



Appendix F

Future Cost Estimates

SUM-CR8-9.08 (High Level Bridge)

Study

Engineer's Opinion of Probable Cost (Roadway Items Associated with a Deck Replacement)

Friday, August 16, 2024



| Ref. No. | Item No. | Item Extension | Item Description | Quantity | Unit | Unit Cost | Total Cost |
|---------------------------------|----------|----------------|---|----------|------|---------------|----------------------|
| Roadway | | | | | | | |
| 1 | 201 | 11000 | CLEARING AND GRUBBING | 1 | LS | \$ 2,500.00 | \$ 2,500.00 |
| 2 | 202 | 23000 | PAVEMENT REMOVED | 317 | SY | \$ 7.00 | \$ 2,219.00 |
| 3 | 202 | 30000 | WALK REMOVED | 800 | SF | \$ 3.00 | \$ 2,400.00 |
| 4 | 202 | 32000 | CURB REMOVED | 200 | FT | \$ 9.00 | \$ 1,800.00 |
| 5 | 204 | 10000 | SUBGRADE COMPACTION | 667 | SY | \$ 1.75 | \$ 1,167.25 |
| 6 | 204 | 45000 | PROOF ROLLING | 1 | HOUR | \$ 265.00 | \$ 265.00 |
| 7 | 608 | | 4" CONCRETE WALK | 800 | SF | \$ 7.50 | \$ 6,000.00 |
| 8 | 609 | | CURB, TYPE 6 | 200 | FT | \$ 27.50 | \$ 5,500.00 |
| Roadway Subtotal | | | | | | | \$ 21,851.25 |
| Erosion Control | | | | | | | |
| 9 | 659 | 10000 | SEEDING AND MULCHING | 400 | SF | \$ 0.90 | \$ 360.00 |
| 10 | 832 | 30000 | EROSION CONTROL | 2,000 | EACH | \$ 1.00 | \$ 2,000.00 |
| Erosion Control Subtotal | | | | | | | \$ 2,360.00 |
| Drainage | | | | | | | |
| 11 | | | ALLOWANCE | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| Drainage Subtotal | | | | | | | \$ 15,000.00 |
| Pavement | | | | | | | |
| 12 | 301 | 56010 | ASPHALT CONCRETE BASE, PG64-28, (449) | 27 | CY | \$ 180.00 | \$ 4,860.00 |
| 13 | 304 | 20000 | AGGREGATE BASE | 53 | CY | \$ 45.00 | \$ 2,385.00 |
| 14 | 407 | 20000 | NON-TRACKING TACK COAT | 18 | GAL | \$ 3.50 | \$ 63.00 |
| 15 | 441 | 70000 | ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (449), PG42-22 | 11 | CY | \$ 350.00 | \$ 3,850.00 |
| 16 | 441 | 70300 | ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (449) | 16 | CY | \$ 200.00 | \$ 3,200.00 |
| Pavement Subtotal | | | | | | | \$ 14,358.00 |
| Water Work | | | | | | | |
| 17 | | | ALLOWANCE | 1 | LS | \$ 2,500.00 | \$ 2,500.00 |
| Water Work Subtotal | | | | | | | \$ 2,500.00 |
| Sanitary Sewer | | | | | | | |
| 18 | | | ALLOWANCE | 1 | LS | \$ 2,500.00 | \$ 2,500.00 |
| Sanitary Sewer Subtotal | | | | | | | \$ 2,500.00 |
| Lighting | | | | | | | |
| 19 | | | ALLOWANCE | 1 | LS | \$ 250,000.00 | \$ 250,000.00 |
| Lighting Subtotal | | | | | | | \$ 250,000.00 |
| Traffic Control | | | | | | | |
| 20 | | | ALLOWANCE | 1 | LS | \$ 50,000.00 | \$ 50,000.00 |
| Traffic Control Subtotal | | | | | | | \$ 50,000.00 |
| Landscaping | | | | | | | |
| 21 | | | ALLOWANCE | 1 | LS | \$ 5,000.00 | \$ 5,000.00 |
| Landscaping Subtotal | | | | | | | \$ 5,000.00 |

SUM-CR8-9.08 (High Level Bridge)

Study


Engineer's Opinion of Probable Cost (Roadway Items Associated with a Deck Replacement)


