PINE RIDGE INDIAN RESERVATION
Pavement Resiliency and Restoration Project

Outcome Criteria

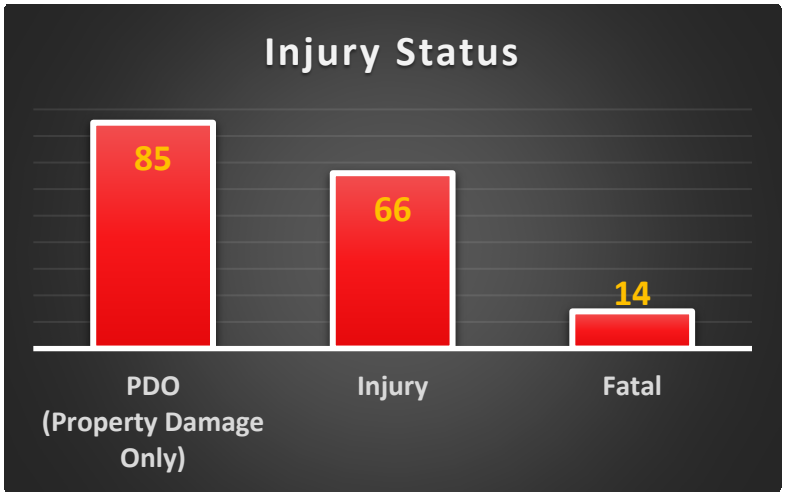
The Pine Ridge Indian Reservation Pavement Resiliency and Restoration Project addresses safety, state of good repair, resiliency, equity, quality of life, and tourism impact challenges located on the Pine Ridge Indian Reservation, a Historically Disadvantaged Community. The Project responds to existing and projected capacity, safety, mobility, and infrastructure issues by completing a comprehensive Reservation-wide project by rehabilitating approximately 103 miles of roadway pavement to include areas of asphalt reconstruction, new asphalt pavement surfacing, crack and chip sealing, shoulder widening, guardrail, and application of high friction surface treatment at identified high crash areas. Completion of the project is critical to improving safety for residents, travelers, and freight mobility across Oglala Lakota County.

- Increase safety with proven countermeasures such as guardrail, high friction surface treatment, speed feedback signs, rumble strips, and wider shoulders to reduce crashes
- Rehabilitates and preserves 103 miles of asphalt pavement to reduce operation and maintenance costs as identified in the Tribal Transportation Improvement Plan
- Provide significant opportunities for the creation of good-paying jobs, apprenticeships and training programs
- Create greater efficiency in the transportation of goods and services throughout the Reservation
- Improve reliability and efficiency on the Pine Ridge Indian Reservation for residents, school and transit busses, and emergency services
- Increase tourism opportunities by providing safer, more efficient roadways throughout the South Unit of the Badlands National Park and along the Crazy Horse Scenic Byway
- Incorporate recycled materials into the asphalt and base course and install geotextiles for a more resilient and sustainable pavement surface

Project Benefits:

a) Safety

The Project will address some of the major safety concerns Reservation-wide and have the greatest impact in this underserved community. To further understand the transportation and safety challenges of this corridor, the Oglala Sioux Tribe Department of Transportation (OST DOT) is investing in the completion of a Road Safety Audit (RSA). Public and stakeholder outreach and preliminary data have been collected. The full report is

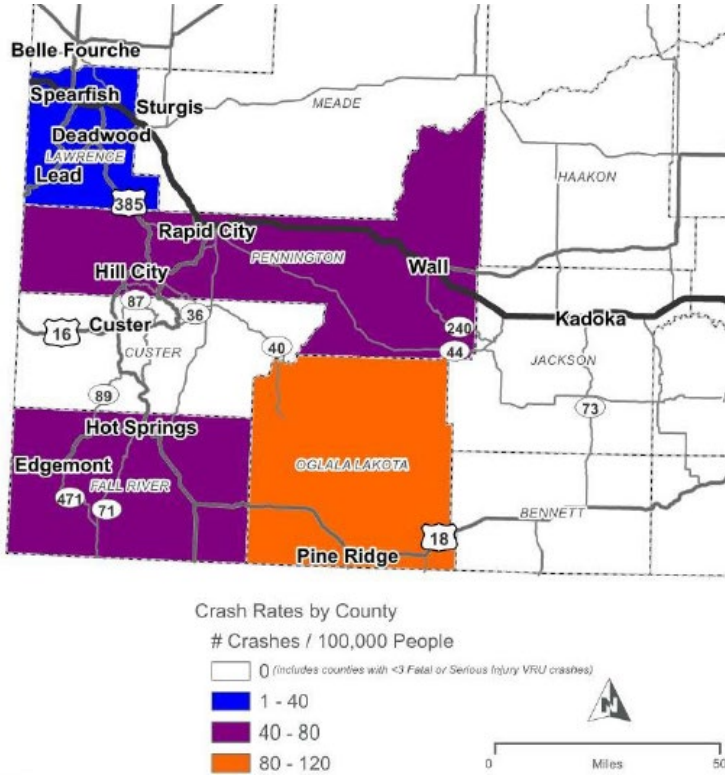


anticipated to be completed by the end of 2024. Data shows from 2013 – 2023, 165 crashes were reported within the Project area, 14 ending in a fatality type crash. It was determined from the crash data that 23-percent of crashes along the Project area were occurring because of Overturn /Rollover and Runoff Road crashes.

