# Merit Criteria

## 1 Safety

Safety is a primary purpose of the Roosevelt Bridge Project. The bridge has a demonstrated history of high collision rates on and near the bridge, particularly severe collisions such as injuries and fatalities. From 2016 to 2020 there were 58 total collisions, including 18 injury collisions and 4 fatal collisions (**Figure 1**). The corridor crash rate (85 crashes per 100 million vehicle miles traveled [MVMT]) was somewhat higher than the statewide crash rate (75 per 100 MVMT). However, the **fatal crash rate for the corridor** was over twice as large at 5.9 per 100 MVMT than the statewide fatal crash rate at 2.6 per 100 MVMT. Collision data is available at ODOT Roosevelt Bridge.

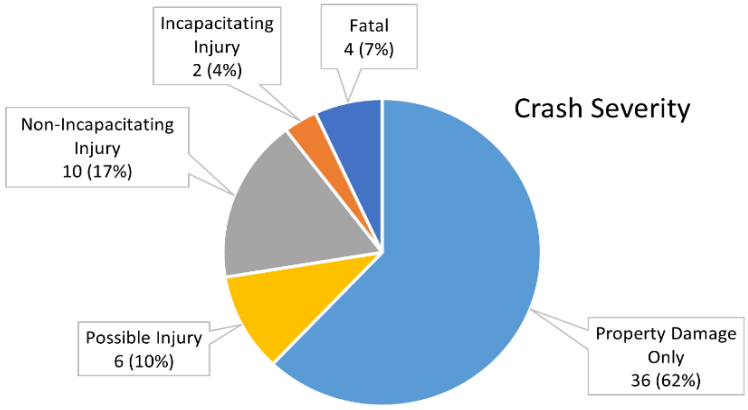


*Figure 1: Roosevelt Bridge Crash Severity, 2016-2020*

***The Roosevelt Bridge has a fatality rate***

***127%***

***higher than the statewide average***

Almost 20% of the collisions involved head on or side swipes which tend to result in more severe outcomes. Close to half of the collisions were documented as "no improper action", indicating conditions on the bridge and roadway may have contributed. "Left of center" was the cause of one fatal collision (**Figure 2**), likely due to the narrow width of the bridge and lack of separation between the two directions of traffic. As seen in **Figure 3**, the existing bridge railing does not have sufficient capacity to withstand the impact of a crash and contain the vehicle(s) on the bridge.

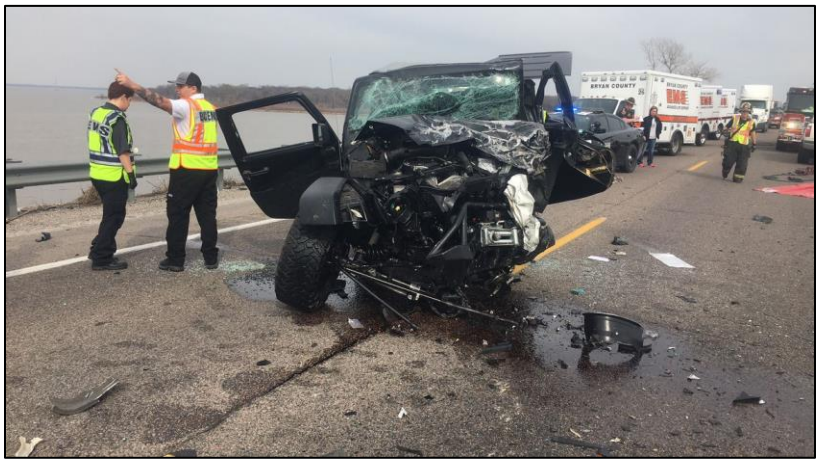

*Figure 2: Fatal Collision, March 2018*

ODOT's analysis of existing bridge condition showed that **approximately 1/3 of the metal railing attachments are missing, providing no capacity**.

A closer look at the collision locations suggests that two areas related to the bridge have experienced a high number of collisions (**Figure 4**): the west approach, where the 5-lane US-70 roadway to the west

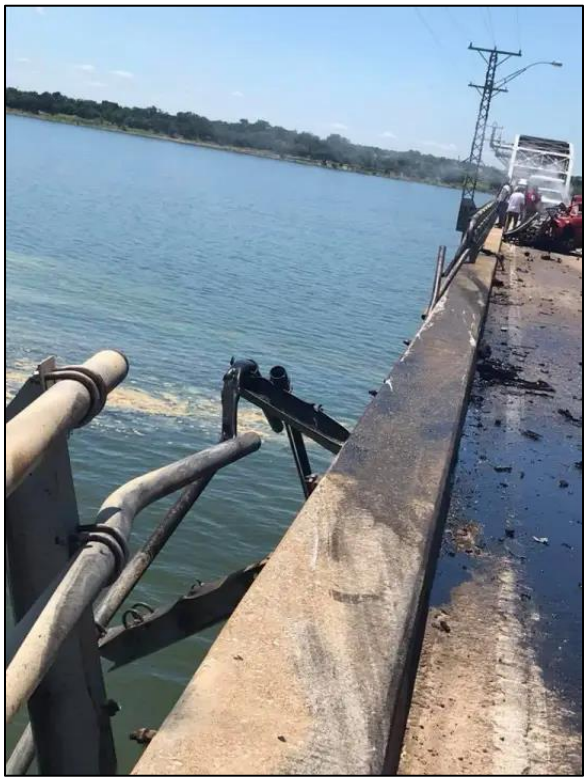

*Figure 3: Fatal Collision, June 2018*

transitions to the 2-lane bridge, and at the location of the truss span on the bridge itself. The intersections at either end of the project also have higher numbers of collisions.

The US-70 roadway in the vicinity of the bridge has characteristics that contribute to safety issues (**Figure 5**). There are no shoulders, median, or rumble strips on the bridge, leaving little room for error should a driver leave his/her lane. While there is lighting on the bridge, the roadway to the east and west is not illuminated. The west approach transitions from 5 lanes to 2 lanes on a steep grade (4.7%), and there is limited sight distance at the intersections on either end.

