Puyallup River Bridge Replacement

Table A-1: Construction Costs

Baseline Scenario					Project Scenario					Cost Difference				
Year	Cost Activity	Costs ($2010)	Discounted Cost (7%)	Discounted Cost (3%)	Year	Activity	Costs ($2010)	Discounted Cost (7%)	Discounted Cost (3%)	Year	Baseline - Project (undiscounted)	Baseline - Project (discounted @ 7%)	Baseline - Project (discounted @ 3%)
2012			$ -	$ -	2012	Begin construction	$ 10,000,000	$ 8,734,387	$ 9,425,959	2012	$ (10,000,000)	$ (8,734,387)	$ (9,425,959)
2013			$ -	$ -	2013	Complete construction	$ 20,000,000	$ 16,325,958	$ 18,302,833	2013	$ (20,000,000)	$ (16,325,958)	$ (18,302,833)
2014			$ -	$ -	2014			$ -	$ -	2014	$ -	$ -	$ -
2015			$ -	$ -	2015			$ -	$ -	2015	$ -	$ -	$ -
2016			$ -	$ -	2016			$ -	$ -	2016	$ -	$ -	$ -
2017			$ -	$ -	2017			$ -	$ -	2017	$ -	$ -	$ -
2018			$ -	$ -	2018			$ -	$ -	2018	$ -	$ -	$ -
2019			$ -	$ -	2019			$ -	$ -	2019	$ -	$ -	$ -
2020			$ -	$ -	2020			$ -	$ -	2020	$ -	$ -	$ -
2021			$ -	$ -	2021			$ -	$ -	2021	$ -	$ -	$ -
2022			$ -	$ -	2022			$ -	$ -	2022	$ -	$ -	$ -
2023			$ -	$ -	2023			$ -	$ -	2023	$ -	$ -	$ -
2024			$ -	$ -	2024			$ -	$ -	2024	$ -	$ -	$ -
2025			$ -	$ -	2025			$ -	$ -	2025	$ -	$ -	$ -
2026			$ -	$ -	2026			$ -	$ -	2026	$ -	$ -	$ -
2027			$ -	$ -	2027			$ -	$ -	2027	$ -	$ -	$ -
2028			$ -	$ -	2028			$ -	$ -	2028	$ -	$ -	$ -
2029			$ -	$ -	2029			$ -	$ -	2029	$ -	$ -	$ -
2030	Begin construction	$ 10,000,000	$ 2,584,190	$ 5,536,758	2030			$ -	$ -	2030	$ 10,000,000	$ 2,584,190	$ 5,536,758
2031	Complete construction	$ 20,000,000	$ 4,830,262	$ 10,750,986	2031			$ -	$ -	2031	$ 20,000,000	$ 4,830,262	$ 10,750,986
			$ 7,414,452	**$ 16,287,743**				**$ 25,060,345**	**$ 27,728,792**		**$ -**	**$ (17,645,893)**	**$ (11,441,049)**

Discount Rate 7%

Discount Rate 3%

$PV = [1/(1+ r)^t] FV_t$

Puyallup River Bridge Replacement

Table A-2: Net Benefit Summary

		Economic Competitiveness							Sustainability					Safety		State of Good Repair	
Calendar Year	Project Year	Travel Time Saved (hours)	Total Value of Travel Time Saved ($)	Fuel Saved from Delay Reduction (Gal)	Fuel Saved from VMT Reduction (Gal)	Total Value of Fuel Savings ($)	7% Discounted Benefit ($)	3% Discounted Benefit ($)	Total CO_2 Saved (Metric Tons)	Cost per Metric Ton of CO_2	Total Value of CO_2 Saved ($)	7% Discounted Benefit ($)	3% Discounted Benefit ($)	Accidents Avoided 7% Discounted Benefit ($)	Accidents Avoided 3% Discounted Benefit ($)	Reduced O&M Costs 7% Discounted Benefit ($)	Reduced O&M Costs 3% Discounted Benefit ($)
2012	1	13,962	$344,027	7,588	100,264	$404,877	$654,122	$705,914	1,047	$22.40	$23,449	$20,482	$22,103	$0	$0	$2,931,260	$3,163,352
2013	2	14,241	$350,908	7,740	102,269	$412,975	$623,555	$699,060	1,068	$22.80	$24,346	$19,873	$22,280	$0	$0	$4,898	$5,491
2014	3	14,526	$357,926	7,895	104,314	$421,234	$594,417	$692,273	1,089	$23.30	$25,377	$19,360	$22,547	$159,375	$173,469	$574,460	$669,031
2015	4	14,817	$365,084	8,053	106,401	$429,659	$566,641	$685,552	1,111	$23.80	$26,440	$18,851	$22,807	$148,949	$173,469	$2,139	$2,588
2016	5	15,113	$372,386	8,214	108,529	$438,252	$540,162	$678,897	1,133	$24.30	$27,535	$18,348	$23,061	$139,204	$168,417	$1,999	$2,512
2017	6	15,415	$379,834	8,378	110,699	$447,017	$514,921	$672,305	1,156	$24.80	$28,664	$17,851	$23,307	$130,098	$163,512	$1,868	$2,439
2018	7	15,724	$387,430	8,546	112,913	$455,957	$490,859	$665,778	1,179	$25.30	$29,827	$17,359	$23,546	$121,587	$158,749	$1,746	$2,368
2019	8	16,038	$395,179	8,717	115,172	$465,077	$467,922	$659,314	1,203	$25.80	$31,025	$16,875	$23,778	$113,632	$154,125	($3,808)	($5,365)
2020	9	16,359	$403,082	8,891	117,475	$474,378	$446,056	$652,913	1,227	$26.30	$32,258	$16,399	$24,003	$106,198	$149,636	$100,399	$146,959
2021	10	16,686	$411,144	9,069	119,824	$483,866	$425,213	$646,574	1,251	$27.00	$33,779	$16,048	$24,403	$99,251	$145,278	($1,188)	($1,806)
2022	11	251,852	$6,205,643	210,583	650,685	$3,233,201	$4,190,959	$6,620,215	6,078	$27.60	$167,760	$74,488	$117,664	$92,758	$141,047	($1,110)	($1,753)
2023	12	254,371	$6,267,699	212,689	657,192	$3,265,533	$3,955,952	$6,491,667	6,139	$28.30	$173,735	$72,094	$118,305	$86,690	$136,938	($1,037)	($1,702)
2024	13	256,915	$6,330,376	214,816	663,764	$3,298,188	$3,734,123	$6,365,615	6,200	$28.90	$179,193	$69,494	$118,468	$81,018	$132,950	($4,848)	($8,264)
2025	14	259,484	$6,393,680	216,964	670,401	$3,331,170	$3,524,733	$6,242,011	6,262	$29.60	$185,369	$67,186	$118,981	$75,718	$129,078	($906)	($1,605)
2026	15	262,079	$6,457,617	219,134	677,105	$3,364,482	$3,327,085	$6,120,807	6,325	$30.20	$191,017	$64,704	$119,036	$70,764	$125,318	($847)	($1,558)
2027	16	264,699	$6,522,193	221,325	683,876	$3,398,126	$3,140,519	$6,001,956	6,388	$30.90	$197,399	$62,492	$119,430	$66,135	$121,668	($791)	($1,513)
2028	17	267,346	$6,587,415	223,538	690,715	$3,432,108	$2,964,415	$5,885,414	6,452	$31.50	$203,245	$60,133	$119,385	$61,808	$118,124	($740)	($1,468)
2029	18	270,020	$6,653,289	225,774	697,622	$3,466,429	$2,798,186	$5,771,134	6,517	$32.10	$209,187	$57,842	$119,296	$57,765	$114,684	($691)	($1,426)
2030	19	272,720	$6,719,822	228,032	704,598	$3,501,093	$2,641,279	$5,659,073	6,582	$32.80	$215,886	$55,789	$119,531	$53,986	$111,343	($775)	($1,661)
2031	20	275,447	$6,787,020	230,312	711,644	$3,536,104	$2,493,170	$5,549,188	6,648	$33.40	$222,034	$53,624	$119,354	$50,454	$108,100	($725)	($1,613)
Total							**$38,094,291**	**$67,465,661**				**$819,292**	**$1,421,284**	**$1,715,391**	**$2,525,907**	**$3,601,304**	**3,965,006**
Discount Rate		7%	3%														

