

Widening and Rehabilitation of State Highway 28 Bridges Oklahoma Department of Transportation BUILD Grant Application July 2018



PROJECT INFORMATION	
Sponsoring Organization	Oklahoma Department of Transportation
DUNS Number	8247000740000
EIN	736017987
Program of Projects	
Name of Project	Widening and Rehabilitation of State Highway 28 Bridges
Type of Project	Bridge
Location of Project	Mayes County, Oklahoma
Congressional District	2nd
BUILD Application Amount Requested	\$14,157,500.00
BUILD Application Agency Match	\$ 5,194,584.00
BUILD Application Partnership Match	\$10,141,819.68
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Supporting Materials

Supporting documentation can be found at the BUILD Project website at

https://www.ok.gov/odot/Progress_and_Performance/Federal_Grant_Awards/BUILD_Grants/Mayes_County_SH-28_Pensacola_Dam_Bridges_Widening_and_Rehabilitation.html

- Preliminary Design Report
- Supplement to Preliminary Design Report
- 60% Plans
- 3-D Images
- Letters of Support for the Application
- Benefit Cost Analysis
- CEC Inspection Reports
- Wage Rate Certification
- Public Meeting Agenda/Meeting Minutes
- Traffic Study

EXECUTIVE SUMMARY

The Oklahoma Department of Transportation (ODOT) is pleased to sponsor and submit

this application for Widening and Rehabilitation for the State Highway 28 (SH 28) Bridges under the U.S. Department of Transportation BUILD Discretionary Grant Program. BUILD funding in the amount of \$14,157,500 will be coupled with funding through ODOT and private funds from the Grand River Dam Authority (GRDA). *The BUILD Grant funds coupled with the \$15,336,403.68 from ODOT and GRDA results in a benefit cost ratio of 1.60.*

The primary purpose of the project is to increase the safety for vehicles traveling in this region by widening and rehabilitating the three bridges on SH 28 over the Grand Lake O' the Cherokees (Grand Lake) in rural Mayes County. The project will provide continued safe and reliable access to community social, commercial, employment, and health care sites in rural northeast Oklahoma. These bridges are functionally obsolete and structurally inadequate. They are also the narrowest and longest two-lane bridges in the State of Oklahoma, and three of a handful of 20-foot-wide bridges remaining on the state highway system. The actual width of these bridges is 19 feet eight inches wide, with two lanes of nine feet ten inches each.

The 1940s era structures cross the Pensacola Dam and the West and East Spillways and are fine example of depression-era construction. The Pensacola Dam Bridge at 5669 feet (1.07 miles) is the longest of the three bridges. The remaining bridges, the West Spillway Bridge and the East Spillway Bridge are shorter at 451 feet (.05 miles) and 410 feet (.078 miles), respectively.



Figure 1 – The Pensacola Dam and bridge structures were constructed in only 20 months



Figure 2 – Project Location on Map of Oklahoma



Figure 3 – Historical Pictures of the Pensacola Dam

“GRDA is a non-appropriated state agency, fully-funded by the revenues from the sale of electricity and water, instead of taxes.”

The three bridges collectively in this report will be described as the SH 28 Bridges. They are listed on the National Register of Historic Places as an “excellent example of multiple arch dam engineering”. An engineering marvel of the time, this project to widen the existing bridges is similarly a feat of engineering and coordination.

Although repairs have been made in the years since construction completion, significant rehabilitation and widening is needed to be able to continue serving the safety and welfare of citizens as well as the existence of the adjoining communities of Langley, Disney, and Tia Juana. Without structural improvements, the bridges will likely require substantial limitations on vehicular traffic and/or eventual closure. Permanent alternative highway route options are minimal and the redirection of traffic away from the communities that bookend the bridges will have devastating effects. Given their historical significance and their service as lifelines to the adjacent communities, ODOT and GRDA are committed to improving the bridges while minimizing the impact to the adjoining communities during construction. Preserving the bridges and restoring their strength is key to saving the communities and allowing them to thrive once again.

Significant progress has been made in the design of the Widening and Rehabilitation of the SH 28 Bridges. The improvements are expected to extend the useful life of the SH 28 Bridges for more than 75 additional years. At the time of the submittal of the BUILD grant application, construction plans are at 60 percent and are expected to be at 95 percent by March 2019. The environmental clearance is underway at both the state and federal levels. All necessary permits are expected to be received so that the project can go to bid by July 2019 and be under construction by September 2019. Construction on the three bridges is scheduled to be completed by April 2021.



Figure 4 – Looking west along the Pensacola Dam Bridge

I. PROJECT DESCRIPTION



Figure 5 – 1940 picture of Pensacola Dam construction

ODOT and GRDA are collaborating on this project and BUILD application to widen and rehabilitate the SH 28 Bridges which run along the south side of Grand Lake. This is a key project for ODOT and GRDA, as well as the rural communities of Langley, Disney and Tia Juana. It is also important to thousands of recreational users that frequent the area. The immediate purpose of the project is to increase the safety for vehicles, and with a long-term goal of preserving the SH 28 Bridges for continued use by the general public for vehicular traffic. Original construction on the SH 28 Bridges was completed 1940 and they are listed on the National Register of Historic Places.

The SH 28 Bridges are the narrowest and longest two-lane bridges in the State of Oklahoma. The bridges’ condition and capacity are inadequate to accommodate the daily loads the bridge currently serves. The bridges are classified by ODOT as functionally obsolete due to their narrow width. The majority of the bridge components are structurally sound and in very good condition as shown in Table 1.



Figure 6 – Current conditions (Left) and designed width of the SH 28 Bridges (Right)

Table 1 – Snapshot of Bridge Condition

Snapshot of Condition	Total Count	Estimated Moderate Deterioration	Significant Deterioration
Total Number of Floor Beams, 3 Br.	729	212 29%	5 1%
Total Number of Longitudinal Girders, 3 Br.	161	4 2%	10 6%
Total Number of Hinges, 3 Br.	102	10 10%	15 15%
Total Number of Arches, 3 Br.	51	5 10%	0 0%

However, the load rating of the deck and floor beams show these components require rehabilitation and additional strengthening measures to carry the heavy vehicular loads crossing the bridges. The damages inflicted to the bridges have reached a point requiring structural improvements prior to failures that would necessitate the closure of the highway altogether. ODOT and GRDA worked collaboratively on the scope of the proposed construction project.

ODOT maintains the driving surface of the bridges between the curbs. GRDA owns and maintains the remainder of the bridges, dam and spillways and is responsible for operating the hydroelectric powerhouse.



Figure 7 - SH 28 Bridges Load Rating.

