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April 22, 2013

Honorable Mayor Anna Peterson
Salem City Council
City of Salem
555 Liberty St SE
Salem, OR 97301

Re: Salem River Crossing Alternate 4D

Dear Mayor and Councilors:

Thank you for the opportunity to provide comments on the proposed modifications to the Salem River Crossing Alternate 4D. 1000 Friends is a consistent advocate for realistic, fact-based land use and transportation planning. After careful review of this proposal, we believe that the traffic forecasting model underpinning the *Salem River Crossing Project Draft Environmental Impact Statement (EIS)* significantly overestimates future bridge use, both inflating the apparent need for the project and implying greater toll revenues than will likely occur.

Salem should look carefully at this project's inherent risks. When we – and others – previously pointed out to the city that the traffic forecast was substantially inflated, staff's response was that the overestimate wasn't significant, because bridge traffic would *eventually* reach that target, albeit many years later than planned. Staff's position ignores the obvious time-value of taxpayers' money, and asks you to build and pay for oversized infrastructure, instead of properly scaling and timing infrastructure to correspond with actual need.

Salem's risks rise even higher because tolling is a possible means of funding this project. The greater the level of uncertainty around traffic and revenue forecasts, the greater the fiscal risks the city will incur. Other jurisdictions around the nation have already been badly burned after committing to expensive tolled projects, only to find that the planned revenues did not materialize. That could happen here.

Unfortunately, many crucial funding questions have been deferred until later in the process, and have apparently not played a role in the selection of the bridge alternative. This is unwise. The twin concerns of cost and revenue sourcing are fundamental to whether or not a given alternative is viable. For example, less expensive alternatives may be the *only* ones that can actually be built. The choice to select Alternate 4D in a vacuum, before addressing these funding questions, may trap the city later. It could eventually kill the project. For instance, voters may balk at committing to a project as large, expensive, and potentially risky as Alternate 4D, even though they might have accepted a more modest alternative.

Below are three factors that, taken together, create substantial risk that the *EIS's* traffic growth estimate is inflated by twofold, threefold, or perhaps even more.

RISK FACTOR #1: POPULATION GROWTH ASSUMPTIONS

In early January, we reported to you that the population forecasts underpinning the *EIS* were outdated, and that new forecasts for Marion County and Polk County were being prepared by the state's Office of Economic Analysis (OEA). Those have now been completed, and on March 28, the OEA released the new official long-range forecast. As expected, the 2013 OEA forecast predicts dramatically less growth for Polk County than the 2004 OEA forecast, which is the basis for the *EIS's* traffic projections. As shown by Table 1 below, the 2004 OEA forecast predicted about 43% more growth for Polk County than the 2013 OEA forecast. The new Marion County forecast (not shown) is also lower.

Table 1.

