year for two-axle vehicles are shown in Tables 4-1 and 4-2, respectively for weekdays and weekends.

Table 4-1: Weekday Two-Axle Vehicle Toll Rates (in year of expenditure $)

Fiscal Year	12-5 AM	5-6 AM	6-7 AM	7-9 AM	9-10 AM	10 AM-2 PM	2–3 PM	3-6 PM	6-7 PM	7-9 PM	9-11 PM	11 PM-12 AM
Good To Go! Weekday 2-Axle Toll Rates												
2013		$1.64	$2.87	$3.59	$2.87	$2.31	$2.87	$3.59	$2.87	$2.31	$1.64	
2014		$1.70	$2.95	$3.70	$2.95	$2.35	$2.95	$3.70	$2.95	$2.35	$1.70	
2015		$1.75	$3.00	$3.80	$3.00	$2.40	$3.00	$3.80	$3.00	$2.40	$1.75	
2016		$1.80	$3.05	$3.90	$3.05	$2.45	$3.05	$3.90	$3.05	$2.45	$1.80	
2017+	$1.25	$2.05	$3.55	$4.35	$3.55	$2.90	$3.55	$4.35	$3.55	$2.90	$2.05	$1.25
Pay By Mail Weekday 2-Axle Toll Rates												
2013		$3.18	$4.41	$5.13	$4.41	$3.84	$4.41	$5.13	$4.41	$3.84	$3.18	
2014		$3.25	$4.50	$5.25	$4.50	$3.95	$4.50	$5.25	$4.50	$3.95	$3.25	
2015		$3.35	$4.60	$5.40	$4.60	$4.05	$4.60	$5.40	$4.60	$4.05	$3.35	
2016		$3.45	$4.70	$5.55	$4.70	$4.15	$4.70	$5.55	$4.70	$4.15	$3.45	
2017+	$2.95	$3.75	$5.25	$6.05	$5.25	$4.60	$5.25	$6.05	$5.25	$4.60	$3.75	$2.95

Table 4-2: Weekend Two-Axle Vehicle Toll Rates (in year of expenditure $)

Fiscal Year	12-5 AM	5-8 AM	8-11 AM	11AM-6PM	6-9 PM	9-11 PM	11 PM-12 AM
Good To Go! Weekend 2-Axle Toll Rates							
2013		$1.13	$1.69	$2.26	$1.69	$1.13	
2014		$1.15	$1.75	$2.30	$1.75	$1.15	
2015		$1.20	$1.80	$2.35	$1.80	$1.20	
2016		$1.25	$1.85	$2.40	$1.85	$1.25	
2017+	$1.25	$1.25	$1.85	$2.50	$1.85	$1.25	$1.25
Pay By Mail Weekend 2-Axle Toll Rates							
2013		$2.67	$3.23	$3.79	$3.23	$2.67	
2014		$2.75	$3.30	$3.90	$3.30	$2.75	
2015		$2.80	$3.40	$4.00	$3.40	$2.80	
2016		$2.85	$3.50	$4.10	$3.50	$2.85	
2017+	$2.95	$2.95	$3.55	$4.20	$3.55	$2.95	$2.95

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Chapter 5

Traffic and Revenue Approach

This chapter presents an overview of the modeling and forecasting approach. The revised forecast utilized the travel demand toll model and model processing tools developed for the September 2011 forecast but incorporated new information to account for key changes. This chapter starts with an overview of the tolling analysis model used in the September 2011 forecast, then describes the changes made to the original model and associated post processing tools.

Overview of September 2011 Tolling Analysis Model

A brief review of the tolling analysis model and model post processing is provided here. The SR 520 tolling analysis model was built from the Puget Sound Regional Council (PSRC) travel demand model. The PSRC files contain highway and transit networks, data on land-use and socioeconomic forecasts, and trip tables representing vehicle trips. These files formed the basis of the tolling analysis model. CDM Smith used a number of studies and surveys specific to the SR 520 corridor to build and update the modelling tools.

Traffic data was obtained from WSDOT's traffic count stations for the years 2008 through 2010. In addition, CDM Smith conducted vehicle occupancy and truck classification studies using video cameras in November 2009. This data was used in the calibration stage of the tolling analysis model. Travel time and speed data was collected using Global Positioning System (GPS) equipped vehicles in November 2009 and was also used for the purposes of model calibration.

A travel pattern survey, conducted by CDM Smith in September 2009 and including 6,400 participants, was a major effort to understand the travel patterns of the SR 520 bridge users. Information obtained from this survey was used to refine the original trip tables. A stated preference survey of approximately 2,000 participants was conducted by Resource Systems Group to determine travelers' likely response to tolls on the SR 520 bridge in terms of their trip making. Results from this survey included estimates of value of time, shift of trips to transit due to tolling, propensity to change travel time for lower tolls, and reduced trip making due to tolling.

An independent review of economic growth forecasts was conducted by local economic forecasting consultant Community Attributes who included impacts of the recent recession on short and long-term growth forecasts for the region as a whole. The most recent population, employment, and economic activity data was used for this purpose, primarily from 2009 and the first half of 2010. Regional independent population and employment forecasts were applied to updated PSRC regional distributions to model zone areas and the results were further augmented by up to date development pipeline information. The resulting model zone socioeconomic forecasts were used to adjust the tolling analysis model trip tables.

The PSRC highway networks were updated to include the fields necessary to perform toll diversion calculations and also to better represent traffic movements on SR 520 and I-90 bridges. Model modifications were made to allow accounting for possible suppression of trips or shifting to non-automobile modes due to tolling.