The need for work is not an elective undertaking; the extent of improvement, however, is subject to the availability of funding. GRDA and ODOT have performed numerous repairs over the years targeting cost effective and short construction durations to maintain the structure. The level of damage now requires more substantial effort if the bridges are to be kept open to the traveling public. Both GRDA and ODOT have programmed

funding for the primary deck rehabilitation and the majority of the current structural capacity repairs for construction beginning in 2019. These repairs are essential to extend the life of the bridges and relieving the structural capacity concerns for the main Pensacola Dam Bridge, however, it should be noted that these repairs alone do not address the long-term safety concerns associated with the dangerously narrow travel lanes. The width of the travel lanes and structural repairs to the West and East Spillway Bridges will be addressed by adding BUILD funding to the project.

To fully address the issues associated with the SH 28 Bridges, GRDA engaged a consultant in September 2017 to provide professional planning and engineering services to evaluate the structural and potential functional renovation of the Oklahoma State Highway 28 bridges over the Grand Neosho River in Mayes County. The consultant team developed and evaluated three rehabilitation and widening alternatives in addition to the sole rehabilitation scenario. Consideration was also given to a “no action” scenario related to the structure.

The wear surface on the deck surface is in constant need of repair and limited depth and duration repair can no longer be effectively performed. The depth of repair necessary for long-term improvement of the deck is at or below the depth of the reinforcing steel in the deck in numerous locations. The top surface of the deck contains unsound concrete and the spacing of the floor beams is such that the deck is structurally inadequate. Proposed project elements to improve the deck condition include:

- Hydrodemolition of the top surface of the deck to remove delamination and unsound concrete, followed by a latex modified overlay
- Addition of supplemental floor beams to raise the structural capacity of the deck to carry current design vehicles.
- Application of carbon fiber reinforcement for augmentation of existing floor beams.
- Restoration of some of the hinges in the upstream longitudinal girders supporting the floor deck.

These improvements go beyond maintenance of the current substandard load carrying capacity which is nearly half that of a structure that would be constructed under current design requirements. These improvements increase the strength of the bridge to be comparable to that of a structure constructed under current design specifications.

The selected design alternative includes rehabilitation of the bridge surface and substructure, structural enhancement of the existing load carrying capacity, along with widening that removes the existing downstream curb and parapet wall, widening the downstream side by approximately four feet to obtain two 12 foot lanes instead of the existing two nine-foot ten-inch lanes. One additional longitudinal beam line is proposed to

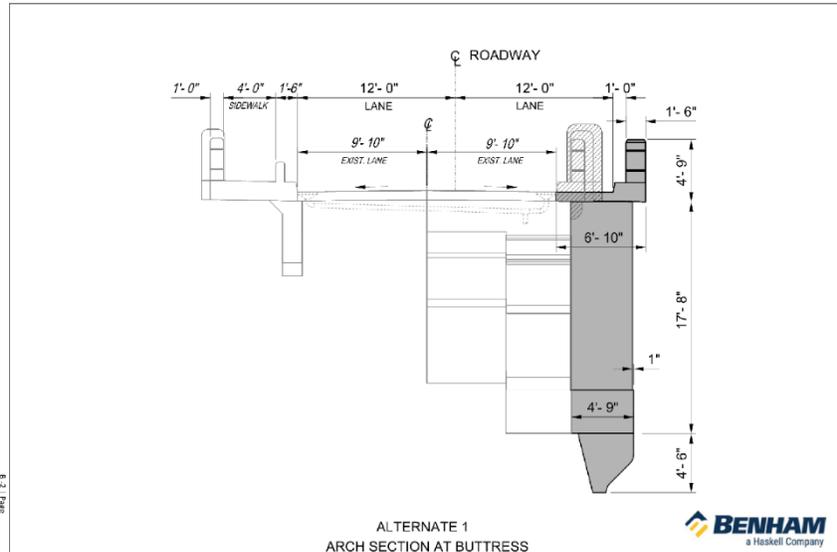


Figure 8 – Selected design alternative

support the downstream edge of the new slab and new parapet. A preliminary stability analysis contained in the Preliminary Design Report shows that construction on the downstream side will not negatively affect stability of the dam. Additionally, although the public view of the dam from the downstream side is not primary, as the downstream side is more secluded and has less access, the view from the downstream side is spectacular. Special consideration has been made regarding the historic aesthetics for the new barrier and buttress tie-in to maintain the spandrel arch aesthetic and Streamline Moderne architectural style.

A preliminary stability analysis contained in the Preliminary Design Report shows that construction on the downstream side will not negatively affect stability of the dam. Additionally, although the public view of the dam from the downstream side is not primary, as the downstream side is more secluded and has less access, the view from the downstream side is spectacular. Special consideration has been made regarding the historic aesthetics for the new barrier and buttress tie-in to maintain the spandrel arch aesthetic and Streamline Moderne architectural style.

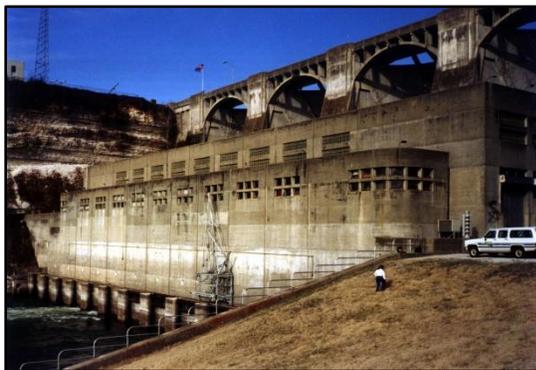


Figure 9 - The arch and powerhouse portion of the dam are visually exceptional. The arch and spillway portions of the bridge soar as much as 150' above the downstream portion of the dam.



Combining the widening with the rehabilitation and structural upgrade in a total project package will not only extend the life of the three SH 28 bridges but also addresses current structural capacity and long-term safety concerns for vehicles and pedestrians utilizing the structures. Tandem construction will reduce impacts to the local communities and decrease the cost of the construction compared to letting two separate projects at different times.

Limited Long-term Benefits without BUILD Funding

Without the BUILD Grant Funding, the full scope and benefit of the project will not be realized. To determine exactly what elements of the project would be delayed, further study and coordination between ODOT and GRDA would be required to determine what work would proceed and what would be postponed. The most likely scenario would be that the rehabilitation work underneath the decks of the West and East Spillway bridges would be postponed.

***Without
BUILD Funding***

No Bridge Widening

*No Underside Deck Rehabilitation of
the Smaller Bridges*

*No Strengthening of the Smaller
Bridges*

It can be assumed, however, that since the main Pensacola Dam structure has the highest costs for falsework/work platforms to access the underside of the bridge, due to its 150-foot height and the 5569-foot length, the full rehabilitation work of this structure would likely proceed as planned to avoid the need to re-mobilize access platforms for future rehabilitation work. The load rating of the main Pensacola Dam structure would be raised such that load posting signage could be removed, and no further rehabilitation work would be required in the near future. The load rating of the West and East Spillway bridges, unfortunately, would not be improved at this time.