Initial recommendations from the RSA data include:

- Add guardrail to steep embankment areas
- Add High Friction Surface Treatment at sharp curves
- Maintain rumble strips and add rumble strips on new pavement
- Widen shoulders
- Remove trees and obstructions
- Maintain pavement surface and increase friction with chip seal surfacing

Additionally, SDDOT conducted a Vulnerable Road User (VRU) Safety Assessment[1] in 2023. The assessment identified high-risk areas and then consulted with those communities to evaluate strategies to improve the safety of VRUs. Seven counties were selected as high-risk areas for vulnerable road users, those having the highest crash rates and a minimum of three VRU fatal or serious injury crashes. The analysis and findings identified Oglala Lakota County as the second highest county and Oglala Sioux Tribe as the second highest tribal area for VRUs. The adjacent map was taken from the VRU Safety Assessment showing Fatal and Serious Injury VRU crash rates by county (2018-2022).



Lane departures are a major cause of crashes on the Pine Ridge Indian Reservation. On BIA 41, there are areas where the shoulders are insufficient. There is no room for drivers to maneuver to avoid crashes or have room to correct if the vehicle leaves the roadway. Adequate shoulder width is particularly important on higher speed roadways and areas where there is limited stopping distance. There is also limited room for emergency vehicles to safely pull over to address emergency situations or for safe storage for parked or disabled vehicles along these roadways. To address this safety issue the identified area of roadway will be reconstructed to meet current highway safety standards and widened to incorporate 2-foot shoulders and 4-foot shoulders along a sharp curve area where no

[1] SDDOT Vulnerable Road User Safety Assessment

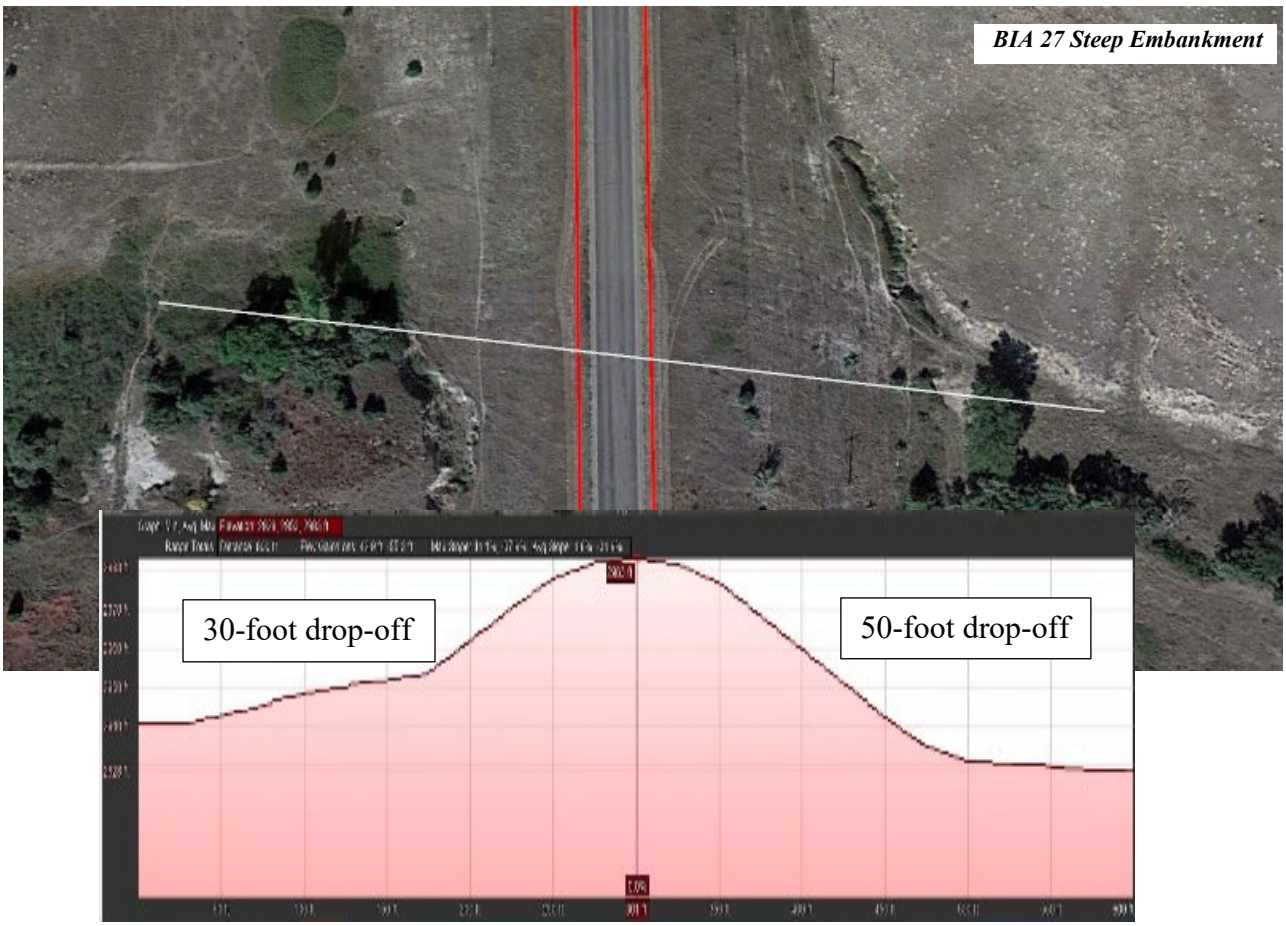
shoulders exist. A wider shoulder present on a two-lane road will increase safety and better accommodate motorists, non-motorized travelers, and emergency services. Additionally, the Project includes installation of rumble strips and 4-inch-wide edge lines on the newly constructed shoulders. Rumble Strips will be reinstalled on asphalt pavement replacement along the shoulders of BIA 28 and BIA 41's three sites. New edge line rumble strips will be added to new asphalt pavement on BIA 25 and the south 7 miles of BIA 41.

Speed Feedback Signs will also be incorporated into the Project at sharp curves and when entering lower speed zones. This will help warn drivers and prevent crashes including pedestrian crashes in communities.