Friday, August 16, 2024





| Ref. No. | Item No. | Item Extension | Item Description | Quantity | Unit | Unit Cost | Total Cost |
|--|----------|----------------|--|----------|------|---------------|------------------------|
| Maintenance of Traffic | | | | | | | |
| 22 | | | ALLOWANCE | 1 | LS | \$ 100,000.00 | \$ 100,000.00 |
| Maintenance of Traffic Subtotal | | | | | | | \$ 100,000.00 |
| Items of Work | | | | | | | |
| 23 | 614 | 11000 | MAINTAINING TRAFFIC | 1 | LS | \$ 150,000.00 | \$ 150,000.00 |
| 24 | 619 | 16020 | FIELD OFFICE, TYPE C | 24 | MTH | \$ 2,100.00 | \$ 50,400.00 |
| 25 | 623 | 10000 | CONSTRUCTION LAYOUT STAKES AND SURVEYING | 1 | LS | \$ 25,000.00 | \$ 25,000.00 |
| 26 | 624 | 10000 | MOBILIZATION | 1 | LS | \$ 400,000.00 | \$ 400,000.00 |
| Items of Work Subtotal | | | | | | | \$ 625,400.00 |
| Construction Subtotal | | | | | | | \$ 1,088,969.25 |
| Contingency (30%) | | | | | | | \$ 326,690.78 |
| Inflation (33%) | | | | | | | \$ 467,167.81 |
| Construction Total | | | | | | | \$ 1,882,900.00 |


In providing estimates of probable construction cost, the Client understands that the Consultant has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor's method of pricing, and that the Consultant's estimates of probable construction cost are made on the basis of the Consultant's professional judgment and experience. The Consultant makes no warranty, express or implied, that the bids or the negotiated cost of the Work will not vary from the Consultant's estimate of probable construction cost. Please note that the pricing, contingencies and opinion contained or referenced herein anticipates a standard economic environment, and does not account for any uncertainty related to COVID-19 or the current extreme market conditions. As such, Client and Consultant recognize the current market volatility due to such factors including but not limited to COVID-19 restrictions, material and equipment shortages, and rapid price fluctuations. The existence and contents of this document shall not be construed to create responsibility or liability of Client or Consultant for changes related to this estimate of probable cost.


|  | | COST ANALYSIS BRIDGE NO. 7730306 N. Main Street ALTERNATIVE 1: Rehabilitate Existing Structure | | Project: CR008 PID: 115383 GPD Job: 2022078 | |
|---|--|---|-------------|---|---------------------|
| Initial Cost = \$43,697,400 Net Present Cost (Lifecycle) = \$72,856,300 | | Calculated By: TJW Checked By: MOJ | | Date: 8/15/2024 Date: 8/15/2024 | |
| Costs for major future expected maintenance events <small>NOTES: Costs are based on values for construction beginning in 2030. (33% inflation from 2024) 30% contingency is included on this sheet.</small> | | | | | |
| Years 20 & 70 | | Repair, Deck Seal | | Inflation Factor 2017 to 2031 | |
| <small>Note: Costs are based on various work items from Projects 1-A, 1-D, & 1-E in the 2017 LCCA Report and engineering judgement with a 30% contingency applied.</small> | | Project Cost | | Total | |
| | | Structure/Drainage/Erosion Repairs | \$754,000 | 1.82 | \$1,372,300 |
| | | Seal Deck & Sidewalks | \$61,600 | 1.82 | \$112,200 |
| | | Patch Concrete Wearing Surface Spans 1, 3 | \$79,690 | 1.82 | \$145,100 |
| | | Repair Epoxy Surface Span 2 | \$52,000 | 1.82 | \$94,700 |
| | | Misc. Roadway, MOT & Incidental Costs | \$107,400 | 1.82 | \$195,500 |
| | | | | TOTAL | \$1,919,800 |
| Years 35 & 85 | | Repair, Deck Overlay | | Inflation Factor 2017 to 2031 | |
| <small>Note: Costs are based on various work items from Projects 1-B & 1-D in the 2017 LCCA Report and engineering judgement with a 30% contingency applied.</small> | | Project Cost | | Total | |
| | | Structure/Drainage/Erosion Repairs | \$2,119,000 | 1.82 | \$3,856,600 |
| | | Deck 1 & 3 Overlay | \$317,200 | 1.82 | \$577,400 |
| | | Deck 2 Epoxy Surface Replacement | \$715,300 | 1.82 | \$1,301,900 |
| | | Misc. Roadway, MOT & Incidental Costs | \$111,200 | 1.82 | \$202,400 |
| | | | | TOTAL | \$5,938,300 |
| Year 50 | | Repair, Re-Deck, Paint | | Total | |
| | | | | Equal to Year 0. | \$43,697,400 |
| | | | | TOTAL | \$43,697,400 |
| Year 100 | | Replace Bridge | | Total | |
| | | | | Assumed equal to Alternative 2C. | \$71,472,500 |
| | | | | TOTAL | \$71,472,500 |

