

Knik Arm Bridge & Toll Authority

CAPITAL EXPENDITURE REPORT

Maintenance, Operations & CAPEX Estimates



Prepared by:

Wilbur Smith Associates

In Association with

PND Engineers, Inc.

February 2011

MAINTENANCE, OPERATIONS and CAPITAL EXPENTITURE COSTS

INTRODUCTION

This report summarizes the Maintenance, Operations and Capital Expenditure (CAPEX) costs estimated by *Wilbur Smith Associates* (WSA) to be associated with the proposed bridge and approach highway over an assumed 40 year period, beginning with the planned opening of the facility in 2015. It represents an update of the 'Maintenance and Operations Costs' section of the 2005 WSA Traffic and Toll Revenue Study and has been prepared in support of the TIFIA letter of interest. Significantly, whereas the 2005 report treated all of these costs as either Maintenance or Operations, this report distinguishes Capital Expenditures from those two cost categories. In this context, Capital Expenditures are considered to be all major repairs, rehabilitation and replacements; as well as cyclical costs, typically with a period of more than two years.

Estimated 2015 Costs:

*Maintenance Costs =
\$1,039,000*

*Operations Costs =
\$707,100*

*CAPEX Costs =
\$28,100*

The development of many of the element specific, contributing cost estimates was conducted in close collaboration with PND Engineers, Inc. Anchorage based PND also provided valuable insight into the differing practices and costs associated with maintaining infrastructure in the central region of Alaska. For instance, the application of roadway salts and the resulting deterioration of both steel and concrete structural elements in most of the northern lower 48 states becomes the driving factor behind bridge repair and rehabilitation costs. We don't see anywhere near those levels of corrosion induced deterioration on the Yukon River bridge which has a similar structural type to the planned Knik Arm Bridge, but which sees virtually no chlorides. While the Knik Arm Bridge will be subject to some salt spray induced chlorides, we never-the-less expect the resulting deterioration (and the associated CAPEX costs) to be somewhat less than would be typically encountered in the lower 48 states. On the other hand, it is common to perform a mill and fill operation to renew asphalt pavement surfaces on a five year cycle in the Anchorage area, while that cycle would be significantly greater in the lower 48. These types of considerations have been incorporated into the development of the itemized cost estimates.

Accordingly, the costs investigated herein comprise the three following categories: Maintenance, Operations and CAPEX.

Maintenance Costs

As compiled herein, Maintenance costs consist of three categories:

- The 'General Maintenance Costs' which would include the crew (assumed to be five persons) and crew chief, along with their vehicles, equipment, tools, incidental supplies and materials.
- A 'Maintenance Administration' entity which is assumed to include a maintenance supervisor/planner, along with the costs of one vehicle, etc.
- Incidental or cyclical maintenance work that would typically be outsourced, but would not normally be considered capital expenditures. This tends to be service oriented work and would not represent direct infrastructure costs.

General Maintenance Costs

Our research yielded several sources for estimating General Maintenance Costs from agencies in ten states. We felt that the New York State Bridge Authority's records were the most applicable with respect to bridge related maintenance costs, as they were the most current and were based on two bridges of similar size. To those costs we applied a 0.70 factor to account for the relative simplicity of the planned Knik Arm Bridge, it's simpler, cleaner structural type, and the age of the New York facilities. We then applied a factor 1.30 to account for the various effects (transport, etc.) associated with working in central Alaska. Accordingly, we estimate the average annual bridge related General Maintenance Costs to be \$692,500, with \$610,150 in the year 2015 for the bridge in new condition.

For the approach roadway costs we relied on data provided by the Alaska Department of Transportation. Based on ADOT's 2006 estimate of \$4,670 per lane mile, and an average of 2.39 lanes throughout the approaches; we estimate the corresponding approach highway related General Maintenance Costs to be \$79,000 per year. Given that 29% of highway maintenance costs in Alaska are reported to be related to snow removal and sanding, we add another \$5,700 to the annual estimate; because we assume that it will be one operation, conducted continuously by the same forces. Therefore, the total annual General Maintenance Cost for the approach highways is \$84,700 . We assume that much of the basic maintenance crew cost is covered in the bridge tabulation above. For this tabulation, the approach highway related costs would be in addition to the bridge crew costs.