There are two areas where the guardrail is currently inadequate. A sharp curve with a steep embankment on BIA 2, approximately 5 miles west of Kyle, is especially dangerous and in need of guardrail, as well as an area 2 miles south of Sharps Corner on BIA 27, where guardrail will be installed on both sides to prevent fatal run-off road crashes.

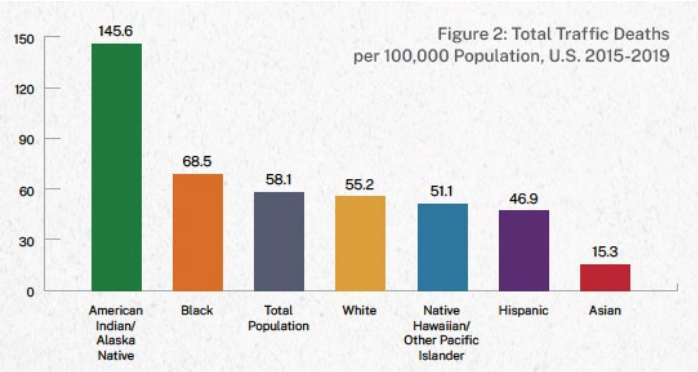


BIA 2 Curve



BIA 27 Steep Embankment

The Project will take an **innovative** approach to safety by incorporating High Friction Surface Treatment (HFST) in identified high crash areas, like the curve above on BIA 2. HFST is ideally suited for targeted locations with increased friction demand, such as horizontal curves, ramps, and intersection approaches. Enhancing friction at these high friction demand locations can help maintain vehicle control and effectively reduce braking or stopping distance, which in turn can decrease speed and kinetic energy in case of a collision. South Dakota Department of Transportation has been utilizing this treatment for the past few years and currently has approximately 75 locations within the state where HFST has been applied. Their results have shown a 66 percent reduction in winter road crashes. Their results have proved that this safety countermeasure is cost effective, approximately $275,000 per lane mile, and have a projected life expectancy of 10 years.



A report completed by the Governors Highway Safety Association: An Analysis of Traffic Fatalities by Race and Ethnicity[2], published June 2021, states that American Indian/Alaskan Native populations had the highest per-capita rate of total traffic deaths of all races and ethnicities. A major contributor to this high fatality rate is the result of roadways lacking appropriate safety countermeasures and failing infrastructure. As per the Governors Report, one the actions for addressing Equity in traffic safety is to prioritize planning and investment in infrastructure safety countermeasures in underserved/lower socioeconomic communities and neighborhoods that have suffered from years of bias and disinvestment. Addressing safety is one of the higher priorities for the Project. Successful completion will mitigate systematic safety issues and reduce fatalities and serious injuries in a historically disadvantaged region.

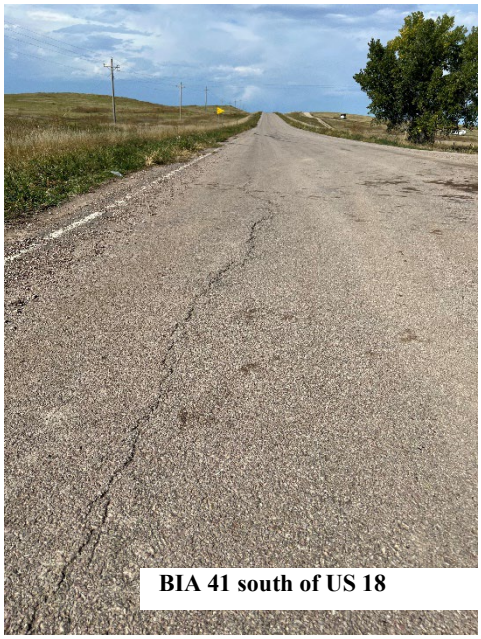
The Benefit-Cost Analysis determined that during the 20-year analysis period, 107.7 crashes would be eliminated due to the safety countermeasures of this Project. Of those crashes, 9.1 are fatality type crashes.

b) State of Good Repair

The Project consists of roadways that are either not designed or no longer meet FHWA standards and are in a state of disrepair. The biggest issue facing OST DOT is with current funding levels they do not have the ability to perform thin lift overlays or mill and overlay projects. OSTDOT is responsible for maintaining 520 miles of BIA roadways and 1450 miles of Tribal roadways within the Pine Ridge Indian Reservation. Due to this, many of the roadways throughout the Reservation are in significant disrepair due to extreme weather conditions and lack of funding. The current state of repair makes it impossible to continue to maintain safe and accessible transportation infrastructure. The OST needs a transportation system that safely and efficiently moves people and goods and provides quality access to Tribal housing, services, and

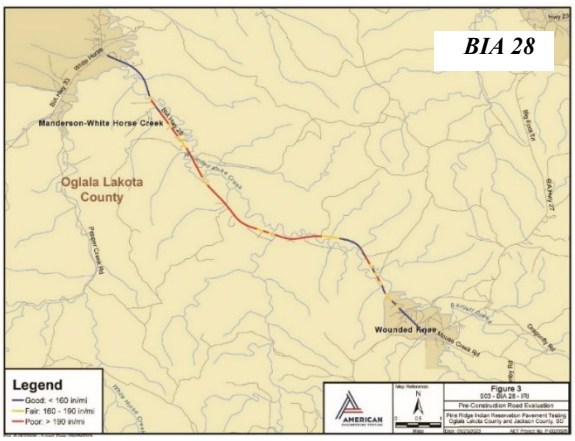
[2] An Analysis of Traffic Fatalities by Race and Ethnicity

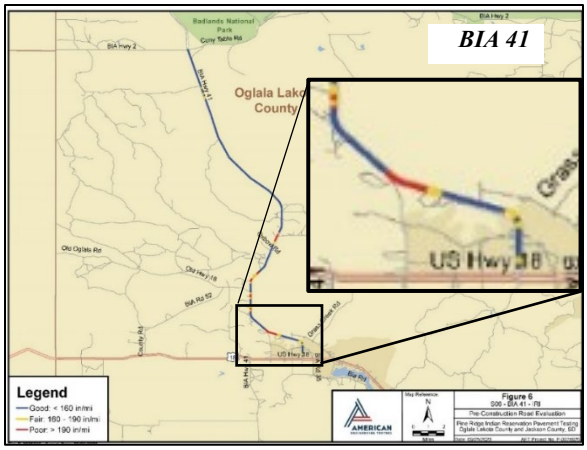
employment. The Project is identified in Tribal Transportation Improvement Program (TTIP) and LRTP.


