



Project Narrative

US-81 UPRR Bridge Replacement Project (NBI 16159 & 16167)

FY 23-26 BRIDGE INVESTMENT PROGRAM GRANT APPLICATION
693JJ324NF00006



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*All project details and supporting materials may also be accessed on ODOT’s [Bridge Investment Program 2026 Grant Website](#).





I. Basic Project Information- Project Description, Location, & Parties

Project Description

The Oklahoma Department of Transportation (ODOT) proposes the replacement of two parallel National Highway System (NHS) bridges carrying northbound and southbound traffic on US-81 over the Union Pacific Railroad (UPRR) in Kingfisher County, Oklahoma (NBI #16159 and #16167).

Constructed in 1964, both bridges (see Figure 1 and Figure 2) have exceeded their 50-year design life and exhibit aging structural conditions that affect long-term performance, safety, and reliability. The project includes one Structurally Deficient bridge (NBI 16159) and a companion bridge (NBI 16167) that contains fracture-critical components and ongoing deterioration concerns.

The existing structures are six-span steel bridges with fracture-critical elements, exhibiting corrosion, fatigue-prone details, and deteriorated components, along with geometric and clearance constraints that increase maintenance needs and lifecycle

FIGURE 1. US-81 BRIDGE NB (16159)



FIGURE 2. US-81 BRIDGE SB (16167)



costs. The proposed project will fully replace both bridges with modern three-span continuous plate girder structures designed in accordance with current AASHTO and ODOT standards. The replacement bridges will:

- Eliminate fracture-critical structural vulnerability through use of redundant design
- Increase vertical and horizontal clearance over the UPRR corridor
- Reduce skew and improve structural load distribution
- Provide improved roadway cross-section and shoulders
- Incorporate crashworthy railings and protective measures over the railroad

These improvements will enhance safety, improve structural performance, and ensure reliable operation of a critical multimodal crossing. The project directly advances the Bridge Investment Program (BIP) goals of restoring bridges to a state of good repair, improving safety and mobility, and enhancing system resiliency.



ODOT has completed final design, environmental review (Programmatic Categorical Exclusion), and railroad coordination. The project is fully ready to proceed to construction upon award. Total eligible project cost is approximately \$24.8 million, including a requested BIP share of \$19.8 million (80 percent) and a non-Federal match of \$4.9 million (20 percent).

Project Location

The project is located in Kingfisher County, Oklahoma, approximately 5.3 miles north of the US-81 and SH-33 intersection near the Town of Dover (see Figure 3).

FIGURE 3. US-81 NB & SB BRIDGE LAYOUT



of the US-81 and SH-33 intersection near the Town of Dover (see Figure 3). US-81 is a major north-south corridor extending from North Texas to the Canadian border and serves as a critical route for regional passenger travel, agriculture and commercial freight movement, and interstate connectivity. At this location, US-81 crosses an active Union Pacific Railroad freight line, with the twin bridges carrying directional traffic over this critical highway-rail corridor (see Figure 4). In this rural area with limited alternate routes,

reliable operation is essential to regional connectivity, economic activity, and access to essential services.

Lead Applicant

The Oklahoma Department of Transportation (ODOT) will serve as the lead applicant and project delivery agency. ODOT has extensive experience delivering transportation projects using Federal-aid highway program funds under 23 U.S.C., including responsibility for planning, design, procurement, construction, and compliance with Federal requirements.

ODOT has a strong track record managing federally funded infrastructure projects, including complex bridge projects such as BIP, requiring railroad coordination. ODOT maintains standardized processes to ensure compliance, risk management, and



FIGURE 4. US-81 BRIDGES PROJECT LOCATION/UPRR



delivery performance. Oklahoma has transformed its bridge system through sustained investment, reducing structurally deficient (SD) bridges by approximately 97 percent since 2004 and improving its national ranking from 49th to 4th, while maintaining a target of less than 1 percent SD bridges statewide. Only 35 SD bridges remain from the 1,168 identified (less than 0.5%). This sustained, data-driven performance demonstrates ODOT's proven ability to deliver bridge improvements efficiently and maintain long-term system reliability.

Through this experience, ODOT has demonstrated the technical, financial, and administrative capacity necessary to successfully deliver the US-81 bridge replacement project and is fully prepared to obligate and administer BIP funds in accordance with all Federal requirements and established timelines.

Other Public and Private Parties

ODOT will serve as the sole project delivery agency and retain full responsibility for design, procurement, construction, and implementation of these ODOT-owned bridges. No private entities will participate in project delivery. Coordination with Kingfisher County will occur as needed to address local considerations, while coordination with the Oklahoma Cooperative Circuit Engineering District Board (OCCEDB) District 8 will be limited to regional communication and awareness. The project crosses an active UPRR corridor and will improve clearance and structural reliability at the crossing, supporting continued rail operations. No public or private entity is expected to receive a direct and predictable financial benefit from the project, which will provide broad public benefits by improving safety, mobility, reliability, and freight movement.

Additional Eligibility Requirements

Eligibility Statement

The US-81 UPRR Bridge Replacement Project is eligible under the BIP Bridge Project grant category. The project consists of the replacement of two existing highway bridges listed on the National Bridge Inventory (NBI #16159 and #16167), consistent with eligible activities defined under 23 U.S.C. 144(b) and 124(a)(1)(A). The total future eligible project cost of approximately \$24.8 million is below the statutory threshold for Bridge Project grants. The project meets all eligibility requirements, including completion of design, readiness to proceed to construction within 12 months of obligation, and compliance with applicable maintenance and multimodal considerations.

Maintenance Commitment

ODOT will be responsible for maintaining the replacement bridges upon completion. ODOT administers a statewide bridge inspection and asset management program in accordance with Federal requirements and will perform all ongoing inspection, maintenance, and preservation activities. Long-term maintenance needs for the replacement bridges are expected to be minimal due to modern design and materials. Routine inspection and maintenance activities are estimated at approximately \$1,000 annually per bridge (in alternating years), with a one-time deck preservation treatment



estimated at approximately \$40,000 early in the service life.

Over a 40-year analysis period, total maintenance costs are estimated at approximately \$60,000 per bridge, or \$120,000 total, equating to an average annual cost of approximately \$3,000 for the project. Maintenance activities will be funded through a combination of State ROADS funds, State Transportation Funds, and Federal Formula funds, all of which are programmed and available to support long-term asset management.