Accordingly, the total for the entire facility in 2015 is estimated to be \$694,850.

All of these numbers are in 2015 dollars, estimated based on an assumed inflationary rate of 3% per annum, typical unless stated otherwise.

Maintenance Administration Costs

This item includes a Maintenance Supervisor/Planner, equipment and vehicle and is estimated at \$182,000 per year.

Outsourced Incidental or Cyclical Maintenance Costs

Incidental or cyclical, maintenance includes striping and inspections: NBIS bridge inspections and sign inspections every two years, plus underwater inspections and bathometric surveys every four years. The estimated costs are included in the tabulation in the M & O and CAPEX Annual Cost table on an annual basis in accordance with their assumed cycles. The sum of these costs for 2015 are estimated to be \$162,100.

Accordingly, for the year 2015, the total combined maintenance costs are estimated to be about \$1,039,000.

Operations Costs

Operations costs typically include, but are not limited to: Administration, Toll Collection, Patrol (safety & security), Communications, Insurance and Miscellaneous Fixed Overhead Costs. Different reporting agencies list varying sub-elements in their Operations cost tabulations, but the totals are fairly consistent (within about 22% as reported on a per system mile basis). Most agencies report operation costs to be independent of the number of lanes. For this report, toll collection costs are being reported elsewhere. Based on prior study results for four states, total net operations costs, adjusted for inflation and increased by a factor of 30% for central Alaska rates, should be \$707,100 for the year 2015.

Capital Expenditures

CAPEX figures are tabulated in the following 'M & O and CAPEX Annual Cost Tables'. In general, CAPEX is considered to include: major repairs and/or rehabilitation; and replacement of mechanical/electrical system elements due to deterioration or obsolescence. Many of these expenditures are planned, cyclical operations, based on historic patterns. Other, more significant rehabilitation projects may re-occur over the long term and for planning purposes are therefore commonly assumed to be cyclical in nature, though some of these may only recur once during the forty year study period.

For each CAPEX category, assumptions have been made relative to the appropriate recurrence cycle, interval period or critical age. The estimated costs also reflect, where applicable, published and anecdotal industry data. The collaborative assumptions are based largely on our 30+ years of focused experience in the inspection and remedial technology of bridges, and on the area sensitive input from PND. The estimated costs were typically derived on a per unit basis and on estimates of the unit quantities.

For various CAPEX categories, both the assumed cycle of repairs and the initial costs have been adjusted during the early years to reflect the lower costs anticipated for a nearly new structure.

For the year 2015, Capital Expenditures are estimated to be only \$28,100.

CONCLUSIONS

Combined M & O and CAPEX Expenditures

For the forty (40) year study period, with the initial two lane traffic configuration maintained throughout, the sum of all M&O and CAPEX costs (rounded to the nearest thousand) would be:

- Maintenance = \$ 49,247,000 (in 2015 dollars), and \$ 94,787,000 (adjusted for inflation)
- Operations = \$ 28,991,000 " " , and \$ 55,735,000 " "
- CAPEX = \$ 62,650,000 " " , and \$137,469,000 " "
- TOTAL = \$140,889,000 " " , and \$287,991,000 " "

For a detailed, annual cost summary, see the following cost tables: M&O and CAPEX Table 1 (in 2015 dollars), and Table 2 (as adjusted for inflation). Table 2 is based on an assumed annual inflation rate of 3.0 %. Tables 1 and 2 reflect the assumption that the initial two lane configuration on the bridge would be maintained for the entire 40 year study period.