The disadvantages to this approach include:

1. The two bridges are close enough to the Main Pensacola Dam that heavy trucks would not effectively be able to use any of the three bridges
2. Without adding sister beams to the West and East Spillway bridges, the deck will continue to be overstressed due to heavy traffic, and the deck rehabilitation work will not last as long as desired.
3. Maintenance costs for the deck will increase more quickly for these two bridges in comparison to the main bridge.

To accomplish the intent of the project, it is essential that comprehensive funding for the project – BUILD, ODOT, GRDA – be realized.

II. PROJECT LOCATION

The SH 28 Bridges are located in rural Mayes County in Northeast Oklahoma. The SH 28 Bridges cross the Pensacola Dam and its auxiliary spillways. They provide access to the southern end of Grand Lake. Grand Lake is one of Oklahoma's largest bodies of water spanning three counties with over 46,500 surface acres. Grand Lake is the foundation for a thriving tourism and recreation industry for the towns of Langley (pop 820), Disney (pop 305) and the unincorporated community of Tia Juana. In total, estimated population in the communities surrounding Grand Lake is approximately 10,300 individuals¹. This number is not inclusive of the recreational non-residential and tourism usage.

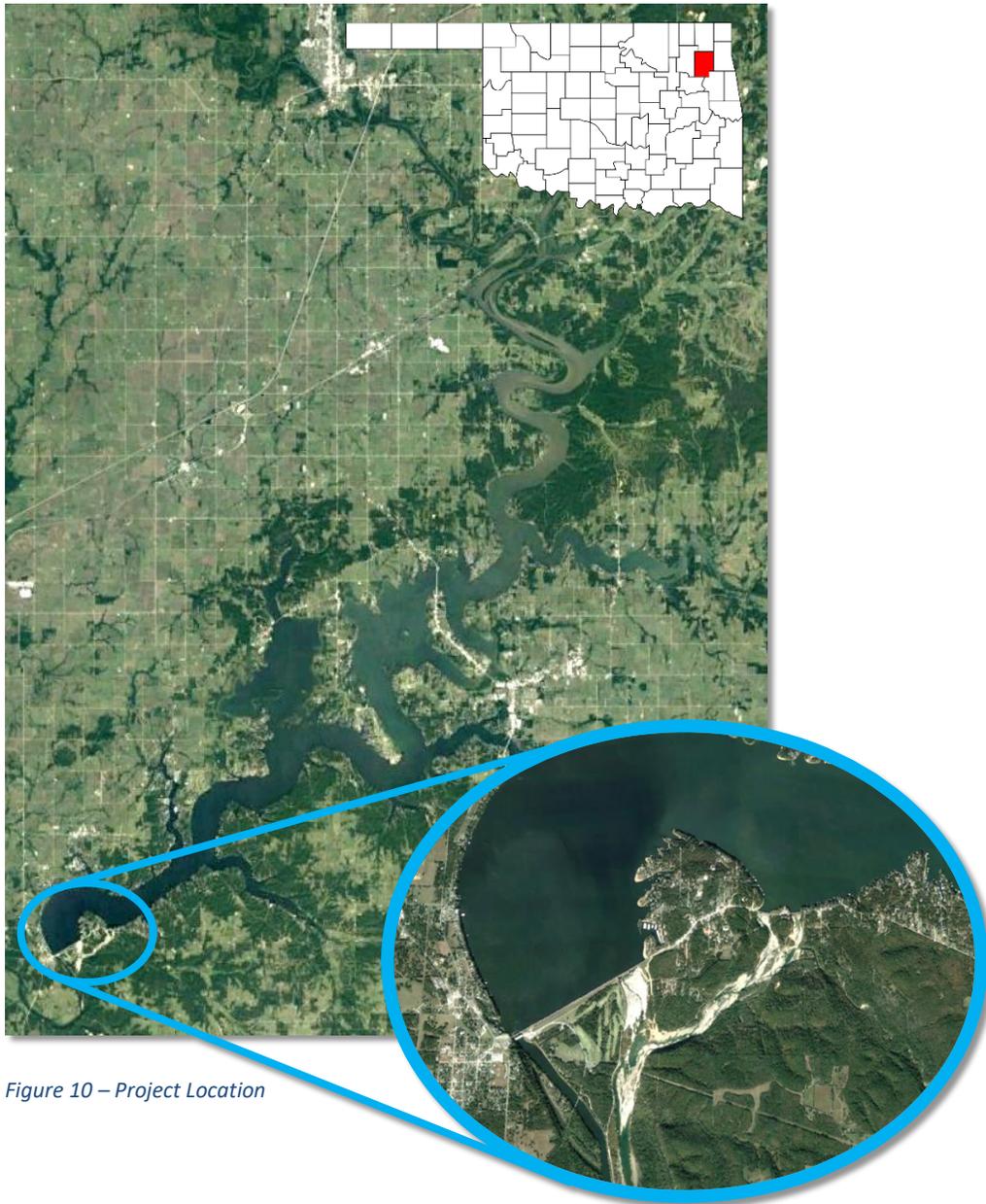


Figure 10 – Project Location

¹ American Community Survey, Demographic and Housing Estimates, 2012 – 2016 ACS 5-year Estimates

III. GRANT FUNDS, SOURCES AND USES OF ALL PROJECT FUNDING

Table 2 – Funding Summary

USES	STATE FUNDS/ODOT		PRIVATE INVESTMENT/GRDA		BUILD FEDERAL FUNDS		TOTAL PROJECT COST
	Previously Incurred	Future	Previously Incurred	Future	Previously Incurred	Future	
Environmental and Preliminary Engineering			\$465,000.00	\$493,000.00			\$958,000.00
Final Engineering and Construction Services	\$20,000.00	\$51,584.00	\$141,819.68*	\$350,500.00			\$563,903.68
Bridge Deck Rehabilitation and Sub-Structure Rehabilitation and Improvements		\$4,628,800.00		\$7,456,500.00		\$2,207,500.00	\$14,292,800.00
Bridge Widening							
Bridge A: Pensacola Dam						\$8,667,000.00	\$8,667,000.00
Bridge B: West Spillway						\$1,197,000.00	\$1,197,000.00
Bridge C: East Spillway						\$1,067,000.00	\$1,067,000.00
Mobilization		\$250,200.00		\$716,000.00		\$443,000.00	\$1,409,200.00
5% Contingency, and Other		\$244,000.00		\$519,000.00		\$576,000.00	\$1,339,000.00
Total Project Cost	\$20,000.00	\$5,174,584.00	\$606,819.68	\$9,535,000.00	\$0.00	\$14,157,500.00	\$29,493,903.68
Total Funding	\$5,194,584.00		\$10,141,819.68		\$14,157,500.00		\$29,493,903.68

*Funding includes Pensacola Dam Lighting upgrades to meet SHPO suggestions.