BIA 41 south of US 18

The Project will provide much needed reconstruction to areas of BIA 2 and BIA 41 that are in poor condition. The completion of this project will reduce maintenance costs within the project area by $4.6 million over the 20-year analysis. In addition, the completion of this project will eliminate a 75-mile detour that is required if either BIA 2 or BIA 41 is closed due flooding or damage. The elimination of the detour will improve the State of Repair of the detour route by saving an additional $1.3 million in maintenance costs over the analysis period. Due to the Tribe's lack of funding, there has been continuous maintenance and patch fixes instead of a much-needed investment into a long-term solution to bring the roadway to a state of good repair. The most recent reconstruction of BIA 2, completed in 2013 with TIGER funds, provided a hard surface from BIA 41 to BIA 27. Due to limited TIGER funding, the center 12-miles of BIA 2 was constructed with a thin double chip seal surface. The double chip seal has experienced a multitude of potholes and needs annual maintenance to repair and patch potholes. It has also been extremely susceptible to damage due to increased severe storm events, which saturate the subgrade. This section needs to be restored to a resilient, asphalt-paved surface.

In 2023, OSTDOT invested in a pavement testing report which measured roughness using a high-speed inertial profilometer and found significant areas of poor condition. The section of BIA 28, below left, is over 70-percent fair and poor condition. It also showed the poor quality of a curve segment 0.7 miles long with severe heaving of BIA 41, below right inset. By contrast BIA 41, located 2.5 miles north to 2.5 miles south of BIA 2 (blue line) which was reconstructed with geotextiles within the asphalt pavement structure is 100-percent good condition. The report can be found at https://inputcentral.com/ost-rural-grant.





If current roadway conditions are not addressed, and temporary detours are needed due to road closures from emergency service or severe weather events, average detour route is approximately 20 miles. In 2019, severe damage occurred to most of the Reservation's paved roads due to a Presidential Disaster declared storm event which closed routes and cost nearly $2 million for pavement repairs. One route had such severe damage traffic had to detour for one month due to asphalt pavement not being available.

State of good repair is a critical piece of the OST DOT's TTIP and maintenance asphalt pavement crack and chip seals are scheduled. Once constructed the Project will be maintained as a critical piece of Tribal transportation infrastructure. Road asphalt paving will be crack and chip sealed every seven years. All analysis at the OST DOT include plans for ongoing operation and maintenance as part of the overall state of good repair for transportation infrastructure on the Pine Ridge Indian Reservation.



When the objectives of the project are achieved, the region will improve its transportation assets and enhance the multimodal transportation network in this rural area. BIA 2 is an arterial east/west route and BIA 27 and BIA 41 are north/south arterials connecting to the largest Reservation community of Pine Ridge Village and larger cities of Rapid City, SD approximately 40 miles northwest, and Chadron, NE approximately 20 miles southwest. BIA 14, 25, 28, and 33 are essential routes connecting Tribal communities. Deteriorating roads creates a vulnerability in an underserved rural community. Completion of the Project will address state of good repair and modernize the corridor by reconstructing the existing pavement and creating a long-lasting transportation connection for the region. Without reconstruction, the corridor will threaten future transportation network efficiency, constrain mobility of goods and people, and inhibit economic growth. Moreover, as road conditions continue to diminish, danger to road users and maintenance costs will continually increase.

c) Economic Impacts, Freight Movement, and Job Creation

Oglala Lakota County's income level is one of the worst in the Nation, but the Oglala Sioux Tribe has a rich cultural history which they share with visitors from across world. In December 2019, the Tribal Council formally designated the Crazy Horse Scenic Byway as a Tribally designated scenic byway, of which BIA 2, BIA 27 and BIA 41 are a large part. In 2020, the OST DOT applied to the SDDOT requesting state designation of this beautiful and culturally significant Byway. The state designation proposal is pending, and the OST DOT is confident that with safe and reliable transportation facilities, SDDOT will approve state designation, and the SD Department of Tourism will promote the Byway's diverse landscapes, breathtaking views, unique wildlife, vast geologic characteristics, iconic monuments, and Tribal history showcased throughout the Crazy Horse Scenic Byway.

The Badlands National Park, South Unit is located in the northern half of Oglala Lakota County where the Project area of BIA 27 and BIA 41 run adjacent. These routes are also along the Tribally designated Crazy Horse Scenic Byway. BIA 27 connects the Badlands National Park, South Unit (within the Reservation) to the Badlands National Park, North Unit (off Reservation) via the Badlands Bombing Range Road and SD 44. BIA 41 connects to SD 40 providing connection from the South Unit of the Park to Rapid City, SD, which is the second largest city in South Dakota and into the Black Hills area where in 2022 received $933 million in tourism spending, the highest in SD[3]. By comparison Oglala Lakota County which is adjacent to the counties of the Black Hills area received 1.2 percent of the Region and 0.5% of SD at $22.5 million[4].



The South Unit receives a fraction of visitors than that of the North Unit. In 2023, there were over 1 million visitors to the North Unit, and by comparison, only 16,500 visitors to the South Unit. While many visitors are interested in the South Unit, the North Unit has received considerably more investment for roads, visitor centers, parking areas, camping, etc. The current conditions of roads restrict economic activity from tourism, which is anticipated to increase resulting from the Tribally designated Crazy Horse Scenic Byway and its connection to the Badlands National Park, South Unit on the Reservation.