$PV = [1/(1+ r)^t] FV_t$

Net Benefit

7% Discount Rate	**$44,230,277**
3% Discount Rate	**$75,377,858**

Cost of Fuel	$3.75	per gallon based on 10/10/2011 http://www.eia.gov/oog/info/gdu/gasdiesel.asp data.
Cost per Metric Ton of CO^2	Varies	Based on Federal Register Table A1: Annual Social Cost of Carbon Balues: 2010-20050, 3% Average.
Value of Travel Time	$24.64	per hour

Puyallup River Bridge Replacement

Benefit: Reduced Operating and Maintenance Costs

Baseline Scenario					Project Scenario					Cost Difference				
Year	Cost Activity	Costs ($2010)	Discounted Cost (7%)	Discounted Cost (3%)	Year	Activity	Costs ($2010)	Discounted Cost (7%)	Discounted Cost (3%)	Year	Baseline - Project (undiscounted)	Baseline - Project (discounted @ 7%)	Baseline - Project (discounted @ 3%)
2012	Structural mitigation[2] + Painting + Maintenance[1]	$ 3,356,000	$ 2,931,260	$ 3,163,352	2012	N/A	$ -	$ -	$ -	2012	$ 3,356,000	$ 2,931,260	$ 3,163,352
2013	Maintenance[1]	$ 6,000	$ 4,898	$ 5,491	2013	N/A	$ -	$ -	$ -	2013	$ 6,000	$ 4,898	$ 5,491
2014	Shoring[3] + Maintenance[1]	$ 756,000	$ 576,749	$ 671,696	2014	Maintenance[4]	$ 3,000	$ 2,289	$ 2,665	2014	$ 753,000	$ 574,460	$ 669,031
2015	Maintenance[1]	$ 6,000	$ 4,278	$ 5,176	2015	Maintenance[4]	$ 3,000	$ 2,139	$ 2,588	2015	$ 3,000	$ 2,139	$ 2,588
2016	Maintenance[1]	$ 6,000	$ 3,998	$ 5,025	2016	Maintenance[4]	$ 3,000	$ 1,999	$ 2,512	2016	$ 3,000	$ 1,999	$ 2,512
2017	Maintenance[1]	$ 6,000	$ 3,736	$ 4,879	2017	Maintenance[4]	$ 3,000	$ 1,868	$ 2,439	2017	$ 3,000	$ 1,868	$ 2,439
2018	Maintenance[1]	$ 6,000	$ 3,492	$ 4,736	2018	Maintenance[4]	$ 3,000	$ 1,746	$ 2,368	2018	$ 3,000	$ 1,746	$ 2,368
2019	Maintenance[1]	$ 6,000	$ 3,264	$ 4,599	2019	Maintain[4] + Inspect[5]	$ 13,000	$ 7,071	$ 9,963	2019	$ (7,000)	$ (3,808)	$ (5,365)
2020	Close bridge + install barricades	$ 200,500	$ 101,924	$ 149,191	2020	Maintenance[4]	$ 3,000	$ 1,525	$ 2,232	2020	$ 197,500	$ 100,399	$ 146,959
2021	Maintain barricades	$ 500	$ 238	$ 361	2021	Maintenance[4]	$ 3,000	$ 1,425	$ 2,167	2021	$ (2,500)	$ (1,188)	$ (1,806)
2022	Maintain barricades	$ 500	$ 222	$ 351	2022	Maintenance[4]	$ 3,000	$ 1,332	$ 2,104	2022	$ (2,500)	$ (1,110)	$ (1,753)
2023	Maintain barricades	$ 500	$ 207	$ 340	2023	Maintenance[4]	$ 3,000	$ 1,245	$ 2,043	2023	$ (2,500)	$ (1,037)	$ (1,702)
2024	Maintain barricades	$ 500	$ 194	$ 331	2024	Maintain[4] + Inspect[5]	$ 13,000	$ 5,042	$ 8,595	2024	$ (12,500)	$ (4,848)	$ (8,264)
2025	Maintain barricades	$ 500	$ 181	$ 321	2025	Maintenance[4]	$ 3,000	$ 1,087	$ 1,926	2025	$ (2,500)	$ (906)	$ (1,605)
2026	Maintain barricades	$ 500	$ 169	$ 312	2026	Maintenance[4]	$ 3,000	$ 1,016	$ 1,870	2026	$ (2,500)	$ (847)	$ (1,558)
2027	Maintain barricades	$ 500	$ 158	$ 303	2027	Maintenance[4]	$ 3,000	$ 950	$ 1,815	2027	$ (2,500)	$ (791)	$ (1,513)
2028	Maintain barricades	$ 500	$ 148	$ 294	2028	Maintenance[4]	$ 3,000	$ 888	$ 1,762	2028	$ (2,500)	$ (740)	$ (1,468)
2029	Maintain barricades	$ 500	$ 138	$ 285	2029	Maintenance[4]	$ 3,000	$ 830	$ 1,711	2029	$ (2,500)	$ (691)	$ (1,426)
2030	N/A	$ -	$ -	$ -	2030	Maintenance[4]	$ 3,000	$ 775	$ 1,661	2030	$ (3,000)	$ (775)	$ (1,661)
2031	N/A	$ -	$ -	$ -	2031	Maintenance[4]	$ 3,000	$ 725	$ 1,613	2031	$ (3,000)	$ (725)	$ (1,613)
			$ 3,635,255	**$ 4,017,041**				**$ 33,951**	**$ 52,035**		**$ 4,279,000**	**$ 3,601,304**	**$ 3,965,006**

