

**Project Summary**

Project Name: Providence Viaduct I-95 Northbound Project  
 Project Number: 72700.18

Date: 10/27/2017



This project summary page details the benefit-cost analysis (BCA) for the Providence Viaduct I-95 Northbound project. A BCA provides estimates of the anticipated benefits that are expected to accrue from a project over a specified period and compares them to the anticipated costs of the project. The annual benefits and operation & maintenance costs are detailed in the respective tabs. The Project Benefits were developed as part of the 2016 FASTLANE Grant Application with adjustments made for some values (i.e. emissions) that are not applicable for the INFRA grant BCA.

The present value cost and benefit were calculated using the information in the U.S. Department of Transportation "Benefit-Cost Analysis Guidance for TIGER and INFRA Applications". These figures were then used to determine the benefit-cost ratio of the entire project.

<b>Benefits at 7% Discount Rate</b>		
Safety	\$	64,100,000.00
Travel Time Savings & Reliability	\$	113,800,000.00
Emissions	\$	206,645.35
Vehicle Operating Costs	\$	51,500,000.00
O&M Costs: With Improvements	\$	2,384,905.41
O&M Costs: Replace In-Kind Only	\$	133,225,548.46
<b>Total:</b>	<b>\$</b>	<b>365,217,099.22</b>

Present Day Total Construction Costs:	\$	342,880,000.00
Residual Value:	\$	141,335,554.00
Transfer of Land Made Available:	\$	8,352,000.00
Service Life:	75	
Analysis Period:	30	
Discount:	7%	
Present Value Cost:	\$	241,870,759.07
Present Value Benefit:	\$	367,147,288.40
Benefit-Cost Ratio:		<b>1.52</b>
Net Present Value (NPV)	\$	<b>125,276,529.33</b>
Return on Investment (ROI)		<b>13%</b>
Average User Cost Savings Per Year (NPV)	\$	<b>7,876,888.18</b>