To further state the impact of how good transportation facilities affect local economies, visitors to the Badlands National Park, South Unit White River Visitor Center have increased 75% since 2013 following the first paving project of BIA 2 located along the south perimeter of the South Unit. Prior to 2011, 19.5 miles was gravel surface and impassable during inclement weather. On average, each visitor contributes approximately $95.30 to the tourism industry. Since paving BIA 2 ten years ago, visitation to the South Unit increased by 75%. Improving Reservation roads adjacent to the South Unit and along the CHSB will, at the very least maintain growth of visitors to the South Unit and Reservation. A 75% increase of visitors in ten years would be 28,875 by 2033, contributing $2,751,787 to the local economy. In another 10 years, by 2043, visitors would be 50,530 and contribute $4,815,628.

[3] Black Hills & Badlands Tourism Association | Black Hills & Badlands - South Dakota (blackhillsbadlands.com)
[4] https://sdvisit.com/sites/default/files/2023-01/22EcoImp_Tourism_Economics.pdf

With a high unemployment rate and location in a rural area of persistent poverty, job creation in the roadway paving and pavement sealing construction phases of the project will have significant short-term and probable long-term economic impact. In accordance with OST Tribal Employment Rights Office (TERO), a contractor is required to give preference to qualified Tribal members in hiring, promotions, and on-the-job training for all work performed on the project. Many of these hires have stayed employed with the construction companies long-term. The recent 2019 Storm Repairs project employed approximately 90% local Native Americans. The key to future long-term economic competitiveness on the Reservation is to strengthen the existing economic base and diversify the economy by supporting it with adequate transportation infrastructure. The project will create a place where diverse industries can survive and prosper, and residents can earn a living wage.



BIA 41 Lacks Shoulders to Support Trucking

According to the Oglala Sioux 2018 Long Range Transportation Plan, trucking is the only means of freight movement within the Reservation, as no railway facilities are present, and the Pine Ridge Airport is not typically used for hauling freight. The roadways within the Project area are the main routes for businesses to receive their goods. When roads are in poor condition it can increase time for delivery and unexpected delays due to road closures can increase the cost of transporting goods and further affect delivery schedules. Reliability of these routes are critical to freight transportation in the area and the economic impact of rural businesses on the Reservation.

Infrastructure is the foundation for economic growth and prosperity, and on the Reservation, the need for infrastructure investment is evident. The lack of economic competitiveness across the Reservation is tied to lack of infrastructure including roads and bridges, telecommunications, water, and housing. The Pine Ridge Indian Reservation experiences economic barriers due to their extremely rural nature and lack of economic diversity, which are obstacles to the untapped workforce of the Oglala Sioux Tribe. The project presents many ways to enhance the economic competitiveness of the area including improving roadways for better access to tourists, residents, businesses, and trucking, as well as creating short-term and long-term employment opportunities with road construction projects.

d) Climate Change, Resilience, and the Environment

The Project directly aligns with the National Climate Resilience Framework by increasing resilience of the built environment and addressing the dilapidated transportation infrastructure on the Pine Ridge Indian Reservation, making an investment in an underserved community that will boost their quality of life. OST is also advancing objectives of the National Climate Resilience Framework by proactively addressing and planning for climate threats and impacts of their transportation infrastructure. The Tribe was recently awarded funding to prepare a Reservation-Wide Transportation Vulnerability Assessment. The purpose of which is to assess the vulnerabilities and risks of the Tribe's transportation assets specifically to extreme weather events, flooding, natural hazards, and climate change. The assessment will encompass the entirety of the Pine Ridge Indian Reservation and related transportation infrastructure.



With storm disasters and flooding becoming more frequent and prevalent within the Reservation the impact will cause increased damage to an already vulnerable surface transportation system. Within the last ten years, there have been three Major Disaster Declarations issued within the region of central Oglala Lakota County, with other severe weather events impacting the Project area.

