

APPENDIX I. BENEFIT-COST ANALYSIS DOCUMENTS

- Bellevue Bridge Alternative Construction Costs
- Annual Net Benefit of Bellevue Bridge
- Benefit-Cost Analysis Spreadsheets

PRESERVATION & MAINTENANCE	DEMOLITIC	N	NEW BRI	DGE	CONVERSION TO TR	RAIL FACILITY	UPGRADE TO SEPA	RATE LANES	EXPANSION OF PI	ERS/PHASED
through 2040	Item Description	Cost	Item Description	Cost	Item Description	Cost	Item Description	Cost	Item Description	Cost
Total Cost (2018 dollars) \$12,540,000.00	General Construction	\$635,000.00	General Construction	\$4,750,000.00	General Construction	\$750,000.00	General Construction	\$1,350,000.00	General Construction	\$3,210,000.00
Total Cost (2040 dollars) \$16,864,000.00										
*Assumes \$570k annual spend, 2.5%	Roadway	\$585,000.00	Roadway	\$4,500,000.00	Roadway	\$1,500,000.00	Roadway	\$1,000,000.00	Roadway	\$4,500,000.00
annual inflation, 2.5% risk-free (discount)										
	Superstructure	\$2,250,000.00	Main River Bridge	\$8,950,000.00	Main River Bridge	\$406,000.00	Main River Bridge	\$445,000.00	Main River Bridge	\$5,400,000.00
	Substructure	\$675,000.00	Nebraska Approach	\$6,390,000.00	Nebraska Approach	\$288,700.00	Nebraska Approach	\$315,000.00	Nebraska Approach	\$3,840,000.00
	Subtotal	\$4,145,000.00								
			Iowa Approach	\$5,450,000.00	Iowa Approach	\$305,300.00	Iowa Approach	\$335,900.00	Iowa Approach	\$4,060,000.00
	Fees (10%)	\$414,500.00	Subtotal	\$30,040,000.00	Subtotal	\$3,250,000.00	Subtotal	\$3,445,900.00	Subtotal	\$21,010,000.00
	Contingency (10%)	\$414,500.00								
	Total Cost (2018 dollars)	\$4,974,000.00	Fees (10%)	\$3,004,000.00	Fees (10%)	\$325,000.00	Fees (10%)	\$344,590.00	Fees (10%)	\$2,101,000.00
	Total Cost (2040 dollars)	\$8,564,000.00	Contingency (10%)	\$3,004,000.00	Contingency (10%)	\$325,000.00	Contingency (10%)	\$344,590.00	Contingency (10%)	\$2,101,000.00
	*Assumes 2.5% ann	ual inflation	Total Cost (2018 dollars)	\$36,048,000.00	Total Cost (2018 dollars)	\$3,900,000.00	Total Cost (2018 dollars)	\$4,135,080.00	Total Cost (2018 dollars	\$25,212,000.00
			Total Cost (2040 dollars)	\$62,060,000.00	Total Cost (2040 dollars)	\$6,715,000.00	Total Cost (2040 dollars)	\$7,119,000.00	Total Cost (2040 dollars	\$43,405,000.00
			*Assumes 2.5% an	nual inflation	*Assumes 2.5% ann	ual inflation	*Assumes 2.5% ann	ual inflation	*Assumes 2.5% anr	ual inflation