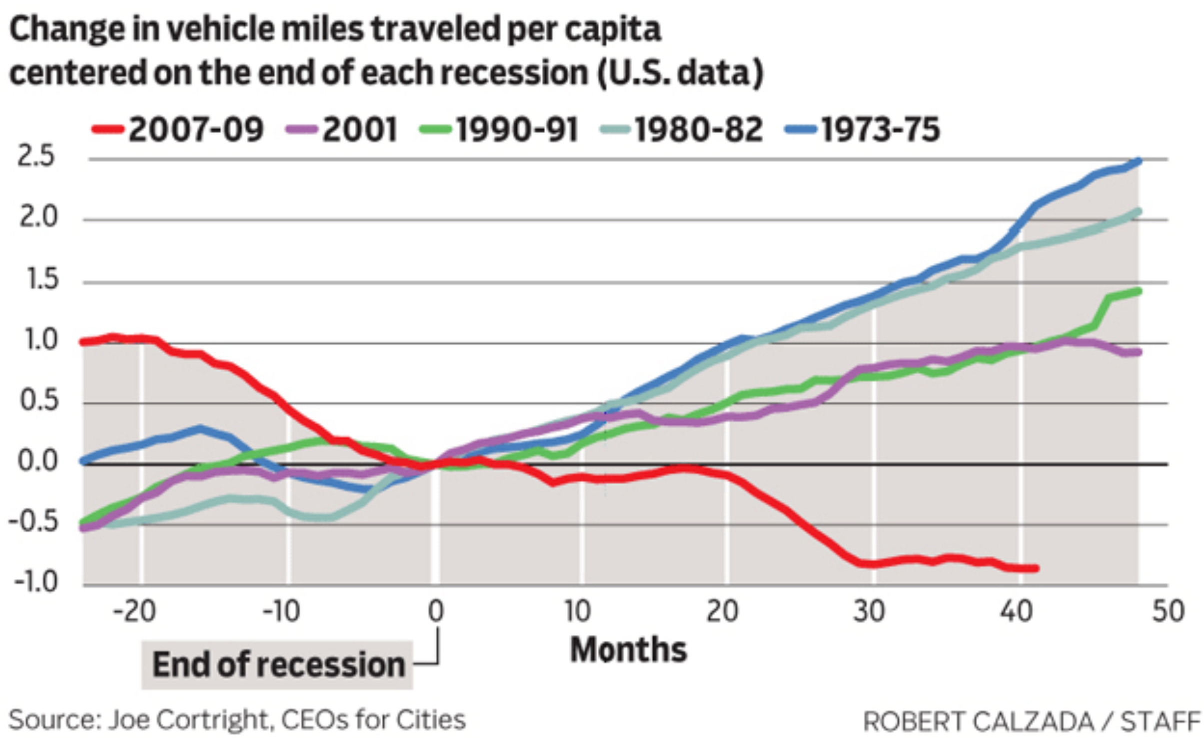
	2004 OEA Forecast	2013 OEA Forecast
2012 Polk County Actual Population	76,625	76,625
2030 Polk County Forecast Population	117,557	105,274
2012-2030 Polk County Growth	40,932	28,649

RISK FACTOR #2: VEHICLE USE ASSUMPTIONS

In recent months, we have reviewed the *EIS's* underlying traffic model. It appears to be a careful and straightforward analysis of future traffic loads, assuming build out of vacant and underdeveloped land in the bridge tributary area, and also assuming that 1990s-era driving patterns will continue into the future, with a modest increase in alternative transportation use. However, the model does not appear to consider how profoundly driving habits have changed over the last decade, locally, regionally and nationally. As discussed in our January letter, Oregon vehicle miles travelled (VMT) peaked in 2002, and have declined ever since, despite an 11% increase in Oregon's population over the last decade. Travel over Salem's existing bridge mirrors the larger Oregon trend of flat or declining traffic since 2002; current bridge traffic levels are 25% lower than the *EIS's* forecast for 2015.

Some believe that these reductions are primarily due to the recession, and that historic travel patterns will reestablish once economic conditions improve. However, both the statewide and local trends *preceded* both the recession and increased fuel prices, and may continue well into the future, even after economic recovery. The below chart,[1] which shows national trends, illustrates that in prior recessions, VMT did recover after the bottom was reached. In recent years, however, VMT has continued to trend downward despite the end of the recession and significant economic recovery.

[1] Economist Joe Cortright, via Sightline Institute http://daily.sightline.org/2013/02/19/driving-declined-during-the-recovery/



What are the true reasons for the continued decline in VMT? The sustained increase in fuel prices has surely reduced driving, as has growth of various sorts of work and e-commerce that reduce car-based movement. The shift also reflects changing tastes; demographic trends show that both baby-boomers and younger people are *choosing* to drive less. For example, surveys for over a decade by the National Association of Realtors have shown that the majority of baby boomers are looking for high-density housing in walkable communities as they age. In addition, younger Americans are less likely to obtain a driver's license or buy a car than any prior generation for decades.

