OKLAHOMA Transportation

BCA Narrative

Restoring Safety, Reliability, and Modernizing Infrastructure on I-35 over SH-39 in McClain County, Oklahoma

Oklahoma Department of Transportation

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FY 2026 Bridge Investment Program (BIP) Grant Application

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BCA NARRATIVE

INTRODUCTION

The following narrative summarizes the assumptions, methodology, and results developed for the benefit-cost analysis (BCA) of the No-Build and Build Alternatives evaluated as part of the I-35 Bridges over SH-39 Replacement Project (Project). The objective of BCA is to bring all the direct effects of a transportation investment into a common measure (dollars) and to allow for the fact that benefits accrue over a long period of time while costs are incurred primarily in the initial years. The primary elements that can be monetized are travel time, vehicle operating costs, vehicle crashes, air quality, remaining capital value, and maintenance costs. The BCA can provide an indication of the economic desirability of an alternative, but decision-makers must weigh the results against other considerations, effects, and impacts of the Project.

The primary issues to be addressed by the Project are structural deficiency, geometric non-compliance, and safety. The two I-35 bridges over SH-39 in McClain County were designed to 1968 standards and carry overall condition ratings of Poor (4) and Fair (5), with documented substructure and superstructure deterioration. Both structures fail to meet current ODOT vertical clearance standards, with a minimum clearance of 14 feet 8 inches on SH-39, more than 2 feet below the 16-foot 9-inch ODOT standard. This deficiency has resulted in multiple over-height-vehicle strikes, including a January 2023 event that forced emergency lane restrictions on both I-35 and SH-39. By replacing both bridges to current design standards, the Project should eliminate the strike hazard, restores full structural reliability, and protects the uninterrupted movement of approximately 35,900 daily vehicles, including 12,924 commercial trucks, on one of the nation's most strategically significant freight corridors.

The Project has a benefit-cost ratio of **1.53** with a net present value of **$10.1 million** (in 2024 dollars, discounted at 7%). Total quantified benefits are $29.0 million against total discounted project costs of $18.9 million.

DESCRIPTION OF ALTERNATIVES

This analysis considers a No-Build and Build Alternative.

No-Build Alternative

Consistent with U.S. Department of Transportation (USDOT) BCA Guidance, the No-Build baseline reflects ODOT's actual stated commitment to keeping I-35 open: it incorporates the agency's programmed maintenance schedule, periodic emergency repairs from continued strikes, and the resulting tail risk of a catastrophic closure. The analysis deliberately does *not*

assume the bridges are load-posted or closed outright in the No-Build, even though their Poor (4) and Fair (5) condition ratings and continued deterioration could plausibly justify such an assumption. A full-closure or load-posting baseline would generate substantially larger benefits but would not reflect ODOT's operational reality; in keeping with the guidance's caution against unrealistic baselines, the more conservative maintained-facility scenario was selected.

The No-Build Alternative assumes the I-35 northbound (National Bridge Inventory (NBI) number: 17208) and southbound (NBI number: 17207) bridges over SH-39 remain in their current condition, with ongoing maintenance and repair activities continuing as needed. Under this scenario, both structures continue to carry substandard vertical clearance over SH-39 and face a documented deterioration trajectory that creates growing safety, reliability, and cost risks over time. In addition, because of the low clearance of the I-35 bridge over SH-39, trucks will continue to strike the bridge and damage its beams, leading to costly emergency repairs. Eventually, there is a chance that one of these bridge strikes could be catastrophic, requiring the closing of one or both lanes of traffic while repairs are completed.

Build Alternative

The Build Alternative replaces both the northbound and southbound I-35 bridges over SH-39 on the existing alignment, constructed to current ODOT 4R design standards. The replacement bridges will accommodate a future six-lane I-35 configuration and will correct the existing vertical clearance deficiency over SH-39, bringing both structures into full compliance with current AASHTO and ODOT geometric requirements.

BCA METHODOLOGY

Methodology and assumptions largely follow the processes outlined by USDOT using standard BCA methodologies and assumptions outlined in *Bridge Investment Program Benefit-Cost Analysis Tool User Manual*, dated January 2026. Specific details regarding the assumptions, values, and sources used in the accompanying BCA Workbook are outlined in the sections below.

Main Components

The main components analyzed included:

- Initial capital costs
- Remaining capital value: The remaining capital value (the remaining value of improvements extending beyond the analysis period) was considered a benefit and was added to other user benefits.
- Maintenance and emergency repair costs
- Travel time savings from avoided load posting and closure scenarios

- Crashes by severity

Analysis Years

The BCA workbook models construction costs beginning in 2026 and concluding in 2030, consistent with the Project's inclusion in the FFY 2026-2029 STIP and anticipated construction in 2029-2030. Benefits accrue beginning in 2031 through 2060, a 30-year period consistent with USDOT BIP guidance.