|  | | COST ANALYSIS BRIDGE NO. 7730306 N. Main Street ALTERNATIVE 1: Rehabilitate Existing Structure | | Project: CR008 PID: 115383 GPD Job: 2022078 | | | |
|---|------------------------|---|----------------------|---|-------------------|----------------------|------------------------|
| Initial Cost = \$43,697,400 Net Present Cost (Lifecycle) = \$72,856,300 | | Calculated By: TJW Checked By: MOJ | | Date: 8/15/2024 Date: 8/15/2024 | | | |
| <small>NOTES: All costs are based on values for construction beginning in 2030 with a 30% contingency applied.</small> | | | | | | | |
| COST-FLOW DIAGRAM | | | | | | | |
| YEAR (n) | 0 | 20 | 35 | 50 | 70 | 85 | 100 |
| ACTUAL COST | \$43,697,400 | \$1,919,800 | \$5,938,300 | \$43,697,400 | \$1,919,800 | \$5,938,300 | \$71,472,500 |
| | Repair, Re-Deck, Paint | Repair, Deck Seal | Repair, Deck Overlay | Repair, Re-Deck, Paint | Repair, Deck Seal | Repair, Deck Overlay | Replace Bridge |
| PRESENT VALUE | \$43,697,400 | \$1,171,600 | \$2,502,230 | \$12,713,420 | \$340,870 | \$728,010 | \$6,049,960 |
| <small>Actual costs for future years have the contingency stated below added to the raw event cost calculated on the previous sheets</small> | | | | | | | |
| ASSUMPTIONS AND FORMULAS | | | | | | | |
| CONTINGENCY APPLIED TO FUTURE WORK ESTIMATES = 30.00% | | | | | | | |
| DISCOUNT RATE (i) IS ASSUME TO BE = 2.50% | | | | | | | |
| PRESENT VALUE FACTOR (P/F) IS CALCULATED AS: $1 \div (1+i)^n$ | | | | | | | |
| CAPITAL RECOVER FACTOR (A/P) IS CALCULATED AS: $[i(1+i)^n] \div [(1+i)^n - 1]$ | | | | | | | |
| THE EQUIVALENT UNIFORM ANNUAL COST (EUAC) IS CALCULATED AS SHOWN BELOW | | | | | | | |
| $EUAC_{REPLACE} = \text{SUM}[\text{YEAR 0 COST}, (\text{YEAR "n1" COST}) \times (P/F, n1), (\text{YEAR "n2" COST}) \times (P/F, n2), (\text{YEAR "n2" COST}) \times (P/F, n2) \dots] \times [A/P, n \text{ final}]$ | | | | | | | |
| EUAC CALCULATED FOR THE CASH FLOW SHOWN ABOVE | | | | | | | |
| EUAC _{REPLACE} | = | [| \$43,697,400 | x | 0.6103 | \$1,171,600 | Year 0 |
| | | | + | \$1,919,800 | x | 0.6103 | Year 20 |
| | | | + | \$5,938,300 | x | 0.4214 | Year 35 |
| | | | + | \$43,697,400 | x | 0.2909 | Year 50 |
| | | | + | \$1,919,800 | x | 0.1776 | Year 70 |
| | | | + | \$5,938,300 | x | 0.1226 | Year 85 |
| | | | + | \$71,472,500 | x | 0.0846 | Year 100 |
| | | | | | x | 0.027311879 | 100 Yr. Insp. + Maint. |
| | | | | | | \$6,049,960 | |
| | | | | | | \$5,652,800 | |
| LIFECYCLE COST ANALYSIS RESULTS | | | | | | | |
| EUAC _{REPLACE} = \$1,989,843 | | PER YEAR FOR 100 YEARS | | Net Present Cost = \$72,856,300 | | | |

|  | | COST ANALYSIS BRIDGE NO. 7730306 N. Main Street ALTERNATIVE 2B: 3-Span Steel Plate Girder | | Project: CR008 PID: 115383 GPD Job: 2022078 | |
|---|--|--|------------------|---|---------------------|
| Initial Cost = \$72,184,400 Net Present Cost (Lifecycle) = \$84,940,200 | | Calculated By: MOJ Checked By: TJW | | Date: 8/13/2024 Date: 8/13/2024 | |
| Costs for major future expected maintenance events <small>NOTES: Total costs are based on values for construction beginning in 2030. (33% inflation from 2024) Contingency is added on EUAC Cost Sheet.</small> | | | | | |
| Years 20 & 70 | Seal Deck | | Unit Cost | Total | |
| | Deck Sealing | | | | |
| | Area = 5,632 sq yd | Cost= | \$18.00/sqyd | | \$101,400 |
| | Traffic, MOT, Incidentals, Etc. | | | Allowance | \$180,000 |
| | | | | TOTAL | \$281,400 |
| Year 35 & 85 | Deck Overlay | | Unit Cost | Total | |
| | Surface Preparation Using Hydro-Demolition | | | | |
| | Area = 5,632 sq yd | Cost= | \$175.00/sqyd | | \$985,600 |
| | Overlay Deck | | | | |
| | Area = 5,632 sq yd | Cost= | \$127.00/sqyd | | \$715,300 |
| | Traffic, MOT, Incidentals, Etc. | | | Allowance | \$300,000 |
| | | | | TOTAL | \$2,000,900 |
| Year 50 | Deck Replacement and Superstructure Painting | | Unit Cost | Total | |
| | Deck removal and replacement | | | | |
| | Removal Area = 6,934 sq yd | Cost= | \$90.00/sqyd | | \$624,100 |
| | Deck, Sidewalk, Railing, Deck Joint, and Fence Costs (from initial estimate) | | | | \$6,404,900 |
| | Approach Slab Costs (from initial estimate) | | | | \$214,200 |
| | Clean and Paint Structural Steel | | | | |
| | Area = 3,278 sq ft | Cost= | \$58.00/sf | | \$190,200 |
| | Roadway, Traffic, MOT, Incidentals, Etc. | | | | |
| | See roadway rehab alternate cost estimate. | | | | \$1,448,300 |
| | | | | TOTAL | \$8,881,700 |
| Year 100 | Replace Superstructure | | Unit Cost | Total | |
| | Total (Includes demo, bridge, roadway, MOT, incidentals) | | | | |
| | | | | Excludes ROW and Contingency Costs. | \$53,603,400 |
| | | | | TOTAL | \$53,603,400 |