The current configuration of the bridge (two 12' lanes with no shoulders) is narrow and provides no opportunity for passing or safe refuge for vehicles. Widening the route from one lane to two lanes in each direction will provide additional passing opportunities and a safer route for the projected traffic volumes along US-70. The new Roosevelt


*Figure 4: Collision Frequency Heat Map, 2016-2020*

Bridge will have four 12-foot driving lanes and two 10-foot outside shoulders. While the additional lanes are needed to accommodate future traffic volumes, they are also anticipated to increase safety. The Project will remove all vehicular traffic from the truss structure, eliminating the safety concerns related to the low vertical clearance. Modern crash-tested railing will be provided to minimize the potential of vehicles leaving the bridge. Pedestrians and bicycles will be provided a barrier-separated designated path to provide a safe crossing of Lake Texoma where none exists today.

Potential safety benefits of adding lanes and 10-foot shoulders plus cross-section elements such as median, lighting, and rumble strips were analyzed using Highway Safety Software (HSS). HSS considers Safety Performance Functions (SPFs) for rural two-lane and multi-lane highways to predict the number of expected crashes, then adjusts this total based on Crash Modification Factors (CMFs) from the presence of a limited number of cross-sectional elements (lane width, shoulder type and width, presence of horizontal curve and superelevation, number of driveways, rumble strips, grade and lighting presence) using data published in the original Highway Safety Manual

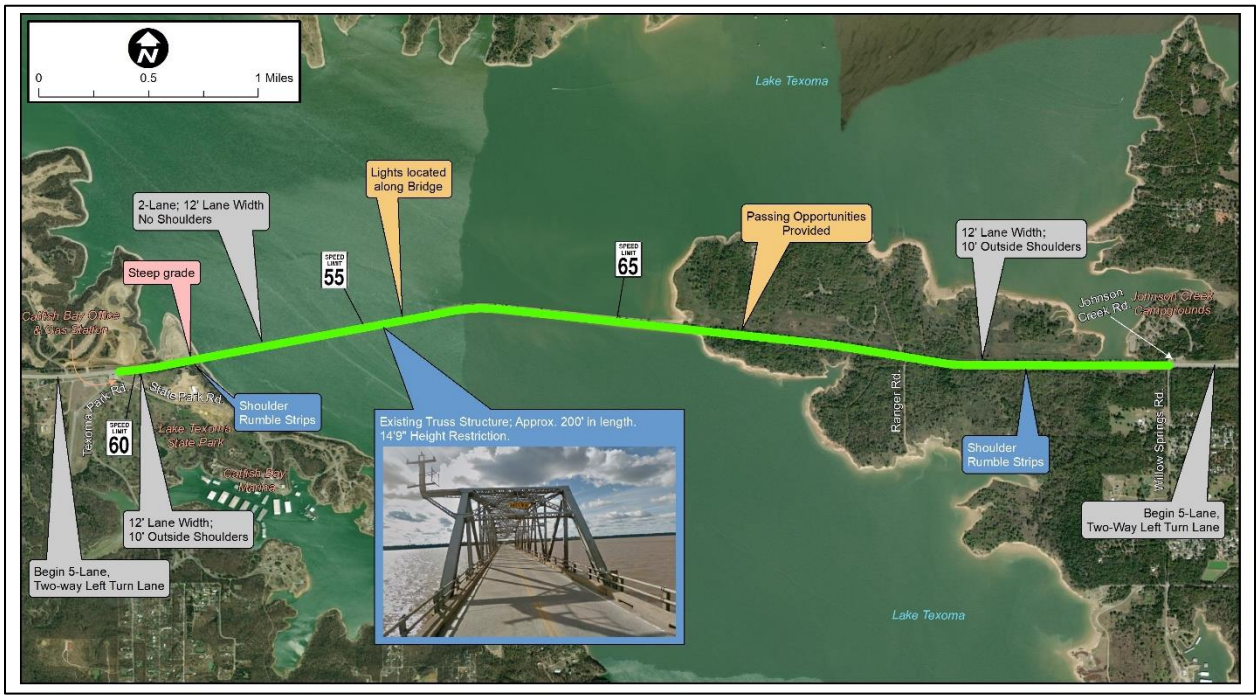


*Figure 5: Existing Safety Considerations*

(HSM). Results of this study show that adding median barrier, rumble strips, and lighting to the new bridge could **reduce crashes by up to 56%,** protecting both motorized and future non-motorized users of the bridge. These improvements are anticipated to significantly reduce fatalities and injuries, bringing them to or below the statewide average. More detail can be found in the *Traffic Analysis Memo* available at ODOT Roosevelt Bridge.

***Safety elements on the bridge could reduce collisions by***

# 56%

Safety was also the number one factor cited by the public in their overwhelming support of the project. In the over 280 comments received during the six-week public comment period, the vast majority cited safety as a major concern. Most individuals indicated the need for a new bridge, with many mentioning the need to widen the bridge with additional lanes and shoulders. Pedestrian and bicycle accommodations were also mentioned frequently, either on the new bridge or on the existing bridge converted to that purpose.

## 2 State of Good Repair

Constructing and maintaining a new crossing of US-70 over Lake Texoma in a state of good repair is a primary purpose of the Project. The Roosevelt Bridge is a 4,943-foot-long bridge composed of 86 approach spans (concrete deck on steel floor beams and girders) and one truss span (250' steel Warren through-truss) all of which are supported on a variety of concrete substructure elements. The bridge is rated in Fair condition and is at risk of becoming structurally deficient. Without major rehabilitation, the bridge would likely fall to poor condition and become structurally deficient in the near term. ODOT restricted the bridge to overload traffic in 2020 due to the superstructure condition, specifically related to section losses to floor beam members.

Emergency repairs completed in 2021 allowed ODOT to again open the bridge to all traffic. More detail on the existing bridge conditions can be found in the *Analysis of Existing Bridge Report* (March 2021), available at ODOT Roosevelt Bridge.

The bridge is currently classified as functionally obsolete due to the substandard vertical clearance on the truss span (14'-9") and its narrow clear roadway width (24') and will not provide sufficient capacity in light of anticipated growth. Existing average annual daily traffic (AADT) volumes on the Roosevelt Bridge are approximately 8,500 vpd, with trucks making up approximately 9% of that volume. Analysis using Highway Capacity Software 7 (HCS7) determined that the bridge currently operates at a Level of Service (LOS) C.