RISK FACTOR #3: TOLL ROAD FORECASTING BIAS

Tolls have been identified as one way to pay for Salem's proposed new bridge. The city should know that several well-run studies have found a built-in optimism bias in traffic forecasts involving new tolled projects. The attached Sightline report, titled "Toll Avoidance and Transportation Funding," describes these studies. During the 1990s and early 2000s, Standard & Poor's tracked 104 start-up toll projects for up to a decade, and found a consistent pattern: actual traffic volumes and toll revenues were much lower than official forecasts, not only upon opening of the project, but also over time. Of particular concern is Standard & Poor's discovery that jurisdictions new to tolling – such as Salem – were especially prone to inflated projections, with a 42% average traffic overestimate. This is an independent risk factor; other contemporary studies indicated that non-tolled projects, as a group, were not subject to errors like this.

Taken together, these three risk factors could produce a traffic growth estimate that is two or three times higher than what will actually occur, perhaps even more. Prior to making a decision on which bridge alternative – if any – to pursue, the city should step back, exercise due diligence, and attempt to quantify the extent to which the *EIS's* traffic model likely overestimates future bridge traffic and toll revenues, as well as the consequences such an overestimate would have on funding viability.

Armed with this information, Salem will be in a much better position to evaluate its alternatives and move forward with realistic, achievable solutions that fit the actual needs of the community.

Sincerely,

Mia Nelson
Willamette Valley Advocate
1000 Friends of Oregon
P.O. Box 51252
Eugene, OR 97405
541.520.3763

Attachments:

"Toll Avoidance and Transportation Funding" by Sightline Institute

Toll Avoidance and Transportation Funding

Official estimates frequently overestimate traffic and revenue for toll roads

Clark Williams-Derry
Research Director, Sightline Institute
September 2011

Introduction

Beginning in December, the Washington transportation department plans to begin tolling the State Route 520 bridge across Lake Washington. State officials predict that the tolls—which will reach $3.50 during rush hour[1]—will raise revenue to replace the aging bridge, while easing gridlock on one of the Puget Sound's most congested highways.

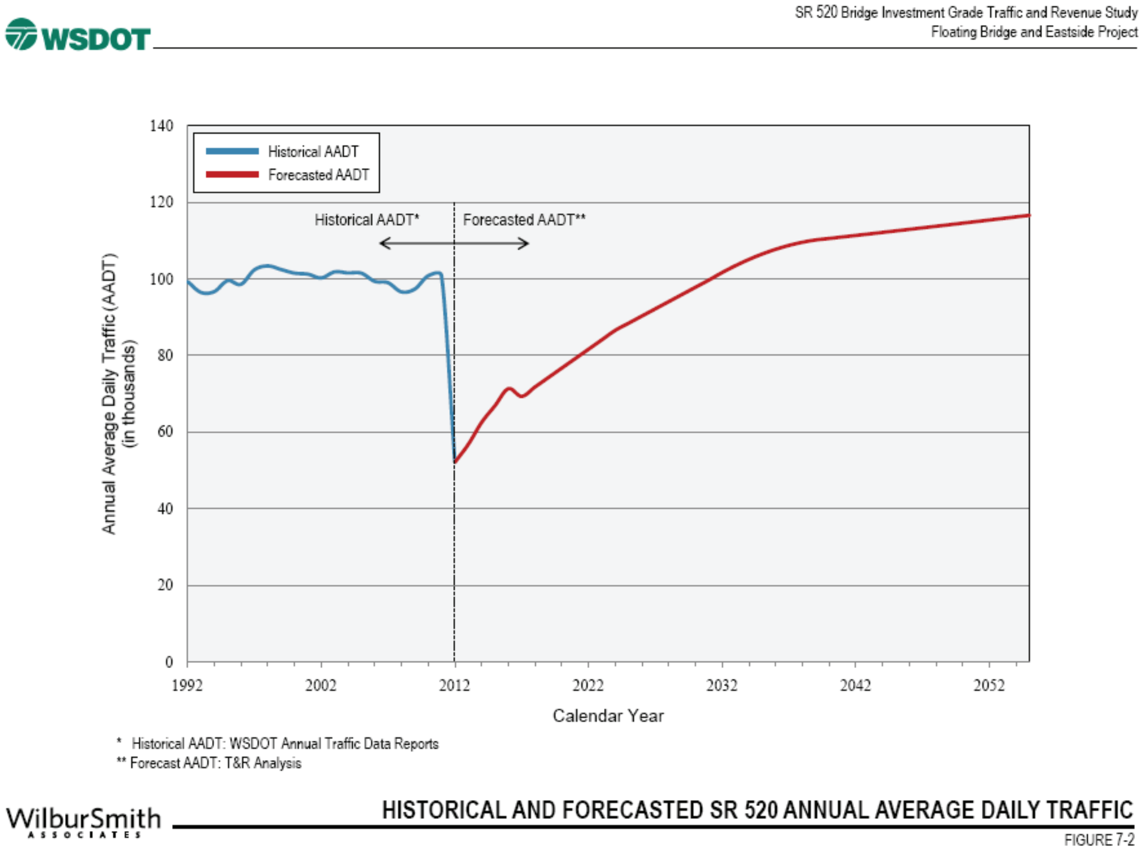
But there's a huge unknown in this tolling experiment: ***how will drivers respond?*** Will tens of thousands of drivers avoid the tolls, by choosing an alternative route such as SR 522 to the north or I-90 to the south, or by selecting different destinations that don't require a trip across the lake?