|  | | COST ANALYSIS BRIDGE NO. 7730306 N. Main Street ALTERNATIVE 2B: 3-Span Steel Plate Girder | | Project: CR008 PID: 115383 GPD Job: 2022078 | | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------|--|--------------|---|-----------|--------------|---------------|--------|-------------|---|--------|-----------|---|--------|-------------|---|--------|--------------|---|--------|---|---|---|-------------|---|-------------|------------------------|
| Initial Cost = \$72,184,400 Net Present Cost (Lifecycle) = \$84,940,200 | | Calculated By: MOJ Checked By: TJW | | Date: 8/13/2024 Date: 8/13/2024 | | | | | | | | | | | | | | | | | | | | | | | |
| <small>NOTES: All costs are based on values for construction beginning in 2030 with a 30% contingency applied.</small> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COST-FLOW DIAGRAM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YEAR (n) | 0 | 20 | 35 | 50 | 70 | 85 | 100 | | | | | | | | | | | | | | | | | | | | |
| ACTUAL COST | \$72,184,400 | \$365,900 | \$2,601,200 | \$11,546,300 | \$365,900 | \$2,601,200 | \$69,684,400 | | | | | | | | | | | | | | | | | | | | |
| PRESENT VALUE | \$72,184,400 | \$223,300 | \$1,096,080 | \$3,359,310 | \$64,970 | \$318,900 | \$5,898,610 | | | | | | | | | | | | | | | | | | | | |
| | Initial | Deck Seal | Deck Overlay | Deck & Paint | Deck Seal | Deck Overlay | Replace Super | | | | | | | | | | | | | | | | | | | | |
| <small>Actual costs for future years have the contingency stated below added to the raw event cost calculated on the previous sheets</small> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ASSUMPTIONS AND FORMULAS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONTINGENCY APPLIED TO FUTURE WORK ESTIMATES = 30.00% DISCOUNT RATE (i) IS ASSUME TO BE = 2.50% PRESENT VALUE FACTOR (P/F) IS CALCULATED AS: $1 \div (1+i)^n$ CAPITAL RECOVER FACTOR (A/P) IS CALCULATED AS: $[i(1+i)^n] \div [(1+i)^n - 1]$ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| THE EQUIVALENT UNIFORM ANNUAL COST (EUAC) IS CALCULATED AS SHOWN BELOW | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $EUAC_{REPLACE} = \text{SUM}[\text{YEAR 0 COST}, (\text{YEAR "n1" COST}) \times (P/F, n1), (\text{YEAR "n2" COST}) \times (P/F, n2), (\text{YEAR "n2" COST}) \times (P/F, n2) \dots] \times [A/P, n \text{ final}]$ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EUAC CALCULATED FOR THE CASH FLOW SHOWN ABOVE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EUAC _{REPLACE} | = | [| \$72,184,400 | x | 0.6103 | \$223,300 | x | 0.4214 | \$1,096,080 | x | 0.2909 | \$365,900 | x | 0.1776 | \$2,601,200 | x | 0.1226 | \$69,684,400 | x | 0.0846 |] | x | [| 0.027311879 |] | \$1,794,600 | 100 Yr. Insp. + Maint. |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LIFECYCLE COST ANALYSIS RESULTS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EUAC_{REPLACE} = \$2,319,877 | | PER YEAR FOR 100 YEARS | | Net Present Cost = \$84,940,200 | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|--|--|--|------------------------------------|-------------------------------------|
|  | | COST ANALYSIS | | Project: CR008 |
| | | BRIDGE NO. 7730306 N. Main Street ALTERNATIVE 2C: 4-Span Steel Plate Girder | | PID: 115383 GPD Job: 2022078 |
| Initial Cost = \$71,472,500 Net Present Cost (Lifecycle) = \$84,500,500 | | Calculated By: MOJ Checked By: TJW | Date: 8/13/2024 Date: 8/13/2024 | |
| Costs for major future expected maintenance events | | | | |
| <small>NOTES: Total costs are based on values for construction beginning in 2030. (33% inflation from 2024) Contingency is added on EUAC Cost Sheet.</small> | | | | |
| Years 20 & 70 | Seal Deck | | Unit Cost | Total |
| | Deck Sealing | | | |
| | Area = 6,149 sq yd | Cost= | \$18.00/sqyd | \$110,700 |
| | Traffic, MOT, Incidentals, Etc. | | | |
| | | Allowance | | \$180,000 |
| | | TOTAL | | \$290,700 |
| Year 35 & 85 | Deck Overlay | | Unit Cost | Total |
| | Surface Preparation Using Hydro-Demolition | | | |
| | Area = 6,149 sq yd | Cost= | \$175.00/sqyd | \$1,076,100 |
| | Overlay Deck | | | |
| | Area = 6,149 sq yd | Cost= | \$127.00/sqyd | \$781,000 |
| | Traffic, MOT, Incidentals, Etc. | | | |
| | | Allowance | | \$300,000 |
| | | TOTAL | | \$2,157,100 |
| Year 50 | Deck Replacement and Superstructure Painting | | Unit Cost | Total |
| | Deck removal and replacement | | | |
| | Removal Area = 7,570 sq yd | Cost= | \$90.00/sqyd | \$681,300 |
| | Deck, Sidewalk, Railing, Deck Joint, and Fence Costs (from initial estimate) | | | \$6,909,400 |
| | Approach Slab Costs (from initial estimate) | | | \$214,200 |
| | Clean and Paint Structural Steel | | | |
| | Area = 3,278 sq ft | Cost= | \$58.00/sf | \$190,200 |
| | Roadway, Traffic, MOT, Incidentals, Etc. | | | |
| | See roadway rehab alternate cost estimate. | | | \$1,448,300 |
| | | TOTAL | | \$9,443,400 |
| Year 100 | Replace Superstructure | | Unit Cost | Total |
| | Total (Includes demo, bridge, roadway, MOT, incidentals) | | | |
| | | | | Excludes ROW and Contingency Costs. |
| | | | | \$53,055,800 |
| | | TOTAL | | \$53,055,800 |

