

Macy Intersection and Pathway Improvements

Benefit Cost Analysis Narrative

FY26 BUILD Grant Application

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Summary

Overview

This memo provides detailed documentation of the Benefit-Cost Analysis (BCA) performed to evaluate the public benefits generated by the US 75 and Main Street roundabout project within the State of Nebraska, on the Omaha Nation lands. The BCA demonstrates the cost effectiveness of the project for which the project sponsor Omaha Tribe is seeking Federal support, measured in terms of a benefit-cost ratio (BCR).

Based upon the BCA presented in the remainder of this document, the project is expected to generate $13.4 million in total discounted user benefits and a discounted cost of $8.7 million in capital expenditures. Therefore, the project generates a positive Benefit/Cost Ratio of 1.55:1. **Table 1** below summarizes the long-term outcomes calculated in this BCA.

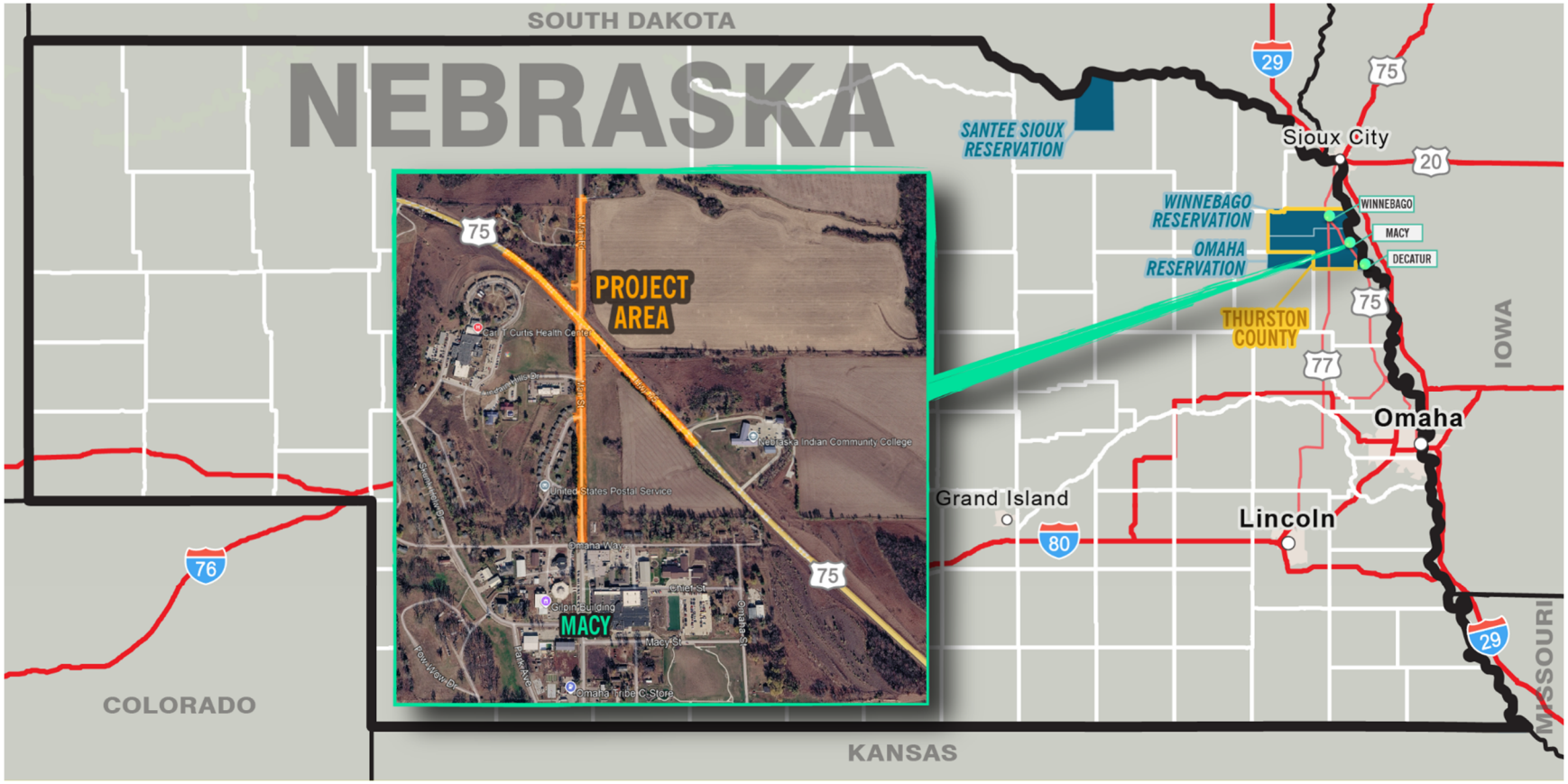
Table 1 - Summary of Benefit/Cost Analysis