A recent study performed by nationally recognized transportation consultants Wilbur Smith Associates, on behalf of the Washington State Department of Transportation (WSDOT), argues that the tolls will spur massive diversion to other routes, destinations, and modes, with traffic on SR 520 falling by nearly half immediately after tolling begins.[2] (See Figure 1.)

Still, despite the steep projected drop in traffic, state officials foresee no threats to their plans to raise $1 billion from tolling the bridge. One WSDOT official called the forecast "ultraconservative," as it was designed as an investment-grade analysis for the risk-averse bond markets.[3]

Only time will tell whether this confidence is justified. Yet a review of the available literature clearly shows that ***toll road revenues typically fall short of official projections***–especially when drivers can choose toll-free alternative routes to reach the same destinations.

Figure 1. WSDOT projects a 50 percent decline in traffic on SR 520 after tolling starts. (Chart reprinted from WSDOT.)



Review of Literature

Standard & Poor's, "Traffic Risks" series (2002, 2003, 2004, and 2005).
In four reports to potential infrastructure lenders, the US-based securities analysis firm Standard & Poor's examined 104 start-up toll projects, tracked for up to a decade—and found clear evidence that real-world traffic volumes and toll revenues systematically fell short of official forecasts.[4]

The 2005 report, the most comprehensive of the four, succinctly summarized their findings: "Across all case studies, toll road forecasts overestimated Year 1 traffic by 20%-30%." This "optimism bias" persisted for years after toll roads were first opened to the public: projects that underperformed their projections in their first year tended to continue to underperform over time, rather than correcting themselves. Jurisdictions new to tolling produced particularly inflated projections, with an average traffic overestimate of 42 percent.

Real-world traffic volumes and toll revenues systematically fell short of official forecasts

Just as important, Standard & Poor's found high margins of error in tolling projections. For the projects studied, actual traffic ranged from 85 percent below forecasted levels, to more than 50 percent above forecasts, with a standard deviation of 26 percent in the first year. Similarly, the Standard & Poors analysts found examples in which different consulting firms produced vastly different traffic forecasts for the same project. These types of errors demonstrate that traffic forecasting is rife with inaccuracy—and suggest that traffic forecasters are engaged in art as much as science.

Dr. Robert Bain, "Error and optimism bias in toll road traffic forecasts" (Transportation v.36:5, pp 469-482).