Federal Funds	48%
State/Private Funds	52%

IV. MERIT CRITERIA

a. Safety

ODOT Traffic Engineering Division Collision Analysis and Safety Branch tracks intersection and segment data along the Oklahoma State Highway System including the project area. Data was collected on SH 28 from approximately two and one-half miles west of the Mayes/Delaware County Line to approximately one-half mile east of the Mayes/Delaware County Line. The collision rates on this section were 33% above the statewide rates between 2013 and 2015.

An average daily safety study was completed in July 2018. The current posted speed on the SH 28 Bridges is 45 miles per hour. During the study period, over 90 percent of the traffic traveled below the posted speed with 48 percent traveling below 35 miles per hour. The report indicated that in order “to have an efficient posted speed limit of 45 <miles per hour> or increase the posted speed limit the LOS <level of service> will need to be higher.” The report stated that widening the SH 28 Bridges to 12-foot lanes would improve the LOS of the SH 28 Bridges. The GRDA Chief Law Enforcement Officer provided additional information based on his experience patrolling the SH 28 Bridges. This information is included in the Benefit Cost Analysis Section.

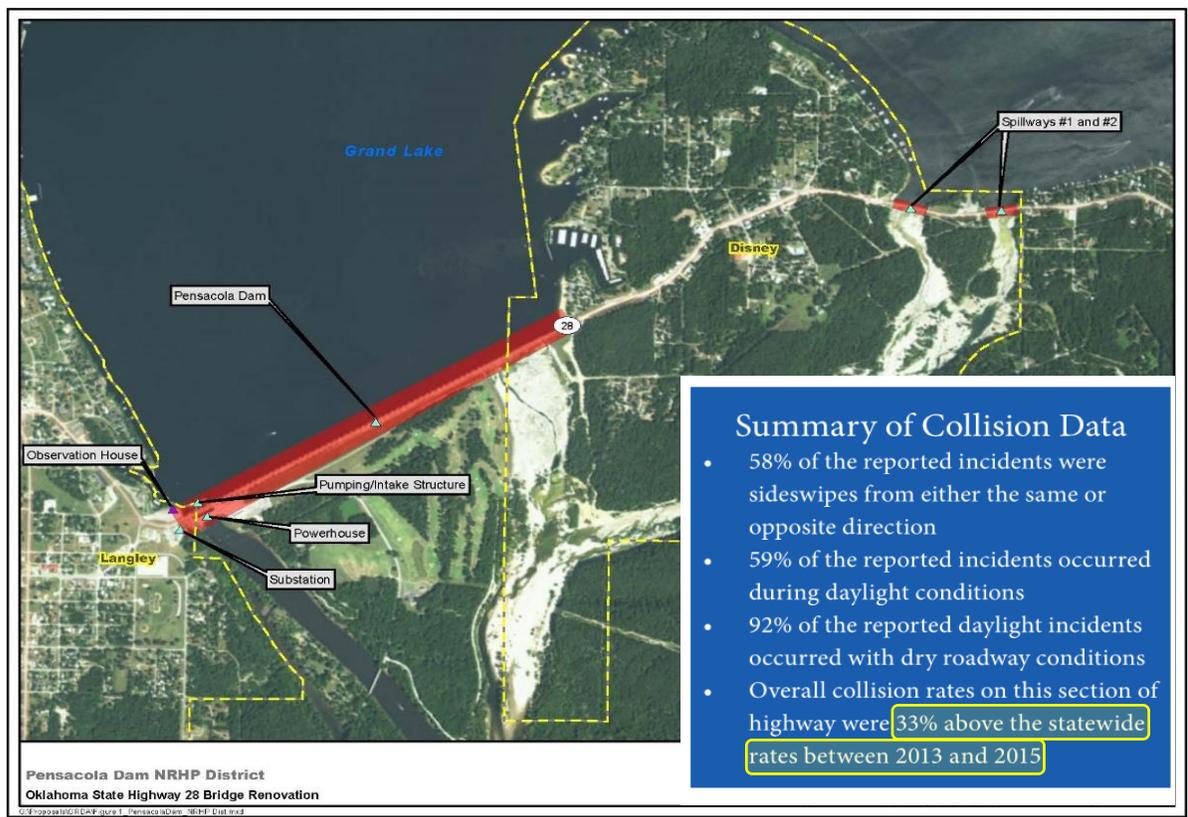


Figure 11 – Collision Data for SH 28 Bridges



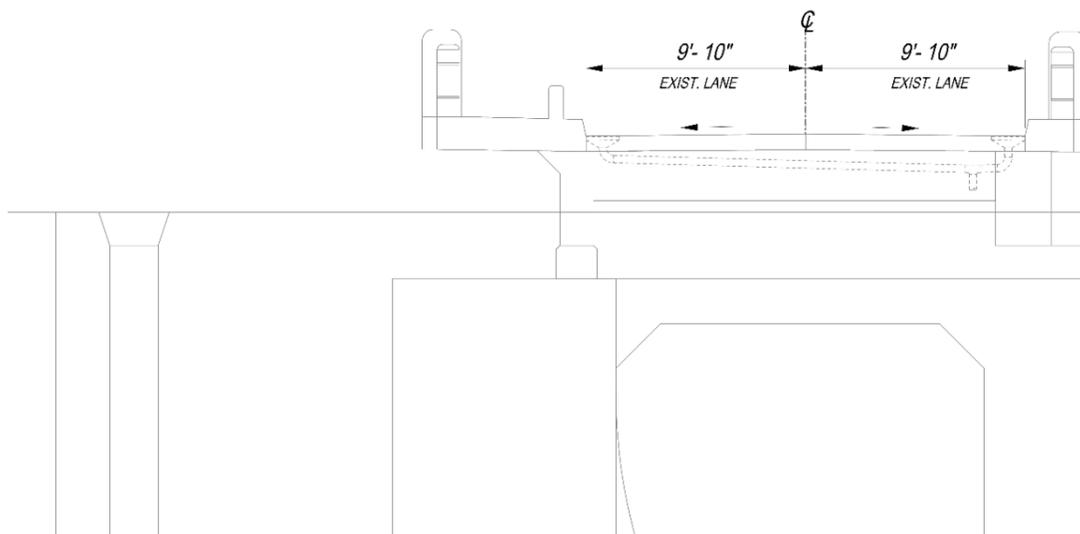
The bridge condition and capacity are inadequate to accommodate the daily loads the bridge serves. The bridges are listed by ODOT as functionally obsolete due to load posted to 16 tons. The deterioration inflicted to the bridge has reached a point requiring condition improvements prior to the failures necessitating closure of the highway altogether.

Figure 12 - The Pensacola Dam Bridge is among the narrowest and longest two-lane bridges in the State of Oklahoma.