Category	Value
Total Discounted Benefits	$13,447,626
Total Discounted Costs	$8,657,043
Net Present Value	$4,790,583
Benefit Cost Ratio	**1.55**

Project Background

Figure 1 below shows the study area for the roadway reconstruction project. The intersection of US 75 at Main Street is to be reconstructed as a roundabout with shared use trail connecting the town and the local community college. The need for this project is a result of public feedback from members of the tribe expressing a desire for improved multimodal travel on the land and ability to cross US 75, as well as a fatal crash which occurred at the intersection in October 2024.

Figure 1 – Study Area



BCA Approach

The BCA approach and methodology used in this analysis is consistent with the U.S. Department of Transportation, Benefit-Cost Analysis Guidance for Discretionary Grant Programs, January 2023. **Figure 2** shows the categories that were monetized for BCA analysis. **Table 2** gives a short explanation of the categories, methodologies, and assumptions. More information for each category is provided in later sections of the report.

Figure 2 - Summary of Benefit/Cost Monetized Categories

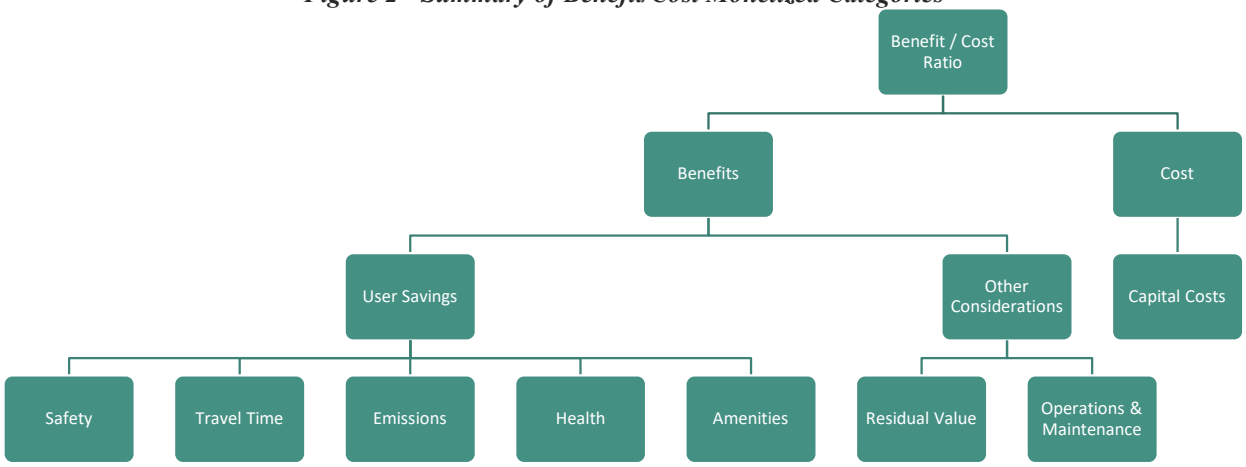


Table 2 - Summary of Benefit/Cost Analysis Methodology

Category	Methodology Overview
Safety	Ten-year crash data gathered from NDOT along the segment. Future crash costs were calculated with the annual average crash rate over the 5-year history. CMFs from CMF Clearinghouse were used to estimate safety benefits for the proposed build.
Travel Time	Travel time and Emission benefits from a decrease in overall vehicle delay traveling the intersection. USDOT BCA guidance was used to quantify the total emissions as non-CO2 and CO2 emissions.
Emissions	
Health	Additional trail available for walking and biking create a healthier and more desirable environment.
Amenities	
Residual Value	Appraisal of remaining value at the design year based on expected infrastructure life and linear approximation of loss in value.
Operating & Maintenance	Estimate of yearly operating and maintenance costs based on *BIA Transportation Maintenance Handbook*.
Capital Expenditures	Preliminary layouts and straightforward quantity takeoff methods

BCA Results Summary

The results of the BCA analysis indicate a positive Benefit-Cost Ratio of 1.55:1. All costs in this summary are discussed in 2025 dollars and account for the appropriate discount rate of 7 percent.