Using a background growth rate of 1.5% alone, traffic volumes on the bridge are anticipated to grow to 12,200 vpd by 2050. However, a large development is currently under construction at the west end of the bridge (Pointe Vista). Pointe Vista is currently constructing approximately 2,700 acres of mixed-use development including 2,100 homes, three resort hotels, a conference center, golf course, casino, marina, and shops and restaurants. The additional demand of this development would significantly increase traffic volumes on the Roosevelt Bridge. Projected 2050 traffic volumes inclusive of the development were estimated at approximately 27,300 vpd. With no improvements to the bridge, the 2050 Level of Service is expected to worsen to LOS E and the two-lane bridge would be a significant bottleneck. Adding two 12-foot lanes for a total of four 12-foot lanes and 10-foot outside shoulders would improve LOS to B in 2050 (**Table 1**)[1].

***By 2050, traffic volumes on the Roosevelt Bridge are anticipated to reach***

# 27,300

***Vehicles per day***

**Table 1: Bridge Level of Service Results**

| *Scenario* | AADT | Level of Service (LOS) Results | |
|---|---|---|---|
| | *Vehicles per day* | *No-Build Condition* | *Build Condition* |
| **2021** | 8,500 | C | A |
| **2050 (with Development)** | 27,300 | **E** | B |

As part of the planning process to improve the condition of the Roosevelt Bridge, ODOT performed an evaluation of the existing structural condition of the bridge. Results of that analysis indicate the concrete deck has multiple large spalls throughout and areas where the deck lifts off the steel floor beams due to pack rust. All joints have lost their seals allowing water to flow onto the steel beams and girders supporting the deck. Many of the steel floor beams in the approach spans have significant corrosion and section loss resulting in substantial member capacity reduction. Numerous bearings have sheared bolts and shifted bearing plates. The metal bridge rail has numerous connections that are sheared, missing, or other failed connections. The rail has also been impacted multiple times by vehicles resulting in misalignment and damaged posts

[1] See Traffic Analysis Memo at ODOT Roosevelt Bridge

throughout. The steel truss members have minor corrosion throughout. Due to the low vertical clearance, the bracing in the portal frames of the truss has impact damage from vehicular collisions. The concrete substructure elements have minor spalls and cracks throughout. **Figure 6** shows select photographs of existing bridge conditions. More photographs can be found at ODOT Roosevelt Bridge.


*Figure 6: Roosevelt Bridge Inspection Photos (2021)*

The latest routine bridge inspection report (5/27/2022) gives the existing deck and superstructure NBI ratings as "5 = Fair"; however, this is based on emergency repairs conducted in 2021 to avoid load posting the bridge and otherwise would have been rated "4 = Poor", resulting in a load posting of the structure. The emergency repairs were not intended to be long term and did not address deficiencies such as the railing. The bridge will be inspected again in 2023 and the emergency repairs will be assessed to determine if they are sufficient to prevent a "Poor" condition rating. It is anticipated that without the Project, the Roosevelt Bridge will fall into poor condition in the near future. Should no major rehabilitation or

> ***"If this bridge makes it five years without cause for action (posting at least), I'd say we're on borrowed time"***
>
> ***Justin Hernandez, P.E.***
> ***Oklahoma State Bridge Engineer***

replacement occur, it is estimated the existing bridge will require load posting in approximately 5 years, and closure 10 years after that. This is a conservative estimate according to Justin Hernandez, P.E., Oklahoma State Bridge Engineer: "if this bridge makes it 5 years without cause for action (posting at least), I'd say we're on borrowed time" (see ODOT Roosevelt Bridge for the latest inspection report).

Load posting and potentially eventually closing the bridge would threaten the future transportation network efficiency of southeastern Oklahoma. As discussed in **Section 3** below, US-70 is a critical freight link, connecting the major freight routes of US-75 and I-35. Should the bridge be load posted or closed, freight and passenger vehicles would be forced to detour close to 40 miles, adding significant user costs and severely affecting the mobility of goods and people. Removing the Lake Texoma crossing would stifle the region's economy, limiting freight movement, population growth, local investment, and recreational access.

The Roosevelt Bridge Project will provide a new structure designed to meet today's geometric and load rating standards with a 75-year design life. A new structure would resolve the structural and geometric deficiencies of the existing bridge and would provide a reliable route for freight and passenger traffic. The Project would restore and modernize this structure through elimination of the fracture-critical truss span and will result in lower long-term maintenance costs. According to ODOT estimates, 20-year maintenance costs for the existing bridge are estimated at $10.8 million.[2] With the Project, these costs would be reduced to less than $1 million. ODOT is responsible for maintenance for on-system facilities throughout the state. As such, ODOT has a $500M 4-Year Asset Preservation Plan which is both federally and state funded to address pavement and bridge condition throughout the state.

When user costs are considered, the cost of doing nothing becomes significantly larger. The high user costs are associated with an approximate 39-mile detour required if the bridge were closed. As expressed in user costs, closing the Roosevelt Bridge would have significant negative impact to transportation network efficiency, accessibility and mobility of people and goods, and economic growth. The costs of closing the bridge far outweigh the costs of a new structure when travel time and vehicle operating cost savings are considered. See the BCA Tech Memo for more discussion of avoided detours. This lifecycle analysis is consistent with the methodology presented in ODOT's Transportation Asset Management Plan (2022-2031) and the Roosevelt Bridge project is consistent with that plan. Maintenance costs would be funded by ODOT through their dedicated maintenance fund.

## 3 Economic Impacts, Freight Movement, and Job Creation

Economic impact is a primary purpose of the Project. The existing Roosevelt Bridge currently carries 8,500 vpd with 9% trucks. This number is expected to increase to 27,300 vpd by 2050. The Pointe Vista development currently under construction on the west side of the bridge is contributing heavily to the future demand (**Figure 7**). At full build-out, Pointe Vista is anticipated to generate 30,000 trips per day with over half of those projected to use the Roosevelt Bridge[3]. Without improvements, Level of Service on US-70 is anticipated to worsen to LOS E by 2050 and result in significant congestion. The additional two lanes planned as part of the Roosevelt Bridge