After the updates of trip tables and highway networks using the data and surveys were completed, CDM Smith developed a toll analysis model for tolling analysis of the SR 520 bridge. Prior to tolling analysis, the model was calibrated using 2010 hourly traffic counts and travel time data under toll-free operation.

Regional Transportation Projects

The September 2011 model assumed that a number of regional highway and transit projects would be completed. The October 2013 forecast is based on the same modeling assumptions. Table 5-1 provides a list of relevant major regional transportation projects, with an indication of completion date as currently anticipated. No significant changes in planned major network projects have occurred. Minor revisions include: the East Link Light Rail Extension to Bellevue has been pushed back to 2023, the previously mentioned widening of SR 520 to Montlake Boulevard via the new west approach bridge north has been added, and the SR 520 eastside expansion/HOV project will likely be completed in 2014.

Adjustments Made to Toll Modeling and Traffic and Gross Revenue Forecasting

The revised forecast utilized the travel demand toll model and model processing tools developed for the September 2011 forecast but incorporated new information to account for key changes. This section focuses on the changes made to the September 2011 tolling analysis model and associated post processing tools.

For the current study, the travel demand toll model was modified to reflect:

- Model re-calibration
- Revised socioeconomic forecasts
- Shift in payment type proportions
- Revised toll rates
- Revised toll vehicle classification proportions.

As nothing in the observed data indicated a need to update the values and distribution of value of time, and the trip suppression and trip diversion methodologies, these parameters and methodologies as applied in the September 2011 study were not modified for the current study. As noted above, the model network assumptions were kept the same as the September 2011 study. During that study, expansion of SR 520 to three lanes in each direction (FY 2017 and onward) from I-5 to the replacement span was tested. The expansion resulted in a marginal increase in transactions and revenue. Consequently, it was assumed, for this forecast, the addition of the west approach bridge north and reconfiguring SR 520 to three lanes in each direction from Montlake Boulevard to the replacement bridge main span will have a marginal positive effect, and using the 2011 study network results in a slightly conservative forecast.

Table 5-1: Summary of Major Regional Transportation Projects

Route	Expected Completion[1]	Updated Completion[2]	Project Description
I-90	2012	Completed	Addition of an HOV2+ lane in each direction on the outer roadway from Mercer Island to Bellevue Way (over the East Channel Bridge) through striping, minor construction, and appropriate ramps.
I-90	2014	2016	Addition of an HOV2+ lane in each direction on the outer roadway across Lake Washington. Closure of the reversible center roadway once the outer roadway is reconfigured. (Center roadway will be used for East Link Light Rail.)
I-405	2010	Completed	Renton widening from I-5 to SR 167. Addition of one general purpose lane in each direction.
I-405	2012	Completed	NE 8th Street to SR 520 Braided Ramps (Bellevue). Improves the I-405 / SR520 interchange by removing a congested merge on I-405 NB south of the SR 520 interchange.
I-405	2015	2015	Bellevue to Lynnwood Widening and Express Toll Lanes Project: - Conversion of existing HOV lane to ETL from SR522 to I-405 in Lynnwood. - Addition of new travel lane and conversion of existing HOV lane to ETL (resulting in two ETL lanes in each direction) from SR522 to downtown Bellevue (NE 6th Street) .
SR 522		Completed 2015-2016	Business Access and Transit Lanes: - east to 83rd Place NE (Kenmore City Limits) - between 61st Ave NE and 65th Ave NE
EastLink	2020-21	2023	EastLink Light Rail Extension - Extension of Link Light Rail from downtown Seattle at International District Station, on I-90 corridor east to Bellevue Way, then north to Downtown Bellevue, and then east to Overlake Transit Center (156th Ave NE) with possible extension to Downtown Redmond.
SR 520 Transit	2010	Completed	Implementation of more frequent transit on SR520 bridge and addition of route from Redmond to University of Washington. Total bus trips increased from 614 to 758 weekday crossings.
SR 520 BRT	2016	Unfunded	SR 520 Bus Rapid Transit System - five routes upgraded or added with 7-10 minute peak hour and 15 minute off-peak weekday service frequencies.

1. Expected completion date as anticipated for September 2011 study
2. Revised completion date as of December 2013

The travel demand toll model, which covers average weekday travel, was re-run for the same model years as the September 2011 study: FY 2012, FY 2016, FY 2017, FY 2024, and FY 2030. The results for years between model years are determined by interpolation.

Further adjustments were made in post processing of model results, and included:

- Change in planned weekend closures due to construction
- Increased weekend toll transactions
- Removed time-shifting

- Removed ramp-up factors (which only affected FY 2012 and FY 2013 in the September 2011 forecast).

Each of these modifications and adjustments are discussed in this section.

Model Recalibration

The travel demand toll model was recalibrated to reflect the toll transactions derived from the toll performance review described in Chapter 2 and 2012 traffic data provided by WSDOT for vehicles crossing Lake Washington on SR 520 and I-90.

Revised Socioeconomic Forecasts

A revised socioeconomic forecast was prepared in 2013, as discussed in Chapter 3. Within the bridge corridor area (Seattle, Bellevue, Redmond, Kirkland), near term employment growth to 2020 is slightly higher than the September 2011 forecast, and nearly even through 2040. Overall employment is lower due to the re-benchmarking of the actual baseline economics. The corridor area population growth is slightly lower and overall population is higher in the early years but lower in the out years due to the re-benchmarking. The model trip tables were factored to reflect changes in the socioeconomic forecast.