Compared to the existing bridges, which require significantly higher maintenance and are projected to incur major rehabilitation costs of approximately \$2.7 million per structure, the proposed replacement will substantially reduce lifecycle maintenance needs and improve long-term cost efficiency.

Bicycle and Pedestrian Accommodation

Pedestrian and bicycle use of US-81 in the project area is minimal and not supported by existing infrastructure or surrounding land use patterns. The corridor functions as a high-speed rural highway serving primarily vehicle and freight traffic and does not include sidewalks, dedicated bicycle facilities, or connecting multimodal networks. Given the absence of existing or planned demand and the lack of supporting infrastructure, dedicated pedestrian and bicycle facilities are not warranted at this location. The replacement bridges will include standard roadway shoulders consistent with current design practices. These shoulders provide space for disabled vehicles, emergency use, and incidental non-motorized use, maintaining overall roadway safety while remaining consistent with the corridor's rural function.

Existing Conditions and Need

The existing US-81 bridges exhibit structural deficiencies and risks typical of aging fracture-critical steel bridges, including corrosion-related section loss and fatigue-prone details affecting long-term performance. Operational deficiencies include insufficient vertical clearance over the Union Pacific Railroad, high skew and curvature affecting load distribution, and substandard geometric design relative to current standards. These conditions increase maintenance complexity, reduce reliability, and elevate the risk of future restrictions or service disruption.

II. National Bridge Inventory Data

The project includes two bridges carrying US-81 over the Union Pacific Railroad (UPRR) in Kingfisher County, Oklahoma. The bridges are listed in the National Bridge Inventory (NBI) as follows:

- NBI #16159 – US-81 Northbound over UPRR
- NBI #16167 – US-81 Southbound over UPRR

Both structures were constructed in 1964 and function as parallel facilities providing directional travel along the US-81 corridor.



NBI Condition Ratings

Bridge NBI #16159

- Sufficiency Rating: 53.3
- Superstructure Condition Rating: 4 (Poor)
- Deck Condition Rating: 5 (Fair)
- Substructure Condition Rating: 5 (Fair)
- Classification: Fracture Critical, Structurally Deficient, Poor

Bridge NBI #16167

- Sufficiency Rating: 68.4
- Superstructure Condition Rating: 6 (Satisfactory)
- Deck Condition Rating: 5 (Fair)
- Substructure Condition Rating: 5 (Fair)
- Classification: Fracture Critical, Structurally Fair, At Risk

Summary of NBI Findings

NBI data indicate that Bridge #16159 is in poor condition due to deterioration of primary structural components, while Bridge #16167 is in fair condition but exhibits deficiencies consistent with accelerated deterioration. Both bridges reflect aging infrastructure with documented structural degradation, supporting the need for replacement to restore structural integrity and ensure continued reliable service along the US-81 corridor. Both bridges are fracture-critical structures, with Bridge NBI #16159 classified as structurally deficient and Bridge NBI #16167 classified as fair condition and at risk of deterioration.

Additional detailed NBI condition, load rating, and inspection data are provided in the accompanying application templates (see Appendix A-B).

III. Project Budget – Grant Funds, Sources, and Uses of All Project Funding

Project Cost Overview

The total project cost is \$25,943,306 (see Table 1) including both previously incurred costs and future eligible project costs. The project leverages a combination of non-

TABLE 1: PROJECT BUDGET

Fund source	Application		
Previously Incurred Costs	\$	%	
Other Federal Funds	1,054,285	96	Not included in FY23-26 BIP Funding Request
Non-Federal, State Funds	44,959	4	
Total Previously Incurred Costs	1,099,244	100	
Future Eligible Project Costs			
BIP Funds	19,875,249	80	Includes eligible project costs in FY23-26 BIP Application
Other Federal Funds		0	
Non-Federal, State Funds	4,968,813	20	
Total Future Eligible Project Costs	24,844,062	100	
Total Project Costs	25,943,306		



Federal funding, prior Federal formula funds, and requested BIP funding to support project delivery.

Previously incurred costs totaled \$1,099,244, including \$44,959 in non-Federal funds, \$1,054,285 in prior Federal formula funding supporting preliminary engineering and preconstruction activities.

The remaining \$24,844,062 represents future eligible project costs (see Table 2).

Funding Sources and Cost Share

Future project funding is structured to meet BIP statutory cost-sharing requirements as follows:

- BIP Funds (Federal – 80%): \$19,875,249
- Non-Federal Match (20%): \$4,968,813

The required non-Federal match will be provided through committed State transportation funds administered by ODOT. These funds are programmed and available for obligation in accordance with the project schedule. This funding structure complies with the 80/20 statutory requirements.

Component	Non-Federal	BIP Share	Total
Construction	\$3,943,502	\$15,774,007	\$19,717,509
Project Inspection (E&C)	\$236,610	\$946,441	\$1,183,051
Contingency	\$788,700	\$3,154,802	\$3,943,502
Total			\$24,844,062

TABLE 2: PROJECT FUNDS BY COMPONENT

Use of Project Funds by Component

Construction includes full bridge replacement and associated roadway improvements necessary to restore structural integrity and meet current design standards.

Project Inspection (E&C) costs include construction oversight, inspection, and project management to ensure compliance with Federal requirements.

Contingency (approximately 20% of construction and 16% of total future project costs) is included to address potential cost escalation, unforeseen site conditions, and construction risks. This level is consistent with FHWA cost estimating guidance and reflects project complexity, including construction over an active railroad corridor.

Previously Incurred Costs

Previously incurred costs supported early project development, including preliminary engineering and design, railroad coordination, and right-of-way and utility coordination. These investments demonstrate project advancement and reduce preconstruction risk.

Financial Completeness and Readiness

The project budget is fully developed and financially complete, with identified and



committed non-federal match, clearly defined federal request within allowable limits, and adequate contingency to address cost uncertainty.

All funding sources will be available and programmed to align with the project schedule. No additional Federal discretionary funding sources are anticipated for this project.

Summary

The proposed funding plan demonstrates a complete and achievable financial structure that meets all BIP statutory requirements. The budget includes sufficient contingency, committed non-Federal funding, and secured prior Federal investments, positioning the project for timely obligation and delivery. Please refer to Appendix G for a more detailed Budget Narrative.

IV. Merit Criteria

Criterion 1: State of Good Repair

Overview of Bridge Condition

The US-81 bridge replacement project addresses two structures (NBI #16159 and #16167) that meet BIP eligibility by improving one bridge in poor condition and one bridge in fair condition that is at risk of falling into poor condition within the next three years. This directly supports BIP program goals to reduce the number of bridges in poor condition and those at risk of deterioration.

