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COPIED: Lee Helgerson, Carley Francis, Jo Mortensen, and Eugene Ryan  
DATE: December 27, 2013  
FROM: Brent Baker, Auden Kaehler, Andrew Cadmus, and Nick Amrhein  
SUBJECT: Columbia River Crossing Updated Net Toll Revenue Projections

## 1. INTRODUCTION

This memorandum documents the assumptions and process used for forecasting net toll revenues for the I-5 Columbia River Crossing (CRC) project. Net toll revenue projections are derived from the annual toll traffic and gross revenue forecasts by accounting for various revenue adjustments and operating and maintenance (O&M) costs across the forecast horizon through fiscal year (FY) 2060. In addition, periodic repair and replacement (R&R) costs are estimated as a further use of net toll revenues. The underlying toll traffic and gross revenue forecasts are prepared by CDM Smith, with the current December 2013 forecasts representing investment grade projections. The accompanying, updated net revenue projections are intended to serve as inputs for assessing the financial capacity of tolls to support construction funding.

The current CDM Smith investment grade toll traffic and gross revenue forecasts were preceded by pre-investment grade analysis of several scenarios differing in toll rates, socio-economic land use inputs, and other assumptions. In September 2013, CDM Smith and Parsons Brinckerhoff provided memorandums documenting the gross and net toll revenue projections, respectively, for a set of scenarios (Scenarios A-F), referred to as the "Stage 2" forecasts. The Stage 2 net revenue projections incorporated revenue adjustments, O&M costs, and R&R costs that were based on the assumption that the state of Washington would lead the toll collection operations and which included input from a joint Oregon-Washington facility O&M cost task force as well as operating experience on other similar facilities.

The net revenue projections documented herein not only reflect the updated traffic and revenue projections, but also incorporate revised assumptions for gross revenue adjustments informed by experience elsewhere, and updated toll collection O&M cost estimates based on an Oregon-led toll collection operation.

## 2. TRAFFIC AND GROSS REVENUE ASSUMPTIONS

The net revenue projections covered in this memorandum rely upon the investment grade traffic and gross toll revenue forecasts provided by CDM Smith on December 5, 2013, as revised to reflect a first phase for the project with a start date for pre-completion tolling on September 30, 2015 (FY2016).<sup>1</sup>

Additional detail regarding CDM Smith's forecasts can be found in their report entitled *Columbia River Crossing Investment Grade Traffic and Revenue Study*, dated December 27, 2013.

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<sup>1</sup> The State of Oregon fiscal year begins July 1 of the previous calendar year and ends June 30 of the same calendar year; e.g. FY2016 begins July 1, 2015 and ends June 30, 2016.

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CDM Smith's investment grade traffic and revenue forecast report describes the assumed configuration and staging of the project. Their current forecast incorporated revisions or refinements to various inputs and assumptions, including:

- Base case socioeconomic forecasts provided by ECONorthwest;
- Value of time (VOT) assumptions for passenger cars by income group and time of day, and for trucks, based on a stated preference survey;
- Trip patterns based on updated origin-destination and stated preference survey results;
- Passenger vehicle toll rate schedule by time of day;
- Truck toll multipliers, which were changed from 2.0x and 4.0x multiples of the auto toll for medium and large trucks, respectively, to an N-1 axle formula multiple of the auto toll with effective multipliers for medium and large trucks of 2.3x to 4.3x, respectively;
- Traffic ramp-up adjustment factor values;
- Payment method percentage shares between account and non-account customers; and
- Reductions in traffic volume due to periodic construction closures through FY2022 not considered in the prior forecasts.

Exhibit 1 below summarizes the key input assumptions for CDM Smith's investment grade traffic and gross revenue forecasts.

### Exhibit 1: Toll Scenario Assumptions for Demand Modeling

Assumption	Investment Grade Scenario
Socioeconomic Forecasts	ECONorthwest Base Case
Toll Time Period	Post-Completion (FY 2022-60) Passenger Car Toll Rates (Account-Based Customers, 2021 \$'s)
5-6 AM	\$2.60
6-7 AM	\$2.93
7-9 AM	\$3.25
9-10 AM	\$2.93
10 AM – 3 PM	\$2.60
3-4 PM	\$3.25
4-6 PM	\$3.25
6-7 PM	\$2.93
7-8 PM	\$2.60
8 PM – 5 AM	\$2.60
Toll Surcharge for Non-Account (Pay by Mail) Transactions	\$1.77
Account-Based Payment Share Inputs*	67% in FY2016, escalating to 82% by FY2036**
Account-Based Payment Share Outputs*	67% in FY2016, escalating to 78% by FY2036
Value of Time for Peak Period Passenger Car Driver (2010 \$'s)	\$12.68 per hour
Passenger Car - Vehicle Operating Cost (2010 \$'s)	\$0.18 per mile
Downward Adjustment for Trip Pattern Changes <sup>1</sup>	Low amount of downward adjustment

Assumption	Investment Grade Scenario
Fiscal Year	Ramp Up Adjustments to Traffic and Revenue Forecasts <sup>2</sup>
FY2016	-2%
FY2017	-1%
FY2022	-2%
FY2023	-1%

Source: CDM Smith

*\*The gross toll revenue forecast outputs show slightly different account-based payment shares due to the demand effects of the non-account toll surcharge.*

*\*\* Account-Based payment share model input values are based on passenger car weekday rates and are cannot be directly compared with account-based payment share outputs which are based off of total annual transaction values.*

<sup>1</sup> *Effect of tolls related to forgoing a trip, mode shift to transit, or changing destination to a location that does not include a bridge crossing; excludes diversions to other highways which are calculated separately using the CDM Smith diversion modeling process.*

<sup>2</sup> *Ramp up is applied to account for potential users becoming accustomed to tolling. Ramp up was applied during the first two years of tolling and again in FY2022 and FY2023 with the opening of the completed bridge.*

Note that the CDM Smith traffic and gross toll revenue forecasts assume that tolls are collected from every eligible vehicle; they do not include any revenue adjustments, including those for leakage such as misread transponders, unreadable license plates, or non-payment of tolls. These adjustments are covered herein as part of the net revenue projections.

The toll traffic and gross revenue forecasts are categorized by the aforementioned two payment methods:

- Account-based transactions for which the user has established a pre-paid account that is tied to a vehicle (transponder or license plate), with payment deducted from the account at the time of travel; and
- Non-account-based transactions (e.g, pay by mail) for which the user would be identified by their license plate and sent an invoice in the mail for the toll plus a surcharge for processing.

The distribution of the traffic forecast by these two payment methods influences the projections for toll payment fees and discounts as well as for revenue adjustments associated with potential revenue leakage and the estimation of toll collection costs by activity.

### 3. KEY CHANGES IN NET TOLL REVENUE COMPONENTS

In addition to the impacts of the updated CDM Smith traffic and gross toll revenue forecasts, the revenue adjustments and cost estimates that underlie the net toll revenue projections have been revised to encompass project implementation and toll operations of the I-5 Bridge by the state of Oregon, specifically the Oregon Department of Transportation (ODOT). The previous net revenue projections were based on a joint Washington-Oregon implementation and a Washington-led toll operation that would have leveraged the procedures, systems, and customer service operations within Washington's three existing toll facilities. The following outlines the key revisions that were made in the current forecast to reflect an Oregon toll operation, divided into the following two categories.

- Toll Billing and Enforcement — this section outlines the key assumptions that have been made to account for an Oregon toll facility operation, assuming limited reciprocity with Washington State. The changes in assumptions are primarily related to non-account users who can be identified for mailing a toll bill and subsequently receive one or two mailed invoices, but also reflect refinements based on experience with other similar toll operations.
- Toll Collection Costs — this section discusses the changes in methodology and assumptions used to calculate toll collection costs for an Oregon toll facility operation.

These two categories of revisions that impact the revenue adjustments and toll collection cost estimates are covered in subsections 3.1 and 3.2. Additional detail on the updated net revenue projections and their components are documented in section 4 of this memorandum.

#### 3.1 Toll Billing and Enforcement

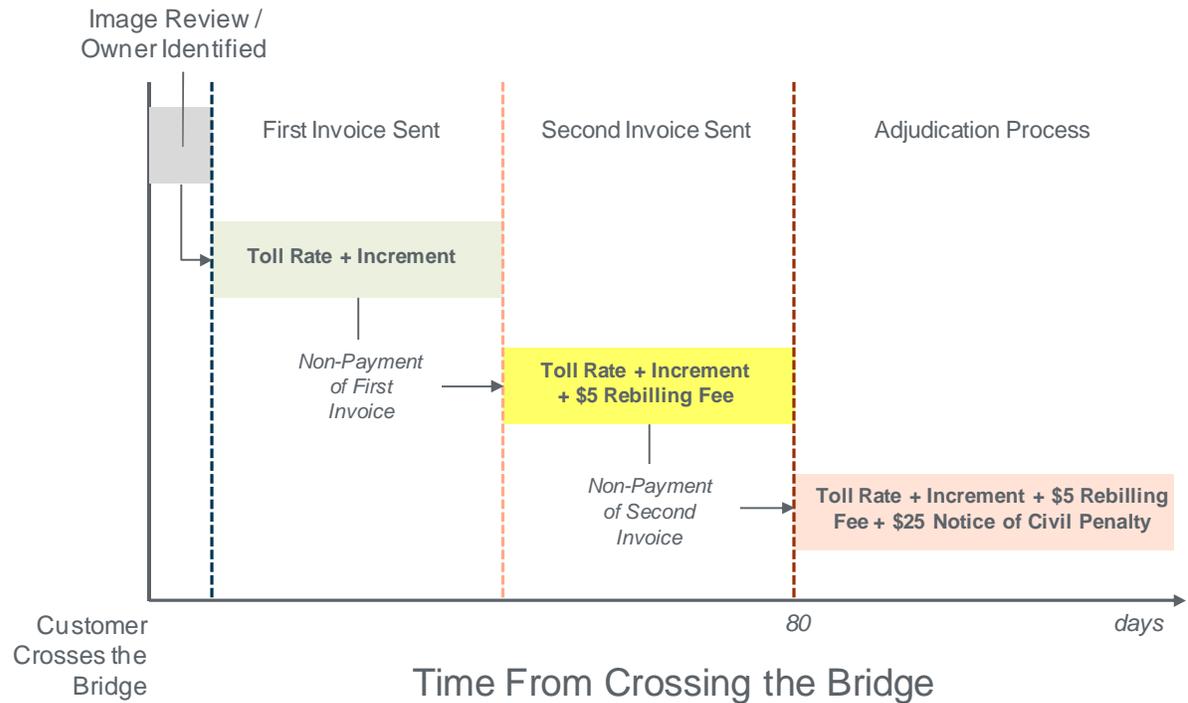
Similar to previous estimates for revenue adjustments and O&M costs, the CRC policies for toll collection, billing and enforcement are based on those currently administered in Washington State for the State Route (SR) 520 Bridge as well as on the Tacoma Narrows Bridge (with the exception that it also allows for cash collection). The I-5 Bridge is assumed to be an all-electronic toll (AET) facility where toll equipment photographs the license plate of any vehicle for which a transponder is not detected. If the plate image is matched to an existing account, the toll is deducted in the same way as it would for a vehicle with a transponder, a process referred to as "pay by plate". For non-account customers, plate images are compared against the toll operator's short term database, Oregon DMV records for in-state plates, and/or an external vendor look-up service for out-of-state license plates to identify the vehicle owner and mailing address. Unless such a customer self-initiates payment before or within 72 hours after travel, they will then be mailed a first toll bill.