Shift in Payment Type Proportions

The tolling analysis model was modified to reflect changes in payment types based on actual tolling performance data covering January 2012 through June 2013. Table 5-2 shows the Good To Go! (account-based) payment share assumed in the September 2011 study, the actual values for fiscal years 2012 and 2013, and the revised payment type proportions in the new forecast.

Table 5-2: Good To Go! Transaction Percentage

Fiscal Year	Sep2011 Forecast	Oct2013 Forecast	Actual*
2012	72%	--	83%
2013	74%	--	83%
2014	76%	82%	--
2016	80%	83%	--
2017	80%	84%	--
2024	85%	86%	--
2031	87%	86%	--

*For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13. For CY 2013, actuals are based on WSDOT monthly lane equipment data and adjustments by CDM Smith.

The actual share of Good To Go! transactions were much higher than anticipated in the September 2011 study. Based on this observation, the proportion of Good To Go! transactions assumed in the revised forecast was adjusted up for the years 2014 through 2024. The level reached in 2024 (86 percent) is now assumed to continue beyond 2024.

Another finding of the tolling performance review was that weekday and weekend Good To Go! shares are different, with account-based transactions representing approximately 84 percent of the weekday totals, but only about 76 percent of weekend transactions. The September 2011 forecast assumed the same share for weekdays and weekends. This was revised in the October 2013 forecast with weekday

share increased and weekend share reduced, which results in a slightly lower overall share in outer years as weekend transactions as a share of all transactions are forecast to be a greater over time.

Revised Toll Rates

The revised toll rate structure adopted by WSTC in May 2013 and described in Chapter 4 of this report was incorporated into the model.

Revised Toll Vehicle Classification

The tolling performance review showed that the actual share of truck transactions and number of truck transactions in general were lower than what had been assumed in the September 2011 study. Consequently, the proportion of truck traffic in the revised forecast was reduced to meet actual experience. Table 5-3 below shows the truck percentage assumed in the September 2011 study, the actual values for fiscal years 2012 and 2013, and the revised truck percentage used in the October 2013 forecast.

Table 5-3: Proportion of Trucks

Fiscal Year	Sep2011 Forecast	Oct2013 Forecast	Actual*
2012	5%	--	1%
2013	5%	1%	1%
2014	5%	1%	--
2016	6%	1%	--
2017	6%	1%	--
2024	7%	2%	--
2031	8%	2%	--

*For CY 2012, actuals are based on WSDOT toll transaction data provided to CDM Smith on 5/20/13 and 7/9/13. For CY 2013, actuals are based on WSDOT monthly lane equipment data and adjustments by CDM Smith.

Change in Planned Weekend Closures due to Construction

The September 2011 forecast assumed a particular set of full weekend closures of the SR 520 bridge due to construction. A revised construction schedule was obtained and incorporated into the revised forecast developed in this study, as shown in Table 5-4. For most fiscal years between 2014 and 2017, the number of weekend closures has increased primarily to accommodate the new west approach bridge north connector from the western high-rise to Montlake Boulevard.

Table 5-4: Equivalent Weekend Closures

Fiscal Year	Sep2011	Oct2013	Actual
2013	5	--	8
2014	4	9	--
2015	2	5	--
2016	0	0	--
2017	0	2	--

Source: WSDOT SR 520 Program

All closures are assumed to be from 11 PM on Friday to 5 AM on Monday. Bridge closures for span opening for vessel navigational needs are not considered in the forecast. It has been determined that they have little impact on toll revenue due to their limited duration and restriction to off-peak hours. Closures outside of tolling hours are not considered in the forecast since they do not affect toll traffic and revenue. No other construction closures in the regional highway system are considered as part of this analysis.

Increased Weekend Toll Transactions

As noted in the tolling performance review (see Table 2-7), weekend transactions exceeded the forecasts during FY 2012 and FY 2013. Consequently, the weekend transaction forecast was raised approximately 19 percent for FY 2016, six percent for FY 2024, and three percent for FY 2031.

This scaled adjustment is smaller than the experience to date. As weekends were already expected to grow significantly in the September 2011 forecast, the adjustment is scaled back over time.

Removed Time Shifting

The September 2011 study assumed up to 20 percent of average weekday traffic shifting time away from peak periods in response to higher tolls. This was based on the stated preference survey conducted for the September 2011 forecast. Analysis of 2012 toll performance (see Table 2-8) indicates there has been virtually no net shift; therefore time shifting is removed in the new forecast.

Removed Ramp-up Factors

A ramp-up cut-back was assumed in the September 2011 study to account for travelers becoming accustomed to tolling. A five percent cut was assumed in FY 2012 and a three percent cut in FY 2013. However, the high participation in the account-based payment program in FY 2012 and FY 2013, and relatively stable transaction data indicates this assumption was unnecessary. No ramp-up factors are applied in the new forecast horizon.

Summary of Assumptions

A summary of the assumptions used for the forecast are shown in Table 5-5.