Total discounted user benefits are estimated to be $13,447,626 million. The results of the five categories used to monetize user benefits are described below and shown in **Table 3**:

- **Safety** – Crashes among all severities at the intersection are forecasted to decrease 72 percent for all crash types. The slowdown effect from the proposed roundabout on either side of the intersection is expected to produce a wide range of reductions based on crash severity and proximity to the intersection. Overall, the forecast projects a 38 percent reduction in crashes along US 75 throughout Macy, NE.
- **Intersection Delay** – An average of over 1 second delay reduction for all vehicles traveling through the intersection.
- **Health and Amenities** – With the proposed trail leading to the local community college, as well as a senior living area, it is anticipated to serve both commuters and general recreational users combining for over $2 million in benefits.
- **Emissions** – $0.003 million saved in emissions.

Table 3 - Summary of Total User Benefits in 2025 Dollars

	Safety Benefits	Travel Time Benefits	Amenities Benefits	Emissions Benefits	Health Benefits	Total User Benefits
Undiscounted	$32,184,486	$193,322	$56,191	$8,081	$4,498,325	$36,940,405
Discounted	**$11,490,765**	**$60,622**	**$19,586**	**$2,556**	**$1,605,118**	**$13,178,647**

In addition to user benefits, operating & maintenance costs and residual value are included in the numerator of the benefit/cot ratio. Total maintenance was expected to incur a cost of $11 thousand for the build condition compared to $0.2 million in the No Build condition over 30 years. This provides a discounted maintenance benefit of $55 thousand. The expected residual value of the project infrastructure at the last design year (2058) is $0.4 million.

When user benefits are added to operating & maintenance costs and residual value, the total benefits from the completion of the project are expected to be $13.1 million as shown in **Table 4** below.

Total Capital Costs are estimated to be $8.6 million, producing a benefit/cost ratio of 1.55:1.

Table 4 - Summary of Total Benefits and Costs (2024$)

Year	Safety Benefits	Travel Time Benefits	Emissions Benefits	Amenities Benefits	Health Benefits	Residual Value	Operating & Maintenance	Total Benefit
2028	$1,034,243	$3,141	$136	$1,369	$126,034	$0	$1,092	$141,087
2029	$1,036,903	$3,072	$133	$1,289	$118,107	$0	$0	$131,329
2030	$1,039,564	$2,998	$129	$1,214	$110,677	$0	$0	$123,198
2031	$1,042,224	$2,922	$126	$1,143	$103,715	$0	$0	$115,568
2032	$1,044,884	$2,842	$122	$1,076	$97,189	$0	$0	$108,409
2033	$1,047,544	$2,760	$118	$1,013	$91,073	$0	$4,600	$106,292
2034	$1,050,204	$2,677	$114	$954	$85,342	$0	$0	$95,391
2035	$1,052,865	$2,593	$110	$898	$79,971	$0	$0	$89,478
2036	$1,055,525	$2,508	$106	$846	$74,937	$0	$0	$83,931
2037	$1,058,185	$2,424	$102	$796	$70,220	$0	$0	$78,727
2038	$1,060,845	$2,340	$99	$750	$65,799	$0	$8,830	$82,674
2039	$1,063,505	$2,256	$95	$706	$61,656	$0	$0	$69,264
2040	$1,066,166	$2,173	$91	$665	$57,773	$0	$0	$64,967
2041	$1,068,826	$2,092	$88	$626	$54,135	$0	$0	$60,935
2042	$1,071,486	$2,012	$84	$590	$50,725	$0	$0	$57,154
2043	$1,074,146	$1,933	$81	$555	$47,530	$0	$0	$53,606
2044	$1,076,807	$1,856	$77	$523	$44,536	$0	$0	$50,277
2045	$1,079,467	$1,781	$74	$492	$41,730	$0	$0	$47,155
2046	$1,082,127	$1,708	$71	$463	$39,101	$0	$40,378	$84,605
2047	$1,084,787	$1,636	$68	$436	$36,637	$0	$0	$41,479
2048	$1,087,447	$1,567	$65	$411	$34,328	$0	$0	$38,902
2049	$1,090,108	$1,500	$62	$387	$32,164	$0	$0	$36,485
2050	$1,092,768	$1,435	$59	$364	$30,137	$0	$0	$34,217
2051	$1,095,428	$1,372	$57	$343	$28,237	$0	$0	$32,090
2052	$1,098,088	$1,311	$54	$323	$26,457	$0	$0	$30,095
2053	$1,100,748	$1,252	$52	$304	$24,789	$0	$0	$28,223
2054	$1,103,409	$1,195	$49	$286	$23,226	$0	$0	$26,468
2055	$1,106,069	$1,141	$47	$270	$21,761	$0	$0	$24,821
2056	$1,108,729	$1,088	$45	$254	$20,388	$0	$0	$23,277
2057	$1,111,389	$1,037	$43	$239	$19,102	$1,771,789	$153	$412,474
Undiscounted	$32,184,486	$193,322	$8,081	$56,191	$4,498,325	$1,771,789	$186,023	$38,898,217
Discounted	$11,490,765	$60,622	$2,556	$19,586	$1,605,118	$217,528	$55,053	$13,447,626
							Capital Expenditures	**$8,657,043**
							Benefit/Cost Ratio	**1.55**