This project will not only increase the strength of the bridges to current structural standards, but also will widen the structure. The dam configuration does not lend itself to the additional width necessary to fully comply with today's standards. However, the additional 4 feet of width will result in a safer travel corridor for those traveling on the bridges.

b. State of Good Repair

The SH 28 Bridges Pensacola Dam Bridge (NBI 27569) and West and East Spillway Bridges (NBI 29642, 29645) were inspected in October 2016. The overall length of the Pensacola Dam Bridge is 5669 feet. The West and East Spillway bridges extend 451 and 410 feet in length respectively. The bridges have been rated by ODOT as functionally obsolete and structurally inadequate. Deterioration associated with age and excessive load require structural repairs. Additionally, the existing lanes that are only nine feet, ten inches wide for a total roadway width of 19 feet and eight inches. A summary of the existing condition of the bridges is described in the Preliminary and Supplemental Design Report (See [ODOT BUILD Project Website](#)) and Table 1. The full assessment of the existing conditions is provided in the Field Assessment Reports.



EXISTING TYPICAL SECTION AT SPILLWAYS

Figure 13 – Current lane widths on SH 28 Bridges

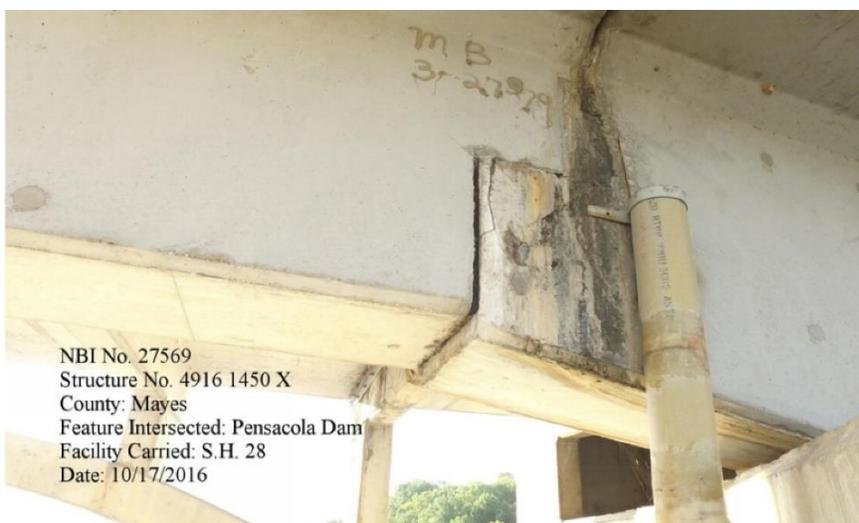


Figure 14 – Damages evident on the SH 28 Bridges

The damages inflicted to the bridge have reached a point requiring condition improvements prior to failure that would necessitate closure of the road altogether. If left unimproved, the result would be the future closure of the SH 28 bridges. The only alternative highway route along the southern side of the lake is approximately 26 miles long and would completely bypass the town of Disney.

c. Economic Competitiveness

The communities of Disney and Langley lie on either side of the SH 28 Pensacola Bridge just west of the two auxiliary spillway bridges. This corridor allows for travel along the southern end of the lake. These towns, along with the unincorporated community of Tia Juana, reap the benefit of the recreational users of the lake.

Without improvements to the structural capacity and width of the bridges, however, the future care for the bridges will likely require substantial limitations or closure to traffic. The alternative highway route that would result from a permanent road closure would have a substantially adverse effect on the communities surrounding the three SH 28 bridges. Specifically hard hit would be the communities of Disney and Tia Juana where SH 28 is the only way into or out of the communities. The only existing alternative highway route around the southern reaches of Grand Lake would be 26 miles and bypass the community of Disney. Closure of the bridge would allow for access from the south, but it would be a cul-de-sac dead end. There are potential new routes that could be constructed but they would also bypass the towns and destroy their businesses. The construction of these new routes would be very costly due to the grade differential between the communities and the Neosho River valley to the south.

Disney is home to multiple restaurants, marinas, and a state park, all of which benefit from the tourism associated with Grand Lake. Additionally, the area hosts the annual Big Meat Run, bringing over 14,000² people from across the United States to the area between Langley and Disney. The downstream side of the dam is filled with enthusiasts exploring the

² www.360grandlake.com/Annual-Events/john-Sumners-Big-Meat-Run.html

spillways and terrain with their off-road vehicles. Every campground and hotel room within a 70-mile radius is reserved for this heavily attended annual event.

d. Environmental Protection

According to the EPA³, the typical passenger vehicle emits 411 grams of CO₂ per mile. The current travel distance related to the SH 28 Bridges is 6,530 feet or approximately 1.2 miles. The resulting CO₂ emissions is approximately 493.2 grams. If the improvements cannot be made and the bridges close or are severely restricted to vehicular traffic, the 26-mile alternative highway route would result in each vehicle forced to take the alternate route would emit more than 10,686 grams of CO₂. This is an increase of more than 2000% in CO₂ per vehicle traveling the alternative highway route.

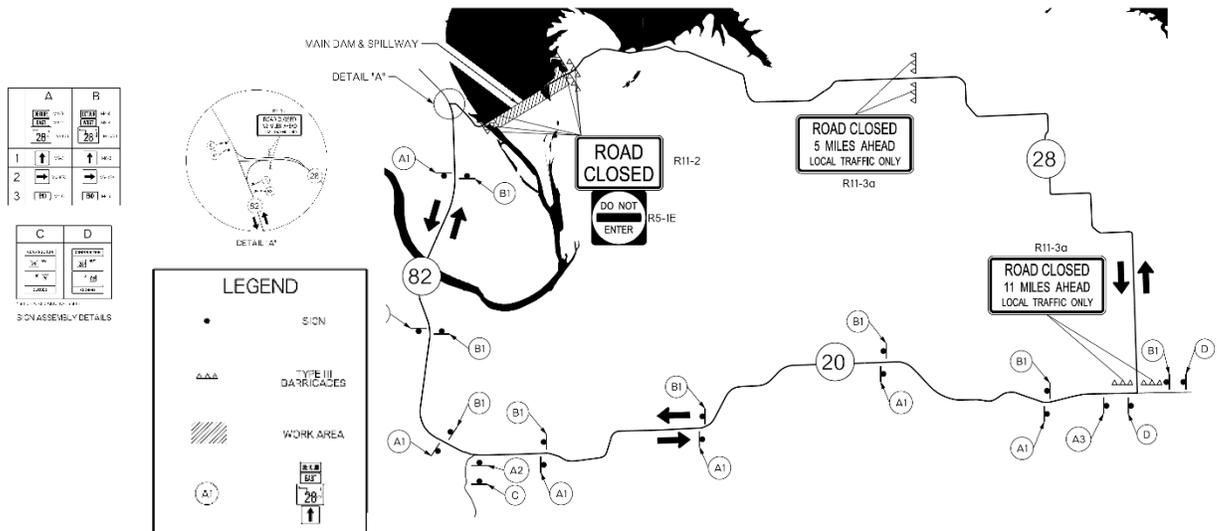


Figure 15 – Alternate highway route

The reduction in greenhouse gases⁴ (GHG) was also computed for the benefit cost analysis as described in Section V.e. Due to the high projected traffic growth and increase in truck traffic over the 20-year period of when the project is completed, the emissions are expected to increase over existing conditions. This results in a negative net present value of approximately \$120,000 contributing against the other benefits to the project.