1. Annual maintenance costs include bi-annual inspections with a Unit and flagman ($2,500); and $3,500 of misellaneous maintenance.
2. Structural mitigation includes gusset plates ($140,000), strengthen floor beams ($140,000), new deck and stringers ($700,000), expansion joints ($30,000), bearings ($140,000), and miscellaneous truss repairs ($170,000).
3. Shoring two additional piers and rebuilding timber piers ($750,000).
4. Annual maintenance costs include bi-annual inspections with a Unit and flagman ($2,500); and changing lightbulbs in the tower and warning system ($500).
5. Special inspection of bridge cables ($10,000).

Discount Rate 7%

Discount Rate 3%

$PV = [1/(1+ r)^t] FV_t$

Puyallup River Bridge Replacement

Construction and Maintenance Cost Summary

Baseline Scenario					Project Scenario					Cost Difference				
Year	Cost Activity	Costs ($2010)	Discounted Cost (7%)	Discounted Cost (3%)	Year	Activity	Costs ($2010)	Discounted Cost (7%)	Discounted Cost (3%)	Year	Baseline - Project (undiscounted)	Baseline - Project (discounted @ 7%)	Baseline - Project (discounted @ 3%)
2012	Structural mitigation[2] + Painting + Maintenance[1]	$ 3,356,000	$ 2,931,260	$ 3,163,352	2012	Begin construction	$ 10,000,000	$ 8,734,387	$ 9,425,959	2012	$ (6,644,000)	$ (5,803,127)	$ (6,262,607)
2013	Maintenance[1]	$ 6,000	$ 4,898	$ 5,491	2013	Complete construction	$ 20,000,000	$ 16,325,958	$ 18,302,833	2013	$ (19,994,000)	$ (16,321,060)	$ (18,297,342)
2014	Shoring[3] + Maintenance[1]	$ 756,000	$ 576,749	$ 671,696	2014	Maintenance[4]	$ 3,000	$ 2,289	$ 2,665	2014	$ 753,000	$ 574,460	$ 669,031
2015	Maintenance[1]	$ 6,000	$ 4,278	$ 5,176	2015	Maintenance[4]	$ 3,000	$ 2,139	$ 2,588	2015	$ 3,000	$ 2,139	$ 2,588
2016	Maintenance[1]	$ 6,000	$ 3,998	$ 5,025	2016	Maintenance[4]	$ 3,000	$ 1,999	$ 2,512	2016	$ 3,000	$ 1,999	$ 2,512
2017	Maintenance[1]	$ 6,000	$ 3,736	$ 4,879	2017	Maintenance[4]	$ 3,000	$ 1,868	$ 2,439	2017	$ 3,000	$ 1,868	$ 2,439
2018	Maintenance[1]	$ 6,000	$ 3,492	$ 4,736	2018	Maintenance[4]	$ 3,000	$ 1,746	$ 2,368	2018	$ 3,000	$ 1,746	$ 2,368
2019	Maintenance[1]	$ 6,000	$ 3,264	$ 4,599	2019	Maintain[4] + Inspect[5]	$ 13,000	$ 7,071	$ 9,963	2019	$ (7,000)	$ (3,808)	$ (5,365)
2020	Close bridge + install barricades	$ 200,500	$ 101,924	$ 149,191	2020	Maintenance[4]	$ 3,000	$ 1,525	$ 2,232	2020	$ 197,500	$ 100,399	$ 146,959
2021	Maintain barricades	$ 500	$ 238	$ 361	2021	Maintenance[4]	$ 3,000	$ 1,425	$ 2,167	2021	$ (2,500)	$ (1,188)	$ (1,806)
2022	Maintain barricades	$ 500	$ 222	$ 351	2022	Maintenance[4]	$ 3,000	$ 1,332	$ 2,104	2022	$ (2,500)	$ (1,110)	$ (1,753)
2023	Maintain barricades	$ 500	$ 207	$ 340	2023	Maintenance[4]	$ 3,000	$ 1,245	$ 2,043	2023	$ (2,500)	$ (1,037)	$ (1,702)
2024	Maintain barricades	$ 500	$ 194	$ 331	2024	Maintain[4] + Inspect[5]	$ 13,000	$ 5,042	$ 8,595	2024	$ (12,500)	$ (4,848)	$ (8,264)
2025	Maintain barricades	$ 500	$ 181	$ 321	2025	Maintenance[4]	$ 3,000	$ 1,087	$ 1,926	2025	$ (2,500)	$ (906)	$ (1,605)
2026	Maintain barricades	$ 500	$ 169	$ 312	2026	Maintenance[4]	$ 3,000	$ 1,016	$ 1,870	2026	$ (2,500)	$ (847)	$ (1,558)
2027	Maintain barricades	$ 500	$ 158	$ 303	2027	Maintenance[4]	$ 3,000	$ 950	$ 1,815	2027	$ (2,500)	$ (791)	$ (1,513)
2028	Maintain barricades	$ 500	$ 148	$ 294	2028	Maintenance[4]	$ 3,000	$ 888	$ 1,762	2028	$ (2,500)	$ (740)	$ (1,468)
2029	Maintain barricades	$ 500	$ 138	$ 285	2029	Maintenance[4]	$ 3,000	$ 830	$ 1,711	2029	$ (2,500)	$ (691)	$ (1,426)
2030	Maintain barricades + begin construction	$ 10,000,000	$ 2,584,190	$ 5,536,758	2030	Maintenance[4]	$ 3,000	$ 775	$ 1,661	2030	$ 9,997,000	$ 2,583,415	$ 5,535,097
2031	Maintain barricades + complete construction	$ 20,000,000	$ 4,830,262	$ 10,750,986	2031	Maintenance[4]	$ 3,000	$ 725	$ 1,613	2031	$ 19,997,000	$ 4,829,537	$ 10,749,373
			$ 11,049,707	**$ 20,304,784**				**$ 25,094,296**	**$ 27,780,827**		**$ 4,279,000**	**$ (14,044,589)**	**$ (7,476,043)**

1. Annual maintenance costs include bi-annual inspections with a Unit and flagman ($2,500); and $3,500 of misellaneous maintenance.
2. Structural mitigation includes gusset plates ($140,000), strengthen floor beams ($140,000), new deck and stringers ($700,000), expansion joints ($30,000), bearings ($140,000), and miscellaneous truss repairs ($170,000).
3. Shoring two additional piers and rebuilding timber piers ($750,000).
4. Annual maintenance costs include bi-annual inspections with a Unit and flagman ($2,500); and changing lightbulbs in the tower and warning system ($500).
5. Special inspection of bridge cables ($10,000).