Methodology / Results

A Benefit-Cost Analysis (BCA) is a conceptual framework that quantifies, in monetary terms, as many of the costs and benefits of a project as possible. Benefits are broadly defined. They represent the extent to which people impacted by the project are made better-off.

Key Assumptions

Key assumptions for the benefit/cost analysis include parameters that apply to all categories and elements of the analysis. All key assumptions are consistent with the U.S. Department of Transportation (USDOT), Benefit-Cost Analysis Guidance for Discretionary Grant Programs, Nov 2024. These key assumptions include:

- **Analysis Period:** The benefit/cost analysis assumes a construction year of 2027 and evaluates a 30-year period resulting in a first analysis year of 2028 to a design year of 2057.
- **Discounting**: A 7% discount was applied to all monetized values to express values in 2025 dollars.
- **User Benefit Unit Values:** USDOT guidance for the valuation of travel time savings, safety benefits, amenities, and reductions in air emissions were used.

Safety Benefits Methodology

In estimating preventable crashes, MDOT provided 10-year crash history from 2015-2024. The safety benefits for the Build condition were calculated from Crash Modification Factors (CMF) from CMF Clearinghouse matching injury severity and crash types.

Table 5 - Crash Modification Factors used

ID	CMF	Treatment	Crash Type	Injury Severity
9403	0.28	TWSC to roundabout	All	All
147	0.56	15% mean speed reduction	All	K
148	0.78			A, B, C
149	0.85			PDO
144	0.68	10% mean speed reduction	All	K
145	0.85			A, B, C
146	0.90			PDO
141	0.83	5% mean speed reduction	All	K
142	0.93			A, B, C
143	0.95			PDO

The safety benefits of $11.5 million reflects the decrease in crashes along the corridor from the speed reduction along US 75 and the increased control at the intersection. The project

area has a history of run-off-the-road crashes which show a lot of potential for reduction with improvements to the intersection. **Table 6** shows the forecasted crash cost savings under build conditions for the 30 years of the benefit/cost analysis. Over the 30-year analysis period, the proposed project is expected to reduce overall crashes by around 10 percent. This analysis is based on the total reported crashes, while it is likely that there were numerous crashes in the study area that went unreported.

Table 6 - Safety Benefit Summary

Year	Decrease in Total Crashes	Total Safety Savings	Discounted 7% to 2025 Dollars
2028	0.26	$1,034,243	$ 844,250
2029	0.26	$1,036,903	$ 791,049
2030	0.26	$1,039,564	$ 741,194
2031	0.26	$1,042,224	$ 694,478
2032	0.26	$1,044,884	$ 650,701
2033	0.27	$1,047,544	$ 609,680
2034	0.27	$1,050,204	$ 571,242
2035	0.27	$1,052,865	$ 535,223
2036	0.27	$1,055,525	$ 501,472
2037	0.27	$1,058,185	$ 469,847
2038	0.27	$1,060,845	$ 440,213
2039	0.27	$1,063,505	$ 412,446
2040	0.27	$1,066,166	$ 386,428
2041	0.27	$1,068,826	$ 362,048
2042	0.27	$1,071,486	$ 339,205
2043	0.27	$1,074,146	$ 317,801
2044	0.27	$1,076,807	$ 297,746
2045	0.27	$1,079,467	$ 278,955
2046	0.27	$1,082,127	$ 261,348
2047	0.27	$1,084,787	$ 244,851
2048	0.28	$1,087,447	$ 229,394
2049	0.28	$1,090,108	$ 214,911
2050	0.28	$1,092,768	$ 201,342
2051	0.28	$1,095,428	$ 188,628
2052	0.28	$1,098,088	$ 176,716
2053	0.28	$1,100,748	$ 165,555
2054	0.28	$1,103,409	$ 155,098
2055	0.28	$1,106,069	$ 145,301
2056	0.28	$1,108,729	$ 136,122
2057	0.28	$1,111,389	$ 127,522
Total	**8.15**	**$32,184,486**	**$11,490,765**