Economic Assumptions

The value of time, vehicle operating costs, and cost of crashes were obtained from the *Bridge Investment Program Benefit-Cost Analysis Tool User Manual*, dated January 2026. The remaining capital value assumptions were consistent with the remaining capital value factors from the Minnesota Department of Transportation, Office of Planning and Programming. Values were adjusted to reflect a 7% discount rate and a 30-year analysis period. All values are calculated in 2024 dollars.

Construction Costs

In consultation with ODOT, engineers at Poe & Associates developed cost estimates for each component. No additional right-of-way is required. Construction is modeled at approximately $11.5 million per bridge ($23.0 million total, 70% spent in 2029 and 30% in 2030), with an additional 15% allocated to preliminary engineering and design (spread over 2026 through 2028). There are $68,000 in previously incurred costs from the Bridge Assessment Report in 2025, divided evenly between the two bridges.

Residual Value

Because many structural components have service lives well beyond the 30-year analysis period, the remaining capital value (RCV) was calculated using the Minnesota Department of Transportation methodology and added to total project benefits per USDOT BIP guidance. Project costs were apportioned as follows:

- 43% of costs: Bridge structure (75-year service life)
- 4% of costs: Pavement base and subgrade (50-year service life)
- 53% of costs: All other project elements (30-year service life or sunk costs with no remaining value)

Operating and Maintenance (O&M) Costs

Replacing both structures now avoids a substantial sequence of near-term structural interventions and long-term maintenance costs. ODOT District 3 engineers provided estimated scheduled maintenance costs for both alternatives. Separately, the BCA workbook incorporates

probability-weighted emergency repair costs arising from continued over-height vehicle strikes under the No-Build scenario. As documented by the Burgess & Niple inspection report (October 2025), ODOT District 3 recommended short-term rehabilitation at $1,122,000 for both bridges, the minimum necessary to keep the bridges in service while awaiting replacement. The following scheduled costs (in 2026 dollars, converted to 2024 dollars in the BIP tool) were provided by ODOT District 3:

No-Build Alternative (per bridge / both bridges):

- $561,000 / $1,122,000 for short term repairs in 2026
- $10,000 / $20,000 for striping in 2026
- $150,000 / $300,000 for beam repairs in 2027
- $500,000 / $1,000,000 to encase columns and pier caps in 2028
- $100,000 / $200,000 for joint replacement in 2029
- $10,000 / $20,000 for striping in 2037
- $1,500,000 / $3,000,000 for resurfacing in 2044
- $100,000 / $200,000 to paint superstructure in 2046
- $10,000 / $20,000 for striping in 2056

Build Alternative (both bridges):

- $10,000 / $20,000 for routine striping in 2040
- $10,000 / $20,000 for routine striping in 2050
- $100,000 / $200,000 for joint replacement in 2056

In addition, bridge strikes from over-height trucks regularly require emergency repairs. ODOT has reported regular strikes, with the most recent in 2023, which required $750,000 in emergency repairs. The BCA analysis assumes that these strikes will continue to occur at a 5-year interval.

Because ODOT makes every effort to keep I-35 open during both regular and emergency maintenance, the vast majority of lane closures are on SH-39. Therefore, travel time delays and safety disbenefits from lane closures are calculated as part of the maintenance analysis. To calculate the delay associated with a lane closure, the analysis assumes 1 minute of delay for vehicles on SH-39 (based on head-to-head traffic with flaggers on a single lane) and 12 minutes delay on I-35 (based on a 3-mile segment at speeds of 15 miles per hour, as in the travel time saving below). For safety benefits, the analysis uses Crash Modification Factor (CMF) 520 (active work with temporary lane closure (compared to no work zone), representing a 66% increase in crashes. Crash data for 2021-2025 was provided by ODOT for both I-35 and SH-39. **Table 1** shows the number of days of closures associated with each type of routine or emergency maintenance, based on information provided by ODOT District Engineers.