Bridge NBI #16159 is classified as poor, with the lowest condition rating of 4 driven by a superstructure rating of 4. Bridge NBI #16167 is currently in fair condition but exhibits extensive structural deficiencies consistent with accelerated deterioration. Both bridges

were constructed in 1964 and have exceeded their design life, exhibiting conditions typical of aging fracture-critical steel structures.

Condition and Risk of Decline

BRIDGE NBI #16159 – POOR
CONDITION

Inspection data confirms that Bridge 16159 is in poor condition, reflecting deterioration of primary load-carrying elements. Documented deficiencies include fatigue cracking in structural connections, corrosion-related section loss in beams and bearings, pack rust accumulation, and deterioration of deck and substructure components (see Figure 5, Figure

FIGURE 5. US-81 NB BRIDGE 16159: VIEW NORTH FROM THE SOUTH ABUTMENT SHOWING IMPACT-DAMAGED WEST RAILING POSTS, FAILED COATING, AND THE ADJACENT UPRR CORRIDOR.





6, and Appendix A). Water infiltration through failed joints continues to accelerate deterioration. Recent inspection cycles indicate a decline in superstructure condition

FIGURE 6. US-81 NB BRIDGE 16159: UNDERSIDE OF THE EAST OVERHANG AT PIER 1 SHOWING SOFFIT SPALLING AND EXPOSED, SEPARATING RAILING POST ANCHORAGE.



from 5 to 4, demonstrating active degradation and confirming continued loss of structural integrity.

BRIDGE NBI #16167 – FAIR CONDITION AT RISK

Bridge 16167 is currently classified as fair but is at high risk of falling into poor condition based on inspection findings. Observed deficiencies include deck cracking and rutting, joint failures allowing water intrusion, bearing distress, substructure cracking and delamination, and documented settlement and undermining (see Figure 7, Figure 8, and Appendix B).

These deficiencies reflect systemwide deterioration across structural components. Continued corrosion and water infiltration are

FIGURE 7. US-81 SB BRIDGE 16167: WEST END OF PIER 5 CAP SHOWING UP TO 1/8-INCH VERTICAL CRACKING IN COLUMN 1 AND THE UPRR CORRIDOR.



FIGURE 8. US-81 SB BRIDGE 16167: UNDERSIDE OF DECK OVERHANG AT PIER 4 SHOWING SPALLING & CRACKING AT BRIDGE RAILING U-BOLTS.

expected to accelerate decline, increasing the likelihood of the bridge transitioning to poor condition within the next inspection cycle.

Geometric and Load Deficiencies

Both structures do not meet current geometric or operational standards for a National Highway System facility.



Key deficiencies include:

- Substandard railings and safety features
- Narrow roadway width (~33 feet curb-to-curb)
- Severe skew (~60 degrees) contributing to stress concentration
- Inadequate vertical clearance over UPRR (~23 feet 3 inches)

These conditions limit operational performance, increase maintenance demands, and restrict the ability of the corridor to safely and efficiently accommodate current and future traffic demands.

Threat to Transportation Network

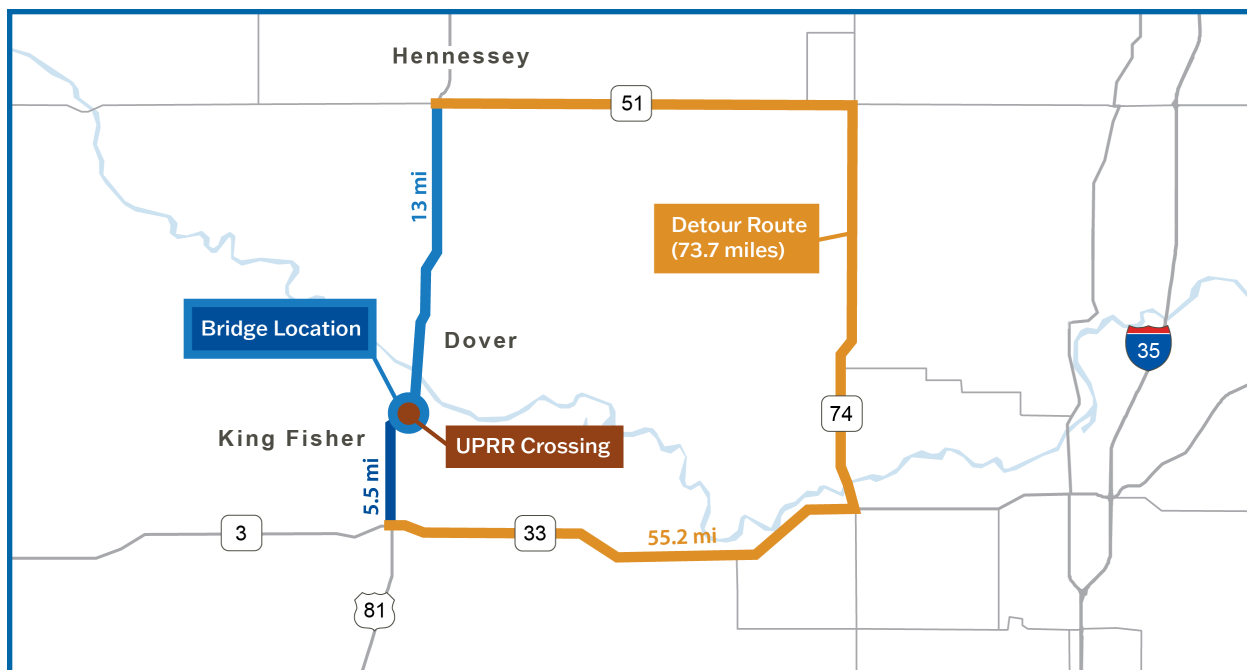
The bridges carry traffic on a National Highway System corridor and serve as a critical grade-separated crossing over an active Union Pacific Railroad freight line. As such, they are essential to regional mobility, freight movement, and multimodal operations.

Without improvement, the structures are at increasing risk of load restrictions, lane

closures or reduced capacity, and potential full closure as conditions worsen.

In the event of a structural restriction or bridge closure, motorists could face detours of up to 73.7 miles. Critical regional trips, such as travel between Kingfisher and Hennessey, would require a 55.5-mile detour—approximately 36.6 miles longer than the normal route (see Figure 9). These extended detours would significantly increase travel time, delay emergency response, increase freight transportation costs, and reduce access to essential services. Traffic volumes are projected to grow from approximately 8,900 vehicles per day to over 16,000 vehicles per day by 2046, increasing person-miles traveled and amplifying the consequences of continued deterioration. These conditions directly support the statutory requirement to evaluate benefits from preventing bridge closure or reduced use.