Discount Rate 7%
Discount Rate 3%
$PV = [1/(1+ r)^t] FV_t$

Puyallup River Bridge Replacement

Benefit: Accident Avoidance

Year	Benefit	Benefits ($2011)	Discounted Benefits @ 7%	Discounted Benefits @ 3%
2012	None	$ -	$ -	$ -
2013	None	$ -	$ -	$ -
2014	Reduced accidents[1]	$ 195,241	$ 159,375	$ 173,469
2015	Reduced accidents	$ 195,241	$ 148,949	$ 173,469
2016	Reduced accidents	$ 195,241	$ 139,204	$ 168,417
2017	Reduced accidents	$ 195,241	$ 130,098	$ 163,512
2018	Reduced accidents	$ 195,241	$ 121,587	$ 158,749
2019	Reduced accidents	$ 195,241	$ 113,632	$ 154,125
2020	Reduced accidents	$ 195,241	$ 106,198	$ 149,636
2021	Reduced accidents	$ 195,241	$ 99,251	$ 145,278
2022	Reduced accidents	$ 195,241	$ 92,758	$ 141,047
2023	Reduced accidents	$ 195,241	$ 86,690	$ 136,938
2024	Reduced accidents	$ 195,241	$ 81,018	$ 132,950
2025	Reduced accidents	$ 195,241	$ 75,718	$ 129,078
2026	Reduced accidents	$ 195,241	$ 70,764	$ 125,318
2027	Reduced accidents	$ 195,241	$ 66,135	$ 121,668
2028	Reduced accidents	$ 195,241	$ 61,808	$ 118,124
2029	Reduced accidents	$ 195,241	$ 57,765	$ 114,684
2030	Reduced accidents	$ 195,241	$ 53,986	$ 111,343
2031	Reduced accidents	$ 195,241	$ 50,454	$ 108,100
			$ 1,715,391	$ 2,525,907

1. Estimated reduction accidents resulting in 7 PDO and 5 injuries per three year period; Cost of accidents taken from guidance referenced in the FR Vol 76, No 156, August 12, 2010 converted to 2010 dollars, and averaged to represent annual project benefit.

Sources: The Economic Impact of Motor Vehicle Crashes 2000, http://www.nhtsa.gov/DOT/NHTSA/Communication%20&%20Consumer%20Information/Articles/Associated%20Files/EconomicImpact2000.pdf,

Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analyses - 2011 Revision (2011). http: ostpxweb.dot.gov/policy;

Values from accident report converted to AIS scale using guidance in Federal Register, August 12, 2011. (Vol 76, No 156, page 50308)

Federal Reserve Bank cost escalation factor from 2010 to 2011 available here: http://www.minneapolisfed.org/community_education/teacher/calc/hist1800.cfm

City of Tacoma Traffic Accident reporting and project-level analysis (2010).

Discounting formula:

$PV = [1/(1+ r)^t] FV_t$

Tacoma Data:

Accident history for the intersection of Portland Ave. and Puyallup Ave. shows 24 accidents in the last 3 years (2009, 2008,2007).

18 of the accidents were PDO. 6 of the accidents were INJ and these 6 INJ accidents resulted in 8 injuries because of multiple injuries in one accident.

Analysis for project area:	PDO Accidents	Injury Accidents
Accidents impacted by the project	7	Injury - 3 (with 5 injuries)
Accidents not impacted by the project	11	Injury - 3 (with 3 injuries)
Total Accidents	18	Injury - 6 (with 8 injuries)

Number and cost of preventable accidents in three year period at intersection of Puyallup & Portland Avenues (see source of costs below)

Estimate in reduction of accidents per analysis of accident report by Al Tabaldi, August 12, 2010 (email in file)

	Cost (2011$)	Number	Total cost (2011$)
Property Value Only Accident[1, 2]	$ 3,393	7	$ 23,754
Injury Accident[3] (per injury)	$ 112,394	5	$ 561,970
Total cost of avoidable accidents			$ 585,724
Average annual cost of accidents reduced (2011$)	**$ 195,241**		

[1] Source: The Economic Impact of Motor Vehicle Crashes 2000. [link in FR, 8/12/2011]

[2] Used PDO number from FR notice in 2010 dollars, inflated to 2011 dollars using 3.3% inflation factor published by the Minneapolis Federal Reserve Bank

[3] Source: Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analyses - 2011 Revision [link in FR, 8/12/2011]; used KABCO-AIS conversion table

Cost per PDO Accident **$ 3,285**

Source: The Economic Impact of Motor Vehicle Crashes 2000. [link in FR, 8/12/2011]

Inflation factor - 2010 to 2011 **3.3%**

Source: Minneapolis Federal Reserve Bank, http://www.minneapolisfed.org/community_education/teacher/calc/hist1800.cfm

KABCO-AIS Conversion Table, Using Column for "Injured: Severity Unknown"

AIS Scale	Conversion factor	AIS value	Conversion*Value
0	0.21538	$ -	$ -
1	0.62728	$ 18,600	$ 11,667
2	0.104	$ 291,400	$ 30,306
3	0.03858	$ 651,000	$ 25,116
4	0.00442	$ 1,649,200	$ 7,289
5	0.01034	$ 3,676,600	$ 38,016
		COST PER INJURY ACCIDENT	**$ 112,394**

Source: NHTSA, July 2011. Published in FR August 12, 2011, page 50308

Puyallup River Bridge Replacement

20-Year Totals for Delay, VMT,
CO_2, Fuel, and Travel Time

DELAY TOTALS	BASELINE	BUILD	NET REDUCTION
Passenger Delay (Hour)	2,173,540	926,594	1,246,946
Heavy Vehicle Delay (Hour)	172,384	66,514	105,870
Total Delay (Hour)	2,345,924	993,108	1,352,816
Passenger CO_2 (Metric Ton)	2,781	1,186	1,595
Heavy Vehicle CO_2 (Metric Ton)	1,418	547	871
Total CO_2 (Metric Ton)	4,199	1,733	2,466
Passenger Fuel (Gallons)	3,673,283	1,565,945	2,107,338
Heavy Vehicle Fuel (Gallons)	291,329	112,408	178,921
Total Fuel (Gallons)	3,964,612	1,678,353	2,286,259