[2] See BCA Tech Memo
[3] See Traffic Analysis Memo at ODOT Roosevelt Bridge

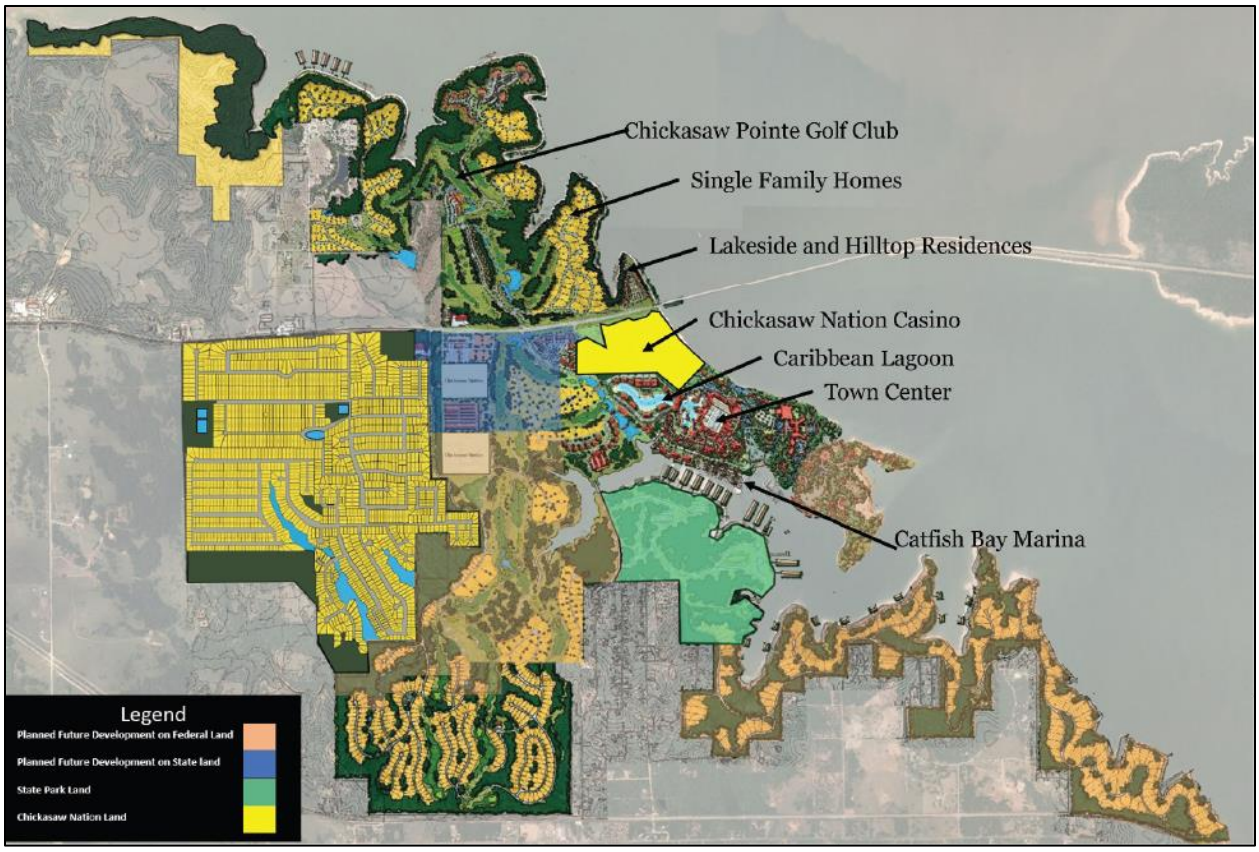


*Figure 7: Proposed Pointe Vista Development*

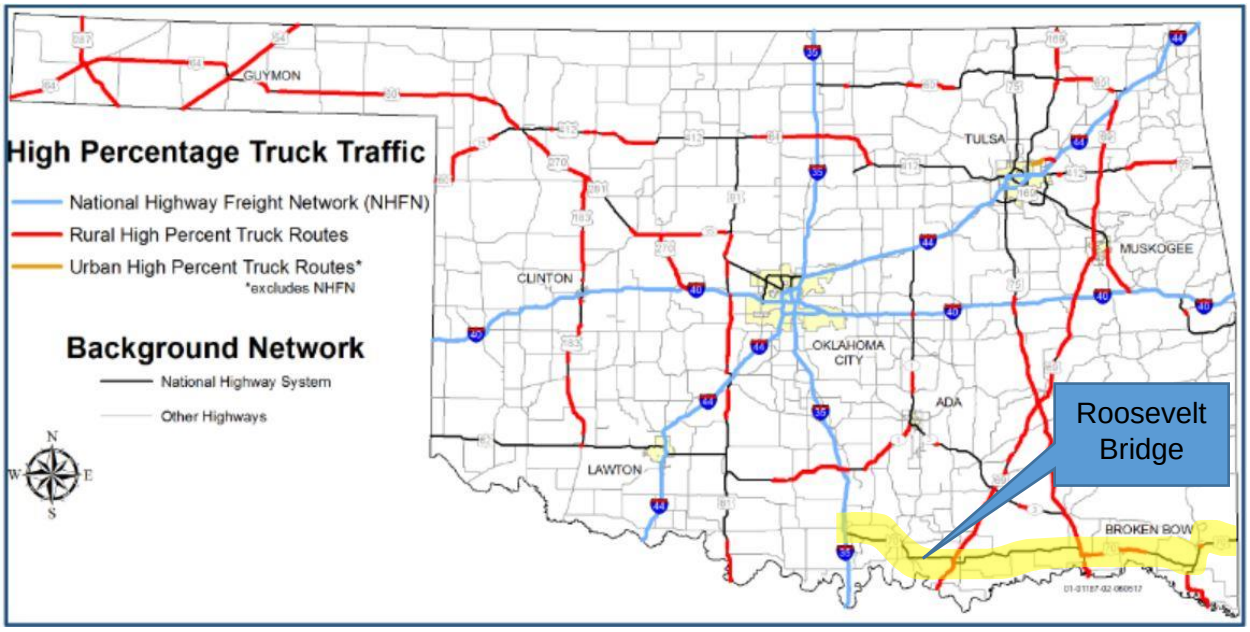


*Figure 8: Oklahoma Truck Freight Routes (US-70 highlighted in yellow)*

Project will improve safety and Level of Service on the bridge to LOS B, and remove a bottleneck created by the existing two-lane facility.

US-70 is an important link on the National Highway System (NHS) and provides critical east-west connectivity across southern Oklahoma, linking major freight routes such as I-35, US-69, and US-75 (**Figure 8**). Most of Oklahoma's freight tonnage and value continues to be carried by truck. US-69 carries approximately 5,300 trucks per day and represents a key north-south route that runs from Minnesota to Texas, forming an important connection between the Midwest and Dallas (Oklahoma State Freight Plan 2023-2030). With improvements to US-69 currently under construction near Durant (a joint ODOT/Choctaw Nation project funded in part by a FASTLANE grant of $62 million), freight mobility on this corridor will be improved and volumes are expected to increase. I-35 is the highest volume freight route in the state, with over 8,000 trucks per day in 2021.