Year#	Year	Project Benefits - Safety, Emissions, and Travel Time Savings	Project Benefits - Safety, Emissions, and Travel Time Savings Discounted at 7%	Annual Operations and Maintenance Costs	Annual Operations and Maintenance Costs Discounted at 7%	Annual Bridge Replacement Only Costs (Includes O&M)	Annual Bridge Replacement Only Costs (Includes O&M) Discounted at 7%	Project Costs	Project Costs at 7% Discount Rate	Net Project Benefits at 7% Discount Rate
1	2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	2017	\$ -	\$ -	\$ -	\$ -	\$ 8,735,000.00	\$ 7,629,487.29	\$ 17,470,000.00	\$ 15,258,974.58	\$ (7,629,487.29)
3	2018	\$ -	\$ -	\$ -	\$ -	\$ 56,185,000.00	\$ 45,863,696.21	\$ 112,370,000.00	\$ 91,727,392.43	\$ (91,727,392.43)
4	2019	\$ -	\$ -	\$ -	\$ -	\$ 35,000,000.00	\$ 26,701,332.42	\$ 70,000,000.00	\$ 53,402,664.84	\$ (53,402,664.84)
5	2020	\$ -	\$ -	\$ -	\$ -	\$ 35,000,000.00	\$ 24,954,516.28	\$ 70,000,000.00	\$ 49,909,032.56	\$ (49,909,032.56)
6	2021	\$ -	\$ -	\$ -	\$ -	\$ 30,000,000.00	\$ 19,990,266.71	\$ 57,590,000.00	\$ 38,374,648.67	\$ (38,374,648.67)
7	2022	\$ -	\$ -	\$ -	\$ -	\$ 10,080,000.00	\$ 6,277,317.40	\$ 15,450,000.00	\$ 9,621,483.51	\$ (9,621,483.51)
8	2023	\$ 2,200,000.00	\$ 1,501,284.93	\$ (308,616.67)	\$ (179,617.71)	\$ 234,083.33	\$ 136,238.63	\$ (8,352,000.00)	\$ (4,860,940.04)	\$ 6,318,845.89
9	2024	\$ 4,500,000.00	\$ 2,902,420.02	\$ (308,616.67)	\$ (167,867.02)	\$ 234,083.33	\$ 127,325.82	\$ -	\$ -	\$ 2,861,878.83
10	2025	\$ 6,700,000.00	\$ 4,003,418.38	\$ (308,616.67)	\$ (156,885.06)	\$ 234,083.33	\$ 118,996.10	\$ -	\$ -	\$ 3,965,529.41
11	2026	\$ 9,000,000.00	\$ 5,104,292.07	\$ (308,616.67)	\$ (146,621.56)	\$ 234,083.33	\$ 111,211.31	\$ -	\$ -	\$ 5,068,881.82
12	2027	\$ 11,200,000.00	\$ 6,105,052.25	\$ (308,616.67)	\$ (137,029.49)	\$ 234,083.33	\$ 103,935.80	\$ -	\$ -	\$ 6,071,958.56
13	2028	\$ 13,500,000.00	\$ 6,805,709.20	\$ (308,616.67)	\$ (128,064.94)	\$ 234,083.33	\$ 97,136.26	\$ -	\$ -	\$ 6,774,780.52
14	2029	\$ 15,800,000.00	\$ 7,306,272.40	\$ (308,616.67)	\$ (119,686.86)	\$ 234,083.33	\$ 90,781.55	\$ -	\$ -	\$ 7,277,367.09
15	2030	\$ 18,100,000.00	\$ 7,906,750.53	\$ (308,616.67)	\$ (111,856.88)	\$ 234,083.33	\$ 84,842.57	\$ -	\$ -	\$ 7,879,736.22
16	2031	\$ 20,500,000.00	\$ 8,307,151.62	\$ (308,616.67)	\$ (104,539.14)	\$ 234,083.33	\$ 79,292.12	\$ -	\$ -	\$ 8,281,904.60
17	2032	\$ 22,800,000.00	\$ 8,707,483.03	\$ (308,616.67)	\$ (97,700.13)	\$ 234,083.33	\$ 74,104.79	\$ -	\$ -	\$ 8,683,887.69
18	2033	\$ 25,300,000.00	\$ 8,907,751.51	\$ (308,616.67)	\$ (91,308.54)	\$ 234,083.33	\$ 69,256.81	\$ -	\$ -	\$ 8,885,699.79