e. Quality of Life

The Pensacola Dam construction was completed in 1940 creating Grand Lake. In the more than 70 years following the completion of the dam, the positive economic effects of the lake continue to ripple through the region. Grand Lake’s 46,500 surface acres of water are the foundation for a thriving tourism and recreation industry in Northeast Oklahoma. Tourism

³ EPA Greenhouse Gas Emissions from Typical Passenger Vehicle
<https://19january2017snapshot.epa.gov/sites/production/files/2016-02/documents/420f14040a.pdf>

⁴ Greenhouse Gases Equivalencies Calculator - Calculations and References
<https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>

provides and supports a broad and ever-expanding tax base. In addition to those who come to Grand Lake to play in the spring and summer months, thousands more live, work and play year-round along the lake's highly-developed shoreline.

The communities of Disney and Langley directly experience the positive impact of the recreation industry that continues to diversify. Without structural improvements to the SH 28 bridges, however, the bridges will likely require substantial closure or limitations on traffic. Alternative highway routes which bypass lakeside communities that depend on recreation dollars would have a substantially adverse effect upon the communities.



Figure 16 – Aerial view of a typical weekend at Grand Lake

The communities on the southern edges of Grand Lake, out of purpose and necessity, coordinate efforts especially when it comes to emergency response. The emergency departments coordinate as the “South Grand Lake Emergency District”. They work collaboratively and provide backup support to each other during times of need; including grass fires, vehicular crashes, drownings and other situations where emergency response is needed. Response time will be hindered when the bridge is closed during construction. The District will work with GRDA and other stakeholders to develop appropriate temporary alternative routes for emergency situations. Should the SH 28 bridges require permanent closure or limitations on further load restrictions, local emergency responders will be forced to find a permanent alternative route which may be devastating during a crisis.

f. *Innovation*

i. Innovation Technologies

Precast Concrete Element Systems (PCES) will be utilized for this project, as well as an Accelerated Bridge Construction (ABC) techniques detailed in per Federal Highway's ABC Final Manual. The new spandrel arches and other longitudinal girders for the widening will be precast. Additionally, the new parapet and portions of the buttress widening will be precast to accelerate the construction schedule. As much as possible, precast elements will be utilized to minimize the need to form concrete at heights up to 150' above the existing downstream grade. Use of PCES will reduce costs, reduce construction time thereby limiting adverse effects on the communities and improve worker safety.

ii. Innovative Project Delivery

The construction sequencing of the project is innovative, performing the majority of the widening and rehabilitation work on the Pensacola Dam Bridge with the bridge fully closed during the off-season for Langley and Disney. During other stages of work when one lane is open for two directions of traffic, temporary signals which are sensor activated will be used to direct the traffic. This improves safety over timer activated occurrences of drivers running the red light.

The full closure will allow the widening and rehabilitation to be completed within nine months, and the bridge to be reopened to traffic as quickly as possible. This schedule is driven by the need to allow the local communities to benefit from tourism as much as possible during the summer months. ODOT and GRDA are coordinating with stakeholders to minimize negative impacts to the communities, including providing a detour route across the spillway channel for use by emergency responders. The terrain is rugged, and not traversable by sedans and truck traffic. However, the initial public meeting identified the need for a shorter detour route by emergency vehicles, and accommodations will be made in the construction plans.

Should additional time be required to complete the rehabilitation on the SH 28 Pensacola Dam bridge, the work will be completed while maintaining one lane of traffic on the bridge, using temporary signals to accommodate traffic in each direction. The smaller bridges are closer in elevation to the downstream grade and can be widened while maintaining one lane open to manage traffic in each direction using the same techniques. The Preliminary Design Report contains a more complete description.

iii. Innovative Financing

GRDA is a non-appropriated state agency, fully-funded by the revenues from the sale of electricity and water, instead of taxes. They function much like a private sector company providing significant economic contributions to the Oklahoma economy. This project combines the private capital of GRDA with state appropriated dollars through ODOT. This partnership will provide more than 52% match to the requested federal funding to be provided by the BUILD Transportation Funds.

g. Partnership

GRDA and ODOT have a long-term partnership with regards to the SH 28 Bridges. Because SH 28 is the primary connection across the southern portion of the lake, it is also essential that they work closely with communities on either side of the bridges as well as every day users. An initial stakeholder meeting was held in October 2017. Project descriptions, scheduling, durations, lane and structure closures and associated impacts were discussed. Stakeholders included the residents surrounding the Grand Lake, as well as Emergency Responders, US Mail Service, Schools, Parks, County Government, Chambers of Commerce and Preservation and Historical Agencies. The Preliminary Design Report details the outcomes of the stakeholder meetings. Informal discussions have continued in the interim as well as a meeting with South Grand Lake Chamber. Additionally, letters of support have been received from various stakeholders and are submitted as part of this application.

Letters of Support from:

*Grand River Dam Authority
Governor Mary Fallin
Mayes County 911
Mayes Emergency Services
Oklahoma Department of Commerce
Oklahoma State Representative Josh West
Oklahoma State Senator Wayne Shaw
South Grand Lake Chamber of Commerce
Grand Gateway Economic Development Assoc.
Town of Disney
U.S. Representative Markwayne Mullin
U.S. Senator James Inhofe*

Figure 17 – List of support letters

h. Non-Federal Revenue for Infrastructure Investment

No new non-federal revenue is expected as part of this project.

V. PROJECT READINESS

a. *Technical Feasibility*

The Preliminary Design Report which was updated in July 2018 (see [BUILD Project Website](#)) documented the technical feasibility of the rehabilitation and widening for the SH 28 Bridges. The design team submitted 60% plans and specifications on April 20, 2018, with a subsequent submittal with comments incorporated made on June 29, 2018. The project requires no new permanent right-of-way (ROW). It is anticipated that the project may be processed as a Categorical Exclusion (CE) once environmental investigations are substantially completed to ensure there are not impacts that prevent the project from being processed at the CE level. Consultation with the Oklahoma State Historic Preservation Office began October 11, 2017 and is expected to conclude in early 2019. Funding for the rehabilitation portion of the project has already been programmed by both ODOT and GRDA. Should funding be available from the BUILD Transportation Grant, it is expected that final design will be completed by May 2019 with letting to occur in July 2019.