As discussed in **Section 2**, the existing Roosevelt Bridge does not have sufficient capacity to accommodate the anticipated traffic demand. The City of Ardmore at I-35 and US-70 is the home of several large distribution centers including DOT Foods, Dollar General and Best Buy. Congestion on I-35 is well documented and is the subject of a major study underway by ODOT. As congestion worsens on I-35, US-70 to US-69 becomes a more attractive route for the freight supply chain to the Dallas Metroplex.

The Roosevelt Bridge becomes an even more critical transportation link in the light of regional freight patterns and lack of alternative routes. Closure of the Roosevelt Bridge would result in a detour of approximately 39 miles (20.9 additional miles). For the purposes of determining a detour distance, it is assumed the majority of the traffic is traveling a distance at minimum the 17 miles between Kingston and Durant (shown in green in **Figure 9**). In the event a detour is needed, the only feasible route is to the north. The detour is shown in red on **Figure 9**. Providing a new bridge would relieve the costs of 27,300 vehicles per day using

***By avoiding a full bridge closure, the Project will result in savings of***

# $230 M

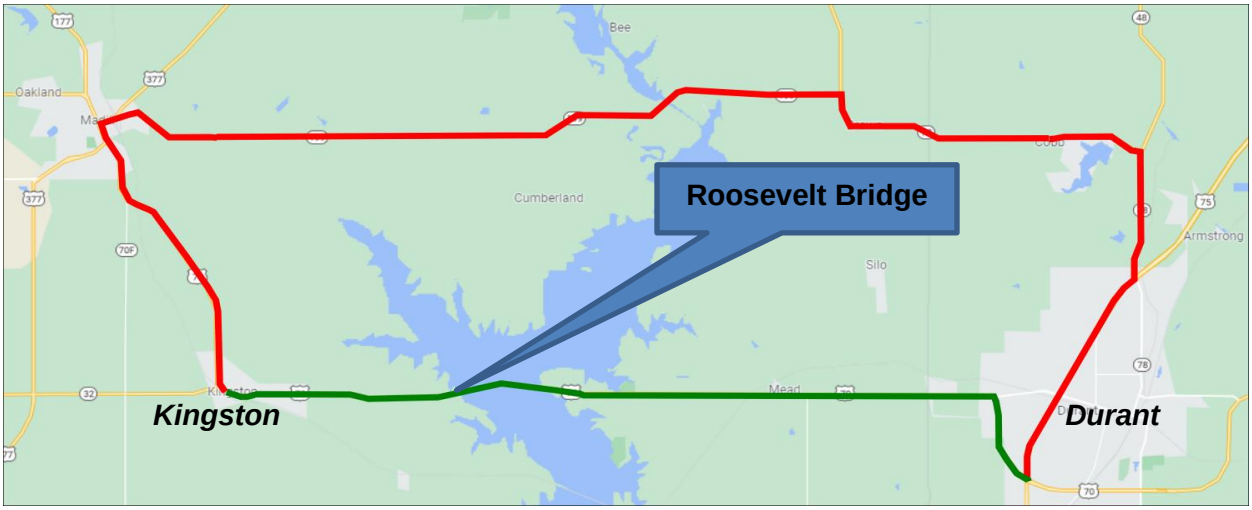


*Figure 9: Roosevelt Bridge Detour Route*

a 20.9-mile detour. These savings are anticipated to amount to $230.0 million, by far the largest monetized benefit of the Project. See the BCA Tech Memo at ODOT Roosevelt Bridge for more information.

In addition to improving freight mobility, the Project will enhance recreational and tourism opportunities by providing direct access to Federal land and a State Park. US-70 provides direct access to Lake Texoma State Park and multiple federal recreational areas surrounding Lake Texoma that are owned and managed by the USACE (**Figure 10**). Improving the Roosevelt Bridge and providing an adequate Level of Service will enhance recreational and tourism opportunities offered by these areas. Without improvement, future congestion on US-70 or detours would discourage (or eliminate) traffic from reaching Johnson Creek Public Use Area, Lake Texoma State Park, Chickasaw Nation casino, and Pointe Vista development.