Written by one of the authors of the Standard & Poor's reports, this paper recapitulates previous findings that toll road traffic estimates suffer from a 20-30 percent optimism bias. But it also presents evidence that toll-free roads do not suffer from this same bias: traffic forecasts for toll-free roads are error prone, but on average they have proven to be reasonably accurate. This pattern—systematic optimism bias for tolled roads, and no such bias for toll-free roads—suggests that political pressures and institutional dynamics tend to favor unrealistically inflated estimates of tolling revenues.[5]

Transportation Research Bureau of the National Academies: "Estimating Toll Road Demand and Revenue: A Synthesis of Highway Practice."

Like the Standard & Poor's reports, this study found that traffic forecasts for toll roads systematically overestimate actual traffic volumes:[6]

> [I]ndustry experience in tolling forecasts and the associated recoverable benefits historically have been quite varied, ***in that demand (and the accompanying revenues) has ranged from frequently overestimated to occasionally underestimated.*** The resultant variations have had significant impacts on both the actual revenue streams and on the facility's debt structuring and obligations. [Emphasis added.]

US tolling forecasts have ranged from frequently overestimated to occasionally underestimated.

The report identifies many toll roads built in the United States after 1986 that have underperformed their projections, along with a few toll roads whose traffic exceeded forecasts. For their entire sample, actual first year traffic volumes fell short of projections by 41 percent. For the subsample of toll roads with continuous 5-year data, toll roads remained 30% below forecasts in year 5. (See Table 1 of the report, appended to this review as Attachment A.) In addition, the report found that in developed corridors where drivers frequently had access to toll-free alternatives, toll roads underperformed planners' projections by an average of 40 to 49 percent—suggesting that transportation planners frequently underestimate the lure of non-tolled alternatives, especially when drivers face high toll rates.

Peter Næss, et al., "Do Road Planners Produce More 'Honest Numbers' Than Rail Planners? An Analysis of Accuracy in Road-traffic Forecasts in Cities versus Peripheral Regions," Transport Reviews, Vol. 26, No. 5, 537-555, September 2006.
This study looked predominantly at European roads, but included 14 US toll roads in its sample. Quoting from the report:

> Among these [US toll] roads, there is a gross overestimation of traffic, with lower traffic than predicted for 13 of the 14 roads. On average, the traffic is 42% lower than forecasted.[7]

***The Denver Post*, series: "The Truth Be Tolled." (Parts 1, 2, 3, and related article.)**
This series of investigative reports looked at toll road financing throughout the US, finding evidence that toll road forecasts commonly overestimate actual revenues:[8]

> As Colorado, other states and federal officials increasingly look to toll roads to spur growth or clear clogged highways, a review of 23 new turnpikes nationwide shows that ***a clear majority are failing to meet revenue projections to justify their costs.*** [Emphasis added.]

The Post focused, in part, on potential conflicts of interest—suggesting, for example, that transportation officials used inflated traffic projections to negotiate favorable bond ratings, which can be crucial to financing expensive projects. But intimations of deception aside, the numbers speak for themselves: many recently constructed toll roads simply have not met their projected revenues, often leaving taxpayers with additional, unanticipated costs.

Washington Department of Transportation, Toll Revenue Projections: Synthesis of Issues.
This review covers many of the same sources and evidence identified above, including a review of eight states with inaccurate toll road estimates—some of which were underestimates, but most of which were overestimates. Most significantly, though, WSDOT's review uncovered no evidence to contradict the findings of systematic upward bias in tolling revenue estimates.[9]

Relevant Local Experience

There are only two tolled facilities operating fully within the state of Washington: the Tacoma Narrows Bridge, and the High-Occupancy/Toll (HOT) Lanes on SR-167.