VMT TOTALS	BASELINE	BUILD	NET REDUCTION
Passenger VMT (Miles)	177,247,490	64,756,316	112,491,174
Heavy Vehicle VMT (Miles)	17,863,307	4,648,402	13,214,904
Total DVMT (Miles)	195,110,796	69,404,718	125,706,078
Passenger CO_2 (Metric Ton)	76,855	28,079	48,777
Heavy Vehicle CO_2 (Metric Ton)	32,188	8,376	23,812
Total CO_2 (Metric Ton)	109,043	36,455	72,589
Passenger Fuel (Gallons)	8,731,403	3,189,966	5,541,437
Heavy Vehicle Fuel (Gallons)	3,195,583	831,557	2,364,026
Total Fuel (Gallons)	11,926,986	4,021,523	7,905,463

SUMMARY

Total 20-Year Reduction in Delay	**1,352,816**	Hours
Total 20-Year Reduction in VMT	**125,706,078**	Miles
Total 20-Year Reduction in CO_2	**75,055**	Metric Tons
Total 20-Year Reduction in Fuel	**10,191,722**	Gallons
Total 20-Year Reduction in Travel Time	**2,787,815**	Hours

Puyallup River Bridge Replacement
DELAY GHG EMISSIONS

PASSENGER IDLING CO_2 EMISSIONS	2.82	LB CO_2/HOUR[1]
HEAVY-DUTY IDLING CO_2 EMISSIONS	18.1	LB CO_2/HOUR[2]
SEATTLE/TACOMA BASED IDLE DELAY FUEL CONSUMPTION	1.69	GAL/HOUR[3]

BASELINE YEAR	PASSENGER BASELINE DELAY	FUEL CONSUMPTION FROM IDLING DELAY	BASELINE PASSENGER CO_2	BASELINE PASSENGER CO_2	BASELINE PASSENGER CO_2	BASELINE HEAVY-VEHICLE DELAY	FUEL CONSUMPTION FROM IDLING DELAY	BASELINE HEAVY-VEHICLE CO_2	BASELINE HEAVY-VEHICLE CO_2	BASELINE HEAVY-VEHICLE CO_2	BASELINE TOTAL
(YEAR)	(HOUR)	(GALLONS)	(LBS)	(TONS)	(METRIC TONS)	(HOUR)	(GALLONS)	(LBS)	(TONS)	(METRIC TONS)	(METRIC TONS)
2012	39,299.00	66,415	110,823	55.412	50.283	7,311.20	12,356	132,552	66.276	60.142	110.42
2013	40,084.98	67,744	113,040	56.520	51.288	7,457.42	12,603	135,203	67.602	61.344	112.63
2014	40,886.68	69,098	115,300	57.650	52.314	7,606.57	12,855	137,907	68.954	62.571	114.89
2015	41,704.41	70,480	117,606	58.803	53.360	7,758.70	13,112	140,665	70.333	63.823	117.18
2016	42,538.50	71,890	119,959	59.979	54.428	7,913.88	13,374	143,479	71.739	65.099	119.53
2017	43,389.27	73,328	122,358	61.179	55.516	8,072.16	13,642	146,348	73.174	66.401	121.92
2018	44,257.06	74,794	124,805	62.402	56.627	8,233.60	13,915	149,275	74.638	67.729	124.36
2019	45,142.20	76,290	127,301	63.650	57.759	8,398.27	14,193	152,261	76.130	69.084	126.84
2020	46,045.04	77,816	129,847	64.924	58.914	8,566.24	14,477	155,306	77.653	70.465	129.38
2021	46,965.94	79,372	132,444	66.222	60.093	8,737.56	14,766	158,412	79.206	71.875	131.97
2022	166,621.28	281,590	469,872	234.936	213.191	8,824.94	14,914	159,996	79.998	72.594	285.78
2023	168,287.49	284,406	474,571	237.285	215.322	8,913.19	15,063	161,596	80.798	73.319	288.64
2024	169,970.36	287,250	479,316	239.658	217.476	9,002.32	15,214	163,212	81.606	74.053	291.53
2025	171,670.07	290,122	484,110	242.055	219.650	9,092.34	15,366	164,844	82.422	74.793	294.44
2026	173,386.77	293,024	488,951	244.475	221.847	9,183.26	15,520	166,493	83.246	75.541	297.39
2027	175,120.64	295,954	493,840	246.920	224.065	9,275.10	15,675	168,158	84.079	76.297	300.36
2028	176,871.84	298,913	498,779	249.389	226.306	9,367.85	15,832	169,839	84.920	77.059	303.37
2029	178,640.56	301,903	503,766	251.883	228.569	9,461.53	15,990	171,537	85.769	77.830	306.40
2030	180,426.97	304,922	508,804	254.402	230.855	9,556.14	16,150	173,253	86.626	78.608	309.46
2031	182,231.24	307,971	513,892	256.946	233.163	9,651.70	16,311	174,985	87.493	79.394	312.56
	2,173,540	**3,673,283**		**PASSENGER CO_2 TOTALS**	**2,730.74**		**291,329**		**HEAVY-VEHICLE CO_2 TOTALS**	**1,357.88**	**4,088.63**

BUILD YEAR	PASSENGER BUILD DELAY	FUEL CONSUMPTION FROM IDLING	BUILD PASSENGER CO_2	BUILD PASSENGER CO_2	BUILD PASSENGER CO_2	BUILD HEAVY-VEHICLE DELAY	FUEL CONSUMPTION FROM IDLING	BUILD HEAVY-VEHICLE CO_2	BUILD HEAVY-VEHICLE CO_2	BUILD HEAVY-VEHICLE CO_2	BUILD TOTAL
(YEAR)	(HOUR)	(GALLONS)	(LBS)	(TONS)	(METRIC TONS)	(HOUR)	(GALLONS)	(LBS)	(TONS)	(METRIC TONS)	(METRIC TONS)
2012	39,299.00	66,415	110,823	55.412	50.283	2,821.00	4,767	51,145	25.572	23.205	73.49
2013	40,084.98	67,744	113,040	56.520	51.288	2,877.42	4,863	52,168	26.084	23.670	74.96
2014	40,886.68	69,098	115,300	57.650	52.314	2,934.97	4,960	53,211	26.605	24.143	76.46
2015	41,704.41	70,480	117,606	58.803	53.360	2,993.67	5,059	54,275	27.138	24.626	77.99
2016	42,538.50	71,890	119,959	59.979	54.428	3,053.54	5,160	55,361	27.680	25.118	79.55
2017	43,389.27	73,328	122,358	61.179	55.516	3,114.61	5,264	56,468	28.234	25.621	81.14
2018	44,257.06	74,794	124,805	62.402	56.627	3,176.90	5,369	57,597	28.799	26.133	82.76
2019	45,142.20	76,290	127,301	63.650	57.759	3,240.44	5,476	58,749	29.375	26.656	84.41
2020	46,045.04	77,816	129,847	64.924	58.914	3,305.25	5,586	59,924	29.962	27.189	86.10
2021	46,965.94	79,372	132,444	66.222	60.093	3,371.36	5,698	61,123	30.561	27.733	87.83
2022	47,435.60	80,166	133,768	66.884	60.693	3,405.07	5,755	61,734	30.867	28.010	88.70
2023	47,909.96	80,968	135,106	67.553	61.300	3,439.12	5,812	62,351	31.176	28.290	89.59
2024	48,389.06	81,778	136,457	68.229	61.913	3,473.51	5,870	62,975	31.487	28.573	90.49
2025	48,872.95	82,595	137,822	68.911	62.533	3,508.25	5,929	63,605	31.802	28.859	91.39
2026	49,361.68	83,421	139,200	69.600	63.158	3,543.33	5,988	64,241	32.120	29.147	92.31
2027	49,855.29	84,255	140,592	70.296	63.789	3,578.76	6,048	64,883	32.441	29.439	93.23
2028	50,353.85	85,098	141,998	70.999	64.427	3,614.55	6,109	65,532	32.766	29.733	94.16
2029	50,857.39	85,949	143,418	71.709	65.072	3,650.70	6,170	66,187	33.094	30.030	95.10
2030	51,365.96	86,808	144,852	72.426	65.722	3,687.20	6,231	66,849	33.424	30.331	96.05
2031	51,879.62	87,677	146,301	73.150	66.380	3,724.07	6,294	67,517	33.759	30.634	97.01
	926,594	**1,565,945**		**PASSENGER CO_2 TOTALS**	**1,135.29**		**112,408**		**HEAVY-VEHICLE CO_2 TOTALS**	**523.93**	**1,659.22**