Pay by mail customers are given two opportunities to pay, with approximately 30 days between the first and second invoices. The second invoice is assumed to include a \$5 rebilling fee. A toll that remains unpaid after 80 days becomes a violation and the customer is mailed a notice of civil penalty (NOCP) and are provided the opportunity to contest the violation via an adjudication process with administrative law judges. The \$25 maximum civil penalty assessed at this point is assumed to cover the cost of the adjudication process, as defined in Oregon House Bill 2800.

For the purposes of this analysis, none of the toll revenue unpaid after 80 days, some of which may eventually be recovered, is assumed to flow back to the project. Similarly, the adjudication process is assumed to be revenue neutral, with zero net fees available for the CRC project. These are conservative assumptions that reflect the early stages of development of institutional policies for the State of Oregon. Toll operators have various enforcement and compliance options—such as referring unpaid tolls and

fees to collections, placing vehicle registration renewal holds, or even suspending vehicle registrations—that could allow the adjudication process to be revenue positive. Exhibit 2 below illustrates the non-account customer toll bill payment process.

Exhibit 2: CRC Payment and Enforcement Process



### OUT-OF-STATE USERS

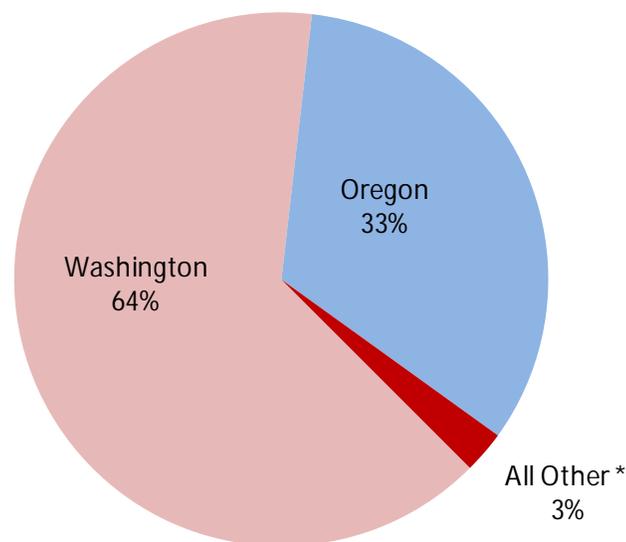
In previous forecasts, it was assumed that the CRC implementation was a bi-state effort with the tolling led by the Washington State Department of Transportation's (WSDOT's) Toll Division and its associated systems and vendors. As such, bridge users with Oregon or Washington registered vehicles were assumed to be "in-state" customers, and that the two states would have a comprehensive reciprocity agreement in place by the start of pre-completion tolling. Such an agreement was to cover the sharing of vehicle owner information, the administration of civil penalties and related adjudication for unpaid toll bills, and a hold on vehicle registration renewal for users who continue to avoid paying delinquent toll bills.

The current forecast with ODOT toll operations does not assume the costless cooperation of the WSDOT Toll Division or Washington State Department of Licensing (DOL). As such, bridge users with Washington registered vehicles are now assumed to be "out-of-state" customers in the same manner as would a customer from Idaho or California. Re-classifying Washington State users as out-of-state increases the cost estimate for out-of-state license plate look-ups, and toll revenue leakage due to higher assumed rates of unpaid toll bills.

Data provided from a video survey of license plates on the current I-5 bridge conducted by National Data & Surveying (NDS), and documented by CDM Smith in late 2012, was used to update the underlying

assumptions for out-of-state users. The survey was conducted on weekdays and weekend days in October and November respectively between the hours of 8:00am and 5:30pm with slight variations for the weekday and weekend survey days. License plates were identified by state-of-plate, weighted by direction and vehicle type, and adjusted for total weekly traffic assuming five weekdays and two weekend days. A seasonality adjustment was also made by adding an additional 0.2 percent to the autumn survey share of non-Washington, non-Oregon vehicles to account for a higher share of such vehicles in the summer months, and recalculating the overall distribution. In the northwest, the months of October and May tend to be the months most representative of annual average highway travel patterns, hence the adjustment to represent an annual average was relatively small. Exhibit 3 provides the assumed breakdown of users based on the adjusted survey data.

Exhibit 3: Estimated Annual Average Distribution of Bridge Users



\* All other includes vehicles with license plates from states other than Washington and Oregon, including out-of-country plates, US government plates, and diplomatic plates.

#### *OUT-OF-STATE TOLL COLLECTION AND ENFORCEMENT*

ODOT will use the same toll collection procedures and enforcement mechanisms for in-state and out-of-state vehicles. ODOT will rely on account based services as the chief mechanism for toll collection. For non-account customers, ODOT will invoice registered owners identified through a vehicle license plate recognition system. These customers will receive up to two invoices over a period of eighty days, and the tolls collected within this period are included in the net revenue projections documented herein. Registered owners accruing unpaid toll invoices will be subject to administrative enforcement procedures, including the imposition of civil penalties and administrative fees, with associated appeal rights under Oregon state law. Tolls, penalties and fees remaining unpaid after the appeals process is concluded will be debts owed to the State of Oregon. ODOT will pursue all avenues to collect on these debts available under Oregon law, regardless of the vehicle owner's state of residence.

This section discusses unique considerations and assumptions for toll collections activities specific to out-of-state users.

For out-of-state, account based users of the facility, toll payments would be debited from their pre-paid Oregon account. Cooperative agreements between tolling organizations such as that governing the Inter-Agency Group *E-ZPass*® create a standardized method of sharing transponder account information (including license plates and account balances) and facilitate the transfer of funds between agencies for tolls incurred outside individual jurisdictions. Combined with common technology standards, this allows for full interoperability across toll authorities and political boundaries. For this study, we assumed that Washington and Oregon issued transponders would be interoperable (employ the same technology), but that customers would be required to maintain separate accounts in each state if they wish to travel at the lower, account-based toll rates in both states.

For out-of-state, non-account users of the facility, vehicle owner and address information is required for each license plate image captured by the toll system cameras in order to mail a toll bill to these customers. States may have agreements or policies in place that allow for free license plate registration lookups; however, these services may be difficult to use or access. At this stage it was assumed that a third party vendor would be used to access and aggregate vehicle owner and address data to provide to toll authorities as a one-stop-shop. These data aggregators, however, charge a small fee per license plate lookup. Oregon license plate lookup data are assumed to be freely provided by the Oregon Department of Motor Vehicles (DMV) for toll collection purposes, with all out-of-state plates incurring a third party vendor unit lookup cost of \$0.75.

Toll invoices will include payment instructions and deadlines, describe the penalties and fees that will accrue if the invoice remains unpaid, and describe the administrative and collections remedies that ODOT may seek for unpaid toll invoices. Unpaid invoices will be subject to imposition of a civil penalty and associated administrative fees. As required by Oregon administrative law, notices of civil penalty will include information about administrative appeal rights and how to request an appeal. For Oregon-registered vehicles incurring a civil penalty, Oregon law authorizes ODOT to place a hold on the vehicle's registration renewal until the owner has satisfied outstanding toll, civil penalties and fees. As noted above, tolls, penalties and fees remaining unpaid after the appeals process may be subject to civil enforcement to collect these funds. This study assumes that vehicle license registration holds will not be available for out-of-state violators.

Several states are in various stages of developing interstate reciprocal toll enforcement arrangements. Notably, in 2011, Maine, Massachusetts and New Hampshire executed an agreement calling for each participating state to place a hold on the registration of vehicles it registers that have toll violations in another participating state until those tolls and any associated penalties are paid. While there are no studies or data tracking the effectiveness of these types of agreements in enforcing payment of toll violations by out-of-state users, this approach may hold promise for other states seeking a direct means of reciprocally enforcing toll violations by other states' residents.

ODOT may seek additional penalties and enforcement options to deter toll violations, including the treatment of toll violations as traffic violations. Under current Oregon law, the accrual of substantial unpaid tolls is subject to criminal prosecution for theft of services. Neither of these factors were included in assumed rate by which toll invoices would be paid in a timely manner for this analysis.

The previous CRC forecasts assumed that 45 percent of pay by mail first invoices and 40 percent of second invoices would be paid within 80 days, for an overall payment rate of 67 percent (before accounting for any tolls that might be recovered in the adjudication process). These previous CRC toll bill payment assumptions were intentionally set somewhat lower than those estimated for SR 520 in Washington. Recent experience on the SR 520 Bridge has resulted in minor revisions there, to 54 and 45

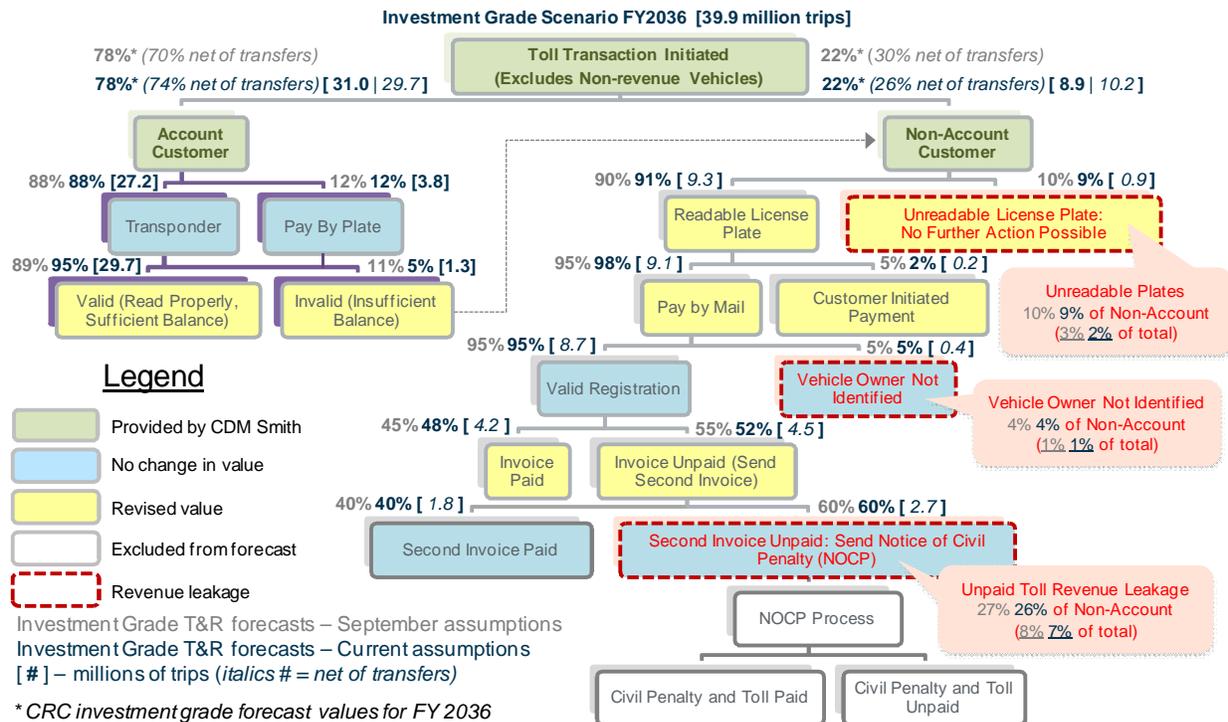
percent payment rates, respectively, for the first and second invoices, yielding an overall payment rate of 75 percent within the two invoice, 80 day period. The E-470 toll road in Denver Colorado uses a similar two toll bill payment cycle, and achieves better than 80 percent payment compliance after just the first toll bill, while the system of facilities operated by the North Texas Tollway Authority (NTTA) have experienced payment rates between 60 and 70 percent. The revised CRC payment rate assumptions, described in detail below, would achieve a 69 percent payment rate. This remains relatively conservative to account for a potentially higher level of scofflaw behavior due to the assumption Oregon will not have the ability to place a hold on vehicle registration renewal for non-payment of delinquent toll bills by Washington residents or other out-of-state users. Additional steps to encourage timely payment of toll bills for certain user groups may include drivers license renewal holds and withholding state income tax refunds; however, these items are not reflected in the projections.