| | | | | | | | |
|---|--------------|--|------------------------------------|---------------------------------|--|--------------|-------------------------------|
|  | | COST ANALYSIS | | Project: CR008 | | | |
| | | BRIDGE NO. 7730306 N. Main Street ALTERNATIVE 2C: 4-Span Steel Plate Girder | | PID: 115383 GPD Job: 2022078 | | | |
| Initial Cost = \$71,472,500 Net Present Cost (Lifecycle) = \$84,500,500 | | Calculated By: MOJ Checked By: TJW | Date: 8/13/2024 Date: 8/13/2024 | | | | |
| <small>NOTES: All costs are based on values for construction beginning in 2030 with a 30% contingency applied.</small> | | | | | | | |
| COST-FLOW DIAGRAM | | | | | | | |
| YEAR (n) | 0 | 20 | 35 | 50 | 70 | 85 | 100 |
| ACTUAL COST | \$71,472,500 | \$378,000 | \$2,804,300 | \$12,276,500 | \$378,000 | \$2,804,300 | \$68,972,500 |
| PRESENT VALUE | \$71,472,500 | \$230,690 | \$1,181,660 | \$3,571,760 | \$67,120 | \$343,800 | \$5,838,350 |
| | Initial | Deck Seal | Deck Overlay | Deck & Paint | Deck Seal | Deck Overlay | Replace Super |
| <small>Actual costs for future years have the contingency stated below added to the raw event cost calculated on the previous sheets</small> | | | | | | | |
| ASSUMPTIONS AND FORMULAS | | | | | | | |
| CONTINGENCY APPLIED TO FUTURE WORK ESTIMATES = 30.00% DISCOUNT RATE (i) IS ASSUME TO BE = 2.50% PRESENT VALUE FACTOR (P/F) IS CALCULATED AS: $1 \div (1+i)^n$ CAPITAL RECOVER FACTOR (A/P) IS CALCULATED AS: $[i(1+i)^n] \div [(1+i)^n - 1]$ | | | | | | | |
| THE EQUIVALENT UNIFORM ANNUAL COST (EUAC) IS CALCULATED AS SHOWN BELOW | | | | | | | |
| $EUAC_{REPLACE} = \text{SUM}[\text{YEAR 0 COST}, (\text{YEAR "n1" COST}) \times (P/F, n1), (\text{YEAR "n2" COST}) \times (P/F, n2), (\text{YEAR "n2" COST}) \times (P/F, n2) \dots] \times [A/P, n \text{ final}]$ | | | | | | | |
| EUAC CALCULATED FOR THE CASH FLOW SHOWN ABOVE | | | | | | | |
| EUAC _{REPLACE} | = | [| \$71,472,500 | x | 0.6103 | \$230,690 | Year 20 |
| | | | + | \$2,804,300 | x | 0.4214 | \$1,181,660 |
| | | | + | \$12,276,500 | x | 0.2909 | \$3,571,760 |
| | | | + | \$378,000 | x | 0.1776 | \$67,120 |
| | | | + | \$2,804,300 | x | 0.1226 | \$343,800 |
| | | | + | \$68,972,500 | x | 0.0846 | \$5,838,350 |
| | | | |] x [| 0.027311879 |] | \$1,794,600 |
| | | | | | | | <i>100 Yr. Insp. + Maint.</i> |
| LIFECYCLE COST ANALYSIS RESULTS | | | | | | | |
| EUAC_{REPLACE} = \$2,307,868 | | PER YEAR FOR 100 YEARS | | | Net Present Cost = \$84,500,500 | | |