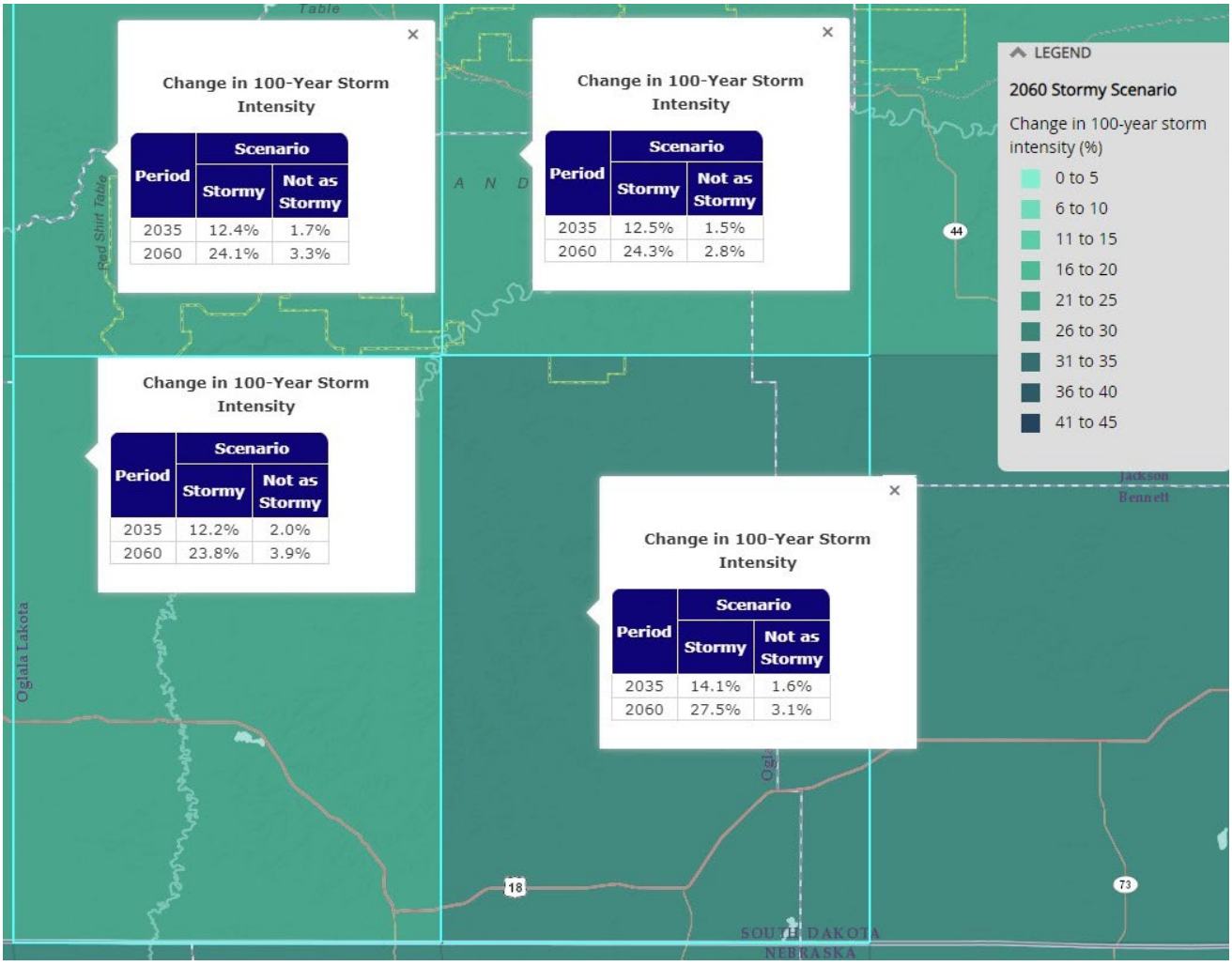
On August 7, 2015, the President declared a Major Disaster Declaration on the Pine Ridge Indian Reservation due to serve storms, straight-line winds, and flooding during the period May 8-26, 2015. $2,052,465.29 in Emergency Relief for Federally Owned Roads (ERFO) funding was received for five sites, four of the sites within the Project area.

On June 20, 2019, the President declared a Major Disaster Declaration on the Pine Ridge Indian Reservation due to a severe winter storm, snowstorm, and flooding during the period of March 13-26, 2019. Public Assistance and Hazard Mitigation was provided. Damage included roads and watermains. Nearly $18.4 Million was spent from 2019 - 2023 in ERFO and Tribal Transportation Program (TTP) funding for road and culvert repairs. $2 Million was expended in the first two years for asphalt pavement repairs alone.



On February 20, 2023, the President declared a Major Disaster Declaration on the Pine Ridge Indian Reservation due to severe winter storms and snowstorms during the period of December 12-25, 2023. And on July 30, 2023, heavy rains impacted several culverts and overtopped roads, damaging some of the most recent repairs of the 2019 storm damage.

According to the EPA's CREAT Climate Change Scenarios Projection Map, Pine Ridge Indian Reservation[5] is anticipated to see an annual increase in average precipitation. Current predictions for the project area region indicate a change in annual precipitation averaging between 3 percent to 6 percent by 2035 and between 5.9 percent and 12 percent by 2060. Additionally, there is an indication that the intensity of the 100-year storm event will impact rainfall and potential flooding scenarios moving forward, with a predicted change of up to 14.1 percent in 2035 and up to 27.5 percent intensity change by 2060.



From CREAT Climate Change Scenarios Projection Map – Project Area Change in 100-Year Storm Intensity

[5] CREAT Climate Change Scenarios Projection Map

OST's aging infrastructure, combined with the effects of global climate change, including volatile weather patterns and an increasing number of severe weather events, highlight the need to provide and maintain resilient and reliable transportation infrastructure that not only limits the environmental consequences, but reduces harm and vulnerability to local communities. Currently OST is having 100-year storm events approximately every 3 to 4 years. The Project will provide a safe, efficient, resilient roadway system designed to withstand larger storm events and further effects of climate change. All Reservation communities will benefit from the Project because the routes included in the Project are arterial and collector corridors.

The roads' horizontal alignments will be centered along the existing road. The roadway pavement structure will be innovatively reconstructed using geotextile separation fabric under the base course and triaxial geogrid between layers of base course. In 2018, this method was tested by the OST DOT on a 5-mile section of BIA 41 which had extreme heaving due to fat clay in the Badlands geology. The road only had one 2-inch lift of asphalt pavement prior to the storms of 2019 and performed so well that no repairs were needed. After 5 years, the road asphalt pavement does not show obvious signs of cracking and little signs of movement. Due to the positive pavement performance for this area, this method of incorporating geotextile separator fabric and triaxial geogrid in the pavement structure will be applied throughout the Project's asphalt pavement replacement and new asphalt pavement section. Additionally, the existing asphalt will be milled, recycled, and up to 20 percent reused in the new asphalt pavement. Base course will be salvaged and used in the bottom lift of base and excess will be reused as surfacing to intersecting approaches or used for temporary surfacing to maintain traffic during construction. The proposed road improvements will be more resilient, sustainable, and have a longer life span.