#### *TOLL TRANSACTION WORK FLOW*

The toll transaction work flow provides a graphical illustration of the disposition of toll transactions across payment types and events that lead to successful toll collection or revenue leakage. Since the previous forecasts, several revisions were made in the transaction work flow to represent the current assumptions, including toll operations conducted solely by ODOT lacking vehicle registration hold reciprocity with Washington, as well as to capture recent experience on similar toll facilities elsewhere in the U.S.

Exhibit 4 compares the underlying toll payment transaction work flow assumptions used in the previous September 2013 and current December 2013 forecasts, as provided for future year FY2036. The transaction work flow begins with the gross toll transactions by pre-paid account customers (left side of diagram) and non-account customers (right side), as provided by CDM Smith. FY 2036 represents the year in which the forecasted pre-paid account payment share reaches its maximum or ceiling value, thereafter remaining constant at about 78 percent through the end of the forecast period in FY 2060. Toll collection effectiveness and leakage figures for other years will vary somewhat from the values in Exhibit 4. Each step within the Exhibit 4 work flow diagram includes two percentages and a value. As the legend indicates, the first percentage value in gray type represents the previous assumption and the second percentage value in blue type represents the revised, current assumption. The third value in brackets represents the transaction value in millions that corresponds to the current assumptions. The green boxes representing CDM Smith's forecasts contain an extra percentage and transaction value that indicate the final assumed transaction allocation to account and non-account customers, net of account transactions that would end up being processed as non-account transactions, primarily due to insufficient account balances (e.g., an expired credit card). The value net of transfers is the starting point for the non-account customer transaction payment work flow.

Exhibit 4: Transaction Workflow Assumptions – Previous and Current Forecast



The primary changes in the underlying assumptions include the following key items.

- Valid Account Rate – revised from 89 percent to 95 percent: The share of account transactions associated with a valid account with a sufficient balance to make payment was increased based on recent experience from other facilities. The previous value of 89 percent was based on earlier SR 520 values, which was subsequently determined to be on the low side due to accounts being established and initially funded with \$30 up to 12 months before tolling actually started. During this time, customers’ credit cards may have expired without notice from the toll authority to update their accounts. Once tolling began, an expired credit card would not have been discovered until the account balance had fallen to the point where auto-replenishment would occur. With an auto-replenishment failure, the account would run out of funds, and subsequent tolls would be processed by mail in the same manner, and with the same leakage assumptions, as those customers without pre-paid accounts. The same would occur for a customer who had purchased a transponder but had failed to actually establish the account, or for a customer who failed to provide funds for an account with manual replenishment.

Data for SR 520 during a recent twelve month period has indicated that the rate of successful toll collection from pre-paid customer accounts has improved substantially to 97 percent, consistent with experience on other facilities including those operated by E-470, NTTA, and MDTA. The improvement is also likely associated with standard account management practices, including notifying customers when account information may require updating, such as when credit card numbers are set to expire or are no longer valid. For CRC, the successful account-based toll collection rate was set slightly lower to 95 percent.

As a result of the increased assumption for successful account-based toll collection, there would be a decrease in invalid account-based transactions that would require re-categorization for processing as pay by mail transactions in the same manner as non-account customers. This is represented by the reduced percentage share associated with the dashed line in the work flow chart above. The impact of this re-categorization on the overall top level transaction type distribution is indicated above the green boxes in the value in brackets labeled “net of transfers.”

- **Readable License Plate**—revised from 90 percent to 91 percent: The current assumption is that CRC will utilize roadside toll equipment that will provide equal or better performance as the equipment currently being used by Washington on SR 520, which includes cameras to capture both front and rear license plate images. It was previously assumed that 90 percent of license plates would be readable either through the initial optical character recognition of the plate image or through subsequent manual review of the image. Recent experience has shown that the readable license plate rate achieved on SR 520 is 93 percent. For CRC, the readable license plate percentage has been revised upwards to 91 percent, but not all the way to 93 percent. A key reason for this has to do with the higher volume of trucks projected for the I-5 Bridge, expected to range from 6 to 7 percent of total transactions, compared to about one percent for SR 520. Trucks, especially tractor trailer combinations, tend to have higher rates of unreadable license plates, due to different registrations on the back of the trailer and the front of the tractor that requires a reliance on the front plate image, additional difficulty in capturing readable license plate images due to varying plate location, and other obstructions including accumulated dirt and road grime.
- **Customer Initiated Payment**—revised from 5 percent to 2 percent: Some non-account customers will contact the customer service center to self-initiate payment before or within 72 hours after travel, prior to a toll bill being mailed, in order to receive a \$0.50 discount on the pay by mail toll. This payment option is not widely offered among all-electronic toll facilities in the U.S. Based on recent experience with SR 520 where less than 1 percent of non-account customers receive the discount, the incidence of non-account customers self-initiating payment was reduced from 5 percent to 2 percent. While marketing may improve the utilization of this payment method, which ultimately helps to reduce revenue leakage from non-payment of toll bills, it is unlikely that many customers will be pro-active to save \$0.50 when passively waiting for a toll bill is the alternative. Promotion of this payment method, when combined with the discount offered, may end up costing as much as the savings in toll bill processing and reduced leakage.
- **First Invoice Payment** — revised from 45 percent to 48 percent: The percentage of users assumed to pay their first invoice was increased with no change to the second invoice payment rate of 40 percent. This is estimated to result in an overall toll bill payment rate within 80 days of 69 percent. Assumptions for this analysis remain slightly lower than those observed on SR 520 and considerably lower than on other comparable all electronic facilities, including Colorado’s E-470 and Maryland’s facilities, where the payment process is similar to what is being proposed for I-5, and similar to rates experienced by NTTA with a comparable payment cycle during a period when vehicle registration holds were not part of the enforcement strategy. Recent information indicates that the actual rate of payment on first invoices is 54 percent on SR 520 and ranges from 65-88 percent on other U.S. facilities listed above, for which comparable

data could be obtained. The current CRC forecast first invoice payment rate assumption of 48 percent remains somewhat conservative based on the following considerations.

- More than half of CRC customers will be out-of-state drivers. Although information from other facilities indicates a wide range in invoice payment rates by out-of-state users, given the high share of such users on CRC, a conservative approach was maintained whereby users from other states would be less likely to pay their toll bills.
- A relatively high forecasted percentage share of trucks, which are slightly more likely to be non-account transactions, also contributed to the lower toll bill payment rates.
- A minor upward revision in the overall share of out-of-state users was made to adjust autumn 2012 license plate survey results to be more indicative of annual average values, inclusive of summer travel patterns.

The current transaction workflow percentages are applied throughout the forecast period. However, as noted previously CDM Smith has revised the payment method distribution in their latest forecast. Exhibit 5 on the following page illustrates the CDM Smith forecasted transaction volumes by pre-paid account and non-account customers over the forecast period. The increase in the pre-paid account share of total transactions through FY2036 improves the revenue collection efficiency over the same period.

Exhibit 5: Projected Pre-Paid Account Share of Total Transactions (FY2016-60)

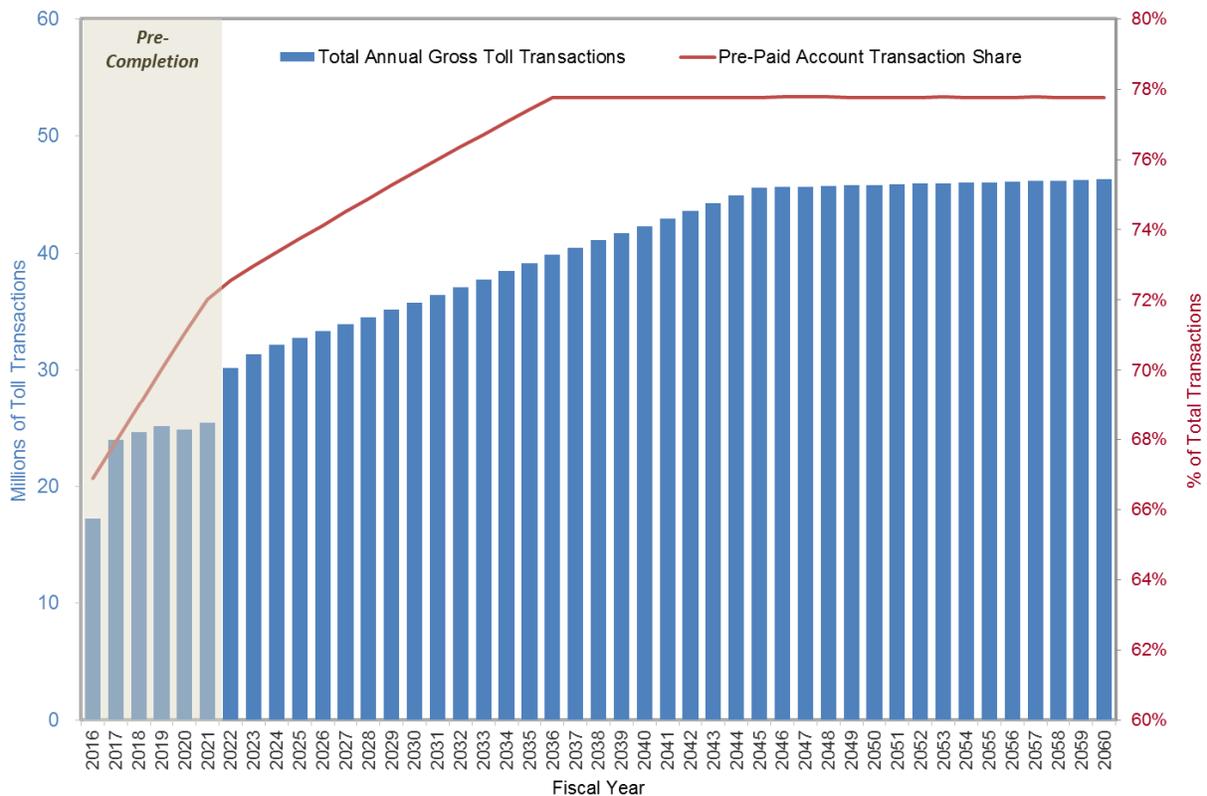
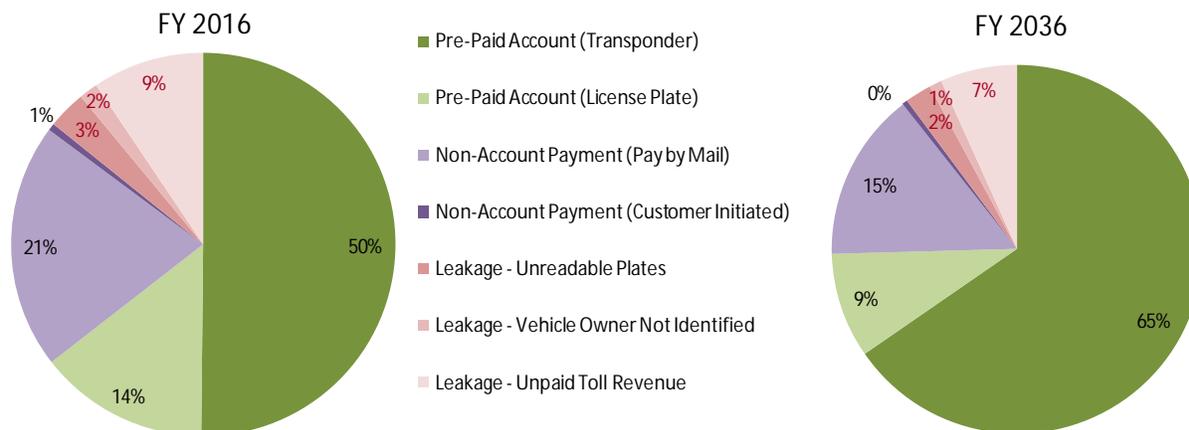