FIGURE 9. DETOUR MAP: US-81 NB & SB BRIDGE PROJECT





Protection and Resiliency Improvements

The proposed project will replace both bridges with structures designed to current standards, improving durability, and reducing long-term risk.

Key improvements include:

- Elimination of fracture-critical failure risk through redundant design
- Correction of erosion and drainage deficiencies
- Replacement of deteriorated joints, bearings, and substructure components
- Improved load distribution through reduced skew and modern structural systems

The project is also compatible with ODOT's use of infrastructure monitoring tools such as U.S. Geological Survey ShakeCast, which supports rapid post-event assessment and improves system resilience following earthquakes. These improvements will enhance long-term structural performance and reduce vulnerability to environmental stressors, supporting resilient infrastructure consistent with BIP objectives.

Maintenance Costs and Lifecycle Benefits

The existing bridges require ongoing maintenance due to widespread deterioration, including joint repair, deck patching, corrosion mitigation, and fatigue monitoring. Current maintenance costs total approximately \$16,000 annually and are expected to increase significantly under a no-build scenario. Projected maintenance under a no-build scenario includes routine maintenance of approximately \$7,000 to \$8,000 per bridge annually and major rehabilitation costs of approximately \$2.7 million per bridge within the next five years. Total projected maintenance costs over five years exceed \$5.4 million. Following replacement, maintenance requirements are limited to routine inspection and preventative maintenance, with estimated costs of approximately \$86,000 over five years (see Appendix F).

Overall, the project reduces maintenance costs by more than 98 percent, eliminates the need for major rehabilitation, and significantly improves lifecycle cost efficiency. These reductions directly address statutory requirements related to avoided maintenance costs and demonstrate long-term value relative to the project's total cost.

Criterion 2: Safety and Mobility

Crash Reduction and Safety Benefits

The existing US-81 bridges exhibit structural and geometric deficiencies that increase safety risks for roadway users. These include fracture-critical elements, deteriorated structural components, narrow roadway width, and high skew geometry, all of which contribute to reduced driver recovery space, increased potential for sideswipe and fixed-object collisions, and elevated crash severity. The proposed project will address these deficiencies through full bridge replacement, bringing the facility into compliance with current AASHTO and National Highway System design standards. Key safety benefits will result from improved roadway geometry, elimination of fracture-critical



vulnerabilities, and restoration of structural integrity.

Crash reduction benefits will be quantified in the project's benefit-cost analysis (BCA), which will estimate reductions in total crashes, serious injuries, and fatalities based on existing crash data and established safety performance methodologies (see Appendix C).

Reduction of Safety Risks

The project includes two fracture-critical (FC) bridges: one Structurally Deficient (SD) bridge (NBI #16159) and a companion bridge (NBI #16167) that is in fair condition and at risk (AR) of deteriorating to poor condition. Both bridges include fracture-critical elements, meaning failure of a single primary load-carrying member could result in partial or total structural collapse. These conditions increase risk to roadway users and necessitate frequent inspection, monitoring, and maintenance activities to manage potential failure.

Additional safety concerns include aging bridge elements, deterioration of joints, bearings, and substructure components, and geometric features that no longer meet current design expectations. Collectively, these conditions increase long-term safety risk, maintenance burden, and system vulnerability. The proposed project will replace both structures, eliminating fracture-critical features and addressing the underlying structural and operational deficiencies. The new bridges will provide full structural redundancy, improved geometry, and compliance with current design and safety standards, significantly reducing the risk of catastrophic failure and improving long-term reliability and resilience.

Safety Features and Protection of Users and Corridor Assets

The project incorporates modern safety features designed to protect roadway users and adjacent infrastructure, including the underlying UPRR corridor.

Key improvements include:

- Installation of crashworthy bridge rail systems meeting current standards
- Increased vertical clearance to reduce the risk of bridge strikes over the railroad
- Improved horizontal clearance and offsets for enhanced separation from rail operations
- Protective fencing to prevent debris or vehicle intrusion onto the rail corridor
- Increased distance between bridge piers and active rail tracks

- Improved emergency access for faster incident response

These improvements reduce exposure to structural, operational, and multimodal safety risks, benefiting both roadway users and freight operations.

Mobility, Efficiency, and System Performance

The project will improve the mobility, efficiency, and reliability of movement along the US-81 corridor, which carries approximately 8,900 vehicles per day, projected to increase to 16,073 vehicles per day by 2046. Approximately 15 percent of traffic consists of heavy trucks, reflecting the corridor's importance for regional and interstate freight movement.

The corridor supports substantial user activity, as measured by person-



miles traveled (PMT). Using FHWA-recommended vehicle occupancy assumptions, the corridor currently supports approximately 2.44 million person-miles traveled annually, increasing to approximately 4.40 million annually by 2046 (See Figure 10). Existing deficiencies therefore place millions of annual person-miles at risk of disruption.

Freight Mobility and System Exposure

The corridor carries substantial truck traffic and provides a grade-separated crossing over an active Union Pacific Railroad line, supporting both highway and rail operations. Existing structural

and geometric deficiencies increase exposure to risk for both freight and passenger vehicles. In the absence of the project, deterioration may result in operational restrictions or reduced capacity, forcing traffic onto less suitable routes. As described in Criterion 1, detours of up to 73.7 miles would significantly increase vehicle miles traveled and shift traffic onto rural roadways not designed for sustained heavy truck volumes. This increased exposure would elevate crash risk, particularly for freight and long-distance travel.

Travel Time Reliability and System Efficiency

Current system performance metrics indicate reduced reliability, with a Travel Time Reliability (TTR) value of 1.60, reflecting corridor vulnerability to delay and disruption. As traffic volumes increase, reliability challenges are expected to intensify without intervention. The proposed project will restore full load-carrying capacity, eliminate structural constraints, and improve travel time reliability. These improvements will support consistent and predictable movement of people and goods while reducing exposure to delay and system inefficiency.