Travel Time Benefits Methodology

The time savings and calculations were derived from a decrease in delay for vehicles traveling through the intersection. Assumed annual values are shown in **Table 7**.

Table 7 – Travel Delay Values Used

Existing Peak Hour Delay (min)	Forecast No Build Peak Hour Delay (min)	Build Peak Hour Delay (min)	Current Intersection AADT	Truck Percentage
22.8	25.9	19.2	3,177	7.3%

Table 8 shows the forecasted VHT savings under no build and build conditions and the corresponding annual savings. **The travel time benefits** of over $0.2 million comes from the expected reduction of delay for vehicles traveling through the intersection.

Table 8 - Travel Time Benefits

Calendar Year	VHT Savings (Hours)	Travel Time Benefits	Discounted VHT Benefits
2028	115	$3,847	$3,141
2029	120	$4,026	$3,072
2030	126	$4,206	$2,998
2031	131	$4,385	$2,922
2032	137	$4,564	$2,842
2033	142	$4,743	$2,760
2034	147	$4,922	$2,677
2035	153	$5,101	$2,593
2036	158	$5,280	$2,508
2037	163	$5,459	$2,424
2038	169	$5,638	$2,340
2039	174	$5,817	$2,256
2040	179	$5,996	$2,173
2041	185	$6,175	$2,092
2042	190	$6,355	$2,012
2043	195	$6,534	$1,933
2044	201	$6,713	$1,856
2045	206	$6,892	$1,781
2046	211	$7,071	$1,708
2047	217	$7,250	$1,636
2048	222	$7,429	$1,567
2049	228	$7,608	$1,500
2050	233	$7,787	$1,435
2051	238	$7,966	$1,372
2052	244	$8,145	$1,311
2053	249	$8,324	$1,252
2054	254	$8,504	$1,195
2055	260	$8,683	$1,141
2056	265	$8,862	$1,088
2057	270	$9,041	$1,037
Total	**5,782**	**$193,322**	**$60,622**

Emissions Benefits Methodology

Emissions benefits were calculated from the assumptions from the Travel Time Benefits Methodology in the above section. The additional travel time from delay at the intersection was translated directly to delay for emission benefits. Emissions savings were converted to non-CO_2 emissions cost directly from the VHT using EPA standard values.

All emissions were monetized using yearly values given in Table A-6 of the appendix of the U.S. Department of Transportation, Benefit-Cost Analysis Guidance for Discretionary Grant Programs. For emissions data that was not based on delay, additional values were based on US Environmental Protection Agency and other national sources. **Table 9** shows the forecasted emissions savings and the corresponding annual savings. **The emissions**

benefits of over $8 thousand stems from vehicles experiencing less delay at the proposed roundabout.

Table 9 - Emissions Benefit Summary

Year	Total Emissions Savings	Discounted Emissions Benefits
2028	$166	$136
2029	$174	$133
2030	$181	$129
2031	$188	$126
2032	$195	$122
2033	$203	$118
2034	$210	$114
2035	$217	$110
2036	$224	$106
2037	$231	$102
2038	$238	$99
2039	$245	$95
2040	$252	$91
2041	$259	$88
2042	$266	$84
2043	$273	$81
2044	$280	$77
2045	$287	$74
2046	$294	$71
2047	$301	$68
2048	$308	$65
2049	$315	$62
2050	$322	$59
2051	$329	$57
2052	$336	$54
2053	$343	$52
2054	$350	$49
2055	$357	$47
2056	$364	$45
2057	$372	$43
Total	**$8,081**	**$2,556**

Health & Amenities

The proposed trail would serve as a direct route to the local community college providing a more traversable and safer nonmotorized route. This would also provide a route for recreational and general health travel where few alternatives exist. **Table 10** and **Table 11** shows the results of the benefit calculations.