19	2034	\$ 27,700,000.00	\$ 9,207,963.27	\$ (308,616.67)	\$ (85,335.08)	\$ 234,083.33	\$ 64,725.99	\$ -	\$ -	\$ 9,187,354.18
20	2035	\$ 30,200,000.00	\$ 9,408,124.05	\$ (308,616.67)	\$ (79,752.41)	\$ 234,083.33	\$ 60,491.58	\$ -	\$ -	\$ 9,388,863.22
21	2036	\$ 32,700,000.00	\$ 9,408,239.06	\$ (308,616.67)	\$ (74,534.96)	\$ 234,083.33	\$ 56,534.19	\$ -	\$ -	\$ 9,390,238.28
22	2037	\$ 35,200,000.00	\$ 9,508,313.07	\$ (308,616.67)	\$ (69,658.84)	\$ 234,083.33	\$ 52,835.69	\$ -	\$ -	\$ 9,491,489.92
23	2038	\$ 37,800,000.00	\$ 9,508,350.51	\$ (308,616.67)	\$ (65,101.72)	\$ 234,083.33	\$ 49,379.15	\$ -	\$ -	\$ 9,492,627.94
24	2039	\$ 40,400,000.00	\$ 9,508,355.38	\$ (308,616.67)	\$ (60,842.73)	\$ 234,083.33	\$ 46,148.74	\$ -	\$ -	\$ 9,493,661.39
25	2040	\$ 43,000,000.00	\$ 9,508,331.33	\$ (308,616.67)	\$ (56,862.37)	\$ 234,083.33	\$ 43,129.66	\$ -	\$ -	\$ 9,494,598.62
26	2041	\$ 45,700,000.00	\$ 9,408,281.74	\$ (308,616.67)	\$ (53,142.40)	\$ 234,083.33	\$ 40,308.09	\$ -	\$ -	\$ 9,395,447.44
27	2042	\$ 48,500,000.00	\$ 9,308,209.67	\$ (308,616.67)	\$ (49,665.79)	\$ 234,083.33	\$ 37,671.12	\$ -	\$ -	\$ 9,296,214.99
28	2043	\$ 51,200,000.00	\$ 9,208,117.88	\$ (308,616.67)	\$ (46,416.63)	\$ 234,083.33	\$ 35,206.65	\$ -	\$ -	\$ 9,196,907.90
29	2044	\$ 54,100,000.00	\$ 9,108,008.96	\$ (308,616.67)	\$ (43,380.03)	\$ 234,083.33	\$ 32,903.41	\$ -	\$ -	\$ 9,097,532.34
30	2045	\$ 56,900,000.00	\$ 9,007,885.19	\$ (308,616.67)	\$ (40,542.08)	\$ 234,083.33	\$ 30,750.85	\$ -	\$ -	\$ 8,998,093.96
31	2046	\$ 59,800,000.00	\$ 8,607,748.68	\$ (308,616.67)	\$ (37,889.80)	\$ 234,083.33	\$ 28,739.11	\$ -	\$ -	\$ 8,598,598.00
32	2047	\$ 62,800,000.00	\$ 8,507,601.34	\$ (308,616.67)	\$ (35,411.02)	\$ 234,083.33	\$ 26,858.99	\$ -	\$ -	\$ 8,499,049.30
33	2048	\$ 65,800,000.00	\$ 8,207,444.88	\$ (308,616.67)	\$ (33,094.42)	\$ 234,083.33	\$ 25,101.86	\$ -	\$ -	\$ 8,199,452.32
34	2049	\$ 68,900,000.00	\$ 8,107,280.88	\$ (308,616.67)	\$ (30,929.36)	\$ 234,083.33	\$ 23,459.68	\$ -	\$ -	\$ 8,099,811.20
35	2050	\$ 72,000,000.00	\$ 8,007,110.74	\$ (308,616.67)	\$ (28,905.94)	\$ 234,083.33	\$ 21,924.93	\$ -	\$ -	\$ 8,000,129.73
36	2051	\$ 75,200,000.00	\$ 7,706,935.75	\$ (308,616.67)	\$ (27,014.90)	\$ 234,083.33	\$ 20,490.59	\$ -	\$ -	\$ 7,700,411.44
37	2052	\$ 78,500,000.00	\$ 7,506,757.03	\$ (308,616.67)	\$ (25,247.57)	\$ 234,083.33	\$ 19,150.09	\$ (141,335,554.00)	\$ (11,562,497.48)	\$ 19,063,157.03
<b>Total Present Day Benefit Value</b>		<b>\$ 236,306,645.35</b>		<b>\$ (2,384,905.41)</b>		<b>\$ 133,225,548.46</b>		<b>Total Present Day Cost Value</b>	<b>\$ 241,870,759.07</b>	