Costs Associated With a Future Conversion to Four Lane Traffic

A similar, detailed tabulation was developed for the 'conversion to four lanes' case. Tables 3 and 4 present the summary totals on an annual basis of the incremental costs associated with a potential conversion. The traffic demand model anticipates the need for additional lanes, beginning in 2025. It is assumed that the associated construction costs would be incurred over a two year period, in 2023 and 2024. Those direct construction costs are not included herein. It is assumed that four lanes will be operational throughout Sections 2 thru 5 on January 1st, 2025. Our review found that while many cost categories will increase under the four lane configuration; others will not change significantly, as for instance the operations costs. In addition, some long-term CAPEX costs, for instance railing and lighting repairs and rehabilitation, will actually be reduced in the first several years following the conversion to four lanes; as it is assumed that those elements on one side of the bridge will be removed for potential use elsewhere, and will not be reset on the new bridge fascia. Accordingly, the incremental increase in costs depicted in Table 3 includes additional costs, but also some relatively smaller reductions in cost due to the new condition of some deck elements on the bridge. Table 4 is a summary of these additional, incremental costs (only), adjusted for inflation.

Accordingly, the additional, incremental costs, for the entire forty (40 year study period, due to a four lane conversion in 2025, are estimated to be:

- Maintenance = \$ 5,787,600 (in 2015 dollars), and \$ 12,353,000 (adjusted for inflation)
- Operations = \$ 0 " " , and \$ 0 " "
- CAPEX = \$12,197,400 " " , and \$ 27,394,000 " "
- TOTAL = \$17,985,000 " " , and \$ 39,747,000 " "

The revised, forty year totals, for a four lane conversion in 2025 are then:

- Maintenance = \$ 55,034,600 (in 2015 dollars), and \$107,140,000 (adjusted for inflation)
 - Operations = \$ 28,991,000 " " , and \$ 55,735,000 " "
 - CAPEX = \$ 74,847,400 " " , and \$164,863,000 " "
 - TOTAL = \$158,873,000 " " , and \$327,738,000 " "
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WILBUR SMITH ASSOCIATES

James A. Walrath
Vice President

M&O and CAPEX TABLE 1 - (in 2015 dollars, with the initial two-lane configuration maintained throughout)

Operation and Maintenance - Bridge			Year-->	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	
BRIDGE TASKS	O / M / C	Description	Interval /Period (yrs)																						
BM11	M	NBIS Biennial Inspection	2	\$ 63,400		\$ 63,400		\$ 63,400		\$ 63,400		\$ 63,400		\$ 101,200		\$ 101,200		\$ 101,200		\$ 101,200		\$ 101,200		\$ 101,200	
BM12	M	Underwater Bridge Inspecti	4			\$ 101,800				\$ 101,800				\$ 101,800				\$ 101,800				\$ 101,800		\$ 101,800	
BM13	M	Bathymetry Survey	Varies	\$ 33,800		\$ 33,800			\$ 33,800					\$ 33,800				\$ 33,800				\$ 33,800		\$ 33,800	
BM1	M	Striping	1		\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	\$ 14,200	
BM2	MA	Maintenance Administration	1	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	\$ 182,000	
BM3	M	Bridge Maintenance Includes:	1	\$ 610,200	\$ 651,300	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	\$ 692,500	
	M	*Damaged Railing Repairs	1																						