Figure 18 – Progress towards project completion

b. *Project Schedule*

Key milestones in the project schedule are found below. It is anticipated that Grant funds will be obligated well in advance of the September 30, 2020 deadline. Additionally, all grant funds will be expended by April 2021 which is in advance of the September 2025 liquidation deadline. All funding outside of the BUILD Grant request have already been programmed. The team does not expect any delays as part of this project, however, should delays occur they would not prevent the total liquidation of funds by the 2025 deadline.

Table 2 – Project Schedule

Key Date	Action
September 2017	Consultant Engagement
October 2017	Initial Public Meeting
December 2017	Preliminary Design Report
May 2018	60% Plan Development and Review
July 2018	Supplemental Design Report
December 2018	BUILD Grant Award (if selected)
December 2018	NEPA Documentation Completed
Jan/February 2019	Public Meeting
March 2019	90% Plan Submittal
April 2019	90% Plan Review Meeting
May 2019	Submit PS&E
July 2019	Construction Letting
August 2019	Project Award/Obligation of Funds
September 2019	Construction Start Date (after Labor Day)
May 2020	Pensacola Dam Bridge Re-opening to Traffic
April 2021	Completion of all Construction Projects
December 2021	Total Liquidation of Funds

c. *Required Approvals*

i. Environmental Permits and Reviews

The SH 28 Rehabilitation and Widening project is not expected to result in significant environmental impacts due to the work being completed generally within existing right of ways and structures. GRDA is paying close attention to any issues that may arise related to the structure being listed on the National Register of Historic Places. Without BUILD funding, the project does not have a federal nexus requiring approval by the State Historic Preservation Officer (SHPO). However, the project team has coordinated with the SHPO to identify any areas or features of concern and is mitigating those concerns as much as practicable with the widening and rehabilitation plans. The Grant funding would provide a federal nexus for the SHPO, and coordination with the SHPO would proceed.

The project does not place footings or fill within the waterway, and therefore a US Army Corps of Engineer’s 404 Permit is not anticipated for the widening and rehabilitation construction activities. GRDA will coordinate with the US Army Corps of Engineer

regarding provisions for minor improvements on the spillway channel for the emergency vehicle detour route and for any construction access requirements.

National Environmental Policy Act: The BUILD funding would also provide the federal nexus for the preparation of documentation in compliance with the National Environmental Policy Act (NEPA) (42 U.S. Code [U.S.C.] Sections 4321-4375) and implementing

regulations promulgated by the Council on Environmental Quality (CEQ, 40 CFR 1500), plus additional environmental regulatory compliance documentation and specialist studies. Specialist studies may include wildlife habitat and vegetation assessment, water resources assessment, archeology survey, historic resources survey, community impact assessment, and hazardous materials initial site assessment.

NEPA documentation and associated specialist studies are in the early stages so that the information is generally ready by December 2018 and can be formatted as needed to comply with the Grant and/or the reviewing agency’s requirements for submission for reviewing prior to submittal to reviewing and regulatory agencies shortly thereafter. The preliminary environmental study area has been established as beginning at the SH 28/SH 82A intersection on the west end and the SH 28/Hines Point Road intersection on the east end plus a one-quarter mile buffer

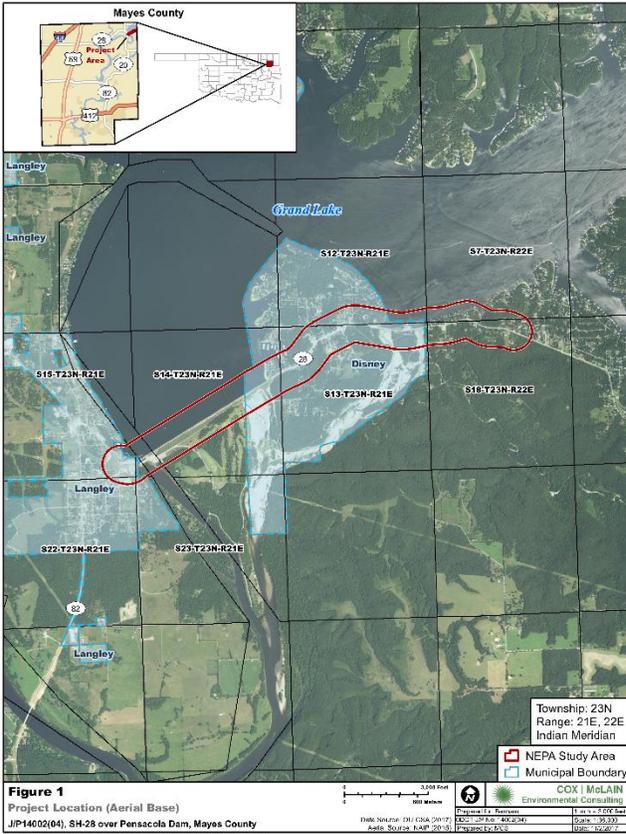


Figure 19 – Preliminary NEPA study area

centered on the roadway centerline. It is anticipated that background research and data collection would be conducted within the one-quarter mile study area. Specialist studies and impacts assessments will focus on the area within the footprint of the proposed project plus a 100-foot buffer around the footprint. Depending on the results of the Specialist Studies, the project may be processed as a Categorical Exclusion with confirmation from ODOT, FHWA, and agencies. Project team coordination will take place to ensure that avoidance and minimization of impacts occurs to the extent possible for efficient environmental review and processing.

Historic Preservation and Cultural Resources: In 2003, the Pensacola Dam was listed in the National Park Service’s National Register of Historic Places under Criterion C as an excellent example of multiple arch dam engineering. With 51 arches, the dam is the longest multi-arch dam in the United States and the only example of a multi-arch dam in Oklahoma.

GRDA and ODOT are committed to preserving the historic significance of the Pensacola Dam Historic District, while balancing the safety needs and continued utility of the bridges and the SH 28 roadway corridor. Although the proposed improvements have not yet been classified as a federal action requiring consultation under Section 106 of the National Historic Preservation Act, GRDA has consulted with the SHPO regarding the aesthetics and historic integrity of the Pensacola Dam Historic District. In the design development process, attention is being given to the SHPO's comments and incorporating them to the greatest extent possible to honor the historic aesthetics and nature of this facility while balancing the needs of the proposed project.



Figure 20 – Looking southwest towards the Pensacola Dam

See the Preliminary Design Report on the [BUILD Project website](#) for additional description.

Engagement with State DOT: This project is being completed cooperatively with ODOT, both at the field division level and headquarters office. Field division staff have actively participated in plan review and the initial public meeting. Ongoing communication has occurred throughout the project design regarding compliance with environmental regulations as well as structural coordination.