## Operations and Costs

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Operating and Maintenance costs were projected for both the no-build baseline and with proposed improvement project. Without the proposed improvement project, the bridge still needs replacement in-kind to maintain structural integrity. Table 1 includes the replace in-kind costs and Table 2 includes operations and maintenance costs for the replace in kind alternative over 30 years. Table 3 shows the annual maintenance cost with the bridge reconstruction and proposed improvements, which has additional structures.

**Table 1. Replace In-Kind: Annual Maintenance Costs**

Description / Task	Cost		Cost
Replace Bridge 57801	\$112,000,000	1	\$112,000,000
		Misc Items/Contingencies (1)	\$39,200,000
		Mobilization (10%)	\$11,200,000
		Engineering (10%)	\$11,200,000
	<b>Total Replace In-Kind Cost</b>		<b>\$175,000,000</b>

**Table 2. Replace In-Kind: Annual Maintenance Costs**

Description / Task	Cost	# of times task performed in 30 years	30 year Maintenance Cost
Bridge Inspection (biannual)	\$50,000	15	\$750,000
820.0300 High Pressure Water Cleaning on Bridge Structure	\$115,000	15	\$1,725,000
820.0110 Concrete Surface Treatment (Protective Coating)	\$200,000	3	\$600,000
Joint Replacement <sup>1</sup>	\$400,000	1	\$400,000
Deck Repairs <sup>2</sup>	\$900,000	1	\$900,000
Repainting Existing Structural Steel <sup>3</sup>	\$1,200,000	1	\$1,200,000
		<b>Subtotal Inspection Cost</b>	<b>\$750,000</b>
		<b>Subtotal 30 year Maintenance</b>	<b>\$4,825,000</b>
		Misc Items/Contingencies (1)	\$482,500
		Mobilization (10%)	\$482,500
		Engineering (10%)	\$482,500
	<b>Total 30 year Maintenance Cost</b>		<b>\$7,022,500</b>

<sup>1</sup> Cost assumes 823.1760 Strip Seal Expansion Joint Assemblies. Note that Joint replacement occurs every 6 years after the initial 20 year replacement

2 joints x 55 LF x (\$500/LF for joint + \$750/LF for demo, prep, concrete patching) = \$1,375,000/joint replacement

<sup>2</sup> Assume 20% of the bridge deck needs partial depth repairs (818.2020)

20% of 1300 LF x 55 LF x \$125/SF = \$1,800,000/deck Repair

<sup>3</sup> Zone/Over-coat Painting (includes cleaning/surface preparation)

**Table 3. Annual Maintenance Costs for Proposed Improvements**

Description / Task	Cost	# of times task performed in 30 years	30 year Maintenance Cost
Bridge Inspection (biannual)	\$50,000	15	\$750,000
820.0300 High Pressure Water Cleaning on Bridge Structure	\$115,000	15	\$1,725,000
820.0110 Concrete Surface Treatment (Protective Coating)	\$200,000	3	\$600,000
Joint Replacement <sup>1</sup>	\$420,000	1	\$420,000
Deck Repairs <sup>2</sup>	\$1,800,000	1	\$1,800,000
Repainting Existing Structural Steel <sup>3</sup>	\$2,000,000	1	\$2,000,000
		<b>Subtotal Inspection Cost</b>	<b>\$750,000</b>
		<b>Subtotal 30 year Maintenance</b>	<b>\$6,545,000</b>
		Misc Items/Contingencies (1)	\$654,500
		Mobilization (10%)	\$654,500
		Engineering (10%)	\$654,500
	<b>Total 30 year Maintenance Cost</b>		<b>\$9,258,500</b>

<sup>1</sup> Cost assumes 823.1760 Strip Seal Expansion Joint Assemblies. Note that Joint replacement occurs every 6 years after the initial 20 year replacement

2 joints x 55 LF x (\$500/LF for joint + \$750/LF for demo, prep, concrete patching) = \$1,375,000/joint replacement

<sup>2</sup> Assume 20% of the bridge deck needs partial depth repairs (818.2020)

20% of 1300 LF x 55 LF x \$125/SF = \$1,800,000/deck Repair

<sup>3</sup> Zone/Over-coat Painting (includes cleaning/surface preparation)