Exhibit 6 provides a breakdown of transactions by payment type and revenue leakage category for the first year of toll operations in FY2016, as well as for FY2036, the latter of which corresponds to the values provided in Exhibit 4. As the use of pre-paid accounts increases, the rate of leakage associated with non-account users decrease. Initial leakage due to the combination of unreadable license plates, unidentifiable vehicle owner, and unpaid tolls after two invoices and 80 days decreases from 14 percent to 10 percent of total transactions between FY2016 and FY2036. The proprietary nature makes it difficult to acquire reliable revenue leakage values from other toll facilities that capture all three leakage types noted above. However, data from three other all electronic toll collection operators indicate similar or lower overall rates of leakage in the range of 4 to 10 percent.

Exhibit 6: Transaction Allocation by Payment or Leakage Type (FY2016 and FY2036)



### 3.2 Toll Collection Costs

The assumptions for an all-electronic tolled CRC operated solely by ODOT has led to revised assumptions for toll collection operations and maintenance (O&M) costs that are separate from the toll billing and enforcement issues described in the previous section. Toll collection operating costs were estimated based on a typical business model where a public entity oversees operations that are conducted by one or more vendors that would provide the customer service center (CSC) systems software; the CSC operations including customer account management, billing and all customer communications; and the roadside toll systems (RTS) for detecting vehicles and assigning trip and toll information for communication to the CSC. The revised CRC toll collection costs were developed using available data from the E-470 Public Highway Authority in Colorado, the Maryland Transportation Authority (MDTA), the Rhode Island Turnpike and Bridge Authority, the Golden Gate Bridge Highway and Transportation District, and the Delaware River and Bay Authority. The following presentation of toll collection O&M cost estimates is structured around three categories of costs, the sum of which comprises column 19 of the CRC traffic and revenue (T&R) table in the Appendix.

#### STATE OPERATIONS COSTS

Cost estimates related to state operations for a new division of ODOT dedicated to toll facility oversight have been developed by labor and non-labor cost categories. Labor costs include 15 full time employees (FTE) covering finance and accounting, operations management, systems management and maintenance, and engineering functions. Including fringe benefits, estimated at 53 percent of salary costs, state operations labor costs are expected to total \$1.5M in FY2017, the first full year of

operations, and are escalated by 2.5 percent annually thereafter.<sup>2</sup> Exhibit 7 shows the state operations cost components for FY 2017, the first full year of tolling, excluding the separately estimated costs for the CSC and RTS vendors.

### Exhibit 7: State Operations Costs (FY 2017)

	FY 2017
Cost item	(\$ millions)
<i>Labor Related Costs</i>	
Salaries	0.99
Benefits and Incentives	0.52
Subtotal Labor Related Costs	1.51
<i>Non-Labor Related Costs</i>	
Office Rent & Utilities	0.07
Telephone & Communications	0.02
Printing, Postage, & Office Supplies	0.01
PC & Laptop Equipment Lifecycle & Licenses	0.03
Consultants & Contracted Services	0.45
2 Vehicles + Operations + Parking	0.03
Records Management	0.05
Training	0.00
Travel	0.00
Subtotal Non-Labor State Operations Costs	0.67
Subtotal State Operations Costs	2.18
Cost Contingency Factor (10%)	0.22
Total State Operations Costs w/Contingency Factor	2.40

The number of state operations employees was guided by experience with WSDOT's Toll Division; however the number of employees was reduced to reflect that the parallel ODOT division will be managing the I-5 CRC facility alone, while WSDOT currently has three toll facilities under management. Specifically, the WSDOT's state toll operations group headcount was reduced by 12 positions, resulting in a forecast of 15 positions for the ODOT operation.

Non-Labor costs include office rent for staff, utilities, telephone, communications, general printing and postage, office supplies, computer equipment, pool vehicles, records management, and an allocation for consultant services. State operations staff are expected to be housed in one location on the Oregon side of the Columbia River, co-located with

the CSC back office staff to assist with management, operations, and systems software. A rent rate assumption of \$15 per square foot per year was used, and a gross space assumption of 250 square feet per employee was assumed, based on standard office efficiency experience. Utilities and janitorial services were estimated at 15 percent of rent. The largest component of state operations non-labor costs is consultant services which were estimated at \$400,000 per year in current year dollars. Consultant services costs include traffic and revenue studies, marketing and public outreach, management consulting, and process improvement studies, and are in line with amounts budgeted by WSDOT for similar services. In total, state operations non-labor costs total approximately \$670,000 in FY2017.

Individual line items within this category escalate based on number of employees, general escalation rates, or a combination thereof. Rent, for example, is based on the maximum number of employees during a given five year lease, with escalation occurring upon lease renewals. Most of the expenses are assumed to escalate by 2.5 percent each year.

#### *CUSTOMER SERVICE CENTER VENDOR COSTS*

A new CSC vendor cost estimate for systems software and operations was prepared by Parsons Brinckerhoff for CRC toll collection by Oregon. Previous assumptions for the jointly operated Washington and Oregon facility related to individual cost items and personnel requirements helped to inform the revised cost estimate. CSC management and operations staff of all types, including the

<sup>2</sup> Benefits costs as a percent of salaries were increased from 35 to 53 percent as provided by ODOT to better reflect actual benefits experience.

customer service center systems and operations, control center, and payment processing personnel, as well as a walk-in retail service counter, would be located at a single office site on the Oregon side of the river that will also house the ODOT state staff. A second, CSC walk-in retail service outlet would be located on the Washington side of the river located in Vancouver to provide Washington users with a local customer interface. Exhibit 8 shows the CSC vendor cost components for the first full year of tolling, inclusive of variable direct expenses that would be in addition to the assumed vendor contract pricing and be passed through to ODOT for reimbursement.

#### Exhibit 8: CSC Vendor Related Costs

	FY 2017
Cost item	(\$ millions)
<i>Labor Related Costs</i>	
Salaries	3.72
Benefits & Incentives	1.90
Subtotal Labor Related Costs	5.62
<i>Non-Labor Related Costs</i>	
Office Rent & Utilities	0.41
CSC Telephone & Fax	0.17
Printing, Postage, & Office Supplies	0.05
PC & Laptop Equipment Lifecycle & Licenses	0.08
Consultants & Contracted Services	0.14
Account Update Notice Cost	0.11
Business Insurance Cost	0.18
Subtotal Non-Labor Costs	1.14
Subtotal CSC Vendor Costs	6.76
Cost Contingency Factor (10%)	0.68
<i>Other Direct Expenses (Passed through to ODOT)</i>	
Toll Bill Printing & Postage	2.96
Out-of-State Plate Lookup	0.86
Total CSC Vendor Costs w/Contingency Factor	11.26

The CSC staff would consist of approximately 60 FTEs expected to be hired under a comprehensive vendor contract in FY2016, and increasing to 68 FTEs in FY2017. CSC operations staff include a general manager and staff, the customer service department, transaction processing department (including persons who mail collection notices and process incoming mail), and additional communications, finance and accounting, and information technology staff.

The largest groups of staff are customer service center phone representatives (23 FTEs in FY2017) and processing clerks (14 FTEs in FY2017). The number of customer service representatives was calculated as a function of mailings and toll trips. The call rates per trip and mail, and calls handle per representative were based on observed rates at the WSDOT customer service center. The

number of processing clerks was based on emails received and mailings received which were functions of trips and mailings sent. All factors used were based on observed rates at the WSDOT customer service center.

Salary rates for all CSC positions are consistent with those observed at or approximated from WSDOT; however the benefits rate used is a slightly higher 35 percent of salary costs to be consistent with other private industry levels. Small amounts of additional funding have been budgeted for training, recruiting efforts, and incentive pay programs. Total CSC staff costs (including benefits) are estimated at just over \$4.9 million in FY2016 (partial year of operations), and \$5.6 million in FY2017. CSC costs are assumed to generally escalate at 2.5 percent each year with additional staff and costs driven by transaction counts.