Table 5-5: October 2013 Traffic and Gross Revenue Forecast Assumptions

General Assumptions
Improvements in the Puget Sound Regional Council's current regional transportation plan, *Transportation 2040*, will be implemented as planned. No new competitive toll-free facilities or additional capacity will be constructed during the projection period other than those assumed in the plan.
The percentage of payment types will be consistent with the ranges assumed for this study. The percentage of potential bridge users in the Good to Go! account-based program is assumed to increase from 82% in FY 2014 to 86% in FY2024.
Economic growth in the project study area will occur as forecasted herein based in part on forecasts from the Puget Sound Regional Council, Conway Pederson April 2013 forecasts, and the independent socioeconomic consultant.
The facility will continue to be well maintained, efficiently operated, effectively signed, and promoted to encourage maximum usage.
Inflation will average 2.5% annually over the forecast horizon. This figure is based on an approximately 10 year historic CPI up to 2009. While current inflation forecasts are somewhat lower for the state overall (2.0% long term), the greater Seattle region and the SR 520 primary market corridor are growing at a significant pace implying the original 2.5% assumption from the Sep2011 forecast should be kept.
Motor fuel will remain in adequate supply and no national or regional emergency will arise that would abnormally restrict the use of motor vehicles. The per gallon price for passenger car gasoline is assumed to be $4.06 in FY 2014, rising to $4.37 in FY 2017, $4.52 in FY 2024, $5.06 in FY 2031, and $9.39 in FY 2056 resulting in a long term annual growth assumption of 2.0 % similar to WSDOT's June 2013 long term forecast.
The value of time for work trips ranges from $9.60 per hour for the lowest income group to $22.80 per hour for the highest income group. The value of time for non-work passenger car trips is $13.80 per hour. Truck trip value of time reaches $36.00 per hour for heavy trucks. All values are in 2010 dollars.

(table continued)

Table 5-5: October 2013 Traffic and Gross Revenue Forecast Assumptions (Continued)

SR 520 Configuration
Bridge Configuration: FY 2014 - FY 2016: Two narrow general-purpose lanes and shoulders in each direction.
Bridge Configuration FY 2017 and onward: Two wider general-purpose lanes in each direction, one HOV/transit lane in each direction, and wider shoulders in each direction on replacement span. A new west approach bridge north connection from the western high rise to Montlake Blvd. interchange such that three standard lanes and full shoulders are provided between the floating span and Montlake Blvd utilizing the current bridge connection and new north bridge connection. West of Montlake Blvd., SR 520 will remain in its current two-lane per direction configuration.
SR 520 Configuration East of Bridge to I-405 FY 2014 - FY 2016: Two general-purpose lanes in each direction and one outside HOV lane (with three person occupancy requirement HOV3+) westbound as exists currently.
SR 520 Configuration East of Bridge to I-405 FY 2017 and onward: Two general-purpose lanes in each direction and one inside HOV/transit lane in each direction (with three person occupancy requirement HOV3+).
Construction Closures
Full weekend closure (or equivalent) of SR 520 from the Montlake Interchange to I-405 including the tolled section will occur nine times in FY 2014, five times in FY 2015, and two times in FY2017. Closure will be from 11 PM on Friday to 5 AM on Monday.
Ramp-Up
No ramp-up is included in the current forecast horizon (FY2014 through FY2056)
Toll Collection
Tolls will be collected at a single point on the eastern high-rise of the main span while traffic remains on the existing bridge and at a single point on the eastern shore when traffic moves to the repalcement bridge.
Toll rates will be the same for either direction on the bridge.
The toll collection is all electronic; there will be no manual toll collection.
FY 2014 - FY 2016: no night time tolling (11pm - 5am). FY 2017 and beyond: tolls will be charged during all 24 hours.

(table continued)

Table 5-5: October 2013 Traffic and Gross Revenue Forecast Assumptions (Continued)

Toll Rates	
Toll Rates FY 2014 - FY 2016	
	The maximum Good to Go! toll rate for 2-axle vehicles is $3.70 on weekdays and $2.30 on weekends in FY 2014 as adopted by the Washington State Transportation Commission. The toll rates have been rounded to the nearest $0.05.
	In FY 2014, Pay By Mail customers pay approximately $1.57 above the Good to Go! toll rates on average. The Pay By Mail rates are rounded to the nearest $0.05.
	At the beginning of FY 2015 and FY 2016 both weekday and weekend account-based tolls will increase by approximately 2.5% on average. It is assumed the tolls schedule reviewed by the WSTC in spring 2013, which included nearest $0.05 rounding for the FY 2015 and FY 2016 increases, will be adopted by the WSTC and implemented.
	At the beginning of FY 2015 and FY 2016, it is assumed the differential for Pay By Mail customers will escalate by 2.5 percent and that the Pay By Mail rates will be rounded to the nearest $0.05.
	Through the end of FY 2016, High occupancy vehicles (HOVs) will pay the same toll as single-occupant vehicles (SOVs).
	Toll exemptions as outlined by the Washington State Transportation Commission (the largest of which is the transit buses, private regular route buses such as the Microsoft Connector, and WSDOT sanctioned vanpools) are assumed.
	Tolls for multi-axle vehicles (those with more than two axles on the ground) will be determined by multiplying the number of axles by the per axle toll rate for two-axle vehicles using the same payment method and rounded to the nearest $0.05. The maximum rate is the six-axle rate, regarless of additional axles.
Toll Rates FY 2017 and beyond	
	Weekday account-based tolls will increase approx. 15% on average from FY 2016 to FY 2017 (i.e. on July 1, 2016).
	Weekend account-based tolls will increase approx. 2.5% on average from FY 2016 to FY 2017 (i.e. on July 1, 2016).
	The Pay By Mail toll differential will increase 2.5% from FY 2016 to FY 2017 (i.e. on July 1, 2016).
	All toll rates will be rounded to the nearest $0.05
	Toll exemptions as noted above are continued.
	HOVs with three or more occupants will be exempt from paying tolls; HOVs with two occupants will pay the same toll as single occupant vehicles (SOVs).
	Tolls for multi-axle vehicles will continue to be factored by the number of axles as noted above.
	No toll rate escalation is assumed after FY 2017.