| GANNETT FLEMING | | COST ANALYSIS | | Project: CR008 | |
|---|--|-----------------------------------|-------------------|---|-------------|
| BRIDGE NO. 7730306 N. Main Street | | ALTERNATIVE 3: Spandrel Arch | | PID: 115383 | |
| Initial Cost = \$80,508,800 | | Calculated By: MSM | | Date: 4/22/2024 | |
| Net Present Cost (Lifecycle) = \$99,947,300 | | Checked By: EFD | | Date: 4/24/2024 | |
| Costs for major future expected maintenance events | | | | | |
| NOTES: Total costs are based on values for construction beginning in 2030. (33% inflation from 2024) Contingency added on EUAC Cost Sheet | | | | | |
| Years 20 & 70 | Seal Deck | Unit Cost | Total | | |
| Deck Sealing | | | | | |
| Area = | 6992 sq yd | (see initial cost quantities) / 9 | \$18.00/sqyd | \$125,900 | |
| Traffic, MOT, Incidentals, Etc. allowance = | 1 LS | | \$180,000.00/LS | \$180,000 | |
| | | | TOTAL | \$305,900 | |
| Year 35 & 85 | Deck Overlay | Unit Cost | Total | | |
| Surface Preparation Using Hydro-Demolition | | | | | |
| Area = | 6992 sq yd | (see initial cost quantities) / 9 | \$175.00/sqyd | \$1,223,700 | |
| Overlay Deck | | | | | |
| Area = | 6992 sq yd | (see initial cost quantities) / 9 | \$127.00/sqyd | \$888,100 | |
| MOT Allowance = | 1 LS | | \$300,000.00/LS | \$300,000 | |
| | | | TOTAL | \$2,411,800 | |
| Year 50 | Deck Replacement and Superstructure Painting | Unit Cost | Total | | |
| Deck removal and replacement | | | | | |
| Area = | 6992 sq yd | Cost= \$ 90.00 | Removal Costs | \$629,400 | |
| | | | | Deck and Sidewalk (Joints, Concrete, and Vandal Fencing) Cost | \$7,370,100 |
| | | | | Approach Slabs | \$214,400 |
| Clean and Paint Structural Steel | | | | | |
| Area = | 148,392 sq ft | | \$90.00/sf | \$13,355,300 | |
| Incidentals | | | | | |
| Roadway, Traffic, MOT, Incidentals, Etc. = | 1 LS | | \$1,448,400.00/LS | \$1,448,400 | |
| | | | TOTAL | \$23,017,600 | |
| Year 100 | Replace Superstructure | Unit Cost | Total | | |
| Bridge (including Demo) | | | | | |
| | | | | \$40,551,200 | |
| 33% (Inflation, 2030 begin construction) | | | | | |
| | | | | \$13,381,800 | |
| Roadway (includes MOT, but not contingency) | | | | | |
| | | | | \$6,073,700 | |
| | | | TOTAL | \$60,006,700 | |