	M	*Scupper & Drain Clearing	1																						
	M	*Bridge Power Washing	1																						
	M	*Partial Paint Touchup	2																						
	M	*Pavement Spot Repairs	1																						
	M	*Lighting (Replace bulbs, et	1																						
BC1	C	Pavement Mill & Fill	5					\$ 777,300						\$ 777,300				\$ 777,300						\$ 777,300	
BC2	C	Bridge Deck Repair	35																						
BC3	C	Substructure Indepth Inspection & Repair	8							\$ 31,700								\$ 31,700							
BC4	C	Deck Joint Replacement (Piers)	10											\$ 623,300										\$ 623,300	
BC5	C	Joint w/ Deck Replacement	10											\$ 58,000										\$ 58,000	
BC6	C	Lighting System Replacement	20																					\$ 973,000	
BC7	C	Bridge Railing Replacement	35																						
BC8	C	Painting	12																						
BC9	C	Superstructure Repairs	25													\$ 4,550,000									
BC10	C	Navigation Light Replacement	30																						
BC11	C	Fender System	NIC																						
Total Annual Bridge Costs				\$ 889,400	\$ 847,500	\$ 1,087,700	\$ 888,700	\$ 952,100	\$ 1,699,800	\$ 1,053,900	\$ 920,400	\$ 952,100	\$ 888,700	\$ 2,584,100	\$ 888,700	\$ 5,539,900	\$ 888,700	\$ 1,125,500	\$ 1,697,700	\$ 989,900	\$ 888,700	\$ 1,125,500	\$ 888,700	\$ 3,421,500	
NIC Not in Contract																									
Operation and Maintenance - Approaches			Year-->	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	
APPR HWY TASKS	O / M / C	Description	Interval /Period (yrs)																						
AM11	M	Sign Inspections (includes bridge signs)	2		\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	\$ 6,200	
AO1	O	General Operations Costs	1	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	
AM1	M	General Roadway Maintenance Includes:	1	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	\$ 84,700	
	M	*Pavement Repair	1																						
	M	*Snow Plowing & Removal	1																						
	M	*Guardrail Repair	1																						
	M	*Sign Maintenance	1																						
	M	*Drainage Structure Clearing & Minor Repairs	1																						
	M	*Fence Maintenance	1																						
	M	*ROW Clearing	1																						
AM2	M	Roadway Crack Sealing	1	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	\$ 64,900	
AM3	M	Striping	1		\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	\$ 52,300	
AM4	M	Culvert Clearing	1		\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	\$ 44,800	
AC1	C	Mill & Fill Asphalt	5					\$ 3,059,600						\$ 3,059,600				\$ 3,059,600						\$ 3,059,600	
AC2	C	Rock Slope Armor Protection	1	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	\$ 28,100	
AC3	C	Culvert Repairs	25																						
Total Annual Approach Roadway Costs				\$884,800	\$988,100	\$981,900	\$988,100	\$981,900	\$3,982,800	\$981,900	\$988,100	\$981,900	\$988,100	\$3,976,600	\$988,100	\$981,900	\$988,100	\$981,900	\$3,982,800	\$981,900	\$988,100	\$981,900	\$988,100	\$988,100	\$3,976,600
O =	Combined Operations Cost			\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	\$ 707,100	
M =	Combined Maintenance Cost			\$1,039,000	\$1,100,400	\$1,334,400	\$1,141,600	\$1,198,800	\$1,110,500	\$1,300,600	\$1,141,600	\$1,198,800	\$1,141,600	\$1,307,300	\$1,141,600	\$1,236,600	\$1,141,600	\$1,372,200	\$1,076,700	\$1,236,600	\$1,141,600	\$1,372,200	\$1,141,600	\$1,171,700	