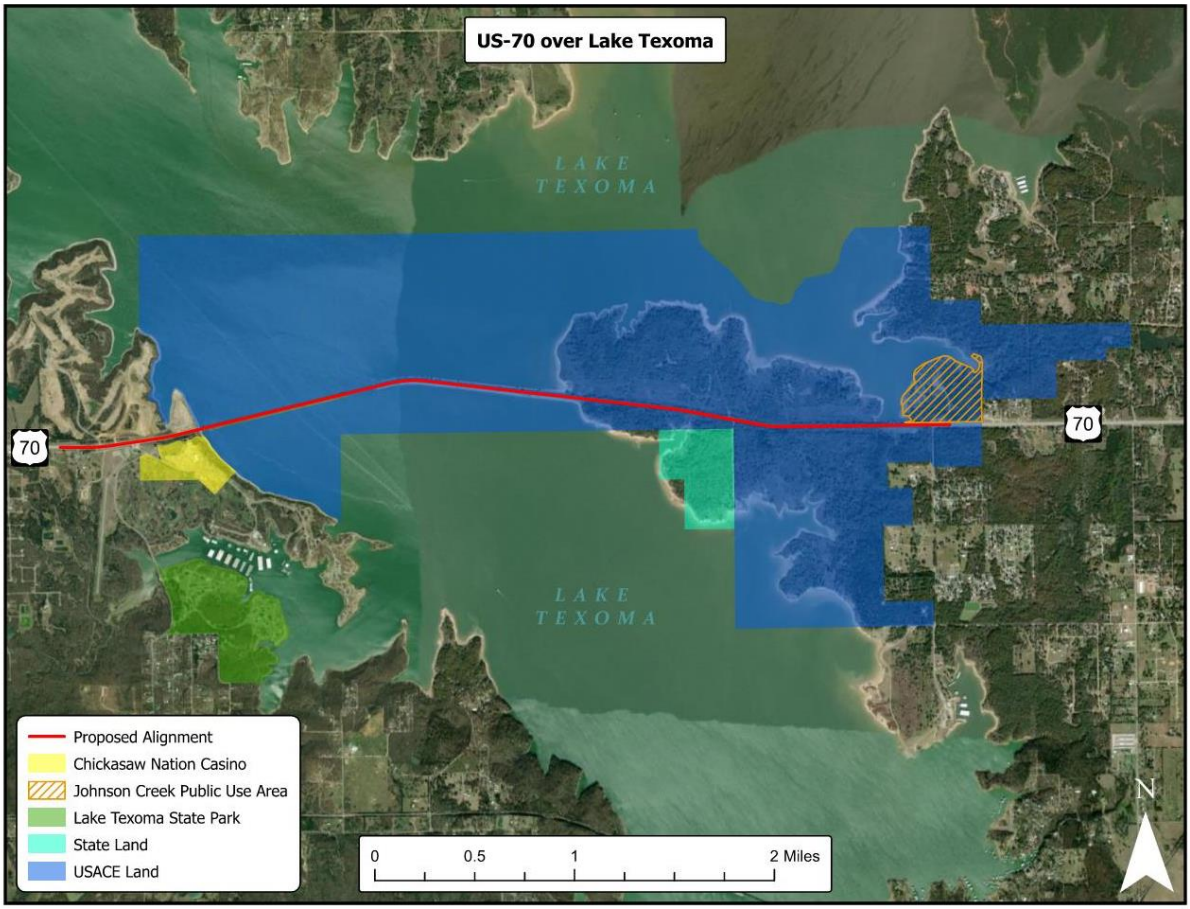


*Figure 10: Recreational Lands Surrounding the Roosevelt Bridge*

The Project will provide a separate bicycle and pedestrian crossing of Lake Texoma. Currently, no multimodal accommodation exists, and non-vehicular modes have no safe way to cross. With the multiple recreational sites located in direct proximity to the Roosevelt Bridge, a pedestrian/bicycle path would provide opportunity for visitors to the area parks to access nearby amenities and connect to local hiking trails (see **Sections 4 and 5**). While not quantified, it is anticipated that some vehicle trips may shift to non-vehicular modes with the provision of a safe, separated crossing. With the build-out of Pointe Vista, additional recreational trails are planned that could be connected to the lake crossing.

## 4 Climate Change, Resiliency, and the Environment

The Roosevelt Bridge Project will address climate change through the reduction of emissions from motor vehicles and providing opportunity for lower-carbon travel modes such as walking and cycling that does not exist today. In addition, the Project will improve resiliency of the existing roadway and bridge by raising the grade above recently observed flood levels. As discussed in **Section 2,** without improvement, US-70 is anticipated to experience severe congestion and stop and go conditions. These conditions tend to increase air pollution as vehicles spend more time idling. In addition, without improvements the bridge would require load posting and eventual closure. Emissions savings includes avoiding 27,300 vehicles using this detour. These savings are tempered somewhat by the additional lanes and traffic capacity the Project will provide. When quantified, emissions savings of the Project (NOx and $CO_2$) are small but positive[4]. These numbers do not include any reduction in vehicle trips as a result of a shift to pedestrian or bicycle modes. While difficult to quantify, some percentage of vehicle trips could be expected to make this shift once a safe bicycle/pedestrian facility is provided.

Bicycle/pedestrian accommodations could take one of two forms, either rehabilitating the existing bridge for bicycle/pedestrian use or adding bicycle/pedestrian accommodations to the new bridge. While multiple alternatives are still under consideration, the project will address the need for pedestrians and cyclists to safely cross Lake Texoma, where no opportunity exists today. **Figure 11** shows the narrow deck on the existing bridge that currently does not provide space for bicycles or pedestrians. With limited crossings of Lake Texoma, the Roosevelt Bridge project would provide a critical link for non-vehicular users.

*Figure 11: Narrow Deck on Roosevelt Bridge*

Multiple stakeholders including Oklahoma State Parks, the Lake Texoma Association, and Pointe Vista have expressed an interest in providing bicycle/pedestrian accommodations. The USACE maintains recreational sites and hiking/biking trails across Lake Texoma (see Lake Texoma Recreational Map at ODOT Roosevelt Bridge). Increasing connectivity across the lake for campers and trail users would not only reduce emissions and further reduce air pollution but would also support one of the USACE's Recreational Objectives of expanding existing trails and developing new ones.

The Roosevelt Bridge Project is within a Historically Disadvantaged Community and Area of Persistent Poverty. According to the USDOT Equitable Transportation Community (ETC) Explorer, the area is also disadvantaged due to transportation insecurity and social vulnerability. Transportation access, cost burdens, and safety barriers are all above the 65$^{th}$ percentile

[4] See BCA Tech Memo

nationwide. Additional time and cost caused by unreliable and deficient infrastructure places a disproportionately high burden on these already overburdened communities. Social vulnerability is high based on high poverty and high rates of disability, lack of insurance, lack of internet, and poor housing. The Project will improve transportation safety and will avoid further impacts of access and cost burdens by providing a modern, reliable bridge before load postings and closure cause costly detours. Affordable bicycle and pedestrian options will also be added.

The Roosevelt Bridge Project will improve the resiliency of at-risk infrastructure by raising the profile grade of the bridge to reduce flood risk. The entire Roosevelt Bridge Project is located within a mapped FEMA flood hazard area (Zone A/AE, see floodplain map at ODOT Roosevelt Bridge). As mentioned in the Project Description, there have been several historic floods that have forced closure of the Roosevelt Bridge for several days. The most recent, in 2015, saw record floodwaters and resulted in a full closure in both directions for nine days. To prepare for future floods and ensure long term resiliency, the Roosevelt Bridge Project will construct the new bridge approximately 10 feet higher than the existing (depending on location). The new bridge will have a low-beam elevation of 647 feet, two feet higher than the top of the flood pool and just over one foot higher than the record 2015 elevation of 645.72 feet. The driving surface would be at 655 feet, six feet higher than existing and almost 10 feet higher than the previous flood record level. These new bridge elevations were selected to keep the superstructure above water during the 200-year storm event, or an event that has 0.5% chance of occurring in a given year (**Figure 12**). The project will be consistent with the Federal Flood Risk Management Standard.

| Frequency | Annual Frequency | Pool Elevation |
|---|---|---|
| 0.99 | 1-Yr | 611.0 |
| 0.5 | 2-Yr | 621.0 |
| 0.2 | 5-yr | 628.8 |
| 0.1 | 10-Yr | 636.0 |
| 0.05 | 20-Yr | 641.0 |
| 0.04 | 25-yr | 642.0 |
| 0.02 | 50-Yr | 646.0 |
| 0.01 | 100-Yr | 646.5 |
| 0.005 | 200-Yr | 647.0 |
| 0.004 | 250-Yr | 647.1 |
| 0.002 | 500-Yr | 647.3 |