[1]: Light-Duty Idle Emissions data from: http://www.epa.gov/oms/climate/regulations/420r10009.pdf. Average mean is 21.3 g/min, converted to lb per hour is 2.82 lb/hr.

[2]: Heavy-Duty Idle Emissions data from: http://www.epa.gov/smartway/documents/publications/epaidlingtesting.pdf. Average mean is 8,224 g/hour, converted to lb per hour is 18.13 lb/hr

[3]: Seattle-Everett urban area - 65,276,000 hours of annual delay; 110,000,000 gallons of annual excess fuel consumed; Average is 1.69 gallons of fuel per hour of travel delay

Puyallup River Bridge Replacement

VMT Calculations

PASSENGER MPG	20.3	MPG (GASOLINE)[1]
HEAVY-DUTY MPG	5.59	MPG (DIESEL)[2]
PASSENGER CO_2	19.4	LB CO_2/GAL (GASOLINE)[3]
HEAVY-DUTY CO_2	22.2	LB CO_2/GAL (DIESEL)[3]

BASELINE YEAR	PASSENGER VMT	PASSENGER GALLONS	PASSENGER CO_2	BASELINE PASSENGER CO_2	BASELINE PASSENGER CO_2	HEAVY-DUTY VMT	HEAVY-DUTY GALLONS	HEAVY-DUTY CO_2	BASELINE HEAVY-DUTY CO_2	BASELINE HEAVY-DUTY CO_2	BASELINE TOTAL
YEAR	(VMT)	(GAL)	(LBS)	(TONS)	(METRIC TONS)	(VMT)	(GAL)	(LBS)	(TONS)	(METRIC TONS)	(METRIC TONS)
2012	2,746,464	135,294	2,624,700	1,312	1,191	757,624	135,532	3,008,810	1,504	1,365	2,556
2013	2,801,393.49	138,000	2,677,194	1,339	1,215	772,776.38	138,243	3,068,987	1,534	1,392	2,607
2014	2,857,421.36	140,760	2,730,738	1,365	1,239	788,231.91	141,007	3,130,366	1,565	1,420	2,659
2015	2,914,569.79	143,575	2,785,352	1,393	1,264	803,996.55	143,828	3,192,974	1,596	1,449	2,712
2016	2,972,861.18	146,446	2,841,059	1,421	1,289	820,076.48	146,704	3,256,833	1,628	1,478	2,767
2017	3,032,318.40	149,375	2,897,881	1,449	1,315	836,478.01	149,638	3,321,970	1,661	1,507	2,822
2018	3,092,964.77	152,363	2,955,838	1,478	1,341	853,207.57	152,631	3,388,409	1,694	1,537	2,879
2019	3,154,824.07	155,410	3,014,955	1,507	1,368	870,271.72	155,684	3,456,177	1,728	1,568	2,936
2020	3,217,920.55	158,518	3,075,254	1,538	1,395	887,677.15	158,797	3,525,301	1,763	1,600	2,995
2021	3,282,278.96	161,689	3,136,759	1,568	1,423	905,430.70	161,973	3,595,807	1,798	1,631	3,055
2022	14,067,241.73	692,968	13,443,571	6,722	6,100	914,485.00	163,593	3,631,765	1,816	1,648	7,747
2023	14,207,914.14	699,897	13,578,007	6,789	6,161	923,629.85	165,229	3,668,083	1,834	1,664	7,825
2024	14,349,993.28	706,896	13,713,787	6,857	6,222	932,866.15	166,881	3,704,764	1,852	1,681	7,903
2025	14,493,493.22	713,965	13,850,925	6,925	6,284	942,194.81	168,550	3,741,811	1,871	1,698	7,982
2026	14,638,428.15	721,105	13,989,434	6,995	6,347	951,616.76	170,236	3,779,229	1,890	1,715	8,062
2027	14,784,812.43	728,316	14,129,328	7,065	6,411	961,132.93	171,938	3,817,022	1,909	1,732	8,143
2028	14,932,660.56	735,599	14,270,621	7,135	6,475	970,744.26	173,657	3,855,192	1,928	1,749	8,224
2029	15,081,987.16	742,955	14,413,328	7,207	6,540	980,451.70	175,394	3,893,744	1,947	1,767	8,306
2030	15,232,807.03	750,385	14,557,461	7,279	6,605	990,256.22	177,148	3,932,681	1,966	1,784	8,389
2031	15,385,135.10	757,888	14,703,036	7,352	6,671	1,000,158.78	178,919	3,972,008	1,986	1,802	8,473
				BUILD PASSENGER CO_2 TOTALS (METRIC TONS)	**75,664**				**BUILD HEAVY-DUTY CO_2 TOTALS (METRIC TONS)**	**30,823**	**106,487**