M&O and CAPEX TABLE 2 - (adjusted for inflation, with the initial two-lane configuration maintained throughout)

Operation and Maintenance - Bridge			Year-->	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035		
BRIDGE TASKS	O / M / C	Description	Interval / Period (yrs)																							
BM11	M	NBIS Biennial Inspection	2	\$ 63,400	\$ -	\$ 67,261	\$ -	\$ 71,357	\$ -	\$ 75,703	\$ -	\$ 80,313	\$ -	\$ 136,004	\$ -	\$ 144,287	\$ -	\$ 153,074	\$ -	\$ 162,396	\$ -	\$ 172,286	\$ -	\$ 182,778		
BM12	M	Underwater Bridge Inspecti	4	\$ -	\$ -	\$ 108,000	\$ -	\$ -	\$ -	\$ 121,555	\$ -	\$ -	\$ -	\$ 136,811	\$ -	\$ -	\$ -	\$ 153,982	\$ -	\$ -	\$ -	\$ 173,308	\$ -	\$ -		
BM13	M	Bathymetry Survey	Varies	\$ 33,800	\$ -	\$ 35,858	\$ -	\$ -	\$ 39,183	\$ -	\$ -	\$ -	\$ -	\$ 45,424	\$ -	\$ -	\$ -	\$ 51,126	\$ -	\$ -	\$ -	\$ 57,542	\$ -	\$ -		
BM1	M	Striping	1	0	\$ 14,626	\$ 15,065	\$ 15,517	\$ 15,982	\$ 16,462	\$ 16,956	\$ 17,464	\$ 17,988	\$ 18,528	\$ 19,084	\$ 19,656	\$ 20,246	\$ 20,853	\$ 21,479	\$ 22,123	\$ 22,787	\$ 23,470	\$ 24,175	\$ 24,900	\$ 25,647		
BM2	MA	Maintenance Administration	1	\$ 182,000	\$ 187,460	\$ 193,084	\$ 198,876	\$ 204,843	\$ 210,988	\$ 217,318	\$ 223,837	\$ 230,552	\$ 237,469	\$ 244,593	\$ 251,931	\$ 259,488	\$ 267,273	\$ 275,291	\$ 283,550	\$ 292,057	\$ 300,818	\$ 309,843	\$ 319,138	\$ 328,712		
BM3	M	Bridge Maintenance Includes:	1	\$ 610,200	\$ 670,839	\$ 734,673	\$ 756,713	\$ 779,415	\$ 802,797	\$ 826,881	\$ 851,688	\$ 877,238	\$ 903,555	\$ 930,662	\$ 958,582	\$ 987,339	\$ 1,016,960	\$ 1,047,468	\$ 1,078,892	\$ 1,111,259	\$ 1,144,597	\$ 1,178,935	\$ 1,214,303	\$ 1,250,732		
	M	*Damaged Railing Repairs	1																							
	M	*Scupper & Drain Clearing	1																							
	M	*Bridge Power Washing	1																							
	M	*Partial Paint Touchup	2																							
	M	*Pavement Spot Repairs	1																							
	M	*Lighting (Replace bulbs, et	1																							
BC1	C	Pavement Mill & Fill	5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 901,104	\$ -	\$ -	\$ -	\$ -	\$ 1,044,626	\$ -	\$ -	\$ -	\$ -	\$ 1,211,008	\$ -	\$ -	\$ -	\$ -	\$ 1,403,890		
BC2	C	Bridge Deck Repair	35	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
BC3	C	Substructure Indepth Inspection & Repair	8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 38,987	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 49,388	\$ -	\$ -	\$ -	\$ -	\$ -		
BC4	C	Deck Joint Replacement (Piers)	10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 837,663	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,125,749		
BC5	C	Joint w/ Deck Replacement	10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 77,947	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 104,754		
BC6	C	Lighting System Replacement	20	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,757,346		
BC7	C	Bridge Railing Replacement	35	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
BC8	C	Painting	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,487,212	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
BC9	C	Superstructure Repairs	25	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
BC10	C	Navigation Light Replacement	30	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
BC11	C	Fender System	NIC	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Total Annual Bridge Costs				\$ 889,400	\$ 872,925	\$ 1,153,941	\$ 971,106	\$ 1,071,597	\$ 1,970,534	\$ 1,258,412	\$ 1,131,976	\$ 1,206,092	\$ 1,159,552	\$ 3,472,814	\$ 1,230,169	\$ 7,898,573	\$ 1,305,086	\$ 1,702,420	\$ 2,644,961	\$ 1,588,499	\$ 1,468,886	\$ 1,916,088	\$ 1,558,341	\$ 6,179,610		