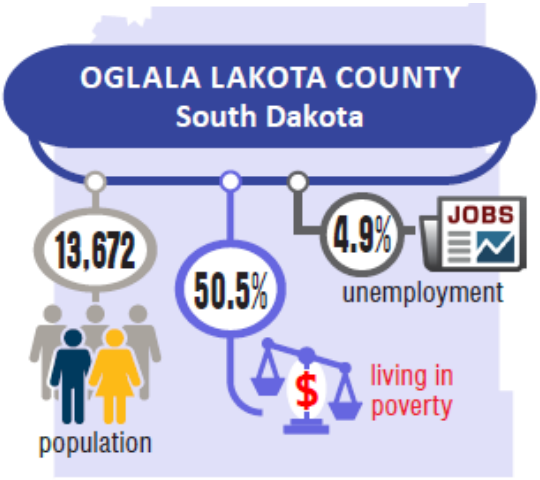
Access to safe and reliable transportation facilities, including transit services, especially for these rural communities is imperative. Economic sustainability and quality of life are all enhanced when a strong transportation system is provided to meet the needs of all users. The Project will improve transit system reliability and decrease GHG emissions due to less idle time for transit and maintenance vehicles. Transportation is the largest emitter of greenhouse gases (GHGs) in the United States—as well as one of the fastest-growing sources. National inventories suggest the transportation sector generates approximately 29 percent of the Nation's GHG emissions, and roadway vehicles account for about 83 percent of that. Integrating consideration of GHG emissions into transportation planning and decision-making is a critical step toward meeting national reduction goals and reducing climate impact.

Upon completion, the Project will extend the useful life of the roadway, reduce risk from heavy rainfall, severe storms, flooding, and provide a safe and reliable multimodal transportation system by reconstructing and improving the resilience of the roadway and allowing for continued access and operation during severe weather events and other natural disasters.

e) Equity, Multimodal Options, and Quality of Life

The Project is located on the Pine Ridge Indian Reservation, an Area of Persistent Poverty and a Historically Disadvantage Community and is one of the poorest Reservations in the nation. It is in the southwest corner of South Dakota and encompasses over 2 million acres, a landmass larger than Delaware and Rhode Island combined. Home to the Oglala Sioux Tribe, the Reservation's

major communities include the Tribe's administrative center, Pine Ridge Village, as well as Kyle, Wanblee, Allen, Porcupine, Oglala, Red Shirt, and Wounded Knee. OST DOT is responsible for maintaining 520 miles of BIA roadways and 1,450 miles of Tribal roadways within the Pine Ridge Indian Reservation. The OST needs a transportation system that safely and efficiently moves people and goods and provides quality access to Tribal housing, services, and employment.



According to 2021 Census data[6], 50.5 percent of Oglala Lakota County residents live in poverty, with the community's median household income approximately 50 percent lower than that of South Dakota. Currently, residents who rely on the roads in the Project area for travel must navigate deteriorated and at times unsafe roadways to access goods and critical services, including health care, education, employment, childcare, recreation, and other essential Tribal services. The Project is critical to the regional rural communities. It will enrich the quality of life for Tribal members and residents of the Pine Ridge Indian Reservation by increasing efficiency and resiliency of the arterial and collector transportation system, provide consistent access and connectivity to living-wage employment and essential services while decreasing the number of traffic incidents, delay time for emergency services, and burdensome deterioration of vehicles. The project creates transportation connectivity among cities and counties across the Reservation.

The Project goal is to provide for a better quality of life and improved transportation access for tribal residents, visitors and those that do business on the Reservation. BIA 2 is an arterial east/west route and BIA 27 and BIA 41 are north/south arterials connecting to the largest Reservation community of Pine Ridge Village and larger cities of Rapid City, SD approximately 40 miles northwest, and Chadron, NE approximately 20 miles southwest. BIA 14, 25, 28, and 33 are essential routes connecting Tribal communities. The current condition of these roadways is deteriorating, insufficient to meet the traffic needs, and presents safety, accessibility, and sustainability risks. The Project will address these issues and provide an improved and more resilient transportation network that will increase access to goods, service, education, and job opportunities for the disadvantaged and underserved community as well as improve freight access across the Reservation.



BIA 41 Curve Reconstruction Area – School Busses Must Slow Down to Avoid Bouncing Off the Road

[6] https://data.census.gov/profile/Oglala_Lakota_County,_South_Dakota?g=050XX00US46102#income-and-poverty

Many individuals living on the Reservation do not have private cars or access to a vehicle, limiting access to essential services and goods, and isolating them from education and workforce opportunities. According to the National Equity Analysis[7], 20 percent of Native American households in the state of South Dakota do not have access to a car. For this reason, reliable and affordable transit access is imperative to increasing transportation efficiency, safety, and improving mobility. Access to safe and reliable transportation facilities, including transit services, especially for these rural communities is imperative. Economic sustainability and quality of life are all enhanced when a strong transportation system is provided to meet the needs of all users.

The Project will reduce consumer spending on vehicle repairs allowing consumers to reallocate these dollars for other essential needs. A rough, pothole-filled road causes damage to vehicles, many owned by Tribal residents who are financially challenged and not able to afford repairs. Overall reduction of household spending will allow consumers to better manage the cost of living in the project area and surrounding proximity. Roads in good condition meeting current highway safety standards also reduce vehicular crashes.



The Project will comply with the OST TERO Compliance Plan. This requires contractors to agree for Native Americans to be given preference for at least 80 percent of the project workforce provided that sufficient qualified Indian applicants are available. This will provide good-paying jobs and workforce development training to an underrepresented tribal community.