Summary of Safety and Mobility Benefits

The project will:

- Reduce crash risk and severity
- Eliminate fracture-critical failure risk
- Improve safety for roadway users and rail operations
- Maintain mobility for up to 16,000 daily users
- Support reliable freight movement along a key corridor
- Reduce system disruption risk affecting millions of person-miles traveled annually

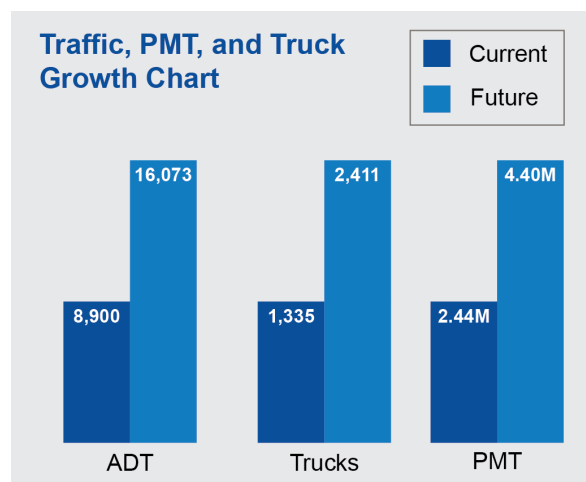


FIGURE 10: TRAFFIC, PMT, AND TRUCK GROWTH CHART



Collectively, these benefits demonstrate substantial improvements in both safety and mobility, directly aligning with BIP evaluation criteria.

Criterion 3: Economic Competitiveness and Opportunity

Overview of Economic Role

The US-81 bridge replacement project supports a critical transportation corridor that underpins regional and interstate economic activity. US-81 functions as a key north–south route (part of the broader Ports-to-Plains corridor) connecting North Texas to the Canadian border and serves as a primary corridor for agricultural production, commercial freight movement, and regional travel.

Within Oklahoma, the corridor provides essential connectivity between rural communities in Kingfisher County and the growing Oklahoma City metropolitan region. At the project location, US-81

crosses an active UPRR freight corridor, creating a critical multimodal interface that supports regional and national supply chains.

Freight Movement and Economic Activity

As described in Criterion 2, the corridor supports substantial daily passenger and freight activity and is projected to experience continued growth in demand.

This level of truck activity supports:

- Movement of agricultural commodities from rural production areas
- Regional distribution of goods
- Interstate freight movement along the US-81 corridor

US-81 also provides direct linkage to US-412, a major east–west freight corridor that connects western Oklahoma to Tulsa and the McClellan-Kerr Arkansas River Navigation System (MKARNS), one of the nation’s most inland navigable waterway systems. This connection extends the reach of the corridor beyond regional truck and rail networks to

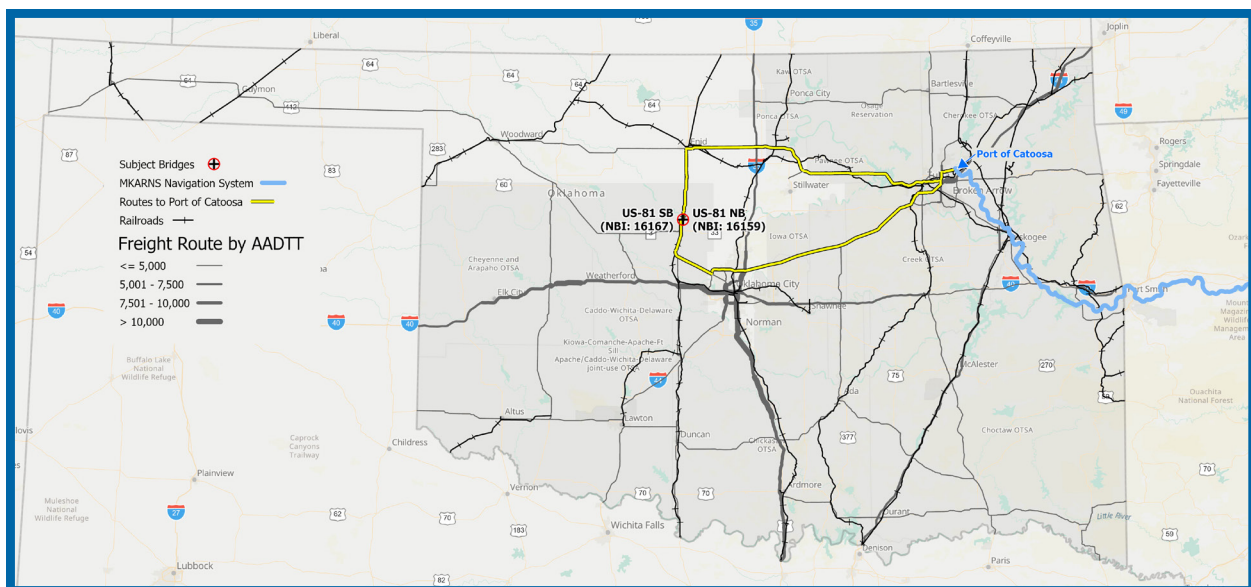


FIGURE 11. US-81 BRIDGE PROJECT CONNECTIVITY TO REGIONAL AND NATIONAL FREIGHT NETWORKS. [US-81] → [US-412] → [TULSA] → [PORT OF CATOOSA] → [MKARNS] → [MISSISSIPPI RIVER/GULF]



national and global markets via barge transportation. As a result, the project supports an integrated multimodal freight system, facilitating efficient movement of agricultural commodities, energy products, and manufactured goods across highway, rail, and inland waterway networks (see Figure 11).

Economic Risk of No-Build Condition

The existing bridges exhibit structural deficiencies, fracture-critical elements, and geometric constraints that increase the risk of load restrictions, reduced capacity, or closure. Given the corridor's freight volumes, these risks translate directly into economic impacts. Without the project, freight movement would be constrained by potential load restrictions; travel distances and times would increase due to detours; transportation costs would rise due to increased fuel use and travel time; supply chain efficiency would be reduced for agricultural producers and regional industries; and disruptions would affect both highway and rail operations at a critical crossing.

Because this corridor carries a substantial volume of freight, disruptions would have disproportionate impacts on regional economic activity and supply chain reliability.

Economic Benefits of the Proposed Project

1. IMPROVED FREIGHT RELIABILITY AND SYSTEM PERFORMANCE

The project will restore full structural capacity and eliminate constraints that limit freight movement. This will ensure reliable movement of approximately 1,300 to 2,400 trucks per day, reduce the risk of unplanned disruptions, and support consistent travel times critical to supply chain performance.

2. REDUCTION IN FREIGHT TRANSPORTATION COSTS

By maintaining direct routing and reducing delay risk, the project will reduce fuel consumption and operating costs for freight carriers, improve travel time predictability for logistics planning, and avoid costs associated with detours and disruption.