Annual Net Benefit of Bellevue Bridge

Calculated from factors in the	e Cai	r - Truck B	real	kdown								
	E	Existing		Rem	ovo	ed	Sources					
Route	Bell	evue Bridg	e US	-275 (North)	US	5-34 (South)						
Share		100%		55%		45%	Calculated from field data					
Distance (mi)		4.0)	17.0		16.5	Google Maps (from Hanco	ock St. & Mission Ave. to I-2	29 & Bunge	Ave.)		
Time (min)		6	,	25		19	Google Maps (from Hanco	ock St. & Mission Ave. to I-2	29 & Bunge	Ave.)		
	F	Existing		Rem	ov	ed						
	- Bell	evue Bridø	∉US	-275 (North)	US	-34 (South)						
Value of Time (\$/hr)	\$	2.092.313	\$2	2.923.789.85	\$2	2.392.191.70						
Vehicle Operation (\$/mi)	\$	1.469.330	\$2	2.569.198.64	\$2	2.102.071.61						
CO ₂ Value (\$/mi)	\$	44,554	\$	80,454.35	\$	65,826.28						
Total (\$/year):	\$3	8,606,197	\$			10,133,532	(*All monetary values have	e been adjusted to 2018 do	llars)			
		Annual N	let	Benefit:	\$	6,527,336						
Simplified Table of Above												
	E	Existing	I	Removed								
Value of Time (\$/hr)	\$	2,092,313	\$	5,315,982								
Vehicle Operation (\$/mi)	\$	1,469,330	\$	4,671,270								
CO ₂ Value (\$/mi)	\$	44,554	\$	146,281								
	¢	2 404 197	¢	10 122 522								
i otai (\$/year):	φ	3,606,177	φ	10,133,332								
Annual Net Ben	efit:		\$	6,527,336								
Car - Truck Breakdown												
	Cai	r	Tr	uck								
Volume (veh/year)		541,877		26,45 I			Provided by Belleview Brid	ge Toll Sales for 2017				
Occupancy (per/veh)		1.67	'	1.14			Texas Department of Tran	nsportation				
Value of Time (\$/hr)	\$	22.42	\$	20.92			Bureau of Labor Statistics					
Vehicle Operation (\$/mi)	\$	0.62	\$	1.09			AAA & American Transpo	rtation Research Institute				
CO ₂ Emission (\$/mi)	\$	0.02	\$	0.07			Environmental Defense Fu	nd				
					т.							
(Value of Time)	¢	2 029 236	¢	63 077	۰۱ د	2 092 3 1 3	Quadrant Calculations- O					
(Veb Operation)	Ψ Φ	1 354 441	Ψ ¢	114 889	Ψ ¢	1 469 330	Quadrant Calculations- Of	Destination	Bridge	Share (%) Dis	tance (mi) Tir	ne (min)
(CO ₂ Emission)	₽ \$	36 859	₽ \$	7 695	Ψ \$	44 554		1-29 & LIS-275		45%		
Total (\$/vear):	ې د ۲	420 535	Ψ \$	185 661	Ψ \$	3 606 197	St.	L29 & H10	US-275	10%	17.0	23
i otal (#/year).	ΨJ	,420,333	Ψ	105,001	Ψ	5,000,177	(West to Fast) I-29 & HIO	US-275 & 13th St.	US-275	45%	11.0	13
Removed							(West to East)	Mission Ave. & Hancock S	t US-275	10%	16.5	17
(Value of Time)	\$	5,081,545	\$	234,437	\$	5,315,982	Mission Ave. & Hancock	I-29 & HI0	US-34	10%	16.5	17
(Veh. Operation)	\$	4,189,456	\$	481,815	\$	4,671,270	St.	I-29 & US-34	US-34	35%	9.0	10
(CO ₂ Emission)	\$	114,008	\$	32,272	\$	146,281	I-29 & H10	Mission Ave. & Hancock S	st US-34	10%	17.5	24
Total (\$/year):	\$ 9	,385,008	\$	748,524	\$	10,133,532	(West to East)	US-34 & Harlan Lewis	US-34	35%	12.0	П





Demolition of Existing Bridge

It is assumed the decision is already made that the existing bridge will be demolished in 2040

			Costs			Benefits
			Maintenance		Added	
			Costs after	Lost Sales Tax	Bicycle/Trail	Benefit of co2, time,
Index (N)	Year	Demolition cost	2040	from vehicles	users Sales Tax	vehicle operation
21	2040 \$	8,564,000 \$	-	\$109,965.37	\$ -	\$ -
22	2041	\$	-	\$112,714.51	\$-	\$ -
23	2042	\$	-	\$115,532.37	\$-	\$ -
24	2043	\$	-	\$118,420.68	\$-	\$ -
25	2044	\$	-	\$121,381.20	\$-	\$ -
26	2045	\$	-	\$124,415.73	\$-	\$ -
27	2046	\$	-	\$127,526.12	\$-	\$ -
28	2047	\$	-	\$130,714.27	\$-	\$ -
29	2048	\$	-	\$133,982.13	\$-	\$ -
30	2049	\$	-	\$137,331.68	\$-	\$ -
31	2050	\$	-	\$140,764.97	\$-	\$ -
32	2051	\$	-	\$144,284.10	\$-	\$ -
33	2052	\$	-	\$147,891.20	\$-	\$ -
34	2053	\$	-	\$151,588.48	\$-	\$ -
35	2054	\$	-	\$155,378.19	\$-	\$ -
36	2055	\$	-	\$159,262.65	\$ -	\$ -
37	2056	\$	-	\$163,244.21	\$-	\$ -
38	2057	\$	-	\$167,325.32	\$-	\$ -
39	2058	\$	-	\$171,508.45	\$-	\$ -
40	2059	\$	-	\$175,796.16	\$ -	\$ -
41	2060	\$	-	\$180,191.07	\$ -	\$ -