# Transfer of Former State-owned Land for Redevelopment

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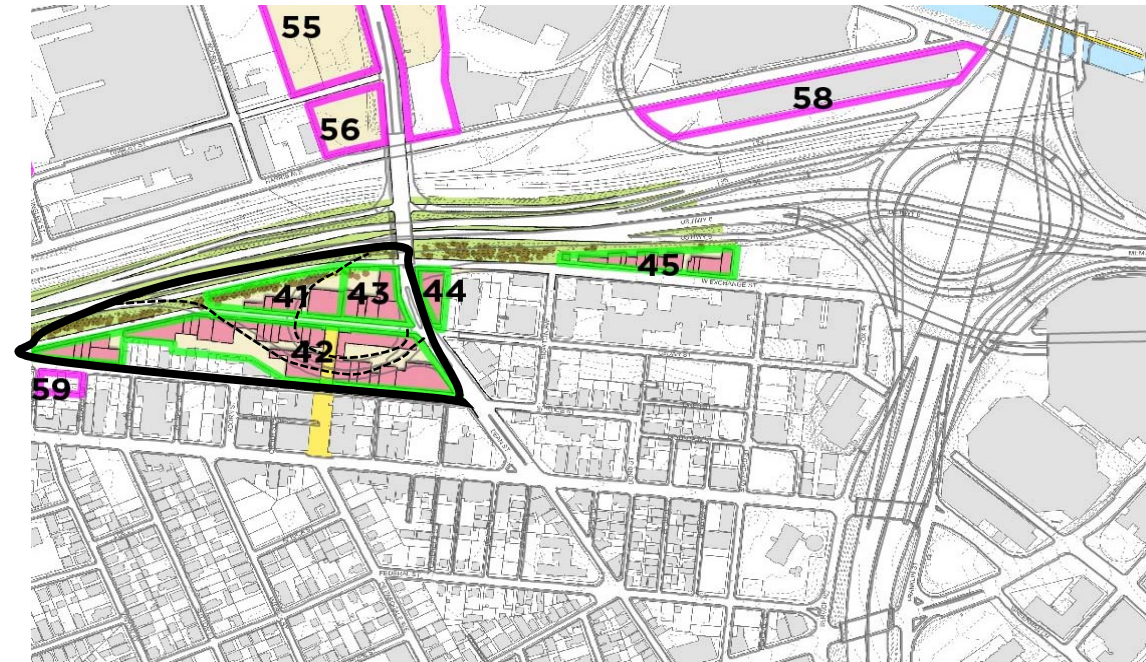
With the reconfiguration of the Dean Street interchange, over 5 acres of land will be made available for development. Because an official land use assessment has not been performed at this time, this analysis is based on the fair market value on similar lands recently transferred in Providence from interchange reconfiguration. As part of the Interstate 195 (I-way) project, 27 acres were freed up and sold for a total of \$42 million, or \$1.55M per acre (in 2013 dollars). This equates to \$44 million in 2017 dollars, or \$1.6M per acre. A comparison of nearby properties assessed land values (Table 2) suggests an average valuation of \$2.4M per acre. To be conservative, the lower \$1.6M per acre valuation was used.

**Table 1. Potential Value of Dean Street Interchange Land**

Parcel	Area (acre)	Est. Value/Acre	Value
41	1.07	\$1,600,000	\$1,712,000
42	3.3	\$1,600,000	\$5,280,000
43	0.85	\$1,600,000	\$1,360,000
<b>Total</b>			<b>\$8,352,000</b>

**Table 2. Nearby Property Comparison**

Property	Assessed Land Value	Acres	Land Value per Acre
121 Spruce Street	\$ 410,000	0.23	\$1,783,000
120 Spruce Street	\$ 835,000	0.31	\$2,694,000
215 Atwells Avenue	\$ 1,200,000	0.56	\$2,143,000
249 Atwells Avenue	\$ 225,000	0.08	\$2,813,000
290 Atwells Avenue	\$ 221,000	0.09	\$2,456,000
	Average		\$2,377,800
	Minimum		\$1,783,000
	Maximum		\$2,813,000



**Project Benefits**

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**Benefits using 7% Discount Rate**