3. SUPPORT FOR RURAL AND REGIONAL ECONOMIES

The corridor provides essential connectivity between agricultural production areas and regional markets. Reliable infrastructure supports efficient shipment of agricultural goods, continued economic viability for rural producers, and access to employment and commercial centers.

4. MULTIMODAL ECONOMIC BENEFITS

The project enhances both highway and rail operations at a critical crossing by increasing vertical clearance to support rail operations, reducing the risk of bridge strikes and rail disruption, and improving structural reliability at a key multimodal interface.

5. ECONOMIC GROWTH AND FUTURE DEMAND

Traffic volumes on the corridor are projected to nearly double by 2046, increasing demand for reliable freight movement. The proposed project will accommodate



this growth by ensuring the corridor can meet future load and traffic requirements. By modernizing the US-81 bridges, the project will improve access to markets, support continued freight movement, and strengthen long-term regional economic competitiveness.

Summary of Economic Benefits

The US-81 bridge replacement project represents a strategic investment that improves freight mobility, reduces transportation costs, and enhances system reliability along a critical corridor. By eliminating structural and operational constraints and maintaining multimodal connectivity, the project will support regional and national economic productivity while strengthening supply chain efficiency.

Criterion 4: Resiliency and the Environment

Resilience Overview

The US-81 corridor is a National Highway System route and a key north–south freight connection supporting regional and interstate mobility. At the project location, the bridges carry traffic over an active Union Pacific Railroad freight corridor, forming a critical multimodal connection. Failure or closure would disrupt both highway and rail operations simultaneously, creating cascading impacts across regional and national freight networks.

Vulnerability of Existing Infrastructure

Both bridges are fracture-critical (FC) structures constructed in 1964 that have exceeded their design life. Bridge NBI #16159 is in poor condition and classified as Structurally Deficient (SD), while Bridge NBI #16167 is in fair condition but exhibits ongoing deterioration and is classified as At Risk (AR) of falling into poor condition.

Key vulnerabilities include:

- Fracture-critical design with no structural redundancy
- Corrosion-related section loss and fatigue-prone details
- High skew and curvature contributing to stress concentration
- Substandard vertical clearance over UPRR
- Deteriorating joints, bearings, and substructure elements

Exposure to Environmental and Climate Risk

The project area is subject to increasing risk from extreme weather, including heavy precipitation and flooding, which accelerate deterioration and increase the vulnerability of aging bridge infrastructure. These risks compound the structural deficiencies of the bridges and increase the potential for future disruption.



Consequences of Disruption

Failure or closure at this location would disrupt both highway and rail continuity, affecting passenger travel, freight movement, and regional supply chains. As described in Criterion 1, detours would be required, shifting traffic onto lower-capacity rural roadways and significantly increasing travel time, costs, and system inefficiency. Disruption would also affect rail operations along the UPRR corridor, reducing throughput and impacting regional and national freight networks. The combined effect would extend beyond local impacts, affecting agricultural supply chains and regional economic activity.

Resiliency Improvements and Risk Reduction

The proposed project replaces both bridges with modern structures designed to current AASHTO standards, improving long-term resilience and system reliability.

Key improvements include:

- Elimination of fracture-critical failure modes through redundant design
- Increased vertical and horizontal clearance to improve rail and roadway safety
- Reduced skew to improve structural performance and load distribution
- Replacement of deteriorated components, including joints, bearings, and substructure elements
- Improved drainage and scour protection

These improvements significantly reduce vulnerability to structural failure and environmental stressors, supporting long-term system resilience.

Environmental Performance, Lifecycle and Maintenance Benefits

Replacement of the existing bridges reduces long-term maintenance demands and environmental impacts. By avoiding detour-related travel, the project reduces vehicle miles traveled, fuel consumption, and emissions. The new structures also incorporate improved drainage and scour protection, reducing long-term exposure to environmental stressors while improving overall system efficiency.

Summary of Resiliency and Environmental Benefits

The project enhances system resilience by replacing aging, vulnerable infrastructure with modern, durable structures designed to withstand environmental stressors and long-term demand.

The project will:

- Reduce vulnerability to structural failure and environmental hazards
- Improve reliability at a critical multimodal crossing
- Minimize disruption risk to highway and rail operations
- Reduce lifecycle environmental impacts and emissions



- Support long-term infrastructure performance and system efficiency

These benefits directly align with BIP goals for resilience and environmental performance.

Criterion 5: Quality of Life

The proposed project will improve quality of life for local, regional, and national users by delivering a construction-ready investment that enhances safety, reliability, and access to essential destinations. The project supports long-term mobility and economic stability for rural communities that rely on this corridor for daily travel, freight movement, and regional connectivity.

Traffic Conditions, Travel Impacts, and System Use

As described in Criterion 2, the corridor supports substantial daily travel and freight movement for thousands of users, providing critical access to employment, healthcare, education, and essential services. Traffic data are derived from ODOT Traffic Viewer and GIS-based analysis using ODOT planning tools (ArcGIS Pro), reflecting current conditions and projected demand.

Documented Public Engagement and Stakeholder Coordination

The project has been developed through Oklahoma's federally compliant transportation planning and environmental review process, incorporating public participation, interagency coordination, and stakeholder engagement.

Public involvement included property owner outreach conducted as part of the NEPA process, interagency and tribal coordination under Section 106 review, coordination with Kingfisher County and OCCEDB District 8, and engagement with local and state officials

As demonstrated on ODOT's [BIP Grant Website](#) and in the attached letters of support, ODOT has secured broad stakeholder backing. This coordinated engagement ensures the project reflects locally identified needs, aligns with regional priorities, and is supported by key public and institutional partners (see Appendix E).

Improved Access to Essential Destinations

The project preserves access to critical destinations in a corridor with limited alternate routes. As described in Criterion 1, structural restriction or closure would require detours of up to 73.7 miles, significantly increasing travel time, costs, and emergency response delays. The project maintains direct routing, preserves emergency access, and sustains regional connectivity.

In rural communities, disruptions to a single corridor can significantly impact daily life. This project avoids those impacts by preserving continuous traffic flow during construction through staged, head-to-head operations. This approach eliminates detour-related delays and ensures uninterrupted access for residents, freight operators, and time-sensitive services. This is essential in rural areas with limited alternate routes, as disruptions disproportionately impact residents with fewer transportation options.