- **Tacoma Narrows Bridge.** Officials projected that traffic volumes on the Tacoma Narrows Bridge would fall by 10–15 percent once the state began collecting a $2.75 electronic toll on eastbound traffic in 2007. Instead, traffic volumes remained relatively steady, perhaps buoyed by reduced travel times after the opening of the new bridge span.[10] However, since the second fiscal quarter of 2010, the bridge has generally under-performed projections—with the shortfalls increasing as gasoline prices rose.[11]

- **SR 167 HOT Lanes.** In contrast to the Narrows Bridge, state transportation officials projected that 5,000 vehicles each day would opt to pay a fee to use the SR 167 HOT lanes, with dynamic tolls expected to be set between $1.50 and $2.00 to keep traffic moving.[12] But as of April of 2010, two years after the HOT lanes were opened, only about 2,200 cars per day paid to use the lanes, with tolls averaging just 88 cents.[13] This actually represented a substantial and steady improvement over the first year's results, when tolls averaged 96 cents per vehicle and traffic never exceeded an average of 1,800 vehicles per day.[14] Of course, the early period of the HOT lanes coincided with high gas prices, followed by a rapid economic decline that reduced traffic volumes throughout the state. Regardless, by the end of the second year of operation, the number of cars paying to use the HOT lane remained 55 percent below forecasts. Indeed, even though traffic on the SR 167 HOT lanes has been lower than projected, traffic throughput and speeds increased after the HOT lane experiment began.

- **Columbia River Crossing on I-5.** After several years of operation as a free bridge, the Columbia River Crossing on I-5 was tolled during the early 1960s. After a $0.20 toll was imposed in 1960 ($1.50 in today's dollars), traffic volumes fell by 14 percent in a single year, despite the lack of a convenient toll-free alternative for drivers who wished to cross the Columbia.[15]

After a 20 cent toll was imposed on the I-5 bridge across the Columbia in 1960, traffic volumes fell by 14 percent in a single year.

Summary and Analysis

Both the published literature and local experience with traffic and revenue forecasts for toll roads suggests several conclusions:

Toll road traffic and revenue tend to fall short of official projections.
In study after study, from the US and beyond, the findings are the same: transportation officials tend to overestimate how much traffic will use tolled facilities, and how much revenue can be generated from tolls. Just as importantly, traffic and revenue projections for tolled road facilities are highly error prone. There appears to be no consistent or reliable method for predicting whether a particular toll road forecast will miss the mark.

Washington's own experience with tolling highlights the problem. After tolling began on the eastbound Tacoma Narrows Bridge, traffic remained steady, rather than falling as had been expected. But for SR 167, fewer drivers than predicted have chosen to pay to enter the HOT lanes. Three years after the lanes were opened, the HOT lane toll revenues still don't even pay for the lane's operating costs.

Toll-free alternatives increase traffic diversion.

Perhaps the greatest difference between the Tacoma Narrows Bridge (which had more traffic than expected) and the SR 167 HOT lanes (which had less) is the availability of convenient, toll-free alternative routes. If eastbound drivers wish to avoid the $2.75 toll on the Tacoma Narrows Bridge, they must travel at least an hour out of their way, wasting more than $2.75 of gas in the process. In contrast, drivers who wish to avoid the SR-167 HOT lane toll have a free alternative literally in the adjacent lane, and fewer drivers than expected have proven willing to pay for the time savings of the HOT lane. The relative performance of these two tolled facilities is consistent with research findings showing that convenient access to toll-free alternative routes can induce substantial toll avoidance, causing traffic volumes on toll roads to fall short of forecasts.

Arguably, Washington's SR 520, the I-5 Columbia River Crossing, and the SR-99 deep bore tunnel have more in common with SR 167 than with the Tacoma Narrows Bridge. For the deep bore tunnel, drivers who wish to avoid tolls will have many toll-free alternatives—including I-5 and city streets—readily available. Indeed, state forecasters already believe that tolls could divert more than half of the traffic away from the deep bore tunnel.[16] Likewise, if nearby alternatives to Columbia River Crossing and SR 520 remain toll free, the risks of traffic diversion increase—potentially affecting the reliability of toll forecasts.

Conclusion

None of the literature reviewed suggests that tolling is inherently a bad idea. On the contrary, tolling can be an important source of revenue, and a powerful tool for managing limited road space and relieving congestion.

Still, the evidence is clear: official forecasts frequently overestimate actual traffic and revenue from tolled roads. And forecasts are most likely to overestimate revenue in jurisdictions with limited experience with tolling, and where drivers have toll-free alternatives.