The Project will support environmental justice and promote equity by providing significant benefits to transportation disadvantaged residents, including those with low-income, children, people with disabilities, and the elderly. Reservation roads have historically been underfunded and as a result are considered some of the worst roads in the Nation. Comparing federal funds historical disbursements to states versus tribes, Oglala Sioux Tribe receives 20 percent of federal funding per lane-mile that SD receives. Road conditions directly impact the ability for Tribal members to access goods and services, medical care, education, and employment.

f) Innovation Areas: Technology, Project Delivery, and Financing

To address the long-term sustainability that is needed for transportation infrastructure, and align with USDOT's investment priorities, the project will incorporate an **innovative technique** that will incorporate the use of geotextiles within the pavement structure where asphalt pavement replacement and new asphalt pavement is planned. The use of separation fabric under the pavement structure maintains separation of soil and base course and prevents soil from pumping up into the base course and intermixing which would weaken the pavement structure over time. The use of triaxial geogrid between layers of base course increases the base strength, prevents rutting, and reduces movement of the asphalt pavement which will reduce cracking and moisture

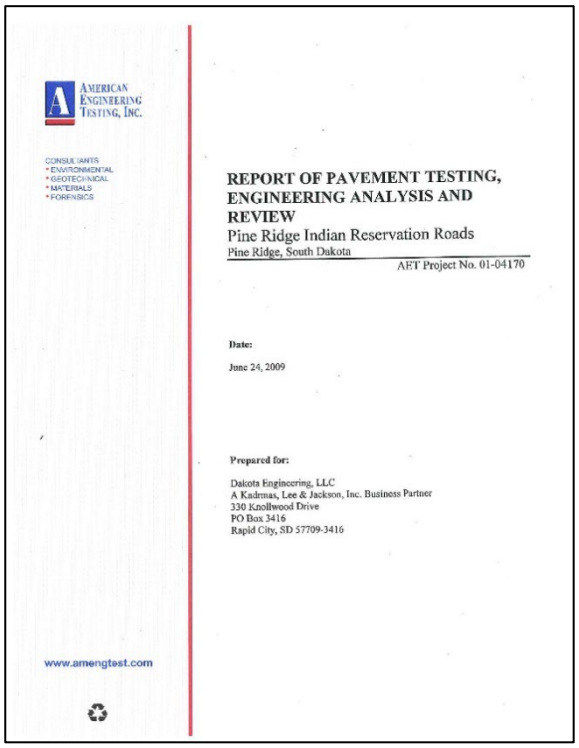
[7] https://nationalequityatlas.org/indicators/Car_access?geo=02000000000046000&breakdown=by-race-ethnicity

infiltration. The geotextile integrated pavement structure will be stronger, more resilient, and have a longer life span than a standard pavement structure of asphalt over base course. In 2018, this method was tested by the OSTDOT on BIA 41's 5 miles at the intersection of BIA 2 which had extreme heaving due to fat clay in the Badlands geology. In fact, the road only had one lift of asphalt concrete prior to the storms of 2019 and performed so well that no repairs were needed. After 5 years, the road asphalt pavement shows very few cracks and is being considered for use on other roads within the region with similar heaving issues and geology characteristics.

Additionally, the existing asphalt will be milled, recycled, and reused in the new asphalt pavement. The remaining existing base course will be salvaged and reused for gravel surfacing of driveways that connect to the reconstructed road or travel gravel to maintain traffic during construction.

To improve the efficiency and **accelerate project delivery**, the environmental Categorical Exclusion checklist has been submitted for review and approval. The project design is 95 percent completed and the project will be "shovel ready" should Rural grant funds be awarded.

In 2009, the OST DOT developed a Pavement Management Plan (PMP) and in 2018, a Pavement Surface Evaluation and Rating (PASER) Study was completed and included in the LRTP (2018 LRTP pages 38-44) Both studies focused on the current condition of asphalt paved roads within the Reservation. These studies were completed prior to significant damage in 2019 and the ratings have likely decreased due to damage and subsequent patch repairs.



AMERICAN ENGINEERING TESTING, INC.

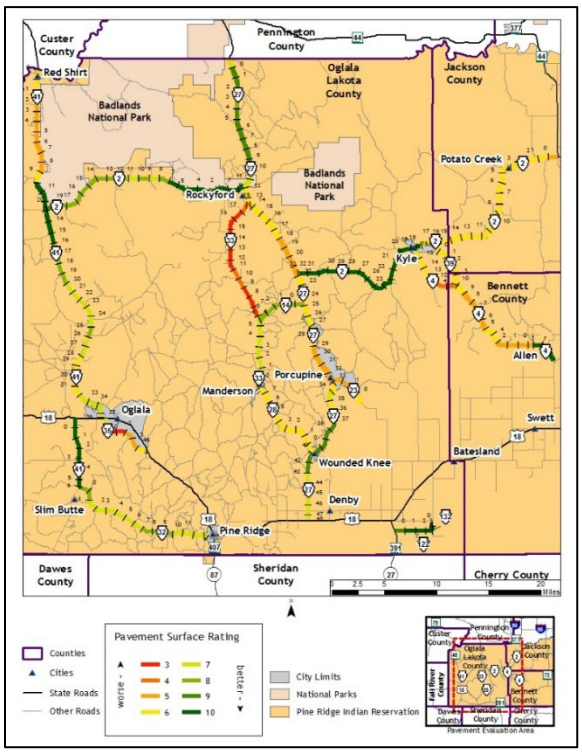
CONSULTANTS
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• MATERIALS
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REPORT OF PAVEMENT TESTING, ENGINEERING ANALYSIS AND REVIEW
Pine Ridge Indian Reservation Roads
Pine Ridge, South Dakota
AET Project No. 01-04170

Date:
June 24, 2009

Prepared for:
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In 2023, OSTDOT invested in a pavement testing report which measured roughness using a high-speed inertial profilometer and found significant areas of poor condition. It also showed the high quality of the 5-mile section of BIA 41 reconstructed in 2018-2019, which used geotextiles incorporated within the pavement structure. The segments of asphalt pavement replacement were chosen based upon these reports, visual inspections, need to improve transportation safety, and Tribal transportation connectivity needs. Please see these three reports at https://inputcentral.com/ost-rural-grant.

Maintenance Plan

State of good repair is a critical piece of the OST DOT's TTIP and maintenance asphalt pavement crack and chip seals are scheduled. Once constructed the Project will be maintained as a critical piece of Tribal transportation infrastructure. Road asphalt paving will be crack and chip sealed every seven years. All analysis at the OST DOT include plans for ongoing operation and maintenance as part of the overall state of good repair for transportation infrastructure on the Pine Ridge Indian Reservation.