NIC				Not in Contract																						
Operation and Maintenance - Approaches			Year-->	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035		
Appr HWY TASKS	O / M / C	Description	Interval / Period (yrs)																							
AM11	M	Sign Inspections (Includes bridge signs)	2	\$ -	\$ 6,386	\$ -	\$ 6,775	\$ -	\$ 7,187	\$ -	\$ 7,625	\$ -	\$ 8,090	\$ -	\$ 8,582	\$ -	\$ 9,105	\$ -	\$ 9,659	\$ -	\$ 10,248	\$ -	\$ 10,872	\$ -		
AO2	O	General Operations Costs	1	\$ 707,100	\$ 728,313	\$ 750,162	\$ 772,667	\$ 795,847	\$ 819,723	\$ 844,314	\$ 869,644	\$ 1,008,156	\$ 922,605	\$ 950,283	\$ 978,792	\$ 1,008,156	\$ 1,038,400	\$ 1,069,552	\$ 1,101,639	\$ 1,134,688	\$ 1,168,729	\$ 1,203,790	\$ 1,239,904	\$ 1,277,101		
AM1	M	General Roadway Maintenance Includes:	1	\$ 84,700	\$ 87,241	\$ 89,858	\$ 92,554	\$ 95,331	\$ 98,191	\$ 101,136	\$ 104,170	\$ 120,762	\$ 110,514	\$ 113,830	\$ 117,245	\$ 120,762	\$ 124,385	\$ 128,116	\$ 131,960	\$ 135,919	\$ 139,996	\$ 144,196	\$ 148,522	\$ 152,978		
	M	*Pavement Repair	1																							
	M	*Snow Plowing & Removal	1																							
	M	*Guardrail Repair	1																							
	M	*Sign Maintenance	1																							
	M	*Drainage Structure Clearing & Minor Repairs	1																							
	M	*Fence Maintenance	1																							
	M	*ROW Clearing	1																							
AM2	M	Roadway Crack Sealing	1	\$ 64,900	\$ 66,847	\$ 68,852	\$ 70,918	\$ 73,046	\$ -	\$ 77,494	\$ 79,819	\$ 92,532	\$ 84,680	\$ -	\$ 89,837	\$ 92,532	\$ 95,308	\$ 98,167	\$ -	\$ 104,145	\$ 107,270	\$ 110,488	\$ 113,803	\$ -		
AM3	M	Striping	1	\$ -	\$ 53,869	\$ 55,485	\$ 57,150	\$ 58,864	\$ 60,630	\$ 62,449	\$ 64,322	\$ 74,567	\$ 68,240	\$ 70,287	\$ 72,395	\$ 74,567	\$ 76,804	\$ 79,108	\$ 81,482	\$ 83,926	\$ 86,444	\$ 89,037	\$ 91,708	\$ 94,460		
AM4	M	Culvert Clearing	1	\$ -	\$ 46,144	\$ 47,528	\$ 48,954	\$ 50,423	\$ 51,935	\$ 53,494	\$ 55,098	\$ 63,874	\$ 58,454	\$ 60,207	\$ 62,014	\$ 63,874	\$ 65,790	\$ 67,764	\$ 69,797	\$ 71,891	\$ 74,048	\$ 76,269	\$ 78,557	\$ 80,914		
AC1	C	MIII & FIII Asphalt	5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,546,915	\$ -	\$ -	\$ -	\$ -	\$ 4,111,847	\$ -	\$ -	\$ -	\$ -	\$ 4,766,757	\$ -	\$ -	\$ -	\$ -	\$ 5,525,978		
AC2	C	Rock Slope Armor Protection	1	\$ 28,100	\$ 28,943	\$ 29,811	\$ 30,706	\$ 31,627	\$ 32,576	\$ 33,553	\$ 34,559	\$ 40,064	\$ 36,664	\$ 37,764	\$ 38,897	\$ 40,064	\$ 41,266	\$ 42,504	\$ 43,779	\$ 45,092	\$ 46,445	\$ 47,838	\$ 49,274	\$ 50,752		
AC3	C	Culvert Repairs	25	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Total Annual Approach Roadway Costs				\$884,800	\$1,017,743	\$1,041,698	\$1,079,724	\$1,105,137	\$4,617,157	\$1,172,440	\$1,215,238	\$1,399,955	\$1,289,246	\$5,344,218	\$1,367,761	\$1,399,955	\$1,451,058	\$1,485,212	\$6,205,073	\$1,575,661	\$1,633,179	\$1,671,619	\$1,732,639	\$7,182,182		
O =	Combined Operations Cost			\$ 707,100	\$ 728,313	\$ 750,162	\$ 772,667	\$ 795,847	\$ 819,723	\$ 844,314	\$ 869,644	\$ 1,008,156	\$ 922,605	\$ 950,283	\$ 978,792	\$ 1,008,156	\$ 1,038,400	\$ 1,069,552	\$ 1,101,639	\$ 1,134,688	\$ 1,168,729	\$ 1,203,790	\$ 1,239,904	\$ 1,277,101		
M =	Combined Maintenance Cost			\$1,039,000	\$1,133,412	\$1,415,665	\$1,247,457	\$1,349,260	\$1,287,374	\$1,552,984	\$1,404,024	\$1,557,827	\$1,489,529	\$1,756,902	\$1,580,241	\$1,763,096	\$1,676,478	\$2,075,576	\$1,677,464	\$1,984,380	\$1,886,891	\$2,336,079	\$2,001,803	\$2,116,221		
C =	Combined Capital Cost			\$28,100	\$28,943	\$29,811	\$30,706	\$31,627	\$4,480,594	\$33,553	\$73,546	\$40,064	\$36,664	\$6,109,847	\$38,897	\$6,527,276	\$41,266	\$42,504	\$6,070,932	\$45,092	\$46,445	\$47,838	\$49,274	\$9,968,470		