*Figure 12: Lake Texoma Storm Event Summary*

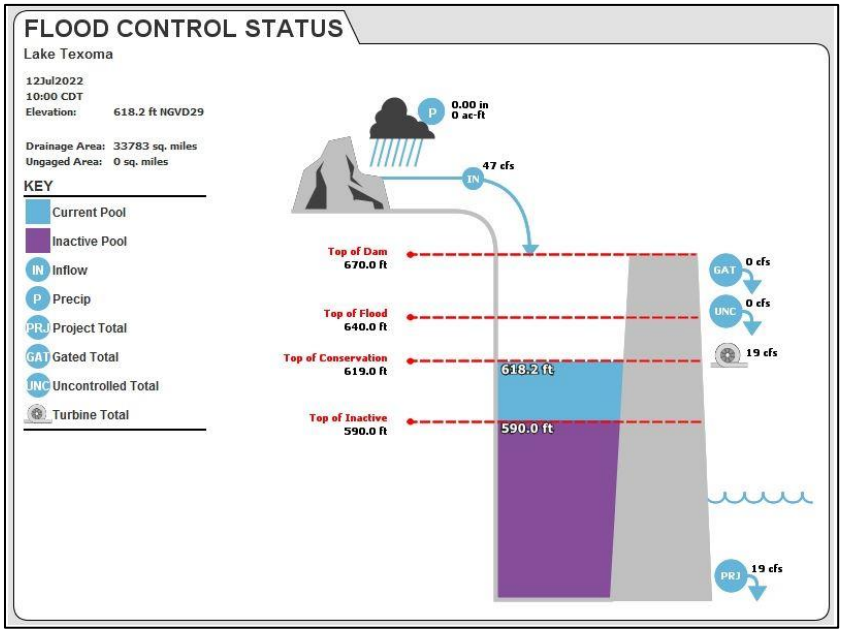


*Figure 13: Lake Texoma Flood Control Status (7/12/2022)*

As a flood control facility, the USACE monitors the levels of Lake Texoma closely to determine the appropriate downstream releases through Denison Dam. Specific elevations define different functional "pools" of the lake that serve to contain water during flood events. As shown in **Figure 13**, the flood pool of Lake Texoma is between 619 and 640 feet. The USACE must maintain this capacity in the event of a large storm.

Therefore, fill within the lake between these elevations, including new bridge piers and roadway embankment, is strictly controlled and must be offset by additional flood storage if impacted.

## 5 Equity, Multimodal Options, and Quality of Life

The Roosevelt Bridge Project will improve the quality of life for local and regional users. As a critical east-west link, the Roosevelt Bridge provides one of only two crossings of Lake Texoma within the 30 miles between Tishomingo, OK and Denison, TX. Improving the bridge to provide a safe, multimodal crossing with sufficient capacity to meet current and future demand will improve mobility for all users for future generations. While congestion on the bridge is not common today unless there is an incident, future traffic volumes of over 27,000 vpd will far exceed the capacity of the existing two-lane facility. Reliability will be improved with increased capacity providing improved traffic flow, as well as additional bridge width to provide a safer facility, allow collisions to be cleared more quickly, and provide emergency responders better access. Today, if there is a collision on the bridge, there is no room to clear vehicles from the roadway and traffic can quickly back up, causing delay for travelers and acting as an obstacle for police and ambulances trying to reach the scene. Regional emergency care and other essential services are concentrated in Durant, approximately 12 miles east of the Roosevelt Bridge. The bridge serves as a critical link for access to these services for residents in Kingston, Madill, and other communities on the west side of Lake Texoma.

As discussed in **Section 4**, the Project will provide accommodation for pedestrians and bicyclists where none exist today. It is desirable that these users have a safe, separated space to travel separately from vehicles. As a major recreational destination also serving to manage water and wildlife resources, Lake Texoma would benefit from a potential reduction in vehicle trips that would reduce emissions (see **Section 4**) and provide better connectivity for its visitors. A new multimodal crossing of Lake Texoma would offer opportunity to all sectors of the population.

As a regional recreational destination, Lake Texoma sees more than 6 million visitors per year. The lake offers 580 miles of shoreline with two wildlife refuges, two state parks, 54 USACE-managed parks, and 23 commercial campgrounds. The lake's primary attractions include camping, boating, fishing, and hiking (**Figure 14**). As primarily public land with abundant access, Lake Texoma provides a relatively affordable recreation option for residents of Oklahoma, Texas, and the surrounding area. Given the location of Lake Texoma within a Historically Disadvantaged Community and Area of Persistent Poverty, providing bicycle and pedestrian accommodations on the bridge would increase mobility options for local underserved communities. It would also allow park users to cross this part of Lake Texoma without having to drive. With Catfish Marina on the west end of the bridge, offering food, gas, and other services, users would be able to access these destinations on the new bridge. With a safe, separated pedestrian and bicycle facility, the bridge could

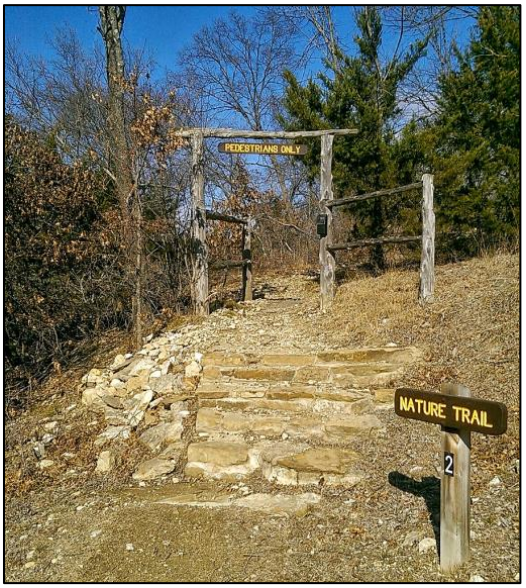

*Figure 14: Hiking Trail at Lake Texoma*

become a recreation destination in and of itself, offering a unique perspective on Lake Texoma not often experienced outside a vehicle.