Data Year	Vehicle Operating Costs	Business Time & Reliability Costs	Value of Personal Time & Reliability	Safety Cost	(C) Shipper/Logistics Cost (\$)	(D) Business Productivity (\$)	(E) Social/ Environ. (non-\$)	Total Benefits (7% Discount)
2020	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2021	\$0.3	\$0.2	\$0.6	\$0.4	\$0.0	\$0.0	\$0.0	\$1.5
2022	\$0.6	\$0.3	\$1.1	\$0.8	\$0.1	\$0.0	\$0.0	\$2.9
2023	\$0.8	\$0.4	\$1.6	\$1.1	\$0.1	\$0.0	\$0.0	\$4.0
2024	\$1.1	\$0.5	\$2.0	\$1.4	\$0.1	\$0.0	\$0.0	\$5.1
2025	\$1.3	\$0.6	\$2.3	\$1.7	\$0.2	\$0.0	\$0.0	\$6.1
2026	\$1.4	\$0.7	\$2.6	\$1.9	\$0.2	\$0.0	\$0.0	\$6.8
2027	\$1.6	\$0.7	\$2.8	\$2.0	\$0.2	\$0.0	\$0.0	\$7.3
2028	\$1.7	\$0.8	\$3.0	\$2.2	\$0.2	\$0.0	\$0.0	\$7.9
2029	\$1.8	\$0.8	\$3.2	\$2.3	\$0.2	\$0.0	\$0.0	\$8.3
2030	\$1.9	\$0.9	\$3.3	\$2.4	\$0.2	\$0.0	\$0.0	\$8.7
2031	\$1.9	\$0.9	\$3.4	\$2.5	\$0.2	\$0.0	\$0.0	\$8.9
2032	\$2.0	\$0.9	\$3.5	\$2.5	\$0.3	\$0.0	\$0.0	\$9.2
2033	\$2.0	\$0.9	\$3.6	\$2.6	\$0.3	\$0.0	\$0.0	\$9.4
2034	\$2.0	\$0.9	\$3.6	\$2.6	\$0.3	\$0.0	\$0.0	\$9.4
2035	\$2.1	\$0.9	\$3.6	\$2.6	\$0.3	\$0.0	\$0.0	\$9.5
2036	\$2.1	\$0.9	\$3.6	\$2.6	\$0.3	\$0.0	\$0.0	\$9.5
2037	\$2.1	\$0.9	\$3.6	\$2.6	\$0.3	\$0.0	\$0.0	\$9.5
2038	\$2.1	\$0.9	\$3.6	\$2.6	\$0.3	\$0.0	\$0.0	\$9.5
2039	\$2.1	\$0.9	\$3.6	\$2.5	\$0.3	\$0.0	\$0.0	\$9.4
2040	\$2.0	\$0.9	\$3.6	\$2.5	\$0.3	\$0.0	\$0.0	\$9.3
2041	\$2.0	\$0.9	\$3.5	\$2.5	\$0.3	\$0.0	\$0.0	\$9.2
2042	\$2.0	\$0.9	\$3.5	\$2.4	\$0.3	\$0.0	\$0.0	\$9.1
2043	\$2.0	\$0.9	\$3.4	\$2.4	\$0.3	\$0.0	\$0.0	\$9.0
2044	\$1.9	\$0.8	\$3.4	\$2.3	\$0.2	\$0.0	\$0.0	\$8.6
2045	\$1.9	\$0.8	\$3.3	\$2.3	\$0.2	\$0.0	\$0.0	\$8.5
2046	\$1.8	\$0.8	\$3.2	\$2.2	\$0.2	\$0.0	\$0.0	\$8.2
2047	\$1.8	\$0.8	\$3.2	\$2.1	\$0.2	\$0.0	\$0.0	\$8.1
2048	\$1.8	\$0.8	\$3.1	\$2.1	\$0.2	\$0.0	\$0.0	\$8.0
2049	\$1.7	\$0.8	\$3.0	\$2.0	\$0.2	\$0.0	\$0.0	\$7.7
2050	\$1.7	\$0.7	\$2.9	\$2.0	\$0.2	\$0.0	\$0.0	\$7.5
Total	\$51.5	\$23.1	\$90.7	\$64.1	\$6.7	\$0.0	\$0.2	\$236.3