Table 10 – Health Benefit Summary

Year	Annual Ped Trips	Annual Bike Trips	Undiscounted Total Annual Benefit	Discounted Benefit
2028	14,710	14,611	$144,297	$117,789
2057	15,814	15,814	$155,592	$17,853
Total	**457,863**	**456,381**	**$4,498,325**	**$2,034,627**

Table 11 – Amenities Benefit Summary

Year	Annual Ped Trips	Annual Bike Trips	Undiscounted Total Annual Benefit	Discounted Benefit
2028	1,827	1,827	$1,677	$1,369
2029	1,841	1,841	$1,690	$1,289
2030	1,855	1,855	$1,702	$1,214
2031	1,868	1,868	$1,715	$1,143
2032	1,882	1,882	$1,728	$1,076
2033	1,897	1,897	$1,741	$1,013
2034	1,911	1,911	$1,754	$954
2035	1,925	1,925	$1,767	$898
2036	1,940	1,940	$1,780	$846
2037	1,954	1,954	$1,794	$796
2038	1,969	1,969	$1,807	$750
2039	1,984	1,984	$1,821	$706
2040	1,998	1,998	$1,835	$665
2041	2,013	2,013	$1,848	$626
2042	2,028	2,028	$1,862	$590
2043	2,044	2,044	$1,876	$555
2044	2,059	2,059	$1,890	$523
2045	2,074	2,074	$1,904	$492
2046	2,090	2,090	$1,919	$463
2047	2,106	2,106	$1,933	$436
2048	2,121	2,121	$1,948	$411
2049	2,137	2,137	$1,962	$387
2050	2,153	2,153	$1,977	$364
2051	2,170	2,170	$1,992	$343
2052	2,186	2,186	$2,007	$323
2053	2,202	2,202	$2,022	$304
2054	2,219	2,219	$2,037	$286
2055	2,235	2,235	$2,052	$270
2056	2,252	2,252	$2,067	$254
2057	2,269	2,269	$2,083	$239
Total	**61,210**	**61,210**	**$56,191**	**$19,586**

The Health & Amenities benefits of $2.1 Million in **Table 10** and **Table 11** shows the forecasted benefits for the build scenarios and annual benefit. Improvements to the roadway and the addition of trail will encourage multimodal travel as well as increased physical activity for health improvement.

Operating & Maintenance Costs Methodology

The operating and maintenance costs for the proposed project utilize a baseline maintenance disbursement which includes winter snow plowing on a per year basis. This value was estimated at $1,000 per lane mile. Additional planning roadway costs were also used from the 2022 NDT Transportation Asset Management Plan which estimates the roadway maintenance costs per mile of light preservation, resurfacing, and reconstruction projects in Nebraska. This allows the more frequent maintenance of an unreconstructed project to be compared to the much less frequent maintenance after a major reconstruction project. **Table 12** shows the information used to monetize the differentiating elements of annual operating and maintenance and the associated years gained of each treatment. No Build assumed 1 thin overlay, 1 chip seal, 2 crack seal, and 1 reconstruction, while Build assumed no maintenance over the 30-year window since it would be a concrete surface. **Table 13** shows the results of the Roadway Maintenance benefit analysis.

Table 12 – Roadway Maintenance Costs

	Year	Treatment	Miles	Cost/Mile	Cost
No Build	1	Crack Seal	0.19	$1.25/ln ft	$1,250
	6	Chip Seal	0.19	$39,000	$7,386
	11	Thin Overlay	0.19	$105,000	$19,886
	20	Reconstruction	0.19	$825,000	$156,250
	30	Crack Seal	0.19	$1.25/ln ft	$1,250
	Annual	Winter Plowing	0.19	$2000	$379