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Chapter 6

Updated Traffic and Gross Toll Revenue Potential

This chapter provides the results of the updated baseline estimates of traffic and gross toll revenue potential for this project. Taking into account the tolling experience to date, revised independent economic forecast, and revised bridge configuration assumptions including closures, the methodology outlined in Chapter 5 was used to generate FY 2014 through FY 2056 transaction and gross toll revenue potential forecasts.

Table 6-1 shows the SR 520 annual traffic and gross toll revenue potential updated forecast. Initially, annual growth is expected to be strong due to increasing demand and congestion on competing facilities. Revenue grows somewhat faster than transactions due to the planned toll increases in FY 2015 and FY 2016. In FY 2017, the large increase in toll rates results in very small transaction growth, but a significant increase in annual revenue due to the toll rate increase. After FY 2017, toll rates are assumed not to change with regular inflation, which makes the real value of the toll decline. This affect, along with regular regional growth, fuels continued increase in usage of the facility. Post FY 2017, the growth rates of both transactions and revenue gradually decline to very modest levels.

Table 6-2 shows the revised forecast compared to the September 2011 forecast for example years. Figure 6-1 shows the comparison of the forecasts over the entire study period. For the pre-completion tolling period (FY 2014 through FY 2016) the revised forecast shows transactions declining by 1.1 percent in FY 2014, down by 0.3 percent in FY 2015, and increasing by 0.9 percent in FY 2016. Gross toll revenue potential decreases by 6.8 percent for FY 2014, 5.5 percent for FY 2015, and 3.9 percent for FY 2016.

From FY 2017 to FY 2024, transactions are forecast to start 2.7 percent higher in FY 2017, and then slowly this increase fades to 2.0 percent in FY 2024. During this period, gross toll revenue potential is shown to decrease compared to the September 2011 forecast, with the decrease starting at 2.6 percent in FY 2017 and slowly declining to 1.6 percent in FY 2024.

For outer years FY 2031 and FY 2056, the forecast transactions are lower than the September 2011 forecast, reaching a maximum low of 3.2 percent less in FY 2031, and then moderating to 2.4 percent less by the end of the forecast period. The forecast gross toll revenue potential from FY 2024 and beyond is lower than the September 2011 forecast, reaching a maximum low of 5.9 percent less in FY 2031, and then moderating to 4.2 percent less by the end of the forecast period.

Table 6-1: SR 520 Annual Traffic and Gross Toll Revenue Potential Updated Forecast