BUILD YEAR	PASSENGER VMT	PASSENGER GALLONS	PASSENGER CO_2	BUILD PASSENGER CO_2	BUILD PASSENGER CO_2	HEAVY-DUTY VMT	HEAVY-DUTY GALLONS	HEAVY-DUTY CO_2	BUILD HEAVY-DUTY CO_2	BUILD HEAVY-DUTY CO_2	BUILD TOTAL
YEAR	(VMT)	(GAL)	(LBS)	(TONS)	(METRIC TONS)	(VMT)	(GAL)	(LBS)	(TONS)	(METRIC TONS)	(METRIC TONS)
2012	2,746,464	135,294	2,624,700	1,312	1,191	197,149	35,268	782,955	391	355	1,546
2013	2,801,393.49	138,000	2,677,194	1,339	1,215	201,092.42	35,974	798,614	399	362	1,577
2014	2,857,421.36	140,760	2,730,738	1,365	1,239	205,114.27	36,693	814,586	407	370	1,609
2015	2,914,569.79	143,575	2,785,352	1,393	1,264	209,216.55	37,427	830,878	415	377	1,641
2016	2,972,861.18	146,446	2,841,059	1,421	1,289	213,400.89	38,175	847,495	424	385	1,674
2017	3,032,318.40	149,375	2,897,881	1,449	1,315	217,668.90	38,939	864,445	432	392	1,707
2018	3,092,964.77	152,363	2,955,838	1,478	1,341	222,022.28	39,718	881,734	441	400	1,741
2019	3,154,824.07	155,410	3,014,955	1,507	1,368	226,462.73	40,512	899,369	450	408	1,776
2020	3,217,920.55	158,518	3,075,254	1,538	1,395	230,991.98	41,322	917,356	459	416	1,812
2021	3,282,278.96	161,689	3,136,759	1,568	1,423	235,611.82	42,149	935,703	468	425	1,848
2022	3,315,101.75	163,306	3,168,127	1,584	1,437	237,967.94	42,570	945,061	473	429	1,866
2023	3,348,252.77	164,939	3,199,808	1,600	1,452	240,347.62	42,996	954,511	477	433	1,885
2024	3,381,735.30	166,588	3,231,806	1,616	1,466	242,751.09	43,426	964,056	482	437	1,904

Puyallup River Bridge Replacement

VMT Calculations

2025	3,415,552.65	168,254	3,264,124	1,632	1,481	245,178.61	43,860	973,697	487	442	1,923
2026	3,449,708.18	169,936	3,296,765	1,648	1,496	247,630.39	44,299	983,434	492	446	1,942
2027	3,484,205.26	171,636	3,329,733	1,665	1,511	250,106.70	44,742	993,268	497	451	1,961
2028	3,519,047.31	173,352	3,363,030	1,682	1,526	252,607.76	45,189	1,003,201	502	455	1,981
2029	3,554,237.78	175,086	3,396,661	1,698	1,541	255,133.84	45,641	1,013,233	507	460	2,001
2030	3,589,780.16	176,836	3,430,627	1,715	1,557	257,685.18	46,098	1,023,365	512	464	2,021
2031	3,625,677.96	178,605	3,464,934	1,732	1,572	260,262.03	46,559	1,033,599	517	469	2,041
				BUILD PASSENGER CO_2 TOTALS (METRIC TONS)	**26,888**				**BUILD HEAVY-DUTY CO_2 TOTALS (METRIC TONS)**	**8,021**	**34,908**

[1]: MPG data from http://www.epa.gov/oms/climate/420f05004.htm

[2]: MPG data from http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/NHTSA_Study_Trucks.pdf

[3]: CO_2 Emission data from http://www.epa.gov/oms/climate/420f05001.htm#calculating

Puyallup River Bridge Replacement

Delay and Travel Time Data Assumptions

Total ADT	16,200
Heavy Vehicle ADT	1,085
Passenger Vehicle ADT	15,115

Detour Route	Total Distribution (%)	Total Vehicles (vehicle)	Heavy Vehicle Distribution (%)	Heavy Vehicle Distribution (vehicle)	Passenger Vehicle Distribution (vehicle)
Lincoln	15%	2,430	80%	868	1,562
I-5	50%	8,100	10%	109	7,991
SR-509	35%	5,670	10%	108	5,562
Total	100%	16,200	100%	1,085	15,115

DELAY

	ADT	Delay (min)	Delay (min/day)	Delay (hr/day)	Delay (hr/year)*	VMT/route (miles)	VMT/day (miles)	VMT/year (miles)
Build (Passenger)	15,115	0.50	7,557.50	125.96	39,299.00	0.58	8,802.77	2,746,464.20
Build (Heavy Vehicle)	1,085	0.50	542.50	9.04	2,821.00	0.58	631.89	197,149.43

*Based on 312 days/year

	ADT	Delay (min)	Delay (min/day)	Delay (hr/day)	Delay (hr/year)*	VMT/route (miles)	VMT/day (miles)	VMT/year (miles)
Baseline (Passenger)								
I-5	7,991	1.83	14,650.17	244.17	76,180.87	2.37	18,902.95	5,897,721.23
Lincoln Avenue	1,562	1.17	1,822.33	30.37	9,476.13	2.17	3,384.69	1,056,022.76
SR-509	5,562	1.79	9,965.25	166.09	51,819.30	2.68	14,913.11	4,652,891.10
Total	**15,115.00**		**26,437.75**	**440.63**	**137,476.30**			**11,606,635.09**
Baseline (Heavy Vehicle)								
I-5	109	1.83	199.83	3.33	1,039.13	2.37	257.84	80,446.95
Lincoln Avenue	868	1.17	1,012.67	16.88	5,265.87	2.17	1,880.86	586,829.55
SR-509	108	1.79	193.50	3.23	1,006.20	2.68	289.58	90,347.40
Total	**1,085.00**		**1,406.00**	**23.43**	**7,311.20**			**757,623.90**

*Based on 312 days/year

Puyallup River Bridge Replacement

Delay and Travel Time Data Assumptions

TRAVEL TIME

	ADT	Delay (min)	Delay (min/day)	Delay (hr/day)	Delay (hr/year)*
Build (Passenger)	15,115	1.16	17,605.54	293.43	91,548.81
Build (Heavy Vehicle)	1,085	1.16	1,263.78	21.06	6,571.65

*Based on 312 days/year

	ADT	Delay (min)	Delay (min/day)	Delay (hr/day)	Delay (hr/year)*
Baseline (Passenger)					
I-5	7,991	3.93	31,413.11	523.55	163,348.15
Lincoln Avenue	1,562	3.66	5,716.78	95.28	29,727.28
SR-509	5,562	3.18	17,690.95	294.85	91,992.95
Total	**15,115.00**		**54,820.84**	**913.68**	**285,068.38**
Baseline (Heavy Vehicle)					
I-5	109	3.93	428.49	7.14	2,228.13
Lincoln Avenue	868	3.66	3,176.80	52.95	16,519.39
SR-509	108	3.18	343.51	5.73	1,786.27
Total	**1,085.00**		**3,948.80**	**65.81**	**20,533.78**