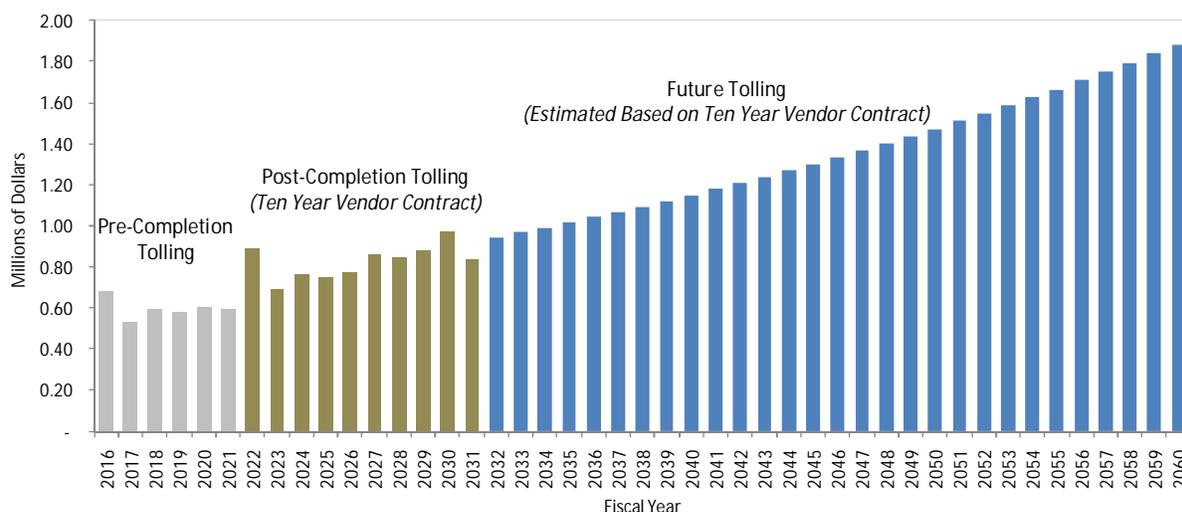
Similar to State Operations, general and administrative costs of the CSC vendor were estimated, including rent, utilities, telecommunications costs, contracted services, office supplies and certain mail costs, and general business insurance. The same unit factors were used to calculate rent and utilities costs. Other costs were estimated based on volumes of account holders, transactions, and experience with other similar operations. The largest single component of Non-Labor CSC costs is rent, estimated at over \$410,000 in FY2017. The second largest single cost, telecommunications, including phone service, software licenses, and hardware replacement, total approximately \$255,000 in FY2017. Business

insurance is estimated at approximately \$182,000, while contracted services were estimated at \$137,000 in FY2017, covering special management and information technology needs. Total Non-Labor CSC costs are expected to be \$1.1M in FY2017. Individual line items in this category escalate based on number of employees, transactions, general escalation rates, or a combination thereof. Many basic expenses are assumed to escalate by approximately 2.5 percent each year.

#### *ROADSIDE TOLL SYSTEMS VENDOR OPERATING COSTS*

The RTS vendor cost estimates for CRC have not changed since the previous forecast documented in September 2013. The estimates assume that the CRC would utilize toll equipment that will be equal or better in performance to the toll equipment currently employed on the SR 520. The change to a solely ODOT toll operation is not assumed to have an impact on RTS costs, when compared to the previous assumption that the CRC would be part of the Washington system of toll facilities. The CRC's current configuration of three lanes in each direction for pre-completion tolling matches the number of lanes at the toll collection point selected for the new SR 99 tunnel in Seattle, for which WSDOT recently procured a detailed vendor estimate. Based on the similarities in operations and configuration, the SR 99 estimates were used to prepare the annual pre-completion RTS O&M costs for CRC. Post-completion RTS costs are based on a new 10 year vendor contract for the wider new bridge, with a smoothed extrapolation for subsequent future years with 2.5 percent annual inflation. Exhibit 9 illustrates the forecasted annual RTS O&M costs for CRC.

Exhibit 9: Roadside Toll Equipment Vendor Operating Cost Forecast



In summary, the unchanged estimates for RTS vendor costs reflect the following.

- Pre-completion (FY2016-21) RTS costs for CRC were based on SR 99, with additional adjustments to account for the isolated location of the facility from other currently operating toll facilities, and a negotiation and change order contingency related to unexpected costs.
- For FY 2017, the first full year of toll operations, the RTS costs are projected to be \$0.53 million.
- Post-completion, a revised estimate for a new ten year vendor contract is assumed (FY2022-31) which accounts for the toll equipment required for monitoring two additional lanes in each direction on the completed facility and assumes higher costs than the pre-completion facility to account for the additional toll equipment.

- After FY2031, an average annual cost during the ten year vendor contract period is calculated and used as the basis for future costs inclusive of 2.5 percent annual escalation.

#### 4. NET TOLL REVENUE PROJECTIONS SUMMARY

The updated net revenue projections incorporate the current traffic and gross revenue projections prepared by CDM Smith combined with revised estimates for the various revenue adjustments and O&M costs incorporating the toll payment, billing and operating assumptions described in section 3 above. The primary components of net revenue are illustrated in the flow of funds or “waterfall” diagram to the right and include the following.

##### *Revenue Adjustments*

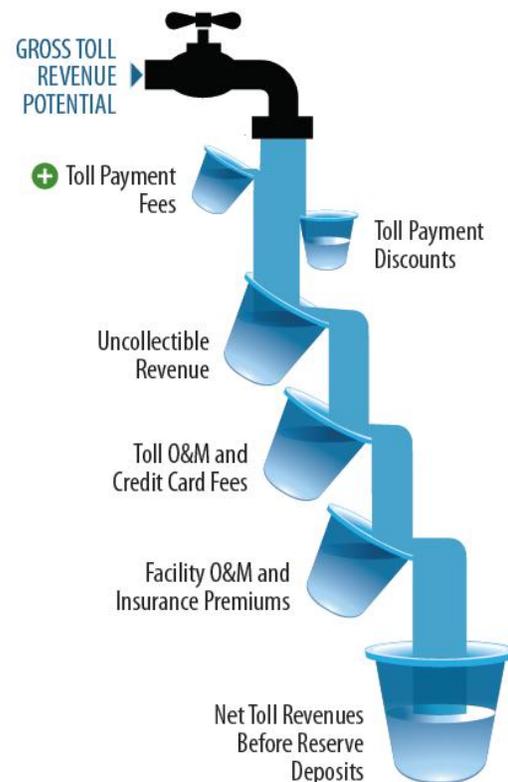
- Toll payment fees and discounts
  - Pay by plate fee revenue
  - Self initiated payment credit (discount)
- Pay By Mail Rebilling Fees
- Uncollectible Revenue)
  - Revenue Not Recognized
  - Unpaid Toll Revenue

##### *Operations and Maintenance Costs*

- Credit card fees
- Initial marketing and start-up costs
- Routine toll collection O&M
- Routine facility O&M costs
- Bridge insurance premiums

In addition, other uses of net toll revenues likely to be downstream of debt service, and thus, paid out of estimated debt service coverage revenues, were also estimated.

- Facility repair and replacement (R&R) costs
- Toll collection R&R costs
- Contributions to various reserve accounts, including one for the two categories of R&R costs noted above



The inputs and assumptions for the components of the net revenue projections are informed by the recent toll operations experience on the SR 520 and Tacoma Narrows bridges in Washington State, the E-470 toll road in Colorado, the Maryland Intercounty Connector and other toll facilities operated by the MDTA, and toll roads operated by the North Texas Tollway Authority. Assumptions were reviewed by toll industry professionals with direct knowledge of toll operations including: *E-ZPass*® interoperability; use by drivers with out-of-state license plates; and, toll collections on the Delaware River Memorial Bridge, operations on the Dulles Toll Road and Pocahontas 895 in Virginia, and other tolled facilities throughout the country. As an example, previous assumptions on toll bill payment rates for non-account users from outside Oregon and Washington were revised to include Washington drivers as out-of-state users and compared to similar information on payment of invoices collected from SR 520, E-470, and MDTA

Assumptions for the bi-state nature of toll operations have also been revised from the previous forecasts to account for project implementation and tolling operations to be performed solely by

Oregon rather than jointly by both states led by Washington. This change now defines Washington residents as “out-of-state” customers where previously both Washington and Oregon customers were considered “in-state” users. The revised assumptions underlying the updated net revenue projections reflect a continual process to refine and validate the various revenue adjustments and O&M estimates that feed into the CRC net revenue projections.

The complete traffic and revenue (T&R) table showing the annual net toll revenue projections, as derived from the investment grade annual traffic and gross revenue forecasts, is provided as an appendix to this memorandum. The following sections of this memorandum will include column number (#) references to specific column labels within the T&R table.

#### 4.1 Gross Toll Revenue Adjustments

Preliminary annual toll traffic forecasts for FY2016 through FY2060 were provided by payment method for all vehicle types (columns 3 and 6), and adjusted for passenger car equivalent (PCE) units (columns 4 and 7) that convert truck volumes to a corresponding number of passenger autos based on the truck multiples of the auto toll. As previously noted, the gross toll revenue estimates include a toll surcharge for transactions by non-account users that would be collected by mail.

Further revenue adjustments have been made to the gross toll revenue projections for the following items.

- + “Pay By Plate” Fee Revenue (column 12): Account-based customers who choose to pre-register a vehicle’s license plate in lieu of installing a transponder in that vehicle are charged a \$0.25 fee per transaction; the fee is assumed to be constant with no annual escalation.
- + “Pay By Mail” Rebilling Fees (column 13): A late payment fee of \$5.00 per invoice is assessed to non-account customers who fail to pay their first mailed toll bill invoice within 30 days; the late fee is assumed to be constant with no annual escalation.
- Self-Initiated Payment Credit (column 14): Customers traveling without a pre-paid account who self-initiate payment before a toll bill is sent to them are assumed to receive a credit of \$0.50 per transaction; these travelers are assumed to be 2 percent of non-account customers with readable license plates and the \$0.50 credit is assumed to be constant with no annual escalation.
- Uncollectible Revenue / Leakage (column 15): Calculated estimate for uncollectible revenue based upon assumed probabilities that revenue from a toll transaction will not be recognized and collected due to an unreadable license plate or a toll equipment error as well as the inability to identify a vehicle’s owner information from a readable license plate. An allowance for leakage is also made for non-payment of tolls by customer after two invoices and 80 days. Leakage estimates are primarily a function of the toll payment method, with non-account customer transactions assumed to account for a vast majority of the uncollectible revenue. The exception to this is for transactions from customers who intended to use a transponder/pre-paid account but either had not yet established an account, or had an insufficient account balance (e.g., expired credit card) such that the transaction ends up getting processed as toll bill by mail with some probability of toll going unpaid within 80 days. This process is further illustrated in Exhibit 4 on page 9.

The values associated with the gross toll revenue adjustments listed above are primarily determined by toll transaction volumes, toll rates, and the assumed levels of pre-paid account penetration, the latter of which varies inversely with the number of uncollectible transactions. The traffic and gross revenue forecasts assume toll rate escalation through FY2022, the year in which the project is completed. Thereafter, tolls are assumed to remain constant for the remainder of the forecast period for purposes of the net revenue projections and financing. Annual growth in overall transactions between FY2022 and FY2045 ranges from 1.5 percent to 3.6 percent with increases of 0.1 percent thereafter. The percentage share of pre-paid accounts is assumed to increase annually through FY2035, before leveling off for the remainder of the forecast period at about 78 percent, as previously shown in Exhibit 5 on page 11. Annual adjusted gross toll revenue collected, after consideration of the above adjustments, increases at a similar rate ranging from 1.5 percent to 3.5 percent between FY2022 and FY2045 with increases of 0.1 percent thereafter.

Overall, the revisions to the gross toll revenue adjustments—informed by recent experience elsewhere and the revised assumptions regarding toll billing and enforcement as noted in section 3—are expected to result in about a 2.5 percent improvement in net revenues, relative to the previous assumptions evaluated with the current traffic and gross toll revenue forecasts. Essentially, the assumed improvement in collecting from pre-paid account customers, reading non-account customer license plates, and receiving payment on first invoice from non-account customers more than offsets the other, revenue reduction revisions.