The fiscal consequences of toll revenue shortfalls can be troubling. If toll revenues for the SR 520 bridge, the Alaskan Way Viaduct, or the Columbia River Crossing fall short of expectations, it is not clear how the state departments of transportation will pay for the projects. Raising toll rates on those facilities may not raise additional revenue, but could simply divert more cars to parallel, toll-free routes. If traffic and tolling revenues don't meet forecasts, the shortfalls can strain state transportation budgets—forcing the state to reprogram money from other projects in other parts of the state to pay off bonds that had been backed by future toll revenues.

Because of the fiscal consequences, members of the public would be wise to take a cautious and skeptical view of official tolling revenue forecasts. Likewise, state transportation officials should carefully consider the long-term fiscal consequences of toll revenue shortfalls, particularly on facilities where drivers can select alternative, toll-free routes.

Attachment 1: Table 1 from *Estimating Toll Road Demand and Revenue: A Synthesis of Highway Practice*, Transportation Research Board of the National Academies, 2006.

TABLE 1
ACTUAL REVENUE AS PERCENTAGE OF PROJECTED RESULTS OF OPERATION

Authority/Facility	Year of Opening	Year 1	Year 2	Year 3	Year 4	Year 5
Florida's Turnpike Enterprise/Sawgrass Expressway *(6)*	1986	17.8%	23.4%	32.0%	37.1%	38.4%
North Texas Tollway Authority/Dallas North Tollway *(6)*	1986, 1987	73.9%	**91.3%**	**94.7%**	**99.3%**	**99.0%**
Harris County Toll Road Authority (Texas)/Hardy *(6)*	1988	29.2%	27.7%	23.8%	22.8%	22.3%
Harris County Toll Road Authority (Texas)/Sam Houston *(6)*	1988, 1990	64.9%	79.7%	81.0%	83.2%	78.0%
Illinois State Toll Highway Authority/ Illinois North South Tollway *(6)*	1989	**94.7%**	**104.3%**	112.5%	116.9%	115.3%
Orlando–Orange Expressway Authority/ Central Florida Greenway North Segment *(6)*	1989	**96.8%**	85.7%	81.4%	69.6%	77.1%
Orlando-Orange Expressway Authority/ Central Florida Greenway South Segment *(6)*	1990	34.1%	36.2%	36.0%	50.0%	NA
Oklahoma Turnpike Authority/ John Kilpatrick *(3)*	1991	18.0%	26.4%	29.3%	31.4%	34.7%
Oklahoma Turnpike Authority/ Creek *(3)*	1992	49.0%	55.0%	56.8%	59.2%	65.5%
Mid-Bay Bridge Authority (Florida)/ Choctawhatchee Bay Bridge *(38,39)*	1993	79.8%	**95.5%**	**108.9%**	113.2%	116.7%
Orlando-Orange Expressway Authority/ Central Florida Greenway Southern Connector *(6)*	1993	27.5%	36.6%	NA	NA	NA
State Road and Tollway Authority (Georgia)/GA 400 *(3)*	1993	117.0%	133.1%	139.8%	145.8%	141.8%
Florida's Turnpike Enterprise/ Veteran's Expressway *(3)*	1994	50.1%	52.9%	62.5%	65.0%	56.8%
Florida's Turnpike Enterprise/ Seminole Expressway *(3)*	1994	45.6%	58.0%	70.7%	78.4%	70.1%
Transportation Corridor Agencies (California)/Foothill North *(3)*	1995	86.5%	**92.3%**	**99.3%**	NA[1]	NA[1]
Osceola County (Florida)/Osceola County Parkway *(3)*	1995	13.0%	50.7%	38.5%	40.4%	NA
Toll Road Investment Partnership (Virginia)/Dulles Greenway *(3)*	1995	20.1%	24.9%	23.6%	25.8%	35.4%
Transportation Corridor Agencies (California)/San Joaquin Hills *(3)*	1996	31.6%	47.5%	51.5%	52.9%	54.1%
North Texas Tollway Authority/ George Bush Expressway *(3)*	1998	152.2%	**91.8%**	NA	NA	NA
Transportation Corridor Agencies (California)/Foothill Eastern *(3)*	1999	119.1%	79.0%	79.2%	NA[1]	NA[1]
E-470 Public Highway Authority (Colorado)/E-470 *(3)*	1999	61.8%	59.6%	NA	**95.4%**[2]	NA[3]
Florida's Turnpike Enterprise/Polk *(3)*	1999	81.0%	67.5%	NA	NA	NA
Santa Rosa Bay Bridge Authority (Florida)/Garcon Point Bridge *(42,43)*	1999	32.6%	54.8%	50.5%	47.1%	48.7%
Connector 2000 Association (South Carolina)/Greenville Connector *(3)*	2001	29.6%	NA	NA	NA	NA
Pocahontas Parkway Association (Virginia)/Pocahontas Parkway *(44,45)*	2002	41.6%[4]	40.4%	50.8%	NA	NA
Northwest Parkway Public Highway Authority (Colorado)/Northwest Parkway *(46,47)*	2004	60.5%	56%[5]	NA	NA	NA