Benefits to School Transportation and Essential Services

Maintaining traffic on the structure is critical for emergency medical services and school transportation, ensuring consistent response times and avoiding increased travel time, route length, and operating costs for essential community services. As a STRAHNET-connected corridor, US-81 supports defense mobility, making reliability at this crossing important for military and emergency response operations. Although the project does not introduce dedicated transit or pedestrian infrastructure, it maintains functional access for all users by preventing disruption and preserving system continuity.

Reduced Disruption and Long-Term Community Stability

The existing bridges require ongoing maintenance and present an increasing risk of closure or restriction. The proposed project eliminates these risks by replacing aging infrastructure with modern structures designed for long-term performance.

The project will reduce the likelihood of emergency closures, improve reliability for up to 8,900 daily users, and reduce travel uncertainty, delay, and operating costs.

These improvements provide long-term stability for the surrounding community by ensuring dependable access to employment, healthcare, education, and regional markets. The project builds on ODOT's long-term efforts to modernize aging bridge infrastructure across the state over the past two decades.

Avoidance and Minimization of Community Impacts

The project has been designed to minimize impacts to surrounding communities. The selected alternative maintains the existing alignment to avoid displacement and reduce right-of-way impacts. Construction will be carefully coordinated to maintain access throughout implementation, ensuring that residents, businesses, and essential services maintain uninterrupted connectivity during the project lifecycle.

Criterion 6: Innovation

Innovative Project Design and Construction

The US-81 bridge replacement project incorporates innovative design approaches and materials that improve durability, reduce lifecycle costs, and support long-term system performance.

Key design and construction innovations include:

- Use of epoxy-coated reinforcement to improve corrosion resistance and extend service life of bridge components exposed to environmental conditions
- Use of uncoated weathering steel to eliminate the need for periodic repainting, reducing long-term maintenance costs and avoiding environmental impacts associated with coating removal and disposal
- Reduced number of expansion joints, with joints relocated away from the railroad corridor to minimize water intrusion, reduce substructure deterioration, and simplify



long-term maintenance

- Use of modern bearing systems and substructure sealing treatments to improve durability and reduce maintenance frequency
- Reduced structural skew, improving load distribution, structural performance, and long-term reliability

These design features collectively extend the service life of the structures to 75+ years, reduce maintenance requirements, and improve lifecycle cost efficiency. The project also incorporates staged construction techniques that maintain traffic during implementation, minimizing disruption to users and reducing economic and community impacts during construction.

Innovative Delivery and Project Efficiency

ODOT will deliver both bridge replacements under a single bundled construction contract, allowing for more efficient project delivery including:

- Economies of scale in design and construction
- Reduced procurement and administrative costs
- Ability to coordinate work activities and minimize overall construction duration
- Reduced need for multiple staging areas and mobilizations
- This approach is expected to reduce overall project costs while accelerating delivery and minimizing disruption to corridor users.

Summary of Innovation Benefits

The project applies innovative design, materials, and delivery methods to:

- Reduce long-term maintenance requirements and lifecycle costs
- Extend asset service life
- Improve construction efficiency
- Minimize community and system disruption

These innovations support BIP objectives by improving cost-effectiveness, enhancing system performance, and delivering durable, long-term infrastructure.

V. Benefit-Cost Analysis

Overview

ODOT prepared a BCA for the project using the FHWA BIP BCA Tool in accordance with USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs.

The analysis evaluates the project by comparing a No-Build baseline scenario, in which existing structural and operational deficiencies persist, to a Build scenario, in which the proposed bridge replacements are implemented.

The analysis assumes project construction will be completed in 2029, with benefits accruing from 2030 through 2059 over a 30-year analysis period. All costs and benefits are expressed in constant dollars and discounted to a 2024 base year using a real discount rate consistent with USDOT guidance.

The analysis demonstrates that the project produces substantial net benefits, including \$441.3 million in total benefits compared to \$19.7 million in discounted costs, resulting in a benefit-cost ratio of 22.42 and a net present value of \$421.6 million.



Benefit-Cost Summary

The project demonstrates a positive net present value and a benefit-cost ratio greater than 1.0, indicating that the project's benefits exceed its costs.

Methodology

The BCA compares anticipated conditions under a No-Build scenario to those with implementation of the proposed project. Under the No-Build scenario, continued deterioration of the existing bridges is expected to result in increased maintenance costs, reduced reliability, and potential load restrictions or closure.

The analysis assumes that, under a No-Build scenario, the existing bridges would require closure by approximately 2054, resulting in significant detour-related impacts.

The Build scenario reflects the replacement of both structures, eliminating structural deficiencies and improving system performance. Benefits were estimated across multiple categories using FHWA-recommended methodologies and project-specific data where available. The largest categories of quantified benefits include safety (41 percent), vehicle operating cost savings (29 percent), and travel time savings (28 percent), reflecting the significant impact of avoiding detour conditions and improving system reliability.

Key Assumptions

- Construction is assumed to occur through 2029, with benefits beginning upon completion
- A 30-year analysis period is applied, consistent with USDOT guidance
- Bridge assets are assumed to have a 75-year service life
- Traffic volumes and growth projections are based on ODOT data
- Discounting is applied using a real discount rate of 7 percent

TABLE 3: BENEFIT-COST ANALYSIS SUMMARY

Category	Total	Percent of Total Benefits
Safety	\$179,946,228	41%
Travel Time	\$123,647,594	28%
VOC	\$129,334,372	29%
Emissions	\$3,279,865	1%
Other Environmental	\$147,839	0%
Maintenance	\$3,461,417	1%
Residual Value	\$1,457,956	0%
Total Benefits	\$441,275,271	100%
Total Discounted Costs	\$19,682,909	N/A
BCR	22.42	N/A
Net Present Value (NVP)	\$421,592,362	N/A



These assumptions reflect conservative conditions consistent with USDOT guidance. Actual benefits are expected to exceed quantified estimates.

Major Benefit Categories

The project generates benefits primarily through avoiding closure and detour conditions that would increase travel time, vehicle operating costs, and emissions while also improving safety and reducing long-term maintenance needs. By maintaining direct routing and preventing disruption, the project reduces fuel consumption, vehicle wear, and emissions while improving travel time reliability.

Summary

The benefit-cost analysis demonstrates that the US-81 bridge replacement project produces substantial economic benefits relative to its cost.