#### 4.2 Operating and Related Expenditures

To account for the cost of operating and maintaining the toll collection system and physical roadway, several deductions are made to the adjusted gross revenue stream. These deductions include credit card fees, start-up costs, ongoing operating and maintenance costs associated with the facility and toll collection, and insurance premiums. These estimated expenditures are described in more detail below.

- Credit Card Fees (column 17): Credit card fees are estimated as a percentage of gross toll revenues, inclusive of toll payment fees and discounts, less uncollectible revenues. It is assumed that 90 percent of revenues will be collected via credit or debit card, thus subject to vendor processing fees. Based on toll operation experience on existing facilities, vendor rates are assumed to be 2.5 percent. An additional factor is also included to capture account refunds.
- One-Time Marketing and Start-Up Costs (column 18): These costs are incurred in FY2015 and FY2016 only. They include costs for pre-operations marketing and possible incentive programs to encourage customers to establish pre-paid accounts.
- Routine Toll Collection O&M Costs (column 19): These costs include customer service center (CSC) and roadside toll system (RTS) vendor costs, and state agency operations costs. State agency operations costs include marketing, management, accounting, and vendor oversight, as well as direct expenses for out-of-state license plate lookup fees, and toll bill printing and postage costs. Routine toll collection costs are assumed to escalate for inflation at varying rates depending on the category of expenditure. Toll collection costs assume the CRC will be operated by ODOT as an independent Oregon facility throughout the forecast period and will not be part of a system of tolled facilities which would result in some cost savings due to the allocation of certain costs across multiple facilities within a system.
- Routine Facility O&M Costs (column 20): These costs include all routine and annual facility O&M costs that are incurred on a regular basis, including bridge structure maintenance, roadway

maintenance, and incident response for disabled vehicles. Facility O&M costs are assumed to escalate at a constant rate throughout the forecast period.

- Bridge Insurance Premium (column 21): Insurance premium costs includes coverage for damage to the physical structure of the bridge, as well as any loss of revenue (business interruption) resulting from such an event.

Forecasted expenditures associated with bridge insurance, routine facility O&M, and one-time marketing and start-up costs have not been revised as part of this December 2013 update, and are considered fixed amounts that are not anticipated to vary based on traffic levels.

Similarly, no revisions were made to the assumptions for the credit card fee rate or the share of revenue subject to the fees; however, the projection for credit card fees has changed as a result of the revised CDM Smith gross revenue forecast and the various adjustments that yield the forecast for adjusted gross toll revenues collected (column 16).

Within routine toll collection O&M costs, the RTS component forecast also remains unchanged. However, the Oregon led toll collection operation results in higher CSC vendor and state operations costs than the previous assumption where the CRC was one of four facilities within a Washington toll system operation. The lack of economies of scale with a single facility operation combined with the need to maintain two CSC retail locations contributes to the higher costs. Overall, Oregon-led toll collection O&M costs are assumed to be about 19 percent higher than the previous Washington-led estimate would have been for the current traffic and gross toll revenue forecasts. This impact of this result is estimated to be a 5 percent reduction in the projection for net toll revenues.

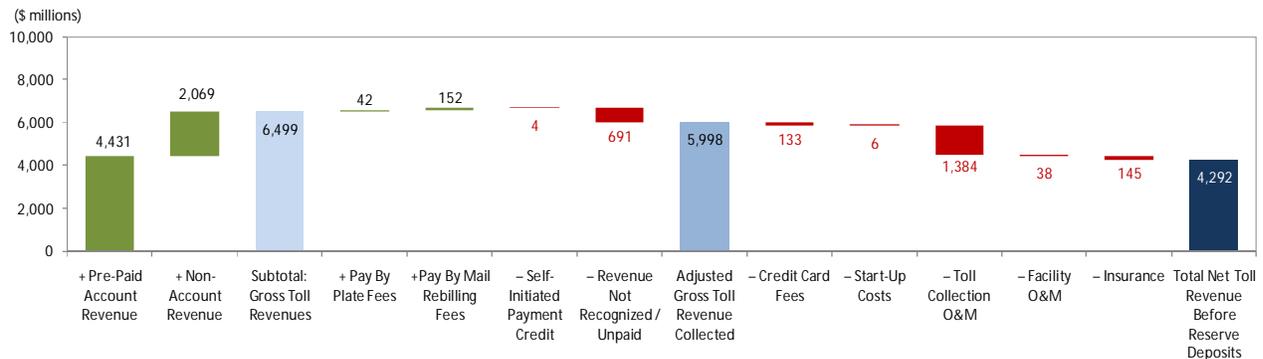
### 4.3 Net Revenue before Reserve Account Deposits

After accounting for revenue adjustments and routine O&M costs, net toll revenues were positive for all years from FY2016 through FY2060. It is important to note that the net revenue projections include start-up costs incurred in FY2015 and FY2016, the year immediately prior to as well as the first year of pre-completion tolling.

Expressed in year of collection dollars (YOC\$), total net toll revenue for the period from FY2015 through FY2060 is forecasted to amount to \$4.3 billion based on the current gross revenue values provided by CDM Smith in their *Columbia River Crossing Investment Grade Traffic and Revenue Study*, dated December 27, 2013. Projected values for various revenues, fees, and cost components associated with the investment grade gross revenue forecast are summarized in Exhibit 10. Between FY2015-60, gross toll revenues are forecast to total \$6.5 billion. After adjustments for the \$0.25 Pay By Plate fee, \$5.00 Pay By Mail rebilling fee, \$0.50 self-initiated payment credit, and uncollectible revenue, adjusted gross toll revenues collected are forecast to total \$6.0 billion. Toll collection O&M, the largest single cost component at 81 percent of total forecast period operating expenditures, requires 23 percent of total adjusted gross toll revenues. Credit card fees and insurance premiums each account for slightly more than 2 percent of total adjusted gross toll revenue, while collectively start-up and facility O&M costs amount to less than one percent of adjusted gross toll revenue.

When combining the 2.5 percent increase in net toll revenues from the revised revenue adjustments with the 5 percent decrease in net toll revenues from the updated toll collection O&M costs, the overall impact of the revised inputs and assumptions of this net revenue update is 2.5 percent less net revenue, when evaluated with the current investment grade traffic and gross toll revenue forecasts.

### Exhibit 10: Forecast Horizon Components of the Net Toll Revenue Projections (FY2015-60)



#### 4.4 Periodic Repair and Replacement and Other Reserve Account Contributions

In addition to the routine annual O&M costs associated with the facility and toll collections, major repairs and/or capital replacement items to both the facility and toll collection systems will be necessary at periodic intervals over the forecast period. Because these costs are typically infrequent but can be sizable, it may be necessary to make annual deposits to an R&R reserve account, with the goal of maintaining a balance sufficient to meet the periodic R&R expenditures, while at the same time smoothing out the annual cash flows over time.

While financial plans and bond covenants vary by project, the net revenue stream before R&R and other reserves is typically identified as the cash flow available to support toll financing. R&R costs (or annual deposits to an R&R reserve account) as well as other reserve account contributions, where applicable, are often treated as expenditures paid downstream of debt service, using excess revenues resulting from debt service coverage requirements. The CRC net revenue projections provided in the T&R table within the Appendix are shown both before (column 22) and after (column 27) contributions to three potential reserve accounts.

Estimated contributions to the following three reserve accounts were determined to arrive at the net revenues after reserve deposits (column 27), reducing the total cash flow estimated as available to support toll financing.

- Revenue Stabilization Account (column 24): Commences one year prior to bridge completion (FY2021) and includes deposits (or refunds) to the account to maintain a balance that is 30 percent of the following year's estimated net toll revenue before reserve account deposits.
- Operations and Maintenance Reserve Account (column 25): Commences with the start of tolling, with deposits made to maintain an account balance at 50 percent of the following year's expected O&M costs inclusive of credit card fees, routine toll collection O&M costs, routine facility O&M costs, and bridge insurance premiums.
- Repair and Replacement Reserve Account (column 26): Commences in FY2016 to provide five years of deposits building up to fund periodic expenditures first needed in FY2021. Additional deposits are made to the account to maintain a balance sufficient to cover periodic R&R expenditures, inclusive of periodic tolling and facility related costs.

Of the three reserve accounts, the R&R reserve account represents 82 percent of the total reserve contributions over the FY2015-60 forecast period. Periodic R&R costs often require significant cash

outlays and are incurred for both the bridge and toll equipment, including but not limited to, toll system software and hardware replacement, vendor re-procurement, pavement rehabilitation, and structural bridge repairs.

Toll collection R&R costs were forecast to cost \$158 million over the FY2015-60 forecast period, with costs inclusive of the following three items, the latter two of which underwent minor revisions as part of this December 2013 update.

- RTS replacement costs including upgrades to or replacement of cameras and transponder readers, networking equipment, and fiber optic communications lines. Total RTS equipment R&R costs are forecast to be \$117 million over the full forecast horizon.
- RTS vendor re-procurement, implementation, and testing costs are assumed to occur on a ten year cycle with the process starting in advance and including one year for procurement of a vendor, followed by two years of implementation and testing. Total RTS re-procurement, implementation, and testing costs are forecast to be \$17 million over the full forecast horizon.
- CSC vendor re-procurement, implementation, testing, and systems betterments costs are assumed to cover CSC systems software on a nine year cycle and CSC operations on a seven year cycle. The renewal process for CSC operations vendor starts with one year of re-procurement followed by one year for implementation and acceptance testing while the renewal process for the CSC systems vendor is assumed to require two subsequent years for implementation and acceptance testing. Total CSC re-procurement, implementation, testing, and systems betterments costs are forecast to be \$24 million over the full forecast horizon.

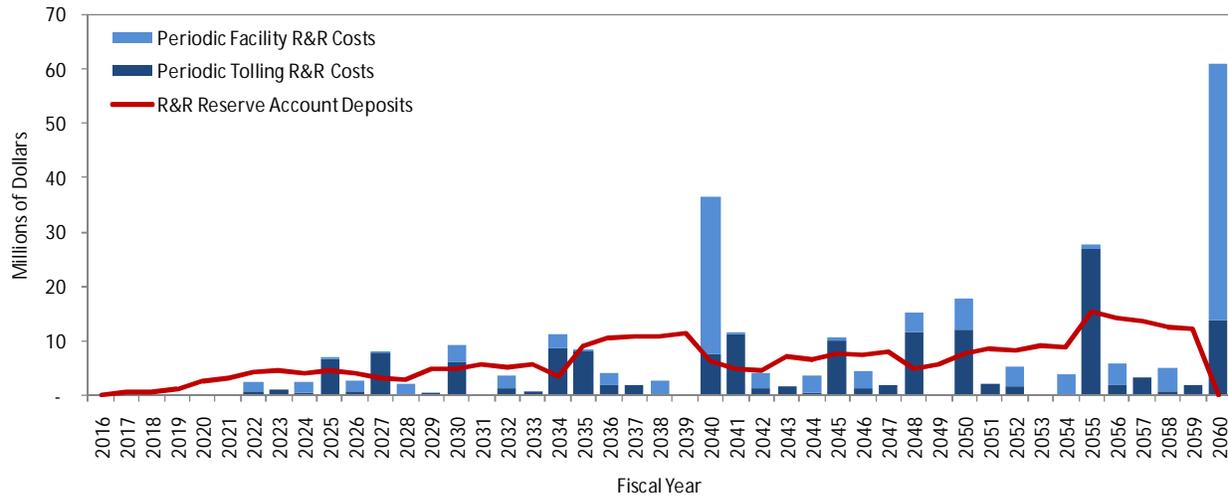
Facility R&R costs were estimated by a joint Oregon-Washington facility cost task force to cost \$133 million over the full forecast horizon, with a majority of the costs associated with bridge resurfacing, bridge painting, and concrete barrier replacement. Of the total Columbia River Crossing corridor, only the primary bridges and approaches within the first phase of the project were considered in the facility cost estimates, and these estimates have not been revised since the previous net revenue forecast. Exhibit 11 provides an overview of the R&R coverage area assumed in the forecasted costs.