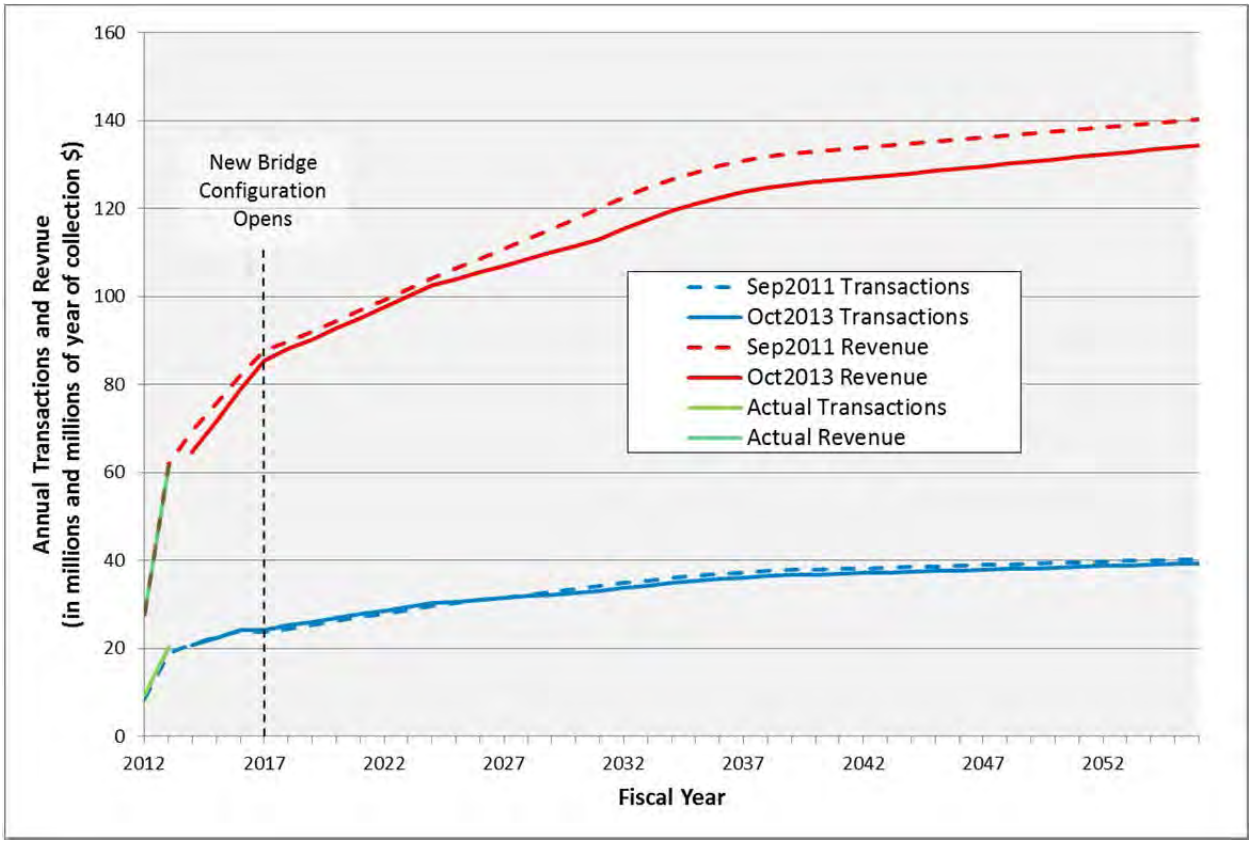
Fiscal Year	Transactions (millions)	Annual Growth	Gross Toll Revenue Potential (millions of year of collection $)	Annual Growth
2014	20.727	--	$64.656	--
2015	22.384	8.0%	71.373	10.4%
2016	24.168	8.0%	78.712	10.3%
2017	24.245	0.3%	85.338	8.4%
2018	25.253	4.2%	88.046	3.2%
2019	26.079	3.3%	90.308	2.6%
2020	26.907	3.2%	92.628	2.6%
2021	27.734	3.1%	95.008	2.6%
2022	28.562	3.0%	97.448	2.6%
2023	29.388	2.9%	99.952	2.6%
2024	30.216	2.8%	102.520	2.6%
2025	30.617	1.3%	104.005	1.4%
2026	31.020	1.3%	105.500	1.4%
2027	31.421	1.3%	107.005	1.4%
2028	31.824	1.3%	108.520	1.4%
2029	32.225	1.3%	110.043	1.4%
2030	32.628	1.3%	111.574	1.4%
2031	33.029	1.2%	113.114	1.4%
2032	33.703	2.0%	115.416	2.0%
2033	34.318	1.8%	117.517	1.8%
2034	34.873	1.6%	119.410	1.6%
2035	35.364	1.4%	121.085	1.4%
2036	35.790	1.2%	122.535	1.2%
2037	36.149	1.0%	123.755	1.0%
2038	36.439	0.8%	124.740	0.8%
2039	36.659	0.6%	125.487	0.6%
2040	36.809	0.4%	125.995	0.4%
2041	36.960	0.4%	126.505	0.4%
2042	37.112	0.4%	127.017	0.4%
2043	37.264	0.4%	127.532	0.4%
2044	37.417	0.4%	128.049	0.4%
2045	37.571	0.4%	128.568	0.4%
2046	37.725	0.4%	129.090	0.4%
2047	37.880	0.4%	129.614	0.4%
2048	38.036	0.4%	130.141	0.4%
2049	38.192	0.4%	130.670	0.4%
2050	38.350	0.4%	131.202	0.4%
2051	38.507	0.4%	131.736	0.4%
2052	38.666	0.4%	132.271	0.4%
2053	38.826	0.4%	132.810	0.4%
2054	38.986	0.4%	133.352	0.4%
2055	39.146	0.4%	133.896	0.4%
2056	39.307	0.4%	134.442	0.4%

Table 6-2: SR 520 Traffic and Gross Toll Revenue Potential – Updated Forecast and Comparison

Fiscal Year	Transactions (millions)			Gross Toll Revenue Potential (millions of year of collection $)		
	September 2011 (1)	October 2013	Change	September 2011 (1)	October 2013	Change
2014	20.968	20.727	-1.1%	$69.390	$64.656	-6.8%
2015	22.455	22.384	-0.3%	75.510	71.373	-5.5%
2016	23.960	24.168	0.9%	81.920	78.712	-3.9%
2017	23.618	24.245	2.7%	87.640	85.338	-2.6%
2024	29.620	30.216	2.0%	104.210	102.520	-1.6%
2031	34.121	33.029	-3.2%	120.150	113.114	-5.9%
2056	40.265	39.307	-2.4%	140.380	134.442	-4.2%

1. September 2011 Traffic and Revenue Forecast by CDM Smith

Figure 6-1: Traffic and Gross Revenue Potential – Updated Forecast and Comparison



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Chapter 7

Sensitivity Tests

This chapter includes the results of a series of tests conducted to measure the sensitivity of gross toll revenue potential forecasts to changes in key study assumptions. The assumptions chosen for the tests are those that present risks because they are subject to variability and have a potential impact on the magnitude of the revenue estimate.

The following sensitivity tests were performed in conjunction with the forecast update:

- Toll rate sensitivity (FY 2017 – after bridge completion)
- Regional growth (FY 2024 and FY 2031)
- Account-based participation rate (FY 2024 and FY 2031).

Each parameter was tested individually. The results are not necessarily additive and do not provide an estimate of the overall impact of changes if they were to occur simultaneously.

Note that other sensitivity tests had been performed for the September 2011 study, including value of time, motor fuel costs, trip suppression/mode shift, and possible tolling of the I-90 bridge. The value of time and trip suppression/mode shift tests were deemed unnecessary now that the tolling analysis model has been calibrated with actual toll experience. The motor fuel cost test is considered of limited value; with the downside socioeconomic test, a bleaker future scenario is already captured. The study of tolling I-90, which has only upside potential for SR 520 revenue and is not therefore a risk, has shifted to a separate EIS process from the SR 520 forecast.