Endnotes

1. Drivers without electronic transponders will pay a surcharge, which means that for some rush-hour drivers the tolls will exceed $3.50.
2. Wilbur Smith Associates, "SR 520 Bridge Investment Grade Traffic and Revenue Study," Washington State Department of Transportation, August 29, 2011, http://www.wsdot.wa.gov/NR/rdonlyres/A3B026EC-C9AF-4B43-BA31-4CB30FFD2CEB/0/SR520InvestmentGradeStudy.pdf.
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10. Washington State Department of Transportation, *Measures, Markers, and Mileposts: The Gray Notebook for the quarter ending March 31, 2008*, p. 40, http://www.wsdot.wa.gov/NR/rdonlyres/BFF201B6-F6BD-406E-BEB7-71F0C4E7D92A/0/GrayNotebookMar08.pdf.

11. Clark Williams-Derry, "Dude Where Are My Cars: Tacoma Narrows Bridge," Sightline Daily blog, July 7, 2011, http://daily.sightline.org/2011/07/07/dude-where-are-my-cars-tacoma-narrows-bridge/.
12. Estimated toll-paying traffic from Washington Department of Transportation, fact sheet, "SR 167 HOT Lanes Pilot Project: By the Numbers," April 2008, http://www.wsdot.wa.gov/NR/rdonlyres/5AF5F8C8-D5F9-4293-A3F5-A9666C233575/0/SR167HOTlanesnumbers.pdf. Toll rates from Washington Department of Transportation, fact sheet, "You have questions. We have answers," http://www.wsdot.wa.gov/NR/rdonlyres/3DC541E1-4C84-4BB0-83DF-9974D76F3CFA/0/SR167_CommonQuestions_Jan07.pdf.
13. Traffic volumes and toll rates from Washington State Department of Transportation, "SR 167 Hot Lanes Pilot Project: Second Annual Performance Summary, May 2008-April 2010," http://www.wsdot.wa.gov/NR/rdonlyres/A43B9DD4-4228-482E-BF82-CEE31B315A0E/69595/2ndAnnualReport_167HOTLanes2.pdf. (Traffic volumes on p. 4, toll rates on p. 7.)
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About the Author

Clark Williams-Derry directs research at Sightline Institute, the Northwest's sustainability think tank. During his decade at Sightline, Clark has written extensively on a wide range of issues, including transportation, land use, pollution, and toxics. He was also the architect of Sightline's Cascadia Scorecard, a compilation of key sustainability trends affecting the future of the Pacific Northwest.

Sightline Institute is a not-for-profit research and communication center—a think tank—based in Seattle. Sightline's mission is to make the Northwest a global model of sustainability—strong communities, a green economy, and a healthy environment.

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