Exhibit 11: Periodic Repair and Replacement Coverage Area



The use of reserves, specifically for R&R expenditures, helps to ensure that funds are on hand for expected as well as unexpected needs, while also minimizing the need to come up with a large lump sum amounts in years when major expenditures are needed, as shown in Exhibit 12.

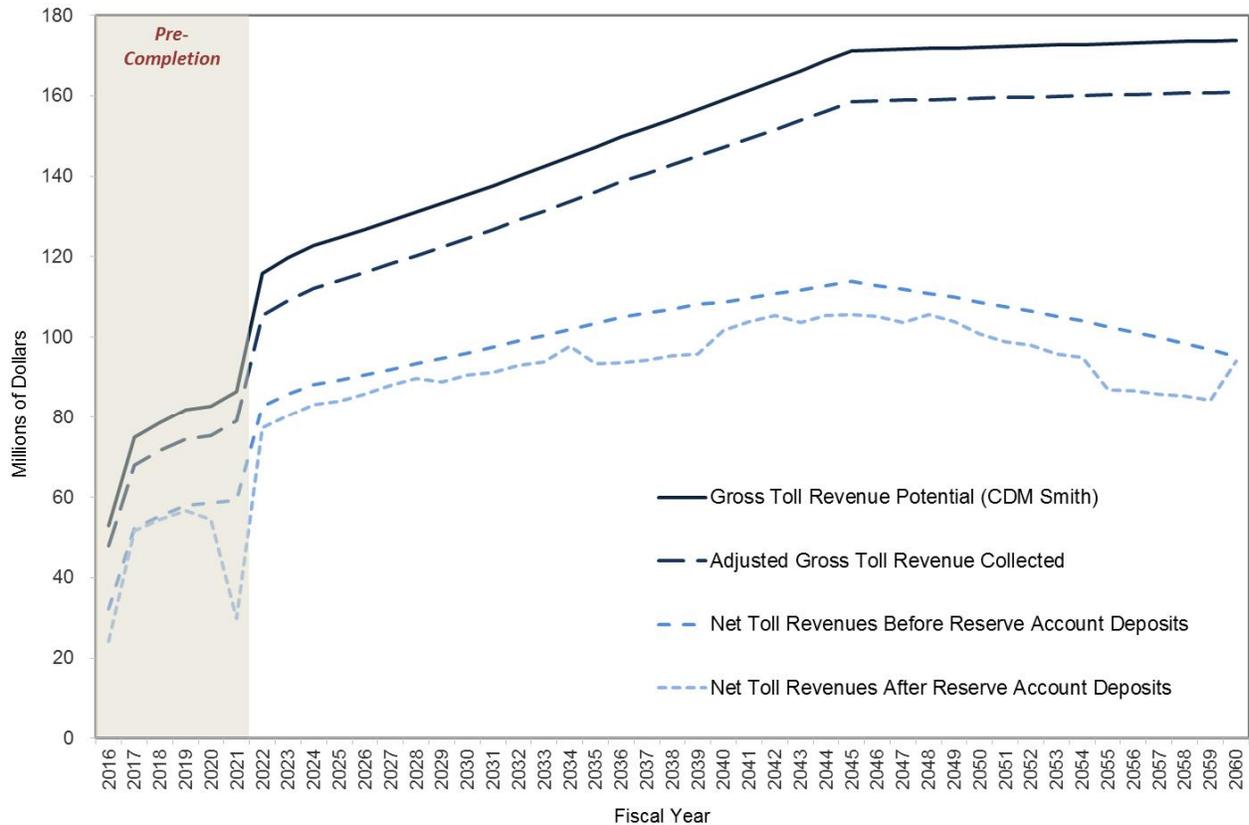
Exhibit 12: R&amp;R Expenditures and Reserve Account Deposits by Fiscal Year – FY2016-60



#### 4.5 Net Toll Revenue after Reserve Deposits

Exhibit 13 illustrates the four measures CRC revenue—gross toll revenue potential, adjusted gross toll revenue collected, net revenues before reserve account deposits, and net revenues after reserve account deposits. As toll rates are assumed to stay constant after FY2022, the growth in gross toll revenue can be attributed to the level of growth in traffic, slightly dampened over time by the assumed increases in pre-paid account use. Revenue growth due solely to traffic growth helps to offset the effects of O&M cost inflation, at least through FY2045. As shown in Exhibit 13, when traffic and gross toll revenue growth are predicted to flatten in FY2045, net toll revenues are expected to decline as escalating costs require an increasing share of the gross revenues collected. Net toll revenue after all reserve deposits are deducted (column 27) serves as a conservative measure of the cash flow available to support toll financing. Net toll revenue results after reserve account deposits, displayed as the light blue dotted line, shows the effect of the initial deposit into the revenue stabilization account in FY2021, amounting to \$25 million. The effect of large deposits to the R&R reserve account is also reflected in the annual variations in net toll revenue, with some years showing substantial declines, despite increases in gross toll revenue.

Exhibit 13: Investment Grade Annual Forecast Results – FY2016-60



## 5. DISCLAIMER

This memorandum was prepared by Parsons Brinckerhoff (PB) as a member of the CRC General Engineering Consultant (GEC) Team in accordance with an agreement with the Oregon Department of Transportation (ODOT). This memorandum is subject to the terms and conditions of that agreement, and is meant to be read as a whole and in conjunction with this disclaimer.

Information and statements contained in this memorandum are based on information provided to Parsons Brinckerhoff by, and obtained from, the CRC Project Team, ODOT, the Washington State Department of Transportation (WSDOT), its General Toll Consultant (GTC), and other sources. In the preparation of this document and the opinions contained herein, Parsons Brinckerhoff makes certain assumptions with respect to such conditions that may exist or events that may occur in the future that are subject to change.

While Parsons Brinckerhoff believes that the projections or other forward-looking statements contained within this document are based on reasonable assumptions and correctly represent the inputs and estimates provided by ODOT and other parties as of the date of the memorandum, such forward looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted.

## 6. APPENDIX

The following page presents the detailed T&R table, including the net toll revenue projections based on the gross toll revenue forecasts provided by CDM Smith in their *Columbia River Crossing Investment Grade Traffic and Revenue Study*, dated December 27, 2013.

CRC Bridge Toll Traffic and Revenue (T&R) Projections — Annual Transactions, Gross Revenues, and Net Revenues — FY 2015-60  
 Toll Revenue Stream Assumed to Begin September 30, 2015 (FY 2016) Toll Case: Investment Grade Forecast (CDM Smith, December 2013)