Table 13 - Operations and Maintenance Costs

Year	No Build Operations and Maintenance Costs	Build Operations and Maintenance Costs	Net Change in Operations and Maintenance Costs	Discounted Benefits
2028	$1,629	$379	$1,250	$1,092
2029	$379	$379	$0	$0
2030	$379	$379	$0	$0
2031	$379	$379	$0	$0
2032	$379	$379	$0	$0
2033	$7,765	$379	$7,386	$4,600
2034	$379	$379	$0	$0
2035	$379	$379	$0	$0
2036	$379	$379	$0	$0
2037	$379	$379	$0	$0
2038	$20,265	$379	$19,886	$8,830
2039	$379	$379	$0	$0
2040	$379	$379	$0	$0
2041	$379	$379	$0	$0
2042	$379	$379	$0	$0
2043	$379	$379	$0	$0
2044	$379	$379	$0	$0
2045	$379	$379	$0	$0
2046	$156,629	$379	$156,250	$40,378
2047	$379	$379	$0	$0
2048	$379	$379	$0	$0
2049	$379	$379	$0	$0
2050	$379	$379	$0	$0
2051	$379	$379	$0	$0
2052	$379	$379	$0	$0
2053	$379	$379	$0	$0
2054	$379	$379	$0	$0
2055	$379	$379	$0	$0
2056	$379	$379	$0	$0
2057	$1,629	$379	$1,250	$153
Total	**$197,386**	**$11,364**	**$186,023**	**$55,053**

Capital Expenditure Methodology

The Omaha Tribe is respectfully requesting $9,411,448 in FY26 BUILD grant funds for the Macy Intersection and Pathway Improvements Project. While planning and environmental activities are ongoing, it is not anticipated there will be any construction expenses/expenses included in the cost estimate provided, incurred between time of award and obligation. Should any construction expenses be incurred during that time, the Tribe acknowledges these will NOT be eligible for reimbursement. The Project budget does not include any previously incurred expenses.

Project estimates include a 2 percent contingency. Estimates were completed in January 2026 and are based on prior planning and construction work in the area and anticipated inflation between time of estimate and time of award, obligation, and start of work. **Table 14** shows a cost breakdown and approximate schedule for the project capital expenditures and **Table 15** shows the costs by Funding Source separated by Omaha Nation Tribal and Federal funding.

Table 14 - Project Capital Expenditures

Year	Final Design / Construction Engineering	Construction	Total
2026	$949,820		$949,820
2027-28		$8,961,628	$8,961,869
Total	**$949,820**	**$8,961,628**	**$9,911,448**

Table 15 - Funding Sources

Funding Source	Amount	%
Omaha Nation	$500,000	5.0%
Federal/BUILD	$9,511,448	95.0%
Total	**$9,911,448**	**100%**

Residual Value Methodology

The residual value in year 2057 was estimated by breaking the project into the elements of engineering, right-of-way, major structures, excavation/removal, grading and drainage, concrete sub-base and base, surface, and remaining project cost. **Table 16** shows the useful life for the categories listed. Any capital expenditures that do not fit into these categories will assume to have a useful life less than 30 years and will not be included in the residual value calculation. After determining the useful life, the residual value at the final year of analysis was calculated with the assumption of linear depreciation for each category.

Table 16 - Residual Value Categories and Useful Life Assumptions

Expenditure Category	Asset Life	Calculated Construction Costs	Discounted Costs (2025 $)	Percent of Capital Expenditures
Final Design Engineering	0	$949,820	$0	10%
Right-of-Way	100	$330,000	$28,361	3%
Major Structures	75	$341,343	$25,145	3%
Excavation/Removals	0	$1,000,000	$0	10%
Grading and Drainage	50	$1,354,099	$66,499	14%
Concrete, Sub-base and Base	40	$3,177,373	$97,524	32%
Surface	30	$695,794	$0	7%
"Other" Project Cost	0	$2,063,019	$0	21%
Total Project Cost		**$9,911,448**	**$8,657,043**	
Residual Value (2057)		**$1,771,789**	**$217,528**	

The residual value showed that at the end of the 30-year analysis time frame the project is expected to retain $1.7 Million in useful life costs before discounting which equates to approximately 21% of its initial capital expenditure. After discounting the residual value became $0.2 Million.

Benefit/Cost Ratio Summary

A Benefit Cost Summary is provided in **Table 17**. The discounted capital expenditures which constitute the denominator of the benefit/cost ratio was calculated to be $8.7 million. When all benefits are added together, the Total Benefits equal $13.4 million. The result is a benefit/cost ratio of 1.55 and a Net Present Value of $4.8 million.

Table 17 - Benefit/Cost Ratio Summary

Category	Value
Total Discounted Benefits	$13,447,626
Total Discounted Costs	$8,657,043
Net Present Value	$4,790,583
Benefit Cost Ratio	**1.55**