**Benefits using 3% Discount Rate**

Data Year	Vehicle Operating Costs	Business Time & Reliability Costs	Value of Personal Time & Reliability	Safety Cost	(C) Shipper/Logistics Cost (\$)	(D) Business Productivity (\$)	(E) Social/ Environ. (non-\$)	Total Benefits (7% Discount)
2020	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2021	\$0.4	\$0.2	\$0.7	\$0.5	\$0.1	\$0.0	\$0.0	\$1.9
2022	\$0.8	\$0.4	\$1.4	\$1.0	\$0.1	\$0.0	\$0.1	\$3.8
2023	\$1.1	\$0.6	\$2.1	\$1.5	\$0.1	\$0.0	\$0.1	\$5.5
2024	\$1.4	\$0.7	\$2.7	\$1.9	\$0.2	\$0.0	\$0.1	\$7.0
2025	\$1.8	\$0.9	\$3.3	\$2.3	\$0.2	\$0.0	\$0.2	\$8.7
2026	\$2.1	\$1.0	\$3.8	\$2.7	\$0.3	\$0.0	\$0.2	\$10.1
2027	\$2.4	\$1.1	\$4.3	\$3.1	\$0.3	\$0.0	\$0.2	\$11.4
2028	\$2.6	\$1.2	\$4.8	\$3.4	\$0.3	\$0.0	\$0.3	\$12.6
2029	\$2.9	\$1.3	\$5.2	\$3.8	\$0.4	\$0.0	\$0.3	\$13.9
2030	\$3.2	\$1.5	\$5.7	\$4.1	\$0.4	\$0.0	\$0.3	\$15.2
2031	\$3.4	\$1.5	\$6.1	\$4.4	\$0.4	\$0.0	\$0.4	\$16.2
2032	\$3.6	\$1.6	\$6.5	\$4.6	\$0.5	\$0.0	\$0.4	\$17.2
2033	\$3.8	\$1.7	\$6.8	\$4.9	\$0.5	\$0.0	\$0.5	\$18.2
2034	\$4.1	\$1.8	\$7.2	\$5.1	\$0.5	\$0.0	\$0.5	\$19.2
2035	\$4.2	\$1.9	\$7.5	\$5.4	\$0.5	\$0.0	\$0.5	\$20.0
2036	\$4.4	\$2.0	\$7.8	\$5.6	\$0.6	\$0.0	\$0.6	\$21.0
2037	\$4.6	\$2.0	\$8.1	\$5.8	\$0.6	\$0.0	\$0.6	\$21.7
2038	\$4.8	\$2.1	\$8.4	\$5.9	\$0.6	\$0.0	\$0.7	\$22.5
2039	\$4.9	\$2.2	\$8.6	\$6.1	\$0.6	\$0.0	\$0.7	\$23.1
2040	\$5.1	\$2.2	\$8.9	\$6.2	\$0.7	\$0.0	\$0.7	\$23.8
2041	\$5.2	\$2.3	\$9.1	\$6.4	\$0.7	\$0.0	\$0.8	\$24.5
2042	\$5.3	\$2.3	\$9.4	\$6.5	\$0.7	\$0.0	\$0.8	\$25.0
2043	\$5.5	\$2.4	\$9.6	\$6.6	\$0.7	\$0.0	\$0.9	\$25.7
2044	\$5.6	\$2.4	\$9.8	\$6.7	\$0.7	\$0.0	\$0.9	\$26.1
2045	\$5.7	\$2.5	\$10.0	\$6.8	\$0.7	\$0.0	\$1.0	\$26.7
2046	\$5.8	\$2.5	\$10.1	\$6.9	\$0.7	\$0.0	\$1.0	\$27.0
2047	\$5.9	\$2.6	\$10.3	\$7.0	\$0.8	\$0.0	\$1.0	\$27.6
2048	\$6.0	\$2.6	\$10.5	\$7.1	\$0.8	\$0.0	\$1.1	\$28.1
2049	\$6.0	\$2.7	\$10.6	\$7.1	\$0.8	\$0.0	\$1.1	\$28.3
2050	\$6.1	\$2.7	\$10.7	\$7.2	\$0.8	\$0.0	\$1.2	\$28.7
Total	\$118.7	\$52.9	\$210.0	\$146.6	\$15.3	\$0.0	\$17.2	\$560.7