Revised 12/27/2013

Fiscal Year	Pre-Paid Accounts			Other Payment Types / No Account			Total Annual Gross Toll Transactions (millions) <sup>4</sup>	Gross Toll Revenue		Total Gross Toll Revenues (\$ millions) <sup>4</sup>	Plus:		Less:		Subtotal: Adjusted Gross Toll Revenues Collected (\$ millions)	Less:		Less:		Less:		Net Toll Revenues Before Reserve Deposits (\$ millions)	NPV of [ Net Toll Revenues Before Res. Deposits / 1.3 ] in FY 2018 @ 5.3% (\$ millions)	Reserve Accounts			Net Toll Revenues After Reserve Deposits (\$ millions)	Periodic R&R Costs				
	Wtd. Average Bridge Toll Rate (one-way) <sup>1</sup>	Annual Bridge Toll Transactions (millions) <sup>2</sup>	Pass Car Equiv (PCE) Volumes (millions) <sup>3</sup>	Wtd. Average Bridge Toll Rate (one-way) <sup>1</sup>	Annual Bridge Toll Transactions (millions) <sup>2</sup>	Pass Car Equiv (PCE) Volumes (millions) <sup>3</sup>		Pre-Paid Accounts (\$ millions) <sup>5</sup>	Other Payment Types / No Account (\$ millions) <sup>6</sup>		Pay By Plate Fee Revenue (\$ millions)	Pay By Mail Rebilling Fees (\$ millions) <sup>7</sup>	Self-Initiated Payment Processing Credit (\$ millions) <sup>8</sup>	Uncollectible Revenue / Leakage (\$ millions) <sup>9</sup>		Credit Card Fees (\$ millions) <sup>10</sup>	One-Time Marketing & Start-Up Costs (\$ millions) <sup>11</sup>	Routine Toll Collection O&M Costs (\$ millions) <sup>12</sup>	Routine Facility O&M Costs (\$ millions) <sup>13</sup>	Bridge Insurance Premium (\$ millions) <sup>14</sup>	Revenue Stabilization Account Deposits/ Refunds (\$ millions) <sup>15</sup>			O&M Reserve Account Deposits (\$ millions) <sup>16</sup>	R&R Reserve Account Deposits (\$ millions) <sup>17</sup>	Periodic Tolling R&R Costs (\$ millions) <sup>18</sup>		Periodic Facility R&R Costs (\$ millions) <sup>19</sup>				
	2015	-	-	-	-	-		-	-		-	-	-	-		-	-	-	-	-	-			-	-	-		-	-	-	-	-
2016	\$2.19	11.53	13.44	\$3.46	5.70	6.75	17.23	29.45	23.36	52.81	0.61	2.00	(0.06)	(7.49)	47.88	(1.12)	(2.49)	(12.14)	(0.56)	(2.15)	(3.64)	(3.27)	27.41	(7.89)	(0.02)	24.22						
2017	\$2.25	16.30	19.01	\$3.55	7.69	9.08	23.99	42.69	32.24	74.93	0.80	2.71	(0.08)	(10.34)	68.02	(1.60)		(14.19)	(0.57)	(2.20)	(3.64)	(3.27)	42.31	(0.19)	(0.51)	51.53						
2018	\$2.30	17.02	19.88	\$3.64	7.65	9.03	24.67	45.79	32.90	78.69	0.76	2.71	(0.08)	(10.56)	71.52	(1.56)		(14.61)	(0.57)	(2.20)	(3.64)	(3.27)	42.57	(0.18)	(0.73)	54.44						
2019	\$2.36	17.60	20.58	\$3.73	7.53	8.90	25.13	48.62	33.23	81.86	0.71	2.68	(0.07)	(10.68)	74.50	(1.63)		(14.90)	(0.57)	(2.20)	(3.64)	(3.27)	42.34	(0.11)	(1.19)	56.66						
2020	\$2.42	17.64	20.67	\$3.83	7.19	8.51	24.83	50.11	32.58	82.68	0.64	2.58	(0.07)	(10.49)	75.34	(1.66)		(15.10)	(0.56)	(2.15)	(3.64)	(3.27)	40.65	(1.55)	(2.59)	54.45						
2021	\$2.48	18.31	21.50	\$3.93	7.11	8.42	25.43	53.41	33.04	86.45	0.68	2.56	(0.07)	(10.64)	78.98	(1.74)		(15.41)	(0.56)	(2.15)	(3.64)	(3.27)	38.95	(24.81)	(1.45)	(3.12)	29.75					
2022	\$2.83	21.95	25.89	\$4.29	8.30	9.92	30.24	73.19	42.56	115.76	0.80	2.99	(0.08)	(14.00)	105.46	(2.34)		(17.64)	(0.57)	(2.20)	(3.64)	(3.27)	51.75	(0.94)	(0.30)	(4.25)	77.22	(0.68)	(1.75)			
2023	\$2.82	22.87	27.01	\$4.29	8.47	10.12	31.34	76.28	43.42	119.69	0.82	3.06	(0.09)	(14.30)	109.19	(2.42)		(18.08)	(0.59)	(2.25)	(3.64)	(3.27)	51.01	(0.67)	(0.39)	(4.44)	80.35	(1.10)				
2024	\$2.82	23.63	27.94	\$4.29	8.58	10.25	32.21	78.89	43.95	122.83	0.84	3.11	(0.09)	(14.49)	112.20	(2.49)		(18.73)	(0.60)	(2.31)	(3.64)	(3.27)	49.70	(0.37)	(0.36)	(4.09)	83.26	(0.49)	(1.83)			
2025	\$2.82	24.17	28.60	\$4.29	8.61	10.27	32.78	80.77	44.04	124.81	0.85	3.12	(0.09)	(14.54)	114.15	(2.53)		(19.32)	(0.62)	(2.37)	(3.64)	(3.27)	47.86	(0.41)	(0.32)	(4.57)	84.01	(6.75)	(0.22)			
2026	\$2.82	24.73	29.29	\$4.29	8.63	10.29	33.36	82.69	44.13	126.83	0.85	3.14	(0.09)	(14.60)	116.14	(2.58)		(19.84)	(0.63)	(2.43)	(3.64)	(3.27)	46.14	(0.37)	(0.39)	(4.05)	85.85	(0.84)	(1.93)			
2027	\$2.82	25.29	29.99	\$4.29	8.65	10.31	33.95	84.67	44.23	128.89	0.86	3.16	(0.09)	(14.65)	118.17	(2.62)		(20.50)	(0.65)	(2.49)	(3.64)	(3.27)	44.42	(0.44)	(0.31)	(3.12)	88.04	(7.95)	(0.16)			
2028	\$2.82	25.87	30.71	\$4.29	8.68	10.33	34.55	86.69	44.32	131.01	0.87	3.17	(0.09)	(14.70)	120.25	(2.67)		(21.00)	(0.66)	(2.55)	(3.64)	(3.27)	42.85	(0.40)	(0.39)	(2.84)	89.74		(2.03)			
2029	\$2.82	26.47	31.44	\$4.29	8.70	10.35	35.16	88.75	44.41	133.17	0.87	3.19	(0.09)	(14.76)	122.38	(2.72)		(21.65)	(0.68)	(2.61)	(3.64)	(3.27)	41.28	(0.40)	(0.42)	(5.00)	88.90	(0.56)				
2030	\$2.82	27.07	32.19	\$4.29	8.72	10.37	35.80	90.87	44.51	135.38	0.88	3.20	(0.09)	(14.82)	124.56	(2.77)		(22.36)	(0.70)	(2.68)	(3.64)	(3.27)	39.76	(0.47)	(0.33)	(4.78)	90.48	(6.24)	(3.13)			
2031	\$2.82	27.69	32.97	\$4.29	8.75	10.39	36.44	93.04	44.60	137.64	0.89	3.22	(0.09)	(14.87)	126.78	(2.82)		(22.88)	(0.71)	(2.75)	(3.64)	(3.27)	38.37	(0.44)	(0.41)	(5.59)	91.18	(0.16)				
2032	\$2.82	28.33	33.75	\$4.29	8.77	10.41	37.10	95.26	44.70	139.95	0.89	3.24	(0.09)	(14.93)	129.06	(2.87)		(23.57)	(0.73)	(2.82)	(3.64)	(3.27)	36.98	(0.40)	(0.50)	(5.26)	92.91	(1.23)	(2.24)			
2033	\$2.82	28.98	34.56	\$4.30	8.79	10.43	37.77	97.53	44.79	142.32	0.90	3.26	(0.09)	(15.00)	131.39	(2.92)		(24.43)	(0.75)	(2.89)	(3.64)	(3.27)	35.59	(0.48)	(0.40)	(5.66)	93.87	(0.63)				
2034	\$2.82	29.64	35.39	\$4.30	8.82	10.45	38.46	99.85	44.89	144.74	0.90	3.27	(0.09)	(15.06)	133.77	(2.98)		(25.08)	(0.77)	(2.96)	(3.64)	(3.27)	34.33	(0.41)	(0.54)	(3.38)	97.65	(8.83)	(2.54)			
2035	\$2.82	30.32	36.24	\$4.30	8.84	10.47	39.16	102.24	44.98	147.22	0.91	3.29	(0.09)	(15.12)	136.20	(3.03)		(26.02)	(0.79)	(3.03)	(3.64)	(3.27)	33.04	(0.46)	(0.48)	(9.02)	93.37	(7.99)	(0.29)			
2036	\$2.82	31.02	37.10	\$4.30	8.87	10.49	39.88	104.67	45.08	149.75	0.91	3.31	(0.09)	(15.19)	138.69	(3.09)		(26.82)	(0.81)	(3.11)	(3.64)	(3.27)	31.84	(0.32)	(0.51)	(10.46)	93.58	(1.75)	(2.47)			
2037	\$2.82	31.48	37.66	\$4.30	9.00	10.65	40.48	106.24	45.75	152.00	0.93	3.36	(0.09)	(15.42)	140.77	(3.13)		(27.70)	(0.83)	(3.19)	(3.64)	(3.27)	30.54	(0.31)	(0.54)	(10.90)	94.18	(1.82)				
2038	\$2.82	31.95	38.23	\$4.30	9.13	10.81	41.09	107.84	46.44	154.28	0.94	3.41	(0.10)	(15.65)	142.88	(3.18)		(28.62)	(0.85)	(3.27)	(3.64)	(3.27)	29.29	(0.34)	(0.50)	(10.72)	95.40		(2.59)			
2039	\$2.82	32.43	38.80	\$4.30	9.27	10.97	41.70	109.46	47.14	156.59	0.96	3.46	(0.10)	(15.88)	145.03	(3.23)		(29.47)	(0.87)	(3.35)	(3.64)	(3.27)	28.11	(0.19)	(0.77)	(11.43)	95.72					
2040	\$2.82	32.92	39.38	\$4.30	9.41	11.13	42.33	111.10	47.84	158.94	0.97	3.51	(0.10)	(16.12)	147.20	(3.28)		(30.86)	(0.89)	(3.43)	(3.64)	(3.27)	26.86	(0.31)	(0.59)	(6.27)	101.58	(7.55)	(28.93)			
2041	\$2.82	33.41	39.97	\$4.30	9.55	11.30	42.96	112.76	48.56	161.32	0.98	3.56	(0.10)	(16.36)	149.41	(3.33)		(31.88)	(0.91)	(3.52)	(3.64)	(3.27)	25.75	(0.30)	(0.62)	(4.89)	103.96	(11.18)	(0.23)			
2042	\$2.82	33.91	40.57	\$4.30	9.69	11.47	43.61	114.46	49.29	163.74	1.00	3.62	(0.10)	(16.61)	151.65	(3.38)		(32.95)	(0.94)	(3.60)	(3.64)	(3.27)	24.67	(0.30)	(0.64)	(4.45)	105.40	(1.18)	(2.86)			
2043	\$2.82	34.42	41.18	\$4.30	9.84	11.64	44.26	116.17	50.03	166.20	1.01	3.67	(0.10)	(16.86)	153.93	(3.43)		(34.07)	(0.96)	(3.69)	(3.64)	(3.27)	23.64	(0.33)	(0.60)	(7.14)	103.70	(1.68)				
2044	\$2.82	34.94	41.80	\$4.30	9.99	11.82	44.93	117.91	50.78	168.69	1.03	3.73	(0.10)	(17.11)	156.23	(3.48)		(35.10)	(0.98)	(3.79)	(3.64)	(3.27)	22.68	(0.27)	(0.73)	(6.43)	105.46	(0.56)	(3.01)			
2045	\$2.82	35.46	42.42	\$4.30	10.14	11.99	45.60	119.68	51.54	171.22	1.04	3.78	(0.11)	(17.37)	158.58	(3.53)		(36.39)	(1.01)	(3.88)	(3.64)	(3.27)	21.70	0.27	(0.54)	(7.84)	105.67	(10.23)	(0.41)			
2046	\$2.82	35.50	42.47	\$4.30	10.15	12.01	45.65	119.80	51.59	171.40	1.05	3.79	(0.11)	(17.38)	158.74	(3.53)		(37.33)	(1.03)	(3.98)	(3.64)	(3.27)	20.45	0.28	(0.55)	(7.34)	105.25	(1.38)	(3.16)			
2047	\$2.82	35.53	42.51	\$4.30	10.16	12.02	45.69	119.92	51.64	171.57	1.05	3.79	(0.11)	(17.40)	158.89	(3.54)		(38.31)	(1.06)	(4.08)	(3.64)	(3.27)	19.25	0.29	(0.57)	(8.02)	103.61	(1.80)				
2048	\$2.82	35.57	42.55	\$4.30	10.17	12.03	45.74	120.04	51.70	171.74	1.05	3.79	(0.11)	(17.42)	159.05	(3.54)		(39.32)	(1.09)	(4.18)	(3.64)	(3.27)	18.12	0.31	(0.59)	(4.99)	105.65	(11.56)	(3.59)			
2049	\$2.82	35.61	42.59	\$4.30	10.18	12.04	45.78	120.16	51.75	171.91	1.05	3.80	(0.11)	(17.44)	159.21	(3.55)		(40.36)	(1.11)	(4.28)	(3.64)	(3.27)	17.05	0.35	(0.66)	(5.76)	103.84					
2050	\$2.82	35.64	42.64	\$4.30	10.19	12.05	45.83	120.28	51.80	172.08	1.05	3.80	(0.11)	(17.45)	159.37	(3.55)		(41.54)	(1.14)	(4.39)	(3.64)	(3.27)	16.02									