Public Engagement: An initial Stakeholder Meeting was held on October 30, 2017 at the GRDA Ecosystems and Education Center in Langley, OK. Identified stakeholders included the communities of Langley, Disney and Tia Juana, as well as Emergency Responders, US Mail Service, Schools, Parks, County government, Chambers of Commerce, and Preservation and Historical Agencies. Project description, durations, lane and structure closures and associated impacts were discussed. The concerns of the stakeholders attending are detailed in the Preliminary Design Report. The Design Team has offered approaches to minimize

impacts and has incorporated design elements as appropriate. See the BUILD Project Website for the agenda and minutes of the public meeting. GRDA has continued informal discussions with stakeholders, most recently a meeting with the South Grand Lake Chamber occurring on July 18, 2018. Another formal public meeting is expected in early 2019.

ii. State and Local Approvals

State and local permits are not required other than a Contractor’s Notice of Intent to Construct (NOI), which will be filed with the Oklahoma Department of Environmental Quality (ODEQ).

Multiple letters of support have been received showing support for the SH 28 Bridges Rehabilitation and Widening. Letters of support for the project have been received from local communities, Chambers of Commerce, federal and state legislators as well as state, regional and local elected officials.

iii. Federal Transportation Requirements Affecting State and Local Planning

The project is consistent with Oklahoma’s Long Range Transportation Plan 2015 – 2040 (LRTP). It will address the Highway Bridge Policies and Strategies #1 Improve the safety and bridge conditions by replacing or rehabilitating structurally deficient bridges on the State Highway System. The deck rehabilitation of the project is included on Oklahoma’s Statewide Transportation Improvement Plan (STIP). Should BUILD funding become available, the STIP will be updated to reflect the additional project components.

The regional Council of Governments, Grand Gateway Economic Development Association is in the process of developing Long Range Transportation Plans for communities in their area. They are expected to begin planning for Mayes County in Federal Fiscal Year 2019. They will include information regarding this project and plan to assist GRDA and ODOT in any way necessary as it would relate to inclusion in their Long Range Transportation Plan.

d. Assessment of Project Risks and Mitigation Strategies

- *State Historic Preservation Office Consultation.* Without BUILD funding, the project does not have a federal nexus requiring approval by the State Historic Preservation Office (SHPO). However, the project team has coordinated with the SHPO to identify any areas or features of concern and is mitigating those concerns as much as practicable with the widening and rehabilitation plans. The BUILD funding would provide a federal nexus for the SHPO, and coordination with the SHPO would continue.

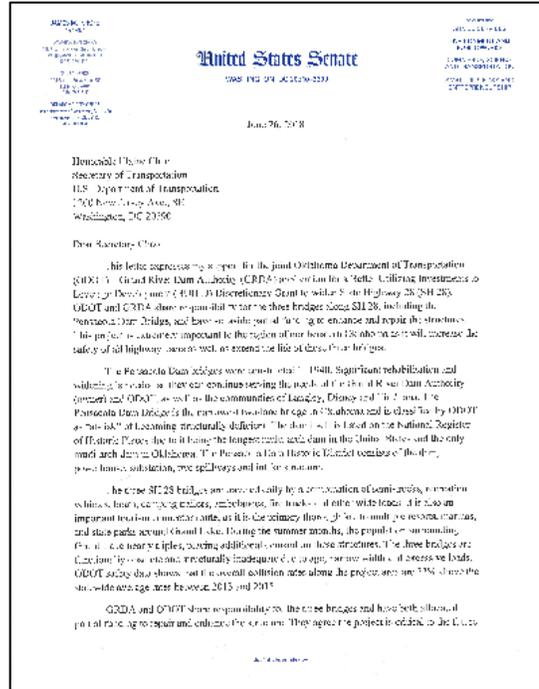


Figure 21 – Letter of Support from Senator James Inhofe

- *Environmental Review.* The SH 28 Rehabilitation and Widening project is not expected to result in significant environmental impacts due to the work being completed generally within existing right of ways and structures. Should the project receive BUILD funding further NEPA coordination will be necessary. Significant review will be related to State Historic Preservation. This risk will be minimized due to consultation being already initiated.

e. *Benefit Cost Analysis*

The Benefit Cost Analysis (BCA) was prepared for the project application in accordance with the BCA Guidance for Discretionary Grant Programs dated June 2018. The SH 28 Widening and Rehabilitation Project provides a benefit-cost ratio of 1.60 when discounted at seven percent. This means, for every dollar invested in the project, motorists receive 160% back in benefits. Consequently, a \$29.5 million investment in the project would equal a positive net user benefit of more than \$41.8 million to the surrounding area.

Over the life of the project, the vehicle operating costs due to closure is the largest contributor to the positive cash flow projected for this project, providing a positive net present value of \$10.9 million. The load rating increase contributes \$10.4 million in positive net present value from the vehicle operating costs. The complete BCA Narrative and calculations can be found on the [BUILD Project website](#).

It is difficult to fully capture the benefit of the widening and rehabilitation of the SH 28 Bridges through calculations in a BCA when incidents are often unreported. Discussions with GRDA Chief Law Enforcement Officer shed some light on some additional benefits that would result from the bridge project. He indicated that there has been more mirror to mirror incidents approximately one per week and increasing especially due to increasingly larger recreational vehicles.

The following costs were also noted regarding the narrowness of SH 28 Bridges, which were not able to be quantified within the Benefit-Cost Analysis:

- Pedestrian safety is at risk due to proximity of the walkway to travel lane
- The travel lanes are too close to the bridge lighting features and often cause issues
- There is no option for traffic to yield when emergency vehicles are responding to emergencies.
- When a commercial vehicle has an incident on SH 28 Bridges, the issues are larger than just the repairs, it is also the lost time and cost due to drug testing of the drivers.
- During snow and ice events, salt and other chemicals cannot be used on the bridge due to the condition of the bridges. Any accumulation must be cleared with mechanical equipment which is dangerous to ODOT crews as well as vehicular traffic.
- GRDA upgrade to LED overhead lighting upgrade to current UTCDC guidelines and more efficient energy utilization and compliance with SHPO suggestions ~ \$1,300,000

SUMMARY

The collaboration between ODOT and GRDA with BUILD funding for the Widening and Rehabilitation of the SH 28 Bridges will result in a much safer corridor for those traveling on the bridges as well as an extended useful life of the structures. The project will also provide for safe and reliable access to the surrounding community's social, commercial, employment and health care sites in northeast Oklahoma. The total project cost is over \$29 million with 52% of the funding coming from non-federal sources. An engineering marvel of the time of construction and completion, this project to widen the existing bridges is similarly a feat of engineering and coordination. Should funding not become available, however, only a portion of the rehabilitation will be completed resulting in a temporary fix, not a long-term solution for the safety issues surrounding the SH 28 Bridges.