The project:

- Avoids costs associated with structural failure or closure
- Reduces travel time and vehicle operating costs
- Improves safety outcomes
- Lowers long-term maintenance expenditures
- Reduces emissions and environmental impacts

Based on these results, the project is expected to generate net societal benefits that outweigh total project costs, consistent with statutory requirements under 23 U.S.C. 124.

VI. Project Readiness and Permitting Risk

Project Readiness and Technical Feasibility

The US-81 Bridge Replacement Project is fully developed and technically feasible, supported by completed engineering, environmental review, and coordination activities by ODOT. Final design has been completed for both bridges (NBI #16159 and #16167), including structural plans, staging, and railroad coordination requirements.

The project replaces two existing structures with modern bridges designed in accordance with current AASHTO and ODOT standards, addressing key structural and operational deficiencies and improving long-term performance. Construction sequencing has been fully developed to maintain traffic operations through staged construction and crossovers, ensuring continuous corridor functionality. Coordination with UPRR has been incorporated into design, including clearance requirements, pier placement, and protective measures.

Environmental Review and Permitting Status

The project has completed environmental review under the National Environmental Policy Act (NEPA) through a Programmatic Categorical Exclusion (PCE) approved on March 24, 2016. The PCE determined that the project will not result in significant environmental impacts.



Key environmental findings include:

- NEPA Status: Approved PCE; no significant impacts identified
- Right-of-Way: No acquisition or relocation required
- Waters/Wetlands: No impacts; no Section 404 Individual Permit required
- Section 106: No historic properties affected; SHPO concurrence obtained
- Tribal Coordination: Completed with no concerns
- Endangered Species Act: “No Effect” determination
- Hazardous Materials: Nearby LUST site identified and addressed through standard procedures

The project includes standard environmental commitments, including erosion control, hazardous materials handling, and resource protection measures.

Permitting and Approval Requirements

The project requires minimal additional approvals prior to construction:

- No major Federal environmental permits are required
- Railroad coordination will be finalized through standard agreements
- While the NEPA has been completed, a re-evaluation will be completed prior to construction to confirm consistency with the approved PCE

Because the project scope has not changed and all major environmental determinations are complete, permitting risk is considered low.

Project Schedule and Delivery Readiness

All major preconstruction milestones have been completed, including final design, environmental clearance, and inclusion in the STIP and ODOT 8-Year Construction Program. The project can advance to construction shortly after award, with no outstanding regulatory or technical barriers. This level of advancement supports timely

Schedule for On-System US-81 Bridges

	2013-2025				2026				2027				2028				2029			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Preliminary Design	✓																			
NEPA		✓																		
ROW Acquisition			✓																	
Utility Relocation		✓																		
Final Engineering				✓																
Letting (Obligation)																				
Construction																				

TABLE 4: PROJECT SCHEDULE

✓ Task Completed ★ Project Completion



obligation and delivery of BIP funds.

Project Risks and Mitigation Strategies

ODOT has identified and addressed all major delivery risks:

Overall Readiness Assessment

The US-81 Bridge Replacement Project demonstrates a high level of readiness, with:

- Completed final design
- Approved environmental clearance
- Minimal permitting requirements
- Defined risk mitigation strategies
- No right-of-way or major environmental constraints

Collectively, these factors position the project as low risk and fully ready for construction,

Type	Risk	Mitigation
Environmental	Age of NEPA document	Confirm no material changes via checklist and re-evaluation
Railroad Coordination	Construction over an active rail corridor	Coordination incorporation into final design; agreements finalized prior to construction
Construction	Subsurface conditions and staging complexity	Final design complete; contingency included
Schedule	Procurement or coordination delays	Advanced design and programming reduce uncertainty
Right-of-Way	Acquisition delays	No ROW acquisition required
Hazardous Materials	Nearby LUST site	Addressed through established ODOT procedures

TABLE 5: RISK MITIGATION STRATEGIES

supporting timely and cost-effective implementation in accordance with BIP program requirements (see Appendix F).

VII. DOT Priority Selection Considerations

Bridge Condition and Project Justification Summary

The US-81 bridge pair (NBI #16159 and #16167) meets the Bridge Investment Program eligibility requirements by addressing one bridge in poor condition and one bridge in fair condition at risk of falling into poor condition within the next three years. Bridge NBI #16159 is classified as poor, with a superstructure rating of 4, while Bridge NBI #16167 is in fair condition but exhibits deterioration consistent with fracture-critical steel



structures and is at risk of near-term decline. Both bridges were constructed in 1964 and exhibit fatigue-prone details, corrosion-related section loss, and degradation of key components.

Observed Condition Trends (2024–2026)

Inspection cycles between 2024 and 2026 confirm continued deterioration, including fatigue cracking, corrosion, and worsening joint and bearing conditions. These trends demonstrate active degradation and increase the likelihood of load restrictions, reduced capacity, higher maintenance and emergency repair costs, and declining reliability if replacement is delayed. This project directly supports BIP objectives by improving bridges in poor condition and bridges at risk of deterioration while restoring long-term system reliability.

Project Justification and Financial Need

Without BIP funding, ODOT cannot advance replacement of the US-81 bridges on schedule because the approximately \$25-26 million project exceeds currently programmed State funding capacity. Resulting delays would allow bridge conditions to continue deteriorating, increase lifecycle costs, and prolong risks to safety, mobility, and system reliability. The application demonstrates that the project cannot proceed without BIP funding, and that delay would defer critical benefits while increasing long-term costs.

Alignment with DOT Priority Considerations

Improved Travel Experience and Reliability

The project will improve passenger and freight travel reliability by eliminating risks of structural restrictions, closures, and detours, resulting in safer, more predictable travel and improved system performance.

Project Readiness

The project is construction-ready, with final design complete, NEPA clearance approved, Union Pacific coordination completed, and inclusion in the STIP and ODOT 8-Year Construction Program. If awarded earlier than anticipated, ODOT is prepared to advance construction shortly after award and deliver benefits on an accelerated schedule.

Timely Use of Federal Funds

With BIP funding, the project will advance to construction within required timeframes, efficiently obligate and expend Federal funds, and deliver immediate and long-term benefits. Without BIP funding, construction would be delayed, increasing costs and deferring benefits.

Summary

While Oklahoma has met statutory geographic priority considerations, the US-81 bridge replacement project remains highly competitive on merit. The project addresses a bridge in poor condition and a companion structure at risk of decline, demonstrates clear financial need and readiness, improves safety, reliability, and mobility, and supports national program goals through enhanced freight movement and reduced disruption risk. Collectively, these factors present a strong case for BIP funding.