**Benefits Undiscounted**

Data Year	Vehicle Operating Costs	Business Time & Reliability Costs	Value of Personal Time & Reliability	Safety Cost	(C) Shipper/Logistics Cost (\$)	(D) Business Productivity (\$)	(E) Social/ Environ. (non-\$)	Total Benefits (7% Discount)
2020	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2021	\$0.4	\$0.2	\$0.9	\$0.6	\$0.1	\$0.0	\$0.0	\$2.2
2022	\$0.9	\$0.5	\$1.7	\$1.2	\$0.1	\$0.0	\$0.1	\$4.5
2023	\$1.4	\$0.7	\$2.6	\$1.8	\$0.2	\$0.0	\$0.1	\$6.7
2024	\$1.8	\$0.9	\$3.4	\$2.4	\$0.2	\$0.0	\$0.2	\$9.0
2025	\$2.3	\$1.1	\$4.2	\$3.0	\$0.3	\$0.0	\$0.2	\$11.2
2026	\$2.8	\$1.3	\$5.1	\$3.7	\$0.4	\$0.0	\$0.3	\$13.5
2027	\$3.3	\$1.6	\$5.9	\$4.3	\$0.4	\$0.0	\$0.3	\$15.8
2028	\$3.8	\$1.8	\$6.8	\$4.9	\$0.5	\$0.0	\$0.4	\$18.1
2029	\$4.3	\$2.0	\$7.7	\$5.5	\$0.6	\$0.0	\$0.5	\$20.5
2030	\$4.8	\$2.2	\$8.6	\$6.2	\$0.6	\$0.0	\$0.5	\$22.8
2031	\$5.3	\$2.4	\$9.4	\$6.8	\$0.7	\$0.0	\$0.6	\$25.3
2032	\$5.8	\$2.6	\$10.4	\$7.4	\$0.8	\$0.0	\$0.7	\$27.7
2033	\$6.4	\$2.9	\$11.3	\$8.1	\$0.8	\$0.0	\$0.8	\$30.2
2034	\$6.9	\$3.1	\$12.2	\$8.7	\$0.9	\$0.0	\$0.8	\$32.7
2035	\$7.4	\$3.3	\$13.1	\$9.4	\$1.0	\$0.0	\$0.9	\$35.2
2036	\$8.0	\$3.6	\$14.1	\$10.0	\$1.0	\$0.0	\$1.0	\$37.8
2037	\$8.6	\$3.8	\$15.1	\$10.7	\$1.1	\$0.0	\$1.1	\$40.4
2038	\$9.1	\$4.0	\$16.0	\$11.4	\$1.2	\$0.0	\$1.3	\$43.0
2039	\$9.7	\$4.3	\$17.1	\$12.0	\$1.3	\$0.0	\$1.4	\$45.7
2040	\$10.3	\$4.5	\$18.1	\$12.7	\$1.3	\$0.0	\$1.5	\$48.5
2041	\$10.9	\$4.8	\$19.1	\$13.4	\$1.4	\$0.0	\$1.6	\$51.2
2042	\$11.5	\$5.1	\$20.2	\$14.1	\$1.5	\$0.0	\$1.8	\$54.1
2043	\$12.1	\$5.3	\$21.2	\$14.7	\$1.6	\$0.0	\$1.9	\$56.9
2044	\$12.8	\$5.6	\$22.3	\$15.4	\$1.6	\$0.0	\$2.1	\$59.8
2045	\$13.4	\$5.9	\$23.5	\$16.1	\$1.7	\$0.0	\$2.2	\$62.8
2046	\$14.0	\$6.2	\$24.6	\$16.8	\$1.8	\$0.0	\$2.4	\$65.8
2047	\$14.7	\$6.5	\$25.7	\$17.5	\$1.9	\$0.0	\$2.6	\$68.9
2048	\$15.4	\$6.8	\$26.9	\$18.2	\$2.0	\$0.0	\$2.8	\$72.0
2049	\$16.0	\$7.1	\$28.1	\$18.9	\$2.1	\$0.0	\$3.0	\$75.2
2050	\$16.7	\$7.4	\$29.3	\$19.6	\$2.2	\$0.0	\$3.2	\$78.5
Total	\$240.8	\$107.5	\$424.6	\$295.5	\$31.3	\$0.0	\$36.3	\$1,136.0