SD DEPARTMENT OF TRANSPORTATION

US 12 Rural Reconstruction Morristown to Watauga

2022 MULTIMODAL PROJECT DISCRETIONARY GRANT (MPDG) OPPORTUNITY

Project Name: **US 12 Rural Reconstruction** Morristown to Watauga
Project Type: **INFRA Small, Rural**
Total Project Cost: **$21,400,364**
2022 INFRA Funds Requested: **$12,840,218**

Contact Information:

Steven Gramm, P.E., Planning Squad Leader
South Dakota DOT
700 E. Broadway Avenue, Pierre, SD 57501
(605) 773-3281
Steve.gramm@state.sd.us

Supporting Information can be found at:

Link to supporting info

Contents

List of Figures

List of Tables

Project Description

The South Dakota Department of Transportation (SDDOT) is requesting funding through the Multimodal Project Discretionary Grant opportunity (MPDG) to reconstruct a rural section of US Highway 12 from Morristown to Watauga in Corson County, South Dakota.

The US 12 project ("Project") is of critical importance to South Dakotans because US 12, a National Highway System (NHS) route, is the only east-west highway serving a remote and rural area of South Dakota entirely within the boundaries of the 2.3 million-acre Standing Rock Indian Reservation. This segment of US 12 is in a historically disadvantaged community with severely limited access to essentials, including groceries, fuel, and basic health care needs. The area is very dependent on the highway network for mobility. A map of the US 12 Project Study Area can be found in Figure 1.

Figure 1 – US 12 Project Study Area

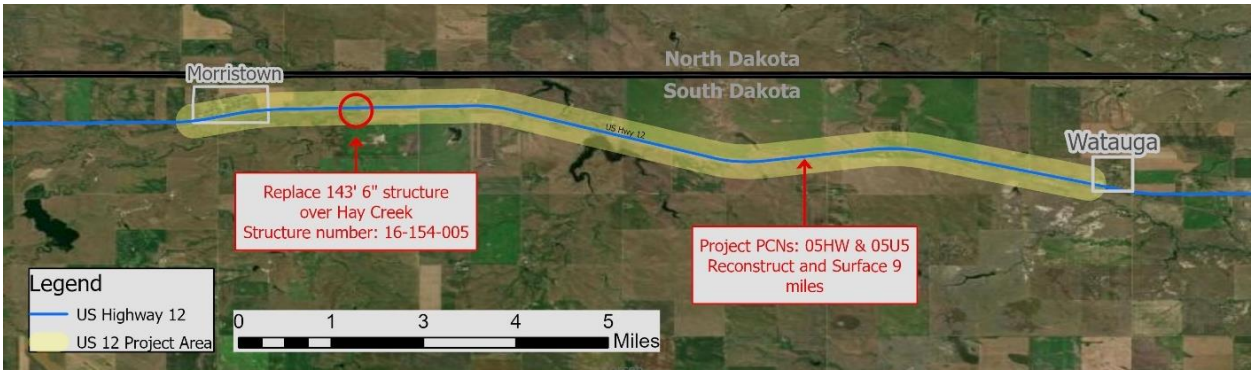
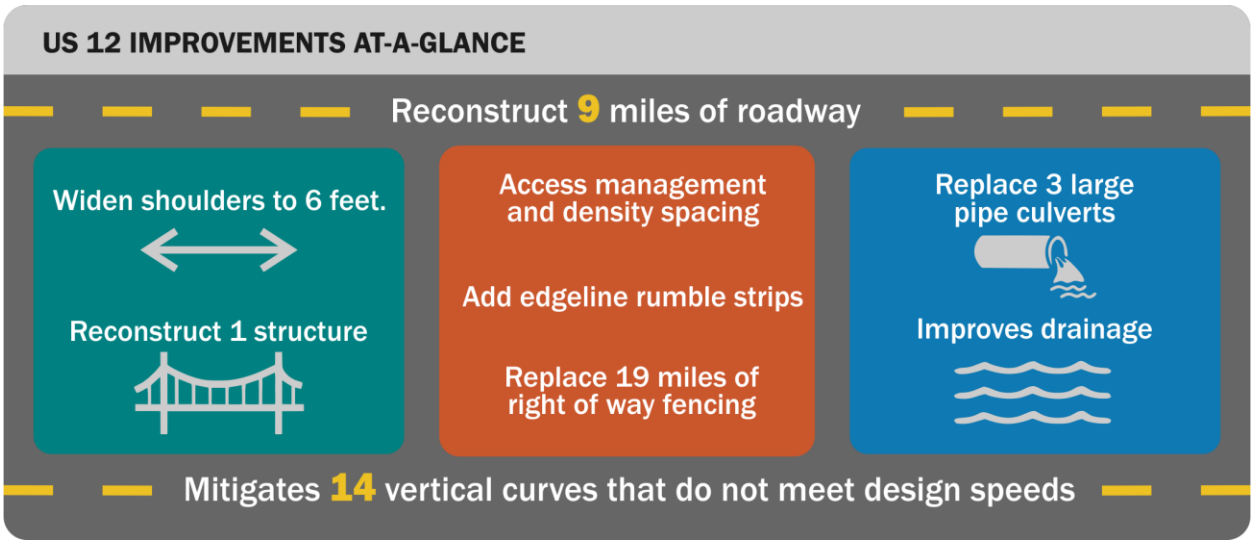


Figure 2 - Summary of Improvements



The Project will reconstruct the two-lane US 12 highway with new pavement, widen the roadway to include six-foot shoulders, replace a 143.5-foot deteriorating bridge over Hay Creek, install three box culverts where there are currently pipe culverts, and replace nearly 19 miles of right-of-way fencing. This portion of US 12 was constructed in 1949 and was resurfaced in 1959, 1988, and 2006. This infrastructure, including the roadway, bridge, and culverts, will be 74 years old at time of replacement and will have reached the end of its useful life.

Proposed Improvements

The US 12 project includes the following improvements:

- Reconstructs nine miles of roadway to new condition
- Widens and paves roadway shoulders from two feet to six feet
- Installs edge-line rumble strips
- Replaces one bridge built in 1949 over Hay Creek
- Replaces three large pipe culverts with box culverts
- Replaces 19 miles of right-of-way fencing
- Mitigates 14 vertical curves with a design speed of 60 mph or less
- Evaluates access management, including driveway density and spacing
- Flattens backslopes to help with the removal of drifting snow traps and melting
- Corrects inslopes to ensure proper roadway drainage

Project Location

The Project is located in Corson County, South Dakota and within the Standing Rock Indian Reservation. US 12 runs generally east-west, crossing into North Dakota about 30 miles west of the Project area. The Project extends from mileage reference marker 112 to mileage reference marker 121 on the west edge of Watauga. The Project is almost entirely rural and is not part of a census-designated urban area, although it travels through the City of Morristown (population 47 in 2020). The entire project is located within Census Tract 9410 with a geospatial location of 45.927751°, -101.620727°. Figure 3 shows the location of the Project.