TABLE 1: LANE CLOSURES DUE TO ROUTINE AND EMERGENCY MAINTENANCE

Maintenance Activity	Days of lane closure on I-35	Days of lane closure on SH-39
Striping	0	0
Routine Beam Repairs	0	0
Encase Columns and Pier Caps	5	10
Joint Replacement	0	10
Resurfacing	0	120
Paint Superstructure	0	60
Bridge Strike	0	7
Emergency Beam Repairs	7	7

Travel Time Savings

Travel time savings accrue from avoiding a catastrophic bridge strike, which ODOT District Engineers report is becoming increasingly likely, given both the poor condition and low clearance of the bridge. In line with the maintenance costs given above, the analysis assumes that an over-height truck will strike the bridge beams once every 5 years, giving a 20% chance of a hit in any given year. The analysis also assumes that there is a 20% chance that any one of these strikes could be catastrophic, requiring emergency repairs and a lane closure for 180 days. Multiplying these probabilities gives an average of 7.2 days of lane closures per year.

During previous lane closures, ODOT District Engineers have seen queues of up to 5 miles and speeds as low as 10 miles per hour on I-35. A more conservative estimate of 3 miles at 15 miles per hour has been used to calculate the additional travel time associated with a lane closure.

Construction Disbenefits

Construction disbenefits reflect the travel time costs and additional crash risk imposed on I-35 users during the construction period. ODOT intends to use ABC techniques and construct a temporary bridge to minimize disruption to I-35 operations.

The workbook models these for 340 days in 2029 and 180 days in 2030. This includes a 10-second delay (based on a reduction in speed from 66 miles per hour to 55 miles per hour in the work zone) and an increase in crashes of 31%, based on CMF 544 (Active work with no lane closure (compared to no work zone)).

Vehicle Operating Cost Savings and Air Quality Benefits

Vehicle operating costs (VOC) savings and emissions benefits were excluded from this analysis via the BCA workbook configuration, even though the BIP BCA tool automatically calculates them based on the detour length. Because ODOT makes every effort to keep I-35 open during both routine and emergency maintenance and intends to build a temporary bridge during the project, the analysis assumes vehicles will not deviate from I-35 during construction.

Safety Analysis

Crash data were obtained from the ODOT SAFE-T collision database covering a five-year period (2021-2025). Because crash data included only the facility (I-35) and not the direction, crashes were split evenly between the two bridges. Over the five years, there were 7 crashes with property damage only and 1 with incapacitating injury.

No Crash Modification Factor (CMF) improvements were applied in the BCA workbook, as the Project's primary safety improvement is the elimination of over-height strike risk (modeled through the maintenance/closure framework) rather than a traditional geometric safety countermeasure.

FACTORS NOT QUANTIFIED

Several factors, while important benefits of the Project, were not quantified due to insufficient data and to maintain a conservative estimate of benefits:

- Avoided Emergency Response Disruption: A future load posting or closure of the I-35 bridges would remove a designated Emergency Evacuation Route and impair emergency response access through the corridor, with consequences that cannot be reliably monetized but represent a meaningful public safety benefit.
- Freight Network Reliability: The replacement eliminates a credible closure risk on a corridor carrying 12,924 commercial trucks per day. The supply chain disruption costs of a closure extend beyond direct vehicle operating costs to include inventory carrying costs, contract penalties, and schedule disruptions for shippers, retailers, and producers that depend on uninterrupted I-35 access. These indirect costs are not quantified.
- Long-Term Capacity Enablement: The replacement bridges are designed to accommodate a future six-lane I-35 configuration, avoiding the need to replace the structures a second time during corridor widening. The avoided future replacement cost and the economic value of uninterrupted freight capacity growth are not quantified in this analysis.

BCA RESULTS

The benefit-cost analysis indicates the economic desirability of a scenario, but results must be weighed by decision-makers along with the assessment of other effects and impacts. Projects are considered cost-effective if the benefit-cost ratio is greater than 1.0. **Table 2** below presents results for each bridge individually and for both bridges combined, in 2024 dollars discounted at 7% over a 30-year analysis period (2031-2060). The combined Benefit Cost Ratio (BCR) of 1.53 exceeds the 1.0 threshold, confirming that the Project's quantified benefits outweigh its costs.

TABLE 2: BCA RESULTS SUMMARY

Benefit/Cost Category	Bridge 17208 (Northbound)	Bridge 17207 (Southbound)	Combined Total
Safety Benefits	($0.06m)	($0.06m)	($0.13m)
Travel Time Benefits	$8.75m	$8.84m	$17.59m
Maintenance Benefits	$5.45m	$5.47m	$10.92m
Residual Value	$0.32m	$0.32m	$0.64m
Total Benefits	**$14.45m**	**$14.57m**	**$29.02m**
Total Discounted Costs	$9.47m	$9.47m	$18.94m
Benefit-Cost Ratio (BCR)	**1.53**	**1.54**	**1.53**
Net Present Value (NPV)	**$4.98m**	**$5.10m**	**$10.08m**

Note: Numbers may not add to totals shown because of independent rounding.