M&O and CAPEX TABLE 3 - (in 2015 dollars, incremental costs for conversion from 2 lane to 4 lane)

Year-->	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Incremental Operation Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Incremental Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$255,800	\$168,100	\$200,000	\$168,100	\$200,000	\$159,000	\$200,000	\$168,100	\$200,000	\$168,100	\$190,900
Incremental Capital Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,400	\$5,400	\$5,400	\$5,400	\$5,400	\$1,689,100	\$5,400	\$5,400	\$5,400	\$5,400	\$1,511,400

2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	40 YR Total	
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
\$168,100	\$200,000	\$168,100	\$200,000	\$159,000	\$200,000	\$168,100	\$200,000	\$168,100	\$190,900	\$168,100	\$200,000	\$168,100	\$200,000	\$159,000	\$200,000	\$168,100	\$200,000	\$168,100	\$190,900	\$5,787,600	
\$1,522,400	\$5,400	\$5,400	\$5,400	\$1,689,100	\$5,400	\$5,400	\$5,400	\$5,400	\$2,484,400	\$5,400	\$5,400	\$1,522,400	\$5,400	\$143,000	\$5,400	\$5,400	\$5,400	\$5,400	\$5,400	\$1,511,400	\$12,197,400
\$ 1,690,500	\$ 205,400	\$ 173,500	\$ 205,400	\$ 1,848,100	\$ 205,400	\$ 173,500	\$ 205,400	\$ 173,500	\$ 2,675,300	\$ 173,500	\$ 205,400	\$ 1,690,500	\$ 205,400	\$ 366,600	\$ 205,400	\$ 173,500	\$ 205,400	\$ 173,500	\$ 1,702,300	\$ 17,985,000	

M&O and CAPEX TABLE 4 - (adjusted for inflation, incremental costs for conversion from 2 lane to 4 lane)

Year-->	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Incremental Operation Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Incremental Maintenance Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$343,774	\$232,690	\$285,152	\$246,861	\$302,518	\$247,717	\$320,941	\$277,844	\$340,487	\$294,764	\$344,787
Incremental Capital Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$7,257	\$7,475	\$7,699	\$7,930	\$8,168	\$2,631,563	\$8,665	\$8,925	\$9,193	\$9,469	\$2,729,757
Total Incremental Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 351,031	\$ 240,165	\$ 292,851	\$ 254,791	\$ 310,686	\$ 2,879,280	\$ 329,607	\$ 286,769	\$ 349,680	\$ 304,233	\$ 3,074,543

2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	40 YR Total
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$312,716	\$383,221	\$331,760	\$406,559	\$332,911	\$431,318	\$373,399	\$457,586	\$396,139	\$463,364	\$420,264	\$515,017	\$445,858	\$546,381	\$447,404	\$579,656	\$501,817	\$614,957	\$532,377	\$622,723	\$12,353,000
\$2,832,112	\$10,347	\$10,657	\$10,977	\$3,536,600	\$11,646	\$11,995	\$12,355	\$12,725	\$6,030,291	\$13,500	\$13,905	\$4,037,915	\$14,752	\$402,382	\$15,651	\$16,120	\$16,604	\$17,102	\$4,930,244	\$27,394,000
\$ 3,144,828	\$ 393,568	\$ 342,417	\$ 417,536	\$ 3,869,511	\$ 442,964	\$ 385,394	\$ 469,940	\$ 408,864	\$ 6,493,655	\$ 433,764	\$ 528,922	\$ 4,483,773	\$ 561,133	\$ 849,786	\$ 595,306	\$ 517,937	\$ 631,561	\$ 549,479	\$ 5,552,967	\$ 39,747,000