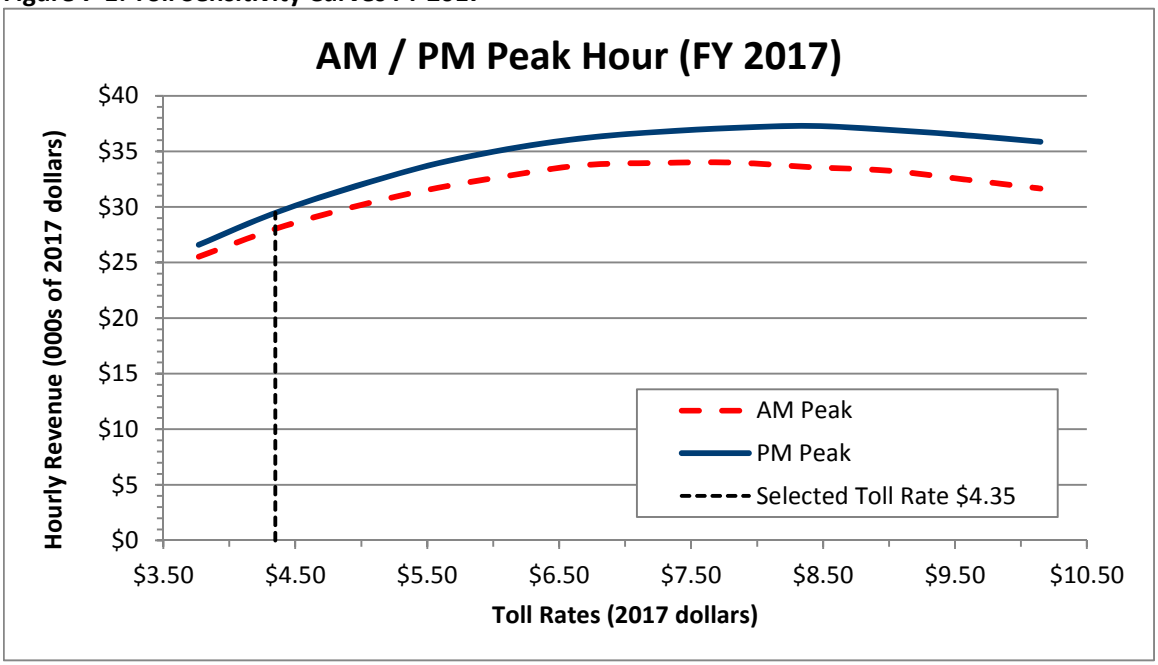
Toll Rate Sensitivity

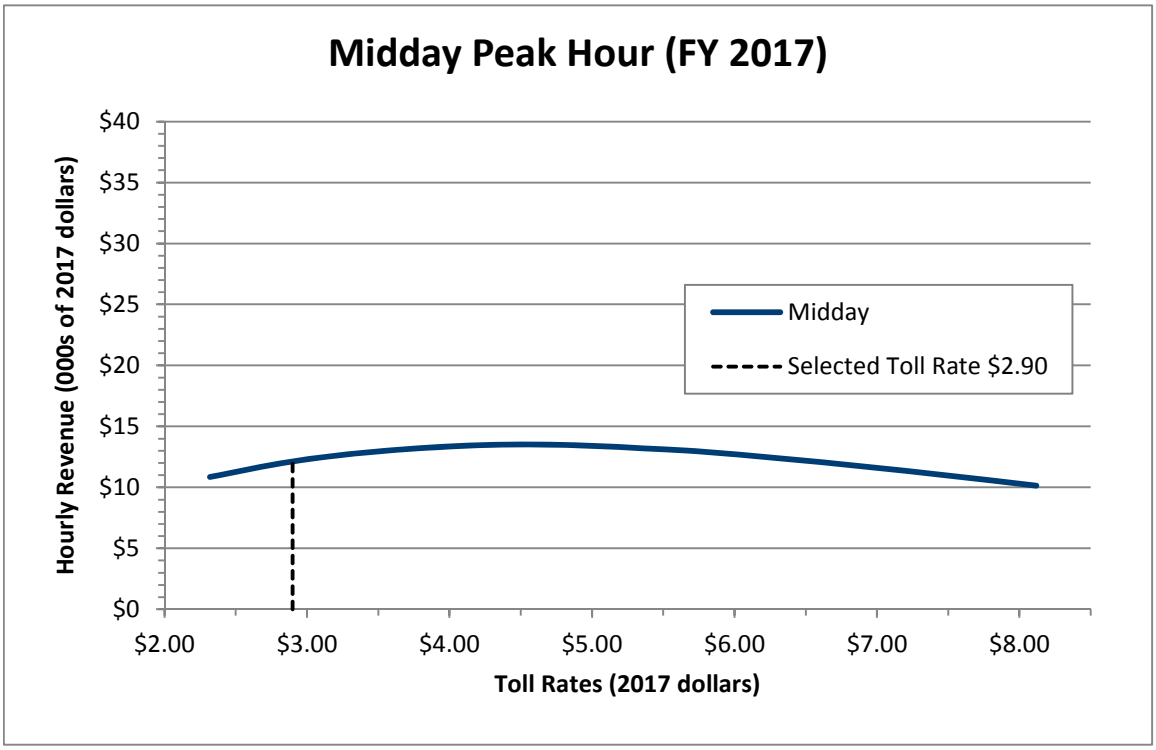
A range of toll rates from $3.77 to $10.15 peak hours and from $2.32 to $8.12 midday was modeled using the tolling analysis model for FY 2017. These toll rates are expressed in year of collection dollars (FY 2017). For each toll rate, the corresponding revenue was computed to develop toll sensitivity curves for AM peak, midday, and PM peak periods.