	Discount Rate	Costs	Benefits	Net Benefits	B/C Ratio
2040 Net Present Value @	2.5%	\$10,816,949	\$0	(\$10,816,949)	0.00

Notes and Assumptions	
Sales tax assumption (vehicles)	
ADT	5,000
Percentage Stop Downtown*	2%
Average spending (Gas, food primarily)**	\$ 25
Total Daily Impact	\$ 2,500
Annual Impact	\$ 912,500
Sales Tax Rate	7%
Annual Sales Tax Revenue (2019 dollars)	\$ 63,875
Annual Sales Tax Revenue (2040 dollars)***	\$ 109,965

Data reference: 2008 DECA Survey, before Hun 24 route
Data rejerence. 2008 DECA Survey, before nwy 54 route
*Referencing DECA survey in 2008 that had 10% of respondents say they use the
bridge to get to thinkgs like gas, food, appoiontments, etc. (divide by 2 for same
vehicles that go over the bridge twice in one day)
**Also, 56% of 441 said they make purchases across the bridge because of the
conveinence
***This is a major assumption that this spending would occur somewhere
outside of Bellevue if not for the bridge

Rehabilitation of existing bridge for bicycles and pedestrian use only

The assumption is a comparison of conversion versus demolition. It is assumed the decision is already made that the existing bridge will be demolished in 2040 *Conversion costs does not indicate the type of bridge or desitnation feature

				Costs			Benefits	
						Added	Benefit of co2,	
		Bridge conversion	1	Maintenance	Bicyc	le/Trail users	time, vehicle	
Index (N)	Year	cost	Cos	ts after 2040		Sales Tax	operation	
21	2040 \$	6,715,000	\$	-	\$	-	\$ -	
22	2041		\$	43,039	\$	111,170	\$ -	
23	2042		\$	44,115	\$	113,950	\$ -	
24	2043		\$	45,218	\$	116,798	\$ -	
25	2044		\$	46,349	\$	119,718	\$ -	
26	2045		\$	47,507	\$	122,711	\$ -	
27	2046		\$	48,695	\$	125,779	\$ -	
28	2047		\$	49,912	\$	128,924	\$ -	
29	2048		\$	51,160	\$	132,147	\$ -	
30	2049		\$	52,439	\$	135,450	\$ -	
31	2050		\$	53,750	\$	138,837	\$ -	
32	2051		\$	55,094	\$	142,308	\$ -	
33	2052		\$	56,471	\$	145,865	\$ -	
34	2053		\$	57,883	\$	149,512	\$ -	
35	2054		\$	59,330	\$	153,250	\$ -	
36	2055		\$	60,813	\$	157,081	\$ -	
37	2056		\$	62,334	\$	161,008	\$ -	
38	2057		\$	63,892	\$	165,033	\$ -	
39	2058		\$	65,489	\$	169,159	\$ -	
40	2059		\$	67,127	\$	173,388	\$ -	
41	2060		\$	68,805	\$	177,723	\$ -	

	Discount Rate	Costs	Benefits	Net Benefits	B/C Ratio
2040 Net					
Present	2.5%	\$7,534,308	\$2,116,273	(\$5,418,035)	0.28
Value @					

Notes and Assumptions	
Sales tax assumption (Bike/Ped)	
Bicycle Traffic ADT*	200
Average spending (food primarily)	\$ 25
Total Daily Impact	\$ 5,000
Yearly Impact	\$ 900,000
Sales Tax Rate	7%
Annual Sales Tax Revenue (2019 dollars)	\$ 63,000
Annual Sales Tax Revenue (2040 dollars)	\$ 108,459

*Could assume that a large portion of this spending is in the downtown area, and not other commercial areas in Bellevue. Thus, somewhat a measure on impacts to downtown

New bridge construction + Rehabilitation of existing bridge for bicycles and pedestrian use only

The assumption is a comparison of conversion versus demolition. It is assumed the decision is already made that the existing bridge will be demolished in 2040 *Conversion costs does not indicate the type of bridge or desitnation feature