| GANNETT FLEMING | | COST ANALYSIS | | Project: CR008 | | | |
|--|--------------|------------------------------|--------------|---------------------------------|-------------|------------------------|---------------|
| BRIDGE NO. 7730306 N. Main Street | | ALTERNATIVE 3: Spandrel Arch | | PID: 115383 | | | |
| Initial Cost = \$80,508,800 | | Calculated By: MSM | | Date: 4/22/2024 | | | |
| Net Present Cost (Lifecycle) = \$99,947,300 | | Checked By: EFD | | Date: 4/24/2024 | | | |
| NOTES: All costs are based on values for construction beginning in 2030 with a 30% contingency applied. | | | | | | | |
| COST-FLOW DIAGRAM | | | | | | | |
| YEAR (n) | 0 | 20 | 35 | 50 | 70 | 85 | 100 |
| ACTUAL COST | \$80,508,800 | \$397,700 | \$3,135,400 | \$29,922,900 | \$397,700 | \$3,135,400 | \$78,008,800 |
| PRESENT VALUE | \$80,508,800 | \$242,710 | \$1,321,170 | \$8,705,840 | \$70,620 | \$384,390 | \$6,603,240 |
| | Initial | Deck Seal | Deck Overlay | Deck & Paint | Deck Seal | Deck Overlay | Replace Super |
| Actual costs for future years have the contingency stated below added to the raw event cost calculated on the previous sheets | | | | | | | |
| ASSUMPTIONS AND FORMULAS | | | | | | | |
| CONTINGENCY APPLIED TO FUTURE WORK ESTIMATES = 30.00% | | | | | | | |
| DISCOUNT RATE (i) IS ASSUME TO BE = 2.50% | | | | | | | |
| PRESENT VALUE FACTOR (P/F) IS CALCULATED AS: $1 \div (1+i)^n$ | | | | | | | |
| CAPITAL RECOVER FACTOR (A/P) IS CALCULATED AS: $[i(1+i)^n] \div [(1+i)^n - 1]$ | | | | | | | |
| THE EQUIVALENT UNIFORM ANNUAL COST (EUAC) IS CALCULATED AS SHOWN BELOW | | | | | | | |
| EUAC _{REPLACE} = SUM[$(\text{YEAR } 0 \text{ COST} + (\text{YEAR } "n1" \text{ COST}) \times (P/F, n1) + (\text{YEAR } "n2" \text{ COST}) \times (P/F, n2) + (\text{YEAR } "n2" \text{ COST}) \times (P/F, n2) \dots$] x [A/P, n final] | | | | | | | |
| EUAC CALCULATED FOR THE CASH FLOW SHOWN ABOVE | | | | | | | |
| EUAC _{REPLACE} | = | [| \$80,508,800 | <i>Present Value Factor</i> | | Year 0 | |
| | | + | \$397,700 | x 0.6103 | \$242,710 | Year 20 | |
| | | + | \$3,135,400 | x 0.4214 | \$1,321,170 | Year 35 | |
| | | + | \$29,922,900 | x 0.2909 | \$8,705,840 | Year 50 | |
| | | + | \$397,700 | x 0.1776 | \$70,620 | Year 70 | |
| | | + | \$3,135,400 | x 0.1226 | \$384,390 | Year 85 | |
| | | + | \$78,008,800 | x 0.0846 | \$6,603,240 | Year 100 | |
| | | | | Capital Recover Factor | \$2,110,500 | 100 Yr. Insp. + Maint. | |
| | | | |] x [0.027311879] | | | |
| LIFECYCLE COST ANALYSIS RESULTS | | | | | | | |
| EUAC _{REPLACE} = \$2,729,749 | | PER YEAR FOR 100 YEARS | | Net Present Cost = \$99,947,300 | | | |

| GANNETT FLEMING | | COST ANALYSIS | | Project: CR008 | |
|---|--|---------------------------------------|--------------|---------------------|--|
| BRIDGE NO. 7730306 N. Main Street | | BRIDGE NO. 7730306 N. Main Street | | PID: 115383 | |
| ALTERNATIVE 4: Segmental Concrete Box | | ALTERNATIVE 4: Segmental Concrete Box | | GF Job: 72477 | |
| Initial Cost = \$79,465,600 | | Calculated By: MSM | | Date: 4/22/2024 | |
| Net Present Cost (Lifecycle) = \$91,981,500 | | Checked By: EFD | | Date: 4/24/2024 | |
| Costs for major future expected maintenance events | | | | | |
| NOTES: Total costs are based on values for construction beginning in 2030. (33% inflation from 2024) Contingency added on EUAC Cost Sheet | | | | | |
| Years 20 & 70 | Seal Deck | Unit Cost | Total | | |
| Deck Sealing | | | | | |
| Area = | 7029 sq yd (see initial cost quantities) / 9 | \$18.00/sqyd | \$126,600 | | |
| Traffic, MOT, Incidentals, Etc. allowance = | 1 LS | \$180,000.00/LS | \$180,000 | | |
| | | | TOTAL | \$306,600 | |
| Year 35 & 85 | Deck Overlay | Unit Cost | Total | | |
| Surface Preparation Using Hydro-Demolition | | | | | |
| Area = | 7029 sq yd (see initial cost quantities) / 9 | \$175.00/sqyd | \$1,230,100 | | |
| Overlay Deck | | | | | |
| Area = | 7029 sq yd (see initial cost quantities) / 9 | \$127.00/sqyd | \$892,700 | | |
| MOT Allowance = | 1 LS | \$300,000.00/LS | \$300,000 | | |
| | | | TOTAL | \$2,422,800 | |
| Year 50 | Deck Overlay | Unit Cost | Total | | |
| Surface Preparation Using Hydro-Demolition | | | | | |
| Area = | 7029 sq yd (see initial cost quantities) / 9 | \$175.00/sqyd | \$1,230,100 | | |
| Overlay Deck | | | | | |
| Area = | 7029 sq yd (see initial cost quantities) / 9 | \$127.00/sqyd | \$892,700 | | |
| Incidentals | | | | | |
| Roadway, Traffic, MOT, Incidentals. Etc. = | 1 LS | \$1,448,400.00/LS | \$1,448,400 | | |
| Deck Items (Reinforcement, Approach Slabs, Vandal Fencing and Joints) = | 1 LS | \$1,957,200.00/LS | \$1,957,200 | | |
| | | | TOTAL | \$5,528,400 | |
| Year 100 | Replace Superstructure | Unit Cost | Total | | |
| Bridge (including Demo) | | | \$39,947,800 | | |
| 33% (Inflation, 2030 begin construction) | | | \$13,182,800 | | |
| Roadway (includes MOT, but not contingency) | | | \$6,073,700 | | |
| | | | TOTAL | \$59,204,300 | |