*Based on 312 days/year

BASELINE YEAR	PASSENGER BASELINE TRAVEL TIME	BASELINE HEAVY-VEHICLE TRAVEL TIME	BUILD YEAR	PASSENGER BUILD TRAVEL TIME	BUILD HEAVY-VEHICLE TRAVEL TIME	REDUCED TRAVEL TIME
(YEAR)	(HOUR)	(HOUR)	(YEAR)	(HOUR)	(HOUR)	(HOUR)
2012	91,548.81	20,533.78	2012	91,548.81	6,571.65	13,962.13
2013	93,379.78	20,944.46	2013	93,379.78	6,703.08	14,241.38
2014	95,247.38	21,363.35	2014	95,247.38	6,837.14	14,526.20
2015	97,152.33	21,790.61	2015	97,152.33	6,973.89	14,816.73
2016	99,095.37	22,226.43	2016	99,095.37	7,113.36	15,113.06
2017	101,077.28	22,670.95	2017	101,077.28	7,255.63	15,415.32
2018	103,098.83	23,124.37	2018	103,098.83	7,400.74	15,723.63
2019	105,160.80	23,586.86	2019	105,160.80	7,548.76	16,038.10
2020	107,264.02	24,058.60	2020	107,264.02	7,699.73	16,358.86
2021	109,409.30	24,539.77	2021	109,409.30	7,853.73	16,686.04
2022	345,502.88	24,785.17	2022	110,503.39	7,932.26	251,852.39
2023	348,957.91	25,033.02	2023	111,608.43	8,011.59	254,370.91
2024	352,447.48	25,283.35	2024	112,724.51	8,091.70	256,914.62
2025	355,971.96	25,536.18	2025	113,851.75	8,172.62	259,483.77
2026	359,531.68	25,791.54	2026	114,990.27	8,254.35	262,078.60
2027	363,127.00	26,049.46	2027	116,140.18	8,336.89	264,699.39
2028	366,758.27	26,309.95	2028	117,301.58	8,420.26	267,346.38
2029	370,425.85	26,573.05	2029	118,474.59	8,504.46	270,019.85
2030	374,130.11	26,838.78	2030	119,659.34	8,589.51	272,720.05
2031	377,871.41	27,107.17	2031	120,855.93	8,675.40	275,447.25
						2,787,814.67

Puyallup River Bridge Replacement

Detour Assumptions

I-5 Baseline Eastbound

	Distance (miles)	**Speed** (mph)	**Travel Time** (hours)	**Travel Time** (minutes)	**Signal Delay** (minutes)	**Total Time** (minutes)
Puyallup Avenue: Portland Avenue - Milwaukee Way	0.58	30	0.02	1.16	0.50	1.66
Total	**0.58**			**1.16**	**0.50**	**1.66**

I-5 Baseline Westbound

Puyallup Avenue: Milwaukee Way - Portland Avenue	0.58	30	0.02	1.16	0.50	1.66
Total	**0.58**			**1.16**	**0.50**	**1.66**

I-5 Detour Eastbound

Portland Avenue: Puyallup Avenue - E 28th St	0.27	30	0.01	0.55	1.33	1.88
E 28th Street: Portland Avenue - I-5	0.28	30	0.01	0.57	0.50	1.07
I-5: I-5 - Port of Tacoma Road	1.00	50	0.02	1.20	0.00	1.20
Port of Tacoma Road: I-5 - SR 99 (Pac Hwy)	0.20	30	0.01	0.41	0.92	1.32
SR 99 (Pac Hwy): Port of Tacoma Road - Milwaukee Way	0.63	30	0.02	1.27	0.00	1.27
Total	**2.39**			**3.99**	**2.75**	**6.74**

I-5 Detour Westbound

SR 99 (Pac Hwy): Milwaukee Way - Port of Tacoma Road	0.63	30	0.02	1.27	0.92	2.19
Port of Tacoma Road: SR 99 (Pac Hwy) - I-5	0.20	30	0.01	0.41	0.00	0.41
I-5: Port of Tacoma Road - E 27th Street	1.00	50	0.02	1.20	0.00	1.20
Portland Avenue: E 27th Street - Puyallup Ave	0.50	30	0.02	1.00	0.00	1.00
Total	**2.34**			**3.87**	**0.92**	**4.79**

SR 509 Baseline Eastbound

Puyallup Avenue: Portland Avenue - Milwaukee Way	0.58	30	0.02	1.16	0.50	1.66
Total	**0.58**			**1.16**	**0.50**	**1.66**

SR 509 Baseline Westbound

Puyallup Avenue: Milwaukee Way - Portland Avenue	0.58	30	0.02	1.16	0.50	1.66
Total	**0.58**			**1.16**	**0.50**	**1.66**

Puyallup River Bridge Replacement

Detour Assumptions

SR 509 Detour Eastbound

SR 509: Pacific Avenue - Port of Tacoma Road	2.40	55	0.04	2.62	1.00	3.62
Port of Tacoma Road: SR 509 - SR 99 (Pac Hwy)	0.28	30	0.01	0.56	0.92	1.48
Total	**2.68**			**3.18**	**1.92**	**5.10**

SR 509 Detour Westbound

Port of Tacoma Road: SR 99 (Pac Hwy) - SR 509	0.28	30	0.01	0.56	1.00	1.56
SR 509: Port of Tacoma Road - Pacific Avenue	2.40	55	0.04	2.62	0.67	3.28
Total	**2.68**			**3.18**	**1.67**	**4.85**

Lincoln Baseline Eastbound

Puyallup Avenue: Portland Avenue - Milwaukee Way	0.58	30	0.02	1.16	0.50	1.66
Total	**0.58**			**1.16**	**0.50**	**1.66**

Lincoln Baseline Westbound

Puyallup Avenue: Milwaukee Way - Portland Avenue	0.58	30	0.02	1.16	0.50	1.66
Total	**0.58**			**1.16**	**0.50**	**1.66**

Lincoln Detour Eastbound

Portland Avenue: Puyallup Avenue - Lincoln Avenue	0.48	30	0.02	0.96	0.83	1.79
Lincoln Avenue: Portland Avenue - Milwaukee Way	0.67	35	0.02	1.16	0.33	1.49
Milwaukee Way: Lincoln Avenue SR 99 (Pac Hwy)	1.08	35	0.03	1.85	0.00	1.85
Total	**2.23**			**3.97**	**1.17**	**5.13**

Lincoln Detour Westbound

Milwaukee Way: SR 99 - Lincoln Avenue	0.95	35	0.03	1.62	0.33	1.96
Lincoln Avenue: Milwaukee Way - Portland Avenue	0.67	35	0.02	1.16	0.33	1.49
Portland Avenue: Lincoln Avenue - Puyallup Avenue	0.48	50	0.01	0.58	0.50	1.08
Total	**2.10**			**3.35**	**1.17**	**4.52**