		Cost	s					Bene	fits	
		New bridge +						Added	Benefit of co2,	
		Existing bridge		Maintenance	А	dded Sales Tax		Bicycle/Trail	time, vehicle	
Index (N) Year	conversion cost	С	osts after 2040		from vehicles	u	sers Sales Tax	operation	
21	2040	\$ 68,775,000	\$	-	\$	-	\$	-	\$ -	
22	2041		\$	258,236		\$112,714.51	\$	111,170	\$11,518,206.83	
23	3 2042		\$	264,692		\$115,532.37	\$	113,950	\$11,806,162.00	
24	2043		\$	271,309		\$118,420.68	\$	116,798	\$12,101,316.05	
25	5 2044		\$	278,092		\$121,381.20	\$	119,718	\$12,403,848.96	
26	5 2045		\$	285,044		\$124,415.73	\$	122,711	\$12,713,945.18	
27	2046		\$	292,170		\$127,526.12	\$	125,779	\$13,031,793.81	
28	3 2047		\$	299,474		\$130,714.27	\$	128,924	\$13,357,588.65	
29	2048		\$	306,961		\$133,982.13	\$	132,147	\$13,691,528.37	
30	2049		\$	314,635		\$137,331.68	\$	135,450	\$14,033,816.58	
31	2050		\$	322,501		\$140,764.97	\$	138,837	\$14,384,662.00	
32	2051		\$	330,564		\$144,284.10	\$	142,308	\$14,744,278.55	
33	3 2052		\$	338,828		\$147,891.20	\$	145,865	\$15,112,885.51	
34	2053		\$	347,298		\$151,588.48	\$	149,512	\$15,490,707.65	
35	2054		\$	355,981		\$155,378.19	\$	153,250	\$15,877,975.34	
36	5 2055		\$	364,880		\$159,262.65	\$	157,081	\$16,274,924.72	
37	2056		\$	374,002		\$163,244.21	\$	161,008	\$16,681,797.84	
38	3 2057		\$	383,352		\$167,325.32	\$	165,033	\$17,098,842.78	
39	2058		\$	392,936		\$171,508.45	\$	169,159	\$17,526,313.85	
40	2059		\$	402,760		\$175,796.16	\$	173,388	\$17,964,471.70	
41	2060		\$	412,829		\$180,191.07	\$	177,723	\$18,413,583.49	

	Discount Rate	Costs	Benefits	Net Benefits	B/C Ratio
2040 Net Present Value @	2.5%	\$73,690,849.32	\$223,525,841	\$149,834,991	3.03

Notes and Assumptions		
Sales tax assumption (vehicle	es)	
ADT		5,000
Percentage Stop Downtown*		2%
Average spending (Gas, food primarily)**	\$	25
Total Daily Impact	\$	2,500
Annual Impact	\$	912,500
Sales Tax Rate		7%
Annual Sales Tax Revenue (2019 dollars)	\$	63,875
Annual Sales Tax Revenue (2040 dollars)***	\$	109,965
Sales tax assumption (Bike/Ped)		
Sales tax assumption (Bike/Ped) Bicycle Traffic ADT****		200
Sales tax assumption (Bike/Ped) Bicycle Traffic ADT**** Average spending (Gas, food primarily)	\$	200 25
Sales tax assumption (Bike/Ped) Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact	\$ \$	200 25 5,000
Sales tax assumption (Bike/Ped) Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact	\$ \$ \$	200 25 5,000 900,000
Sales tax assumption (Bike/Ped) Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact	\$ \$ \$	200 25 5,000 900,000
Sales tax assumption (Bike/Ped) Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact Sales Tax Rate	\$ \$ \$	200 25 5,000 900,000 7%
Sales tax assumption (Bike/Ped) Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact Sales Tax Rate Annual Sales Tax Revenue (2019 dollars)	\$ \$ \$	200 25 5,000 900,000 7% 63,000

Data reference: 2008 DECA Survey, before Hwy 34 route
*Referencing DECA survey in 2008 that had 10% of respondents say
they use the bridge to get to thinkgs like gas, food, appoiontments,
etc. (divide by 2 for same vehicles that go over the bridge twice in one
**Also, 56% of 441 said they make purchases across the bridge
because of the conveinence
***This is a major assumption that this spending would occur
somewhere outside of Bellevue if not for the bridge
****Could assume that a large portion of this spending is in the
downtown area, and not other commercial areas in Bellevue. Thus,
*****Based on 2100 ADT

Net Benefits for a bridge connection: time saved, vehicle				
savings from shorter commutes, carbon emmission from				
shorter commute				
Annual Net Benefit (2018) dollars*****	\$ 6,527,336.00			
Annual Net Benefit (2040) dollars	\$11,237,274.96			

New bridge construction with room for bicyclists and pedestrians

The assumption is a comparison of conversion versus demolition. It is assumed the decision is already made that the existing bridge will be demolished in 2040