| GANNETT FLEMING | | COST ANALYSIS | | Project: CR008 | | | |
|---|--------------|---------------------------------------|--------------|---------------------------------|-------------|--------------|------------------------|
| BRIDGE NO. 7730306 N. Main Street | | BRIDGE NO. 7730306 N. Main Street | | PID: 115383 | | | |
| ALTERNATIVE 4: Segmental Concrete Box | | ALTERNATIVE 4: Segmental Concrete Box | | GF Job: 72477 | | | |
| Initial Cost = \$79,465,600 | | Calculated By: MSM | | Date: 4/22/2024 | | | |
| Net Present Cost (Lifecycle) = \$91,981,500 | | Checked By: EFD | | Date: 4/24/2024 | | | |
| NOTES: All costs are based on values for construction beginning in 2030 with a 30% contingency applied. | | | | | | | |
| COST-FLOW DIAGRAM | | | | | | | |
| YEAR (n) | 0 | 20 | 35 | 50 | 70 | 85 | 100 |
| ACTUAL COST | \$79,465,600 | \$398,600 | \$3,149,700 | \$7,187,000 | \$398,600 | \$3,149,700 | \$76,965,600 |
| PRESENT VALUE | \$79,465,600 | \$243,260 | \$1,327,200 | \$2,091,010 | \$70,780 | \$386,140 | \$6,514,940 |
| | Initial | Deck Seal | Deck Overlay | Deck Overlay | Deck Seal | Deck Overlay | Replace Super |
| Actual costs for future years have the contingency stated below added to the raw event cost calculated on the previous sheets | | | | | | | |
| ASSUMPTIONS AND FORMULAS | | | | | | | |
| CONTINGENCY APPLIED TO FUTURE WORK ESTIMATES = 30.00% | | | | | | | |
| DISCOUNT RATE (i) IS ASSUME TO BE = 2.50% | | | | | | | |
| PRESENT VALUE FACTOR (P/F) IS CALCULATED AS: $1 \div (1+i)^n$ | | | | | | | |
| CAPITAL RECOVER FACTOR (A/P) IS CALCULATED AS: $[i(1+i)^n] \div [(1+i)^n - 1]$ | | | | | | | |
| THE EQUIVALENT UNIFORM ANNUAL COST (EUAC) IS CALCULATED AS SHOWN BELOW | | | | | | | |
| EUAC _{REPLACE} = SUM[YEAR 0 COST, (YEAR "n1" COST) x (P/F, n1), (YEAR "n2" COST) x (P/F, n2), (YEAR "n2" COST) x (P/F, n2)] x [A/P, n final] | | | | | | | |
| EUAC CALCULATED FOR THE CASH FLOW SHOWN ABOVE | | | | | | | |
| EUAC _{REPLACE} | = | [| \$79,465,600 | x | 0.6103 | \$243,260 | Year 20 |
| | | | \$398,600 | x | 0.4214 | \$1,327,200 | Year 35 |
| | | | \$3,149,700 | x | 0.2909 | \$2,091,010 | Year 50 |
| | | | \$7,187,000 | x | 0.1776 | \$70,780 | Year 70 |
| | | | \$398,600 | x | 0.1226 | \$386,140 | Year 85 |
| | | | \$3,149,700 | x | 0.0846 | \$6,514,940 | Year 100 |
| | | | \$76,965,600 | x | 0.0846 | \$1,882,500 | 100 Yr. Insp. + Maint. |
| | | | | x [| 0.027311879 |] | |
| | | | | | | | |
| LIFECYCLE COST ANALYSIS RESULTS | | | | | | | |
| EUAC _{REPLACE} = \$2,512,188 | | PER YEAR FOR 100 YEARS | | Net Present Cost = \$91,981,500 | | | |