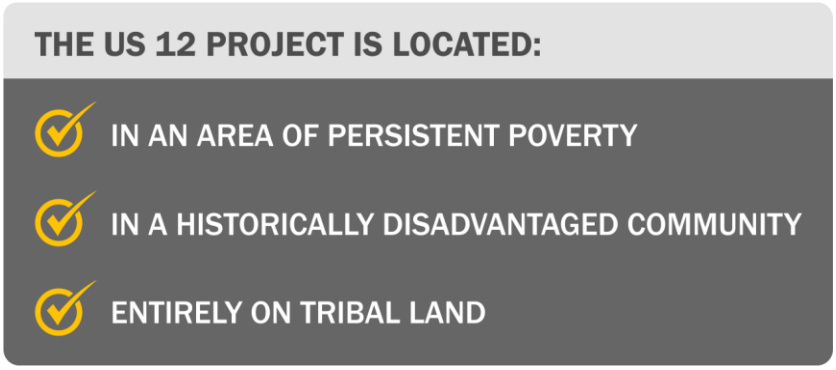
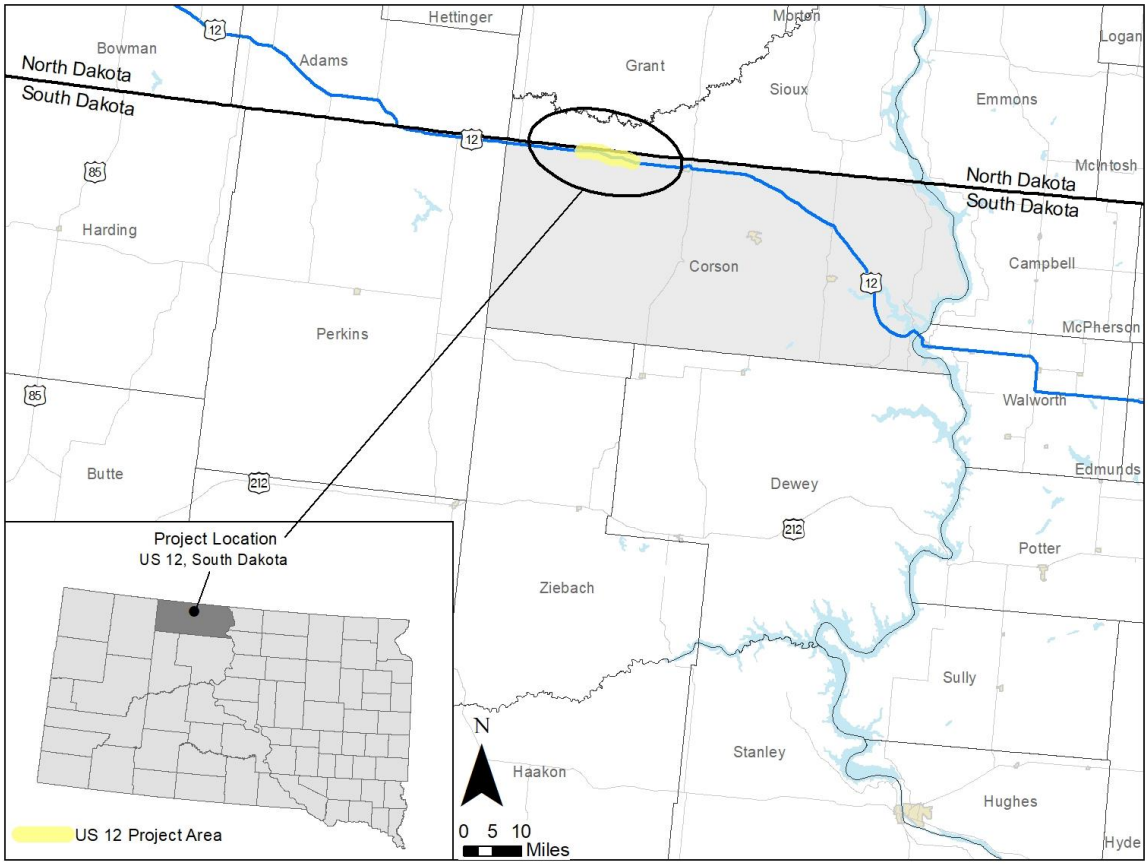


Figure 3 – Project Location



Area Demographics

Corson County

Established in 1909, Corson County is home to the cities of McIntosh, which is the county seat, and McLaughlin, which is the largest city in the county. Corson County has a population of 3,902, which ranks 41st among the 66 counties in South Dakota, and has an area of 2,530 square miles, which makes it the fifth largest county in the state by size. The County population has decreased as farm and ranch size have increased due to larger farm equipment and more efficient operations.

As of the 2020 census, the population density was about 1.5 people per square mile. The racial makeup of the county is 70 percent American Indian or Alaska Native, 25 percent White, 0.5 percent Asian or Pacific Islander, 0.15 percent Black or African American, and five percent two or more races. In 2019, the median age was 29 years old, and 49 percent of residents were female.

Standing Rock Indian Reservation

Corson County is contained within the Standing Rock Indian Reservation, the fifth-largest reservation in the United States at 2.3 million acres. Spanning the border between North and South Dakota, it is

bordered by the Missouri River on the east. The Reservation is home to people from the Lakota and Dakota nations.

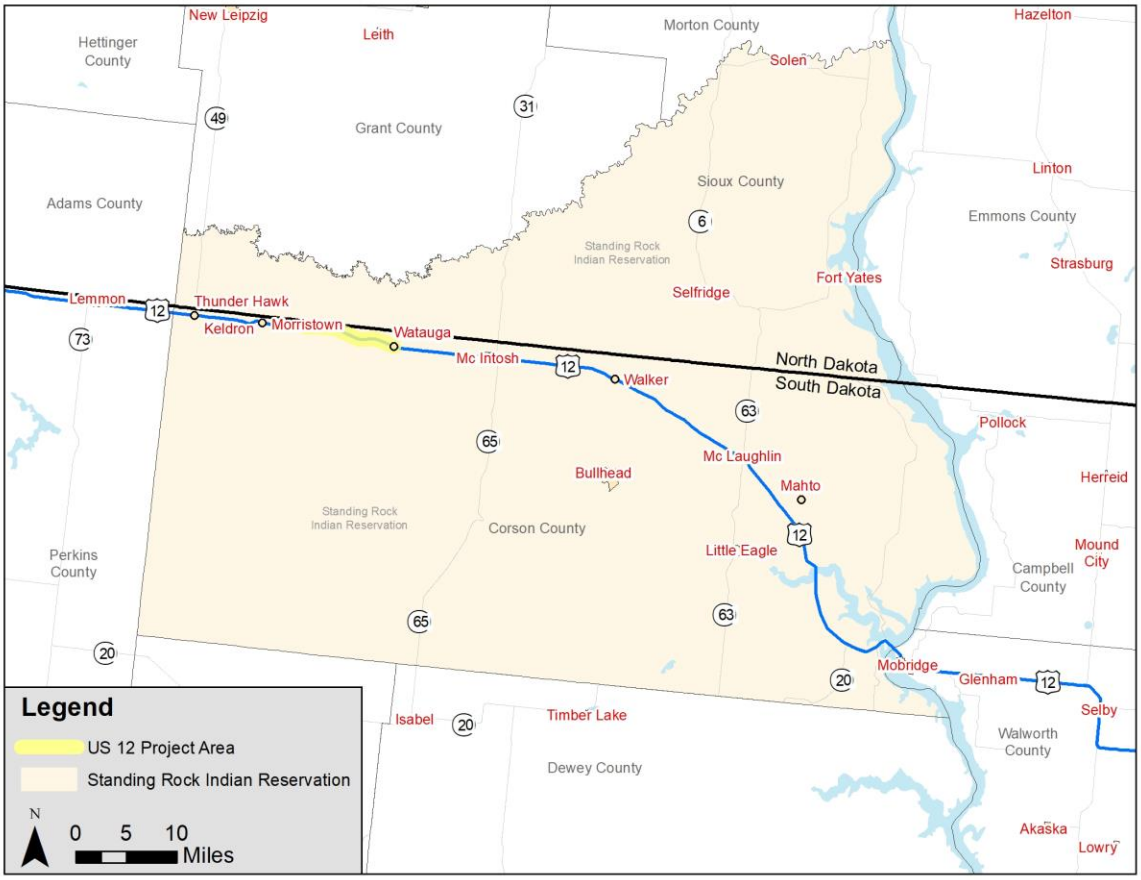
Communities

The Town of Morristown caps the western edge of the Project area. According to the 2020 Census, its population is currently 47 – a decline from 67 in 2010 and 269 at its peak in 1920. The City of McIntosh is located on US 12, along the western portion of the project area. The city has seen a decline in population over the past 100 years, from 727 people in 1920 to only 111 in the 2020 Census. At the easternmost point of the Project area is the unincorporated community of Watauga.