		Costs				Benefits					
					Added				Benefit of co2,		
New bridge + room Maintenance Costs		A	dded Sales Tax		Bicycle/Trail	time, vehicle					
	Index (N)	Year	for bike/ped		after 2040		from vehicles		users Sales Tax	operation	
	21	2040	\$ 70,624,000	\$	-	\$	-	\$	-	\$-	
	22	2041		\$	215,196		\$112,714.51	\$	111,170	\$11,518,206.83	
	23	2042		\$	220,576		\$115,532.37	\$	113,950	\$11,806,162.00	
	24	2043		\$	226,091		\$118,420.68	\$	116,798	\$12,101,316.05	
	25	2044		\$	231,743		\$121,381.20	\$	119,718	\$12,403,848.96	
	26	2045		\$	237,537		\$124,415.73	\$	122,711	\$12,713,945.18	
	27	2046		\$	243,475		\$127,526.12	\$	125,779	\$13,031,793.81	
	28	2047		\$	249,562		\$130,714.27	\$	128,924	\$13,357,588.65	
	29	2048		\$	255,801		\$133,982.13	\$	132,147	\$13,691,528.37	
	30	2049		\$	262,196		\$137,331.68	\$	135,450	\$14,033,816.58	
	31	2050		\$	268,751		\$140,764.97	\$	138,837	\$14,384,662.00	
	32	2051		\$	275,470		\$144,284.10	\$	142,308	\$14,744,278.55	
	33	2052		\$	282,356		\$147,891.20	\$	145,865	\$15,112,885.51	
	34	2053		\$	289,415		\$151,588.48	\$	149,512	\$15,490,707.65	
	35	2054		\$	296,651		\$155,378.19	\$	153,250	\$15,877,975.34	
	36	2055		\$	304,067		\$159,262.65	\$	157,081	\$16,274,924.72	
	37	2056		\$	311,669		\$163,244.21	\$	161,008	\$16,681,797.84	
	38	2057		\$	319,460		\$167,325.32	\$	165,033	\$17,098,842.78	
	39	2058		\$	327,447		\$171,508.45	\$	169,159	\$17,526,313.85	
	40	2059		\$	335,633		\$175,796.16	\$	173,388	\$17,964,471.70	
	41	2060		\$	344,024		\$180,191.07	\$	177,723	\$18,413,583.49	

	Discount Rate	Costs	Benefits	Net Benefits	B/C Ratio
2040 Net Present Value @	2.5%	\$74,720,541.10	\$223,525,841	\$148,805,300	2.99

Notes and Assumptions		
Sales tax assumption (vehicl	les)	
ADT		5,000
Percentage Stop Downtown*		2%
Average spending (Gas, food primarily)**	\$	25
Total Daily Impact	\$	2,500
Annual Impact	\$	912,500
Sales Tax Rate		7%
Annual Sales Tax Revenue (2019 dollars)	\$	63,875
Annual Sales Tax Revenue (2040 dollars)***	\$	109,965
Sales tax assumption		
Sales tax assumption Bicycle Traffic ADT****		200
Sales tax assumption Bicycle Traffic ADT**** Average spending (Gas, food primarily)	\$	200 25
Sales tax assumption Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact	\$ \$	200 25 5,000
Sales tax assumption Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact	\$ \$ \$	200 25 5,000 900,000
Sales tax assumption Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact	\$ \$ \$	200 25 5,000 900,000
Sales tax assumption Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact Sales Tax Rate	\$ \$ \$	200 25 5,000 900,000 7%
Sales tax assumption Bicycle Traffic ADT**** Average spending (Gas, food primarily) Total Daily Impact Yearly Impact Sales Tax Rate Annual Sales Tax Revenue (2019 dollars)	\$ \$ \$	200 25 5,000 900,000 7% 63,000

Net Benefits for a bridge connection: time saved, vehicle savings from shorter commutes, carbon emmission from shorter commute

Annual Net Benefit (2018) dollars****	\$	6,527,336.00
Annual Net Benefit (2040) dollars	Ś	\$11,237,274.96

Data reference: 2008 DECA Survey, before Hwy 34 route
*Referencing DECA survey in 2008 that had 10% of respondents say they use
the bridge to get to thinkgs like gas, food, appoiontments, etc. (divide by 2 for
same vehicles that go over the bridge twice in one day).
**Also, 56% of 441 said they make purchases across the bridge because of the
conveinence
***This is a major assumption that this spending would occur somewhere
outside of Bellevue if not for the bridge
****Could assume that a large portion of this spending is in the downtown
area, and not other commercial areas in Pollovius. Thus, comowhat a measure

area, and not other commercial areas in Bellevue. Thus, somewhat a measure *****Based on 2100 ADT