Figure 7-1 shows toll sensitivity curves for FY 2017. The graphs show where the selected toll rates fall on the sensitivity curves ($4.35 for peak hours and $2.90 for midday). Revenue maximization is obtained at toll rates corresponding to the crest of the revenue curve. As indicated on the figure, the selected toll rates are lower than the maximization revenue toll rates.

The FY 2017 selected peak period toll rate of $4.35 is estimated to generate 82 and 79 percent of the maximum revenue during the AM and PM peak periods, respectively. During the off-peak (midday) period in FY 2017, the selected toll rate of $2.90 is estimated to generate 90 percent of the maximum revenue.

Figure 7-1: Toll Sensitivity Curves FY 2017





Regional Growth

Using the downside economic forecast described in Chapter 3, the tolling analysis model was run to determine transactions and gross toll revenue potential under lower economic growth conditions. The results are in Table 7-1. For FY 2024, under an approximately 8 and 11 percent economic downside scenario for population and employment respectively, transactions and revenue are expected to be about 13 percent lower. For FY 2031, under an approximately 11 and 13 percent economic downside scenario for population and employment respectively, transactions and revenue are expected to be about 15 percent lower.

Table 7-1: Regional Growth Sensitivity Test

	Transactions[1]	Gross Toll Revenue Potential[2]
FY 2024		
Baseline	30.216	$102.52
Downside Socioeconomic	26.364	$89.14
Percent Difference	-12.7%	-13.1%
FY 2031		
Baseline	33.029	$113.11
Downside Socioeconomic	28.086	$95.99
Percent Difference	-15.0%	-15.1%

1. In millions

2. In millions of year of collection dollars

Account-based Participation Rate

This test examined the difference in transactions and revenue for account-based participation rates differing from those assumed in the baseline scenario. The tolling analysis model input values of participation rate reflect the entire market of eligible bridge users, not just those forecasted to use the bridge. The output percentages reflect the difference in total cost to the motorists. Since the potential Pay By Mail market faces a higher toll rate, a greater proportion of potential Pay By Mail users will divert away from the bridge than those using transponders. Hence, the resulting account-based Good To Go! shares for all years are higher than the input assumptions due to the lower toll cost.

In the baseline scenario, the Good To Go! market input share is assumed to be 86 percent on weekdays and 76 percent on weekends in FY 2024 and FY 2031. The resulting overall output transaction Good To Go! share is 86 pecent for both FY 2024 and FY 2031.

The high sensitivity test evaluates an increase to 96 percent weekday and 86 percent weekend input market share in FY 2024 and FY 2031. The low sensitivity test evaluates a decrease to 81 percent weekday and 71 percent weekend input market share in FY 2024 and FY 2031.

The results of the tests are shown in Table 7-2. The higher account-based participation rate results in transactions increasing by 1 to 2 percent and revenue decreasing by 3 percent for both FY 2024 and FY 2031 respectively. The effect is reversed for lower account-based participation rate, with transactions decreasing by less than 1 percent, and revenue increasing by up to 2 percent.

Table 7-2: Account-based Participation Rate Sensitivity Test

	Transactions[1]	Gross Toll Revenue Potential[2]
FY 2024		
Baseline	30.216	$102.520
Higher Account-based Participation Rate	30.700	$99.56
Percent Difference	1.6%	-2.9%
Lower Account-based Participation Rate	29.997	$104.12
Percent Difference	-0.7%	1.6%
FY 2031		
Baseline	33.029	$113.11
Higher Account-based Participation Rate	33.455	$109.61
Percent Difference	1.3%	-3.1%
Lower Account-based Participation Rate	32.836	$115.34
Percent Difference	-0.6%	2.0%

1. In millions

2. In millions of year of collection dollars

Disclaimer

CDM Smith used currently-accepted professional practices and procedures in the development of these traffic and revenue estimates. However, as with any forecast, it should be understood that differences between forecasted and actual results may occur, as caused by events and circumstances beyond the control of the forecasters. In formulating the estimates, CDM Smith reasonably relied upon the accuracy and completeness of information provided (both written and oral) by Washington State DOT. CDM Smith also relied upon the reasonable assurances of independent parties and is not aware of any material facts that would make such information misleading.

CDM Smith made qualitative judgments related to several key variables in the development and analysis of the traffic and revenue estimates that must be considered as a whole; therefore, selecting portions of any individual result without consideration of the intent of the whole may create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results. CDM Smith gives no opinion as to the value or merit of partial information extracted from this report.

All estimates and projections reported herein are based on CDM Smith's experience and judgment and on a review of information obtained from multiple agencies, including Washington State DOT. These estimates and projections may not be indicative of actual or future values, and are therefore subject to substantial uncertainty. Future developments cannot be predicted with certainty, and may affect the estimates or projections expressed in this re¬port, such that CDM Smith does not specifically guarantee or warrant any estimate or projection contained within this report.

While CDM Smith believes that the projections or other forward-looking statements contained within the report are based on reasonable assumptions as of the date of the report, such forward-looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report, as they pertain to socioeconomic and demographic forecasts, proposed residential or commercial land use development projects and/or potential improvements to the regional transportation network.

CDM Smith is not, and has not been, a municipal advisor as defined in Federal law (the Dodd Frank Bill) to Washington State DOT and the State of Washington and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to Washington State DOT and the State of Washington with respect to the information and material contained in this report. CDM Smith is not recommending and has not recommended any action to Washington State DOT and the State of Washington. Washington State DOT and the State of Washington should discuss the information and material contained in this report with any and all internal and external advisors that it deems appropriate before acting on this information.

CDM Smith

Washington State Department of Transportation