Project Area Demographics

The project area is located within an Area of Persistent Poverty, having poverty rates consistently above 40 percent, and a historically disadvantaged community, with the Project being located on Tribal land, entirely within the Standing Rock Indian Reservation.[1] Corson County has consistently seen some of the highest rates of poverty in the country.

Figure 4 – Project Area Communities



[1] Areas of Persistent Poverty & Historically Disadvantaged Communities. U.S. Department of Transportation. https://www.transportation.gov/RAISEgrants/raise-app-hdc

Project Parties

South Dakota Department of Transportation (SDDOT) is the applicant for this 2022 MPDG opportunity. The Project has documented support from the state of South Dakota, Corson County, the Standing Rock Sioux Tribe, as well as two US Senators and South Dakota's lone member of the US House of Representatives.

SDDOT has a dependable record for completing project milestones on schedule. Every year since recordkeeping began in 1986, SDDOT has received the additional federal highway funds redistributed in August to grant recipients that met all of that year's obligation deadlines.

Grant Funds, Sources and Uses of Project Funds

Total Project Cost: $22 million

Total Future Eligible Project Cost: $21.4 million

INFRA Grant Request Amount:

$12.84 million (60 percent of future eligible project cost)

Rural Grant Request Amount:

$17.12 million (80 percent of future eligible project cost)

Primary Contact Information:

Steven Gramm, P.E.
Planning Squad Leader
South Dakota DOT
700 E. Broadway Avenue
Pierre, SD 57501
(605) 773-3281
Steve.gramm@state.sd.us

SDDOT is requesting 60 percent of the construction cost, or $12.84 million out of an estimated $21.4 million, in INFRA grant funding. Per the guidance given in the Notice of Funding Opportunity (NOFO) and by USDOT, SDDOT is also requesting to be considered eligible for federal funding through the RURAL program (up to 80 percent funding), requesting $17.12 million through that program.

The two possible scenarios – one in which an INFRA grant is received, and one in which a Rural grant is received – are shown in detail in the tables on the following page. A third possibility was discussed in a USDOT webinar; according to that discussion, it may be possible to combine the two awards so that 60 percent of the construction cost is funded through INFRA and 20 percent is funded through Rural.

If INFRA and/or Rural funding is received, the remaining allowable federal contribution will come from National Highway Performance Program (NHPP) formula funding. SDDOT would cover the local match using its general fund. The state has already invested programmed dollars to see the Project completed. SDDOT is solely responsible for funding the preliminary engineering, environmental studies, and right-of-way acquisition, which will total approximately $1 million. Approximately half of these funds have already been expended.

Table 1 – INFRA and Rural Grant Project Funding Breakdown

Project Element		Project Funding: **INFRA Small**				Project Funding: **Rural**			
		INFRA Small	Other Federal	SDDOT	Total	Rural	Other Federal	SDDOT	Total
Preliminary Engineering, Environmental, Right-of-Way	PCN 05HW	$0	$0	$449,064	$449,064	$0	$0	$449,064	$449,064
	PCN 05U5	$0	$0	$5,750	$5,750	$0	$0	$5,750	$5,750
	Total Not Eligible	**$0**	**$0**	**$454,814**	**$454,814**	**$0**	**$0**	**$454,814**	**$454,814**
	PCN 05HW	$0	$0	$263,502	$263,502	$0	$0	$263,502	$263,502
	PCN 05U5	$0	$0	$262,628	$262,628	$0	$0	$262,628	$262,628
	Total Not Eligible	**$0**	**$0**	**$526,130**	**$526,130**	**$0**	**$0**	**$526,130**	**$526,130**
Future Eligible Cost		INFRA Small	Other Federal (NHPP)	SDDOT	Total	Rural	Other Federal (NHPP)	SDDOT	Total
	PCN 05HW	$9,470,148	$3,464,496	$2,848,936	$15,783,580	$12,626,864	$3,156,716	$0	$15,783,580
	PCN 05U5	$3,370,070	$1,232,884	$1,013,829	$5,616,784	$4,493,427	$1,123,357	$0	$5,616,784
	Total Eligible	**$12,840,218**	**$4,697,380**	**$3,862,766**	**$21,400,364**	**$17,120,291**	**$4,280,073**	**$0**	**$21,400,364**
MPDG Request Summary		**Mega & INFRA Overview (60/40)**				**Rural Overview (80/20)**			
		INFRA Small Request	**$12,840,218**	**60%**		**Rural Request**	**$17,120,291**	**80%**	
		Other Federal	$4,697,380	22%		Other Federal	$4,280,073	20%	
		South Dakota DOT	$3,862,766	18%		South Dakota DOT	$0	0%	
		Total Eligible Cost	$21,400,364			Total Eligible Cost	$21,400,364		

* Miscellaneous costs include mobilization, temporary pavement & drainage, construction traffic control, landscaping, and non-quantified minor items.

Project Outcome Criteria

1. Safety

The Project will provide multiple safety outcomes for those who use US 12 in Corson County – whether they are residents or passing through, drivers, cyclists, or pedestrians. Those outcomes will be realized through:

- Reconstructing nine miles of roadway to new condition
- Widening shoulders from 2 paved feet to 6 paved feet
- Installing edge-line rumble strips
- Improving 14 vertical curves with a design speed of 60 mph or less, improving sight distance
- Evaluating access management, density, and spacing
- Correcting roadway inslopes to improve drainage

Reconstruction and Resurfacing the Entire Roadway

As described earlier, the Project will reconstruct, regrade, and resurface a nine-mile stretch of US 12. The reconstruction and resurfacing will enhance the safety of the roadway by providing:

- More paved roadway surface due to the installation of wider shoulders
- A smoother driving surface and better friction/traction for all users, including heavy trucks, motor vehicles, bicyclists, and pedestrians
- Improved stormwater runoff and roadway drainage reducing the likelihood of hydroplaning
- A reduction of debris accumulating on the highway surface
- New pavement markings that are more visible and reflective during adverse driving conditions

Widening Shoulders

The proposed improvements to US 12 will pave and widen shoulder widths from two feet to six feet for the entire nine-mile corridor. Figure 5 shows the new typical section.

The safety effects of paving and widening shoulders to six feet are significant. Safety and efficient traffic operations can be adversely affected as shoulder widths get narrower. Wider shoulders will lessen the likelihood of rear-end crashes with parked or disabled vehicles, particularly on high-speed two-lane roadways. Taken altogether, the safety benefits include:

- Emergency storage of disabled vehicles
- Adequate space for law enforcement
- Adequate space for maintenance activities
- Area for drivers to maneuver to avoid rear end crashes
- Area with a stable, clear recovery for drivers who have departed the travel lane
- Improved safety and areas for bicyclists and pedestrians
- Improved driver comfort

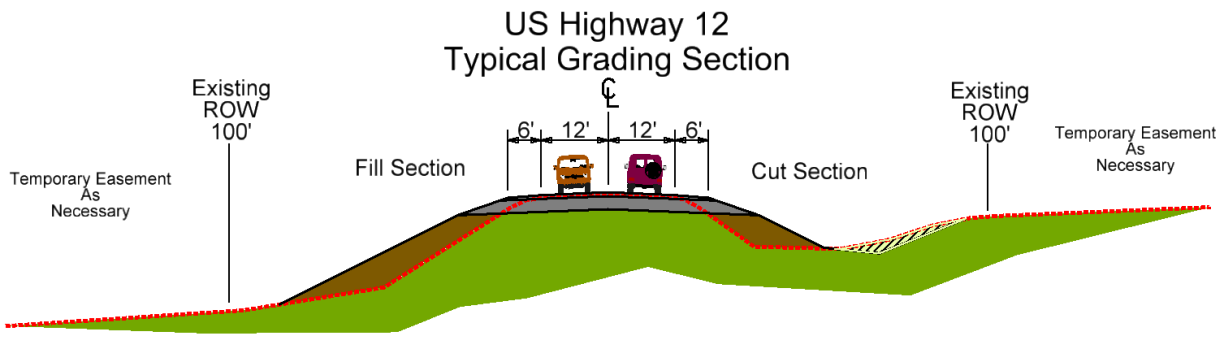
A Transportation Research Board Record paper[2] determined that crashes will be reduced when wider roadway shoulders are present. The study found that providing a shoulder that is paved and four-feet wider than the existing one will result in crash reductions of 29 percent on two-lane highways.