ODOT has begun engaging stakeholders in the planning of the Roosevelt Bridge Project. Initial stakeholder meetings have been held with local elected officials and agencies including the USACE, Chickasaw Nation, Choctaw Nation, Oklahoma State Historic Preservation Office, Oklahoma Archaeological Survey, Oklahoma State Parks, Lake Texoma Association, and nearby Chambers of Commerce. These agencies were briefed on the existing condition of the bridge and the potential alternatives to provide a safe crossing of Lake Texoma that meets future demand. Alternatives that preserve the historic integrity of the existing structure as well as replacement alternatives have been presented. Stakeholder meeting notes are included at ODOT Roosevelt Bridge. The project also has widespread support from local agencies and elected officials. Letters of support are included with this application.

Public engagement has included in-person and virtual outreach opportunities. ODOT prepared a Public Involvement Plan describing the planned methods of outreach and notification, including identification of environmental justice communities. Notification of the in-person and on-line public meetings was done through several means, including letters to agencies, tribes, elected officials, local school districts, law enforcement, medical facilities, and emergency service providers. In addition, 4,670 postcards were delivered via direct mail to all addresses in the vicinity of the Project on both sides of the lake. Using direct mail ensures that all addresses receive notification regardless of owner status. Local media also reported on the meeting and the website.

ODOT recently concluded a six-week virtual public open house at www.odot.org/US70LakeTexoma. Because US-70 is a significant regional facility, and Lake Texoma attracts visitors from a large area, on-line engagement was included to reach these users as well as to provide a convenient way for the public to access Project information. The website presented a virtual tour of the project, providing visitors with a general overview of the project and then directing them to different pages with more detailed information. Pages on the Section 4(f) alternatives and the replacement alternatives were provided. In the six weeks the site was live there were over 2,600 unique visitors and over 280 comments submitted[5]. ODOT also held an in-person public meeting on July 25, 2023, in Kingston, OK (**Figure 15**). Over 140 people attended the public meeting, where ODOT staff gave a presentation on the Project and answered questions. The primary concern expressed at the meeting was the construction schedule, and the current programmed start date of 2029. Several attendees asked if ODOT would be pursuing federal grant funding to accelerate construction.

*Figure 15: Roosevelt Bridge Public Meeting, July 25, 2023*

[5] See website analytics report at ODOT Roosevelt Bridge

# 6 Innovation Areas: Technology, Project Delivery, and Financing

## Innovative Technology

ODOT commits to providing 3D computer models of the project as part of the contracting process. This technology will allow contractors to utilize the most recent GPS controlled equipment with Automated Machine Guidance in the construction process. Using and following the 3D model will minimize the potential for human error in establishing grades and elevations while improving efficiency in earthmoving during the construction process. These efficiencies improve quality while reducing the overall cost of construction. E-Construction methods will include mobile inspection and video monitoring and reporting of construction progress.

ODOT will incorporate stipulations that the contractor can make use of embedded strain gauges to serve as maturity meters in newly placed concrete. Current wireless technology allows for smart-phone connection or remote logger with cloud connections to track strength of concrete. The readings from these meters would be utilized by the contractor and ODOT to make critical real-time decisions during concrete curing. This allows for removal of concrete forms and opening to traffic earlier than conventional time constrained specifications.

## Innovative Project Delivery

### *Progressive Design Build*

ODOT intends to deliver the Roosevelt Bridge Project as the state's first Progressive Design Build (PDB) project. PDB is an alternative delivery procurement method that uses a primarily qualifications-based selection process to select a Design-Builder. Once selected, ODOT and Design-Builder then progress towards an agreed upon design and construction price (thus the term "progressive"). The complexity of the US-70 over Lake Texoma Bridge has many features that would benefit from early owner and contractor collaboration. The size of the drilled shafts, the depth of the lake, the length of the bridge, and the potential for Accelerated Bridge techniques are a few of the features. PDB delivery allows for:

- Early selection and involvement of a Design-Builder to ensure that design and construction related decisions are informed by cost, schedule, risk, and other input from the Design-Builder.
- Project cost and schedule development and refinement during the preconstruction phase.
- Design advancement and risk mitigation which improve cost and schedule accuracy.
- Participation of an independent cost estimator (ICE). The role of the ICE is to develop independent cost estimates for the project that validate the costs submitted by the Design-Builder at pricing milestones.
- Incremental progression of the project over two phases (preconstruction and construction) with an option for ODOT or the Design-Builder to terminate, i.e., "off-ramp", if the project is not progressing to the mutual satisfaction of the parties.

PDB allows ODOT enhanced ability to minimize unnecessary contingency during the preconstruction phase. If not needed, contingency can create a windfall to the contractor. If the contractor doesn't estimate contingency correctly, it can cause shortfalls which have a significant negative impact on the overall health of the project and can result in delays and disputes. Use of PDB will improve the return on investment for ODOT because more project funding will go to actual design and construction instead of contingency which may or may not be needed.

### *Accelerated Bridge Construction*

ODOT will consider Accelerated Bridge Construction (ABC) techniques for the new bridge over Lake Texoma. The use of ABC techniques has the potential to shorten construction time, reduce construction costs, reduce traffic impacts, improve worker safety, and improve the quality control of materials. Float-in Modular Spans, Precast Concrete Pier Caps and Precast Concrete Deck Panels are some of the techniques that could be further studied for benefit to the project. A Float-in Modular Span concept is shown in **Figure 16**. This potential ABC method would improve safety of the construction laborers by removing many activities from the hazards associated with lake construction. Construction time would be reduced because the superstructure can be constructed at the same time as the substructure. Repetition, efficiency, speed, safety, and control could be some of the benefits of this method.


*Figure 16: Example of a Float-in Modular Span Technique*

## Innovative Financing

### *TIFIA and RETRO Funding*

The size of the Roosevelt Bridge Project demands that ODOT pursue alternative funding sources to construct the project before potentially severe consequences force closure of the bridge. On other major projects, phased construction with separate projects of independent utility allows ODOT the ability to spread out project funding over multiple years; however, this project must be built as one and has a very high upfront cost. In addition to MPDG and potential BIP funds, ODOT intends to pursue a TIFIA loan to overcome this challenge. This Project will be the single largest infrastructure investment in rural Oklahoma for the foreseeable future. In addition, the Oklahoma legislature recently appropriated $200 million in the Rural Economic Transportation Reliability and Optimization Fund (RETRO) for projects to enhance economic development in rural areas. This was the largest appropriation for infrastructure in state history and shows Oklahoma's commitment to improving safety and enhancing economic vitality in rural areas. The Roosevelt Bridge Project is an ideal candidate for this funding.