---

[2] Zegeer, Reinfurt, Hummer, Herf, and Hunter, Safety Effects of Cross-Section Design for Two-Lane Roads http://onlinepubs.trb.org/Onlinepubs/trr/1988/1195/1195-003.pdf

In addition, widening roadway shoulders could lead to a health benefit for area residents and provide opportunities for recreation and alternate modes of transportation. With safer conditions for alternative uses, residents could choose to walk, bicycle, or run along the roadway.

Figure 5 – US 12 Project Typical Grading Section



Adding Edge Line Rumble Strips

Edge line rumble strips will be installed throughout the entire nine-mile project area. In combination with wider shoulders, rumble strips allow drivers to make corrections and avoid run-off-the-road crashes. Additionally, South Dakota weather is extreme, with heavy rains, snow, fog, and quickly changing weather conditions that can lead to poor visibility. Rumble strips can be used by motorists as navigational aids; vibration provided by rumbles can assist drivers from unintentionally crossing the edge line in poor weather conditions or when pavement markings cannot be seen due to snow cover. If pavement marking is placed within the rumble strip, the vertical component of the rumble will often still be visible in adverse weather conditions.[3]

Installations and investments in rumble strips have proven worthwhile not only as a safety benefit but also due to an almost nonexistent maintenance need. Rumble strips are essentially self-cleaning, as snow, ice, rain, or sand do not typically remain for any length of time; this is attributed to the wind created by passing vehicles. Milled rumble strips typically require little to no maintenance[4] and do not increase deterioration of pavement condition.[5]

---

[3] Federal Highway Administration, Impacts of Rumble Strips, T5040.40, Revision 1, November 2011 - https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/t504040/

[4] E.R. Russel and M.J. Rys, *NCHRP Synthesis 339: Centerline Rumble Strips – A Synthesis of Highway Practices*, Transportation Research Board, National Cooperative Highway Research Program (Washington, DC: TRB 2005). Federal Highway Administration, Maintenance Concerns for Keeping the Rumble Strips https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/media/RumbleStripGuide_Pavement/pavement_bpg.cfm

[5] Federal Highway Administration, Maintenance Concerns for Keeping the Rumble Strips https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/concerns_main.cfm

Address 14 Vertical Curves

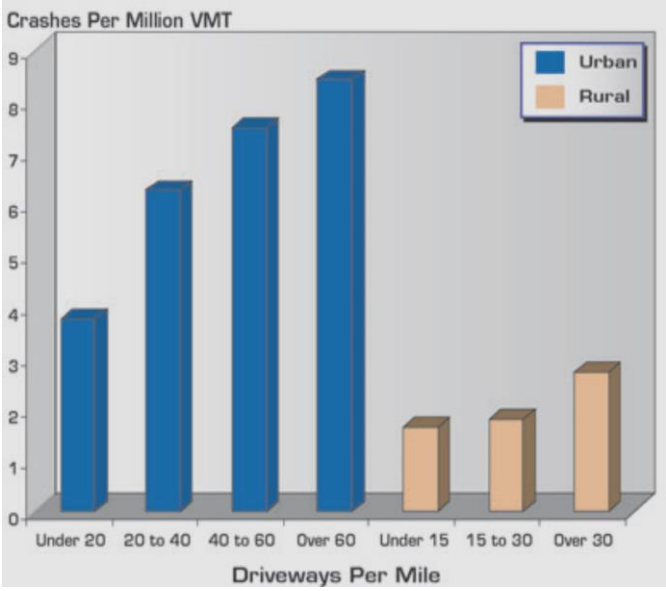
As part of the proposed construction on US 12, improvements to 14 vertical curves will be made. The vertical road alignment will increase the radius of several crests by leveling off the top of the hill which will improve sight distance, contributing to a safer roadway.

Evaluating Access Management in Morristown

Access management in Morristown and along the entire nine-mile segment of US 12 will be evaluated as part of the Project.

Within the City of Morristown, there are 14 access points (nine north and five south) directly onto US 12. On average, that is one access point every 160 feet or 33 access points per mile. High numbers of access points increase the number of potential conflict points along roads and generally correlate with increased crash rates. According to US Department of Transportation (USDOT) Federal Highway Administration (FHWA), reducing the number of driveways per mile will help to prevent rear-end crashes.[6]

Figure 6 – Crashes Based on Number of Access



2. State of Good Repair

The Project takes important steps to bring this stretch of highway into a state of good repair through bridge and pavement improvements.

Bridge Improvements

The bridge over Hay Creek (1.3 miles east of Morristown) was built in 1949. According to the Office of Bridge Design, the structure has a rating of fair, and is reaching the end of its useful life. Because the bridge is 30 feet wide, it does not meet current width standards and is functionally obsolete. Reconstruction of this bridge is key for maintaining US 12 as a useful corridor for local and regional travel and for the movement of goods and services in and throughout the area.

---

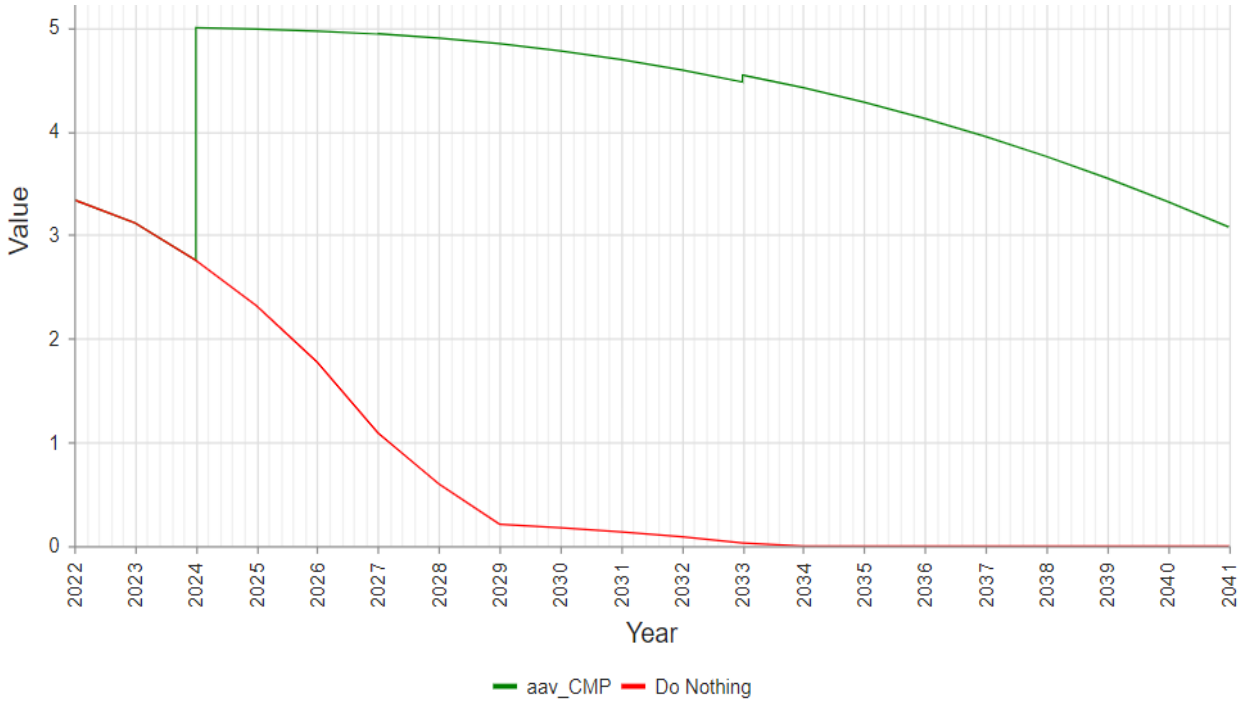
[6] Benefits of Access Management. US DOT Federal Highway Administration. https://ops.fhwa.dot.gov/access_mgmt/docs/benefits_am_trifold.pdf

Without completion of this project, the Hay Creek bridge will reach the end of its useful life and in four to eight years will need to close. This situation would threaten the livelihood of those living in Corson County and the Standing Rock Indian Reservation, by cutting residents off from employment opportunities, goods, and services.

Pavement Conditions

Further, this section of US 12 has deteriorating pavement condition. Over the 70-year life span of the road, maintenance overlays and other activities have occurred every 15 to 20 years. Most of the project area rates at a 3.34 on the Surface Condition Index, which is "fair" condition. This section of US 12 was last improved in 2006 and sealed in 2009. For comparison, other nearby sections of the highway were sealed in 2015, 2017, and 2018. See the South Dakota DOT Interactive Needs Book for more details.[7]

Figure 7 - US 12 surface rating over time



The green line in Figure 7 represents the US 12 value of surface condition over time for the Project if constructed in 2024, while the red line shows the US 12 pavement degradation that would occur over time without any future improvements.

[7] Highway Needs and Project Analysis Report (Needs Book) 2020 – Interactive Map. South Dakota Department of Transportation. https://apps.sd.gov/hr53needsbook/

3. Economic Impacts, Freight Movement, and Job Creation

The success of a region's employment base is closely tied to the quality of the transportation system. Investments into the National Highway System allow businesses to be more efficient, and dependable transportation infrastructure allows goods to be delivered in a timely matter and at a lower cost to consumers.

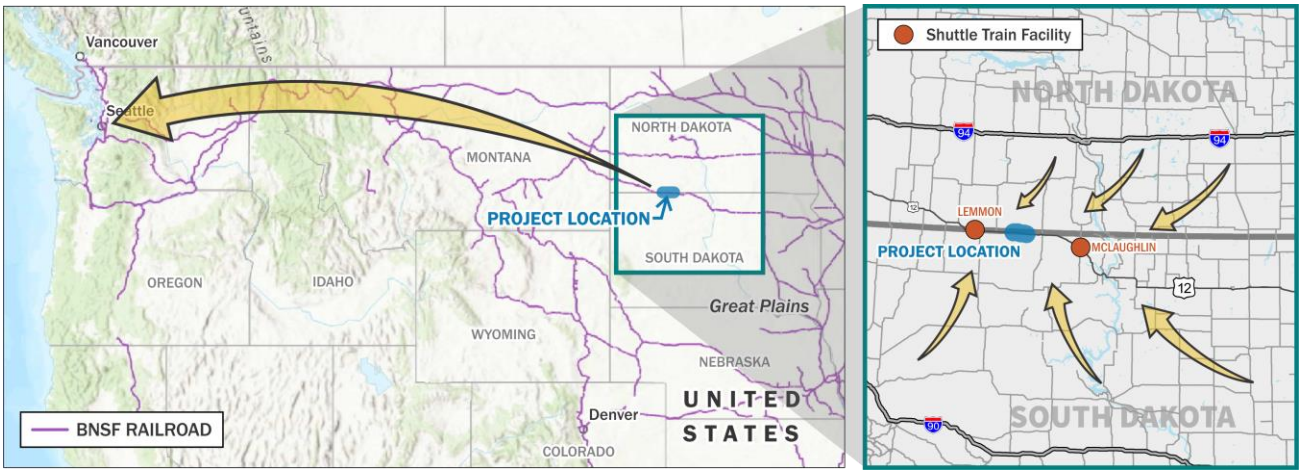
US 12 is a key east-west trucking route along the South Dakota and North Dakota border. The portion of US 12 within South Dakota has been identified as a Preferential Truck Route in the South Dakota Freight Plan, while the portion in North Dakota has been labeled as a Level One Highway in the North Dakota State Strategic Freight System.

Current traffic volumes indicate that 28 percent of the vehicular traffic on US 12 between Morristown and Watauga is trucks.[8]

From the North Dakota state line to Interstate 29, US 12 is part of South Dakota's Long Combination Truck Network, which allows vehicles over 81.5 feet in length.[9]

As US 12 is located directly on the border with North Dakota, it provides intermodal access to rail lines leading to the west coast from both Dakotas. Rail lines are not very dense in this part of the country. For wheat growers in south-central North Dakota as well as for producers in South Dakota, the shuttle train facilities at Lemmon and McLaughlin along US 12 are among the best options available for shipping to Pacific Northwest ports at Seattle, Portland, Olympia, and Tacoma (Figure 8). According to the South Dakota Freight Plan, Corson County produces an estimated 5,000 to 20,000 grain trucks per year.

Figure 8 – Project Area Rail Connections



[8] South Dakota Freight Plan. South Dakota Department of Transportation. August 2017. https://dot.sd.gov/media/documents/SDDOTFreightPlanApproved.pdf

[9] 23 CFR, Chapter 1, Subchapter G, Part 658, Appendix C to Part 658.

This is also one of the reasons that the North Dakota Strategic Freight System Index identifies two highways leading into South Dakota near the project area, Highway 31 and Highway 6, as Level 2 segments, meaning that they are considered strategically important for regional freight movements[10]

Looking more locally, this stretch of US 12 provides a vital connection for many small communities along US 12 (Thunder Hawk, Keldron, Morristown, Watauga, McIntosh, Walker, McLaughlin, and Mahto) to the more populous cities of Lemmon (population 1,239) to the west and Mobridge (population 3,385) to the east.

US 12 serves as a key transportation corridor providing residents of Corson County and the Standing Rock Indian Tribe access to employment and services. The communities along this portion of US 12 are small and residents travel long distances to access vital services and employment.

The United States Census Bureau indicates there are approximately 215 people employed within five miles of US 12 between the western Corson County border and the City of McIntosh. About half of them (106), travel more than 50 miles each way for their employment, while an additional 27 percent travel between 25 and 50 miles each way for work.[11] Many of those people are traveling east and southeast to their place of employment, which indicates that they use US 12 for commuting. The average commute time for Corson County residents to work was 21.6 minutes in 2019, which is 26 percent higher than the average for South Dakota (17.2 minutes).[12] This illustrates the rural nature of the area.

Figure 9 – Project Area Commute Patterns

Jobs by Distance - Work Census Block to Home Census Block

	2019	
	Count	Share
Total All Jobs	215	100.0%
Less than 10 miles	14	6.5%
10 to 24 miles	36	16.7%
25 to 50 miles	59	27.4%
Greater than 50 miles	106	49.3%

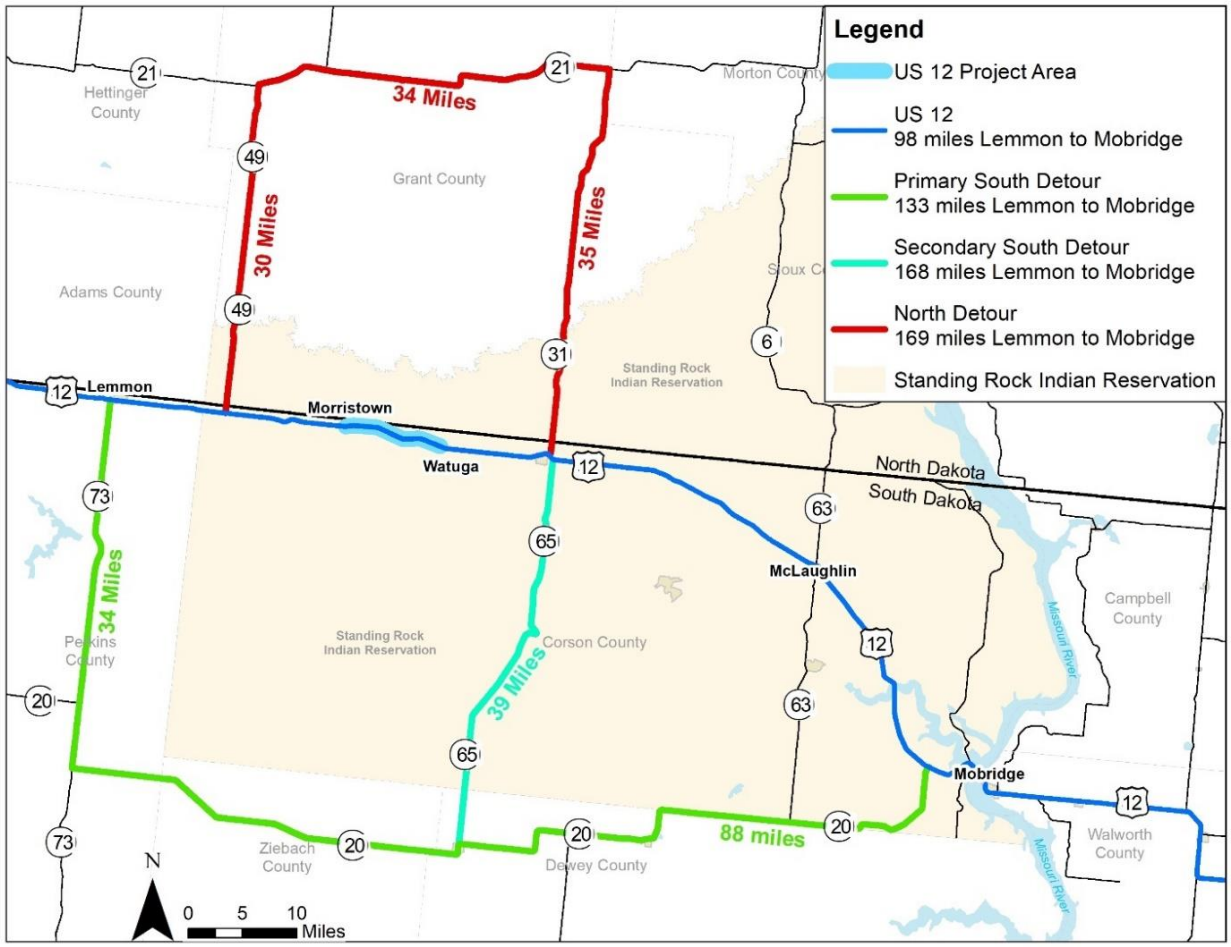
Due to the very rural nature of this portion of US 12, there are few alternate east-west routes available.

US 12 is the only highway that provides east-west travel across the Standing Rock Indian Reservation and within a 64-mile area.

[10] North Dakota State Rail Plan. https://www.dot.nd.gov/divisions/planning/freight/docs/FreightPlan.pdf
[11] OnTheMap. United States Census Bureau. https://onthemap.ces.census.gov/
[12] American Community Survey 2019 5-Year Estimates. United States Census Bureau.

If US 12 between Morristown and Watauga became unusable, detours would require traveling 30-34 miles to the north or south to use ND 21 or SD 20, respectively. The full detour distance would exceed 100 miles and would add a minimum of 60 miles to each trip. Figure 10 illustrates the available detours.

Figure 10 – Available Detours Around Project Area



Due to the length of the detours, travel times, fuel consumption, and emissions would increase substantially if this portion of US 12 were closed for any duration. For example, if US 12 were closed or unavailable, a trip between Morristown and McLaughlin would **triple** in distance and travel time.

McLaughlin to Morristown via US 12	45 miles	42-minutes
McLaughlin to Morristown via alternate routes	140 miles	2 hours and 15 minutes

Further, if a secondary incident were to occur, travel options would become even more limited for area residents and the traveling public. In some cases, closure of US 12 and a secondary route would result in no routes available, forcing residents to wait for the incident to be cleared.

The Project will improve the connectivity and reliability of this area for residents, businesses, and anyone traveling to and from the Standing Rock Indian Reservation. This serves as a critical transportation connector in an area that is lagging economically behind the rest of South Dakota and the rest of the county.

4. Climate Change, Resiliency, and the Environment

Emissions Reduction

US 12 provides a vital east-west corridor across the Standing Rock Indian Reservation. As discussed in the preceding section, additional detour miles due to closure would result in increased greenhouse gas emissions from both local traffic and regional truck traffic.

Based on current truck volumes, a one-week closure would result in at least 100 additional metric tons of carbon dioxide emissions from freight alone.[13]

Supporting Community Resilience

Further, US 12 plays a key role in maintaining community resilience in the face of climate change. Native American tribes are uniquely vulnerable to climate change, in part because many live in relatively inhospitable parts of the country.[14] The impacts of climate change are making it more difficult for indigenous people to access traditional sources of food and other goods,[15] and Standing Rock is no exception.[16] Standing Rock entrepreneurs and community organizations have taken a proactive approach to all aspects of environmental sustainability and self-reliance with the introduction of local solar power generation[17] and home-grown food programs.[18] Within the reservation, travel distance has been shown to have a meaningful impact on access to fresh produce markets.[19]

By improving transportation access to local resources, the Project will promote resilience for all US 12 users, area residents, and those populations within the Standing Rock Indian Reservation.

---

[13] The Green Freight Handbook: A Practical Guide for Developing a Sustainable Freight Transportation Strategy for Business. https://storage.googleapis.com/scsc/Green%20Freight/EDF-Green-Freight-Handbook.pdf

[14] Treisman, Rachel. "How loss of historical lands makes Native Americans more vulnerable to climate change." National Public Radio. November 2, 2021. https://www.npr.org/2021/11/02/1051146572/forced-relocation-native-american-tribes-vulnerable-climate-change-risks

[15] https://toolkit.climate.gov/topics/tribal-nations

[16] Wolfe, David. "Climate Change Perspectives from Indian Country." The Hill, February 2, 2016. https://thehill.com/blogs/pundits-blog/energy-environment/267784-climate-change-perspectives-from-indian-country/

[17] https://www.mic.com/impact/why-native-americans-at-standing-rock-are-building-solar-farms-three-years-after-the-nodapl-pipeline-protests-18546399

[18] http://indiangiver.firstnations.org/nl20200102-02/

[19] Ruelle, Morgan & Kassam, Karim-Aly. (2013). Foodways Transmission in the Standing Rock Nation. Food and Foodways. 21. 10.1080/07409710.2013.850007.

5. Equity, Multimodal Options, and Quality of Life

Improving quality of life for an underserved population is a primary purpose for the Project. Corson County and the Standing Rock Indian Reservation are areas with very low access to opportunity and disproportionately high levels of vulnerability.

This is an Area of Persistent Poverty, with poverty rates consistently greater than 40 percent, nearly four times the state average.

Further, in Corson County, 17 percent of households were living on less than $10,000 per year.[20] That is an increase from 12.7 percent in 2010 (inflation adjusted to 2020 dollars), which indicates that there is an increasing number of Corson County residents living well below the poverty level.

Dating back to 1990, more than 40 percent of Corson County's population met the definition of being in poverty. Further, over the past 30 years, median household income in Corson County has lagged significantly behind incomes for South Dakota as a whole. In 2018, Corson County's median household income was only 62 percent of the state median.

Table 2 – Income and Poverty 1990-2018

Survey/Census year	Corson County		South Dakota	
	Poverty Rate (%)	Median Household Income ($)	Poverty Rate (%)	Median Household Income ($)
1990 Census	42.5	14,324	15.9	22,503
2000 Census	41.0	20,654	13.7	35,282
2010 SAIPE[21]	40.9	27,233	14.6	45,861
2018 ACS 5-year	44.3	35,411	13.6	56,499
2020 ACS 5-year	41.0	36,705	12.8	59,896

Census Tract 9410 has also been identified under other transportation disadvantage indicators. Those indicators show that the Project is located within a Tract with a health disadvantage, economic disadvantage, and resilience disadvantage.[22] Beyond that, a relatively low percentage of the area's population has a broadband internet subscription. Depending on the specific Project area geography, between 59 percent and 68 percent of the population has broadband, compared to 85 percent for South Dakota and 87 percent for the nation. To further describe the Project area, Table 3 shows other relevant data from the 2019 American Community Survey 5-Year Estimates.

[20] 2020 American Community Survey 2016-2020 5-year estimates
[21] 2010 Small Area Income and Poverty Estimates. United States Census Bureau.
[22] Transportation Disadvantaged Census Tracts (Historically Disadvantaged Communities). U.S. Department of Transportation. https://usdot.maps.arcgis.com/apps/dashboards/d6f90dfcc8b44525b04c7ce748a3674a

Table 3 – Population Characteristics

Measure	Census Tract 9410	Corson County	Standing Rock Indian Reservation	City of McIntosh
Population	1,825	4,150	8,553	193
Zero-Vehicle Households (%)	1.8%	2.8%	N/A	0.0%
Below Poverty Status (%)	42.9%	44.8%	41.3%	23.3%
Mean Travel Time to Work (min)	20.6	21.6	19.8	11.3
Individuals with a Disability	168 (9%)	446 (11%)	970 (11%)	23 (12%)
Households with a Broadband Subscription (%)	68.3%	60.5%	59.2%	64.2%

Standing Rock Reservation

Native Americans have long experienced significantly worse health outcomes compared to non-native Americans. Alcoholism, drug addiction, and suicide occur at higher rates within reservations and according to the Indian Health Service, there is a significant disparity in mortality rates for Native Americans compared to all US races. Specifically, Native Americans are over six times more likely to die due to alcohol consumption, one and a half times more likely to die due to drugs or suicide, and twice as likely to die through homicide. Mortality rates also show disparities related to disease and other accidents.[23] Although Standing Rock does not publish health statistics of its own, its residents have known challenges with health and improving health outcomes is one of the reservation's goals.[24]

Environmental Justice

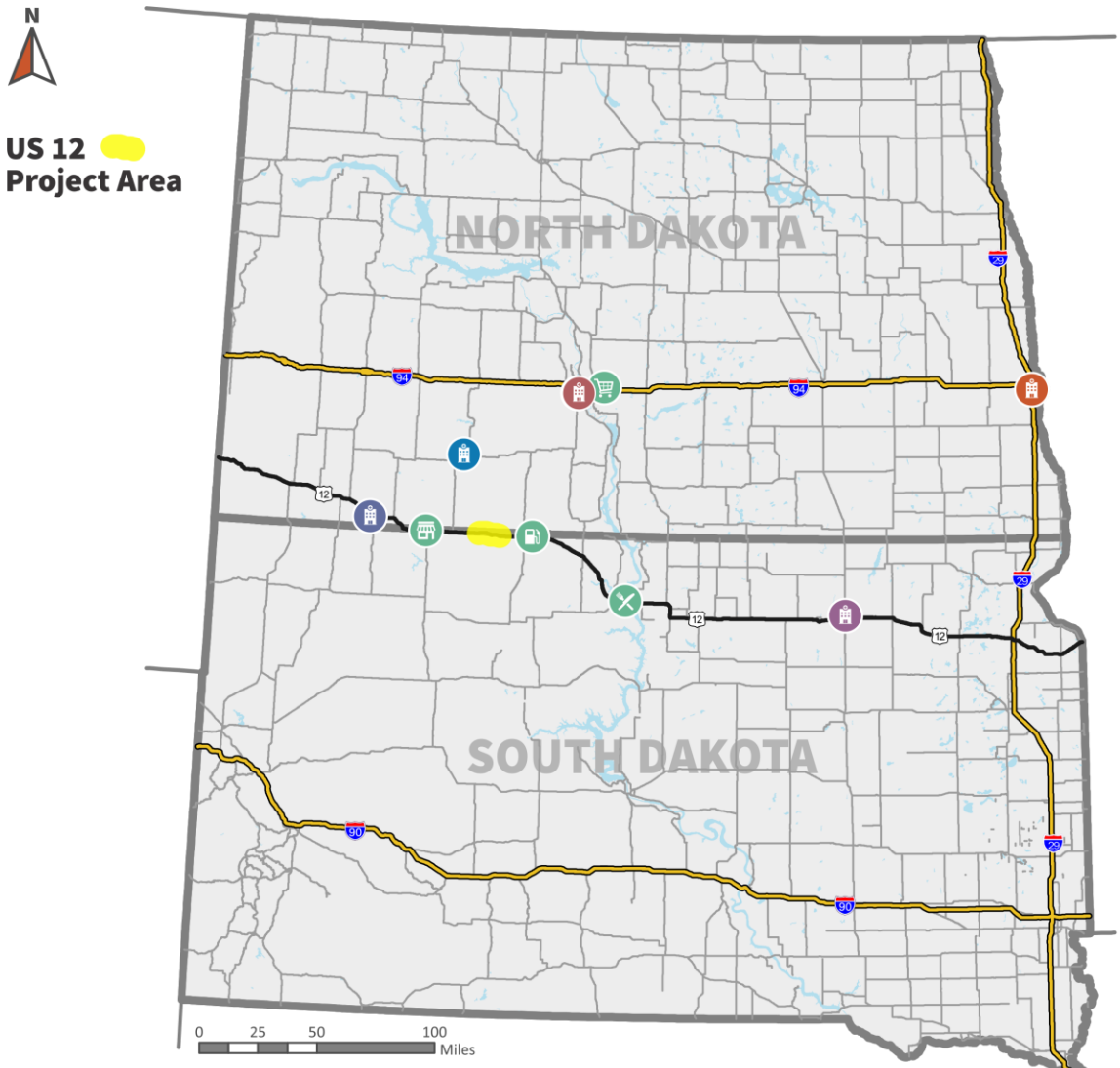
Corson County ranks poorly based on many indicators used by the Environmental Protection Agency (EPA) to assess progress on environmental justice. EJScreen, hosted by the EPA, uses a combination of demographic and environmental data to provide 12 environmental indicators covering a range of topics. The measures provide an additional method of evaluating how vulnerable a community is. According to EJScreen, Corson County ranks in the 84th or higher state percentile for all twelve indicators. Similarly, the county scores in the 59th or higher national percentile for all twelve indicators. This indicates that, relative to the rest of the state and the nation, Corson County residents are at relatively high risk of exposure to all 12 environmental indicators and thus, are more vulnerable to impacts from each of the 12 indicators. The Project will help stabilize the area by providing a reliable transportation system that gives residents access the vital services, health care, and daily necessities.

Residents in the Standing Rock Indian Reservation are traveling great distances to access daily necessities and essentials.

[23] Disparities. Indian Health Service. https://www.ihs.gov/newsroom/factsheets/disparities/
[24] Standing Rock Next Generation Plan: 2020-20145.

Figure 11 illustrates the distance from Morristown to a variety of the nearest medical, service, and retail shopping opportunities. The improved roadway will provide safer travel for longer trips and ensure the most direct regional access to these necessary services and locations.

Figure 11 – Distance from Morristown, SD to Nearest Shopping and Medical Services



	Location	Driving Distance from Morristown
Level 1 Hospital – Sanford Health	Fargo, ND	295 miles
Level 2 Hospital – CHI St. Alexius Health	Bismarck, ND	106 miles
Level 3 Hospital – Avera St. Lukes Hospital	Aberdeen, SD	177 miles
Level 4 Hospital – West River Regional Medical Center	Hettinger, ND	46 miles
Level 5 Hospital – Jacobson Memorial Hospital	Elgin, ND	50 miles
Big Box Retail - Walmart/Target	Bismarck, ND	102 miles
Chain Fast Food - Subway	Mobridge, SD	77 miles
Pharmacy and Grocery Store – Smith's Rexall Drug & IGA and nearest Senior Living Facility	Lemmon, SD	22 miles
Gas Station - Marathon	McIntosh, SD	18 miles

Level 1 – Trauma center capable of providing total care for every aspect of injury from prevention through rehabilitation.

Level 2 – Trauma center with ability to initiate definitive care for all injured patients.

Level 3 – Trauma center with ability to provide prompt assessment, resuscitation, surgery, intensive care, and stabilization.

Level 4 – Trauma center with ability to provide advanced life support, including evaluation and stabilization for injured patients.

Level 5 – Trauma center with ability to provide initial evaluation, stabilization, and prepare for transfer to higher level of care.

In addition, widening the shoulder from two to six feet will make US 12 safer for residents who rely on shoulders to get around walking, biking, or using mobility devices. As Table 3 shows, close to three percent of county households do not have access to personal vehicles. For these households, and for others who do not have reliable access to a car, walking or biking on highway shoulders is an important option to have and in many cases, their only transportation option.

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

Innovation Area #1: Technology

The Project will salvage asphalt surfacing disturbed in the initial stages and stockpile it for re-use. Twenty percent of the asphalt concrete mix used to resurface US 12 will consist of **reclaimed asphalt pavement**. By reducing waste, this innovative approach will help keep down the cost and environmental impact of the Project.

SDDOT uses a data-driven system to maintain pavements efficiently. One tool used to collect objective pavement data annually is the "spider van," a vehicle that travels at near highway speeds and collects thousands of data points for each linear inch of pavement. These **pavement surveys** are performed for nearly every mile of state highway and are done on an annual basis. This data, along with historical information on roadway layers and projected performance curves, is used to project future conditions and optimize the timing of improvements.

The Project includes the installation of **rumble strips** to increase safety. When combined with the wider shoulders, as discussed earlier, this will be a key safety enhancement to allow drivers to make corrections and avoid run-off-the-road crashes. Two vehicles ran off the road between 2014 and 2018.

Innovation Area #2: Project Delivery

SDDOT will be keeping US 12 open throughout the construction process by using **lane crossovers and night work**. This will ensure that the usual disruptions to travel associated with construction work are minimized and that the net benefit to the public is even greater.

SDDOT has established an **e-Construction process** that cuts down on processing time and paper. It includes a web portal (MySD) initiated in December 2018 that offers a one-stop shop for contractors and other entities that do business with the SDDOT. Contractors can use this portal to access the new Electronic Payroll Submission System, which saves over 100,000 pieces of paper that would otherwise be mailed in every year. MySD is also in the process of being expanded to bid letting, contractor prequalification, and construction management and testing systems.

Innovation Area #3: Innovative Financing

The South Dakota Legislature introduced significant new revenue for transportation in 2015, when it passed a bill to increase **motor fuel and motor vehicle tax increases**. The tax on motor fuels and

ethyl alcohol increased by six cents per gallon; the excise tax on motor vehicle sales increased from three to four percent; and license plate fees for pickups and cars increased by 20 percent. Between 2016 and 2018, license plate fees for noncommercial trucks rose from 60 percent to 80 percent of the commercial rate. This resulted in a dramatic leap in available highway funding.

Benefit Cost Analysis

The objective of a benefit-cost analysis (BCA) is to bring all the direct effects of a transportation investment into a common measure (dollars), and to account for the fact that benefits accrue over an extended period while costs are incurred primarily in the initial years. The primary elements that can be monetized are travel time, changes in vehicle operating costs, vehicle crashes, environmental impacts, remaining capital value, and maintenance costs. The results of the BCA are briefly summarized below. A detailed technical memorandum of the analysis is attached and available to view at the grant application website: https://www.srfconsulting.com/sddot-us-12-mpdg.

No Build Alternative

The No Build Alternative includes leaving the US 12 corridor in its current geometric and operational state, as described in the above sections of this document. Maintenance activities to keep the corridor operational are expected to increase the future without this project.

Build Alternative

The Build Alternative consists of reconstructing nine miles of US 12 pavement and subgrade to current standards and constructing various geometric and operational enhancements to increase safety. Specific design elements included in the Build Alternative are as follows:

- Entire nine miles of roadway reconstructed to new condition
- Expansion and paving of roadway shoulders from two feet to six feet
- Installation of edge-line rumble strips
- Replacement of one 143.5 foot bridge built in 1949 (fair condition)
- Replacement of three large pipe culverts with box culverts
- Replacement of 19 miles of right-of-way fencing
- Improved sight distance on 14 vertical curves with a design speed of 60 mph or less
- Evaluation of access management, including driveway density and spacing
- Correction of roadway inslopes

BCA Methodology

The primary cost and benefit components analyzed in the BCA included:

- Travel time/delay
- Vehicle operating costs
- Crashes by severity
- Environmental and air quality impacts
- Initial capital costs: capital costs are expected to incurred in years 2023 and 2024
- Remaining capital value: the remaining capital value (value of improvement beyond the analysis period) was considered as a benefit and was added to other user benefits
- Operating and maintenance costs

Other analysis considerations included:

- It was assumed that the Build Alternative would be constructed over a two-year period in years 2023 through 2024. Therefore, 2025 was the first year that most benefits would begin accruing.
- The present value of all benefits and cost was calculated using 2020 as the year of current dollars.
- A benefit-cost analysis period of 20 years was used to determine net project costs and benefits.

Project Costs

Year 2020 project cost for the MPDG components of the overall project is expected to be about $21.4 million. The current 2020 project costs discounted at a rate of seven percent is approximately $16.7 million.

BCA Results

The benefit-cost analysis provides an indication of the economic desirability of a scenario, but results must be weighed by decision-makers along with the assessment of other effects and impacts. Projects are considered cost-effective if the benefit-cost ratio is at least 1.0. The larger the ratio number, the greater the benefits per unit cost. Results of the benefit-cost analysis are shown in Table 4. See attachments for the complete benefit-cost analysis workbook.

Table 4 – Benefit Cost Analysis Results

	Initial Capital Cost (2020 Dollars)	Project Benefits (2020 Dollars)	Benefit-Cost Ratio (7% Discount Rate)	Net Present Value (2020 Dollars)
No Build vs. Build	$16.7 million	$43.9 million	2.6	$27.2 million

Project Readiness & Environmental Risk

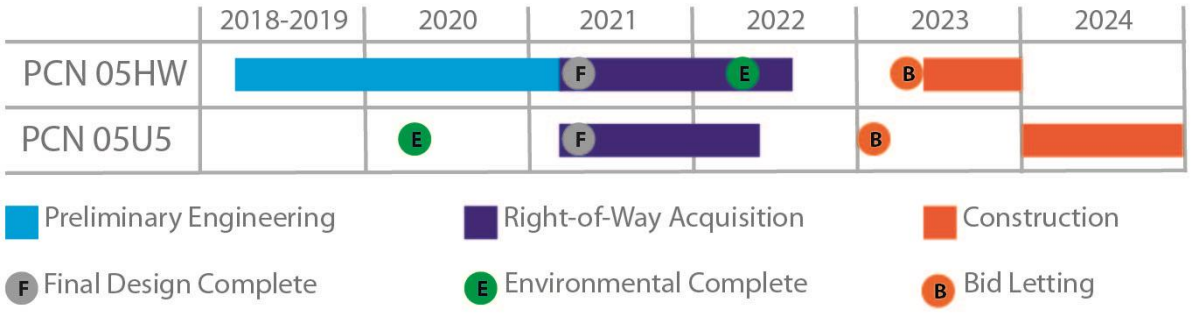
Technical Feasibility

The Project is well-positioned to commence construction on schedule. Preliminary engineering commenced in 2018 and was completed in early 2021. Design criteria are based on SDDOT standards. SDDOT has completed similar facilities throughout the state and the technical challenges are well understood.

Project Schedule

A project schedule identifying major project milestones is presented below. All planning, agreements, permitting, review periods, and approvals have been considered.

Figure 12 – Project Schedule



Required Approvals

Environmental Permits & Reviews

Construction activities will result in earth disturbance and work in a waterway, which will require two permits including the Department of Agricultural & Natural Resources (DANR) General Permit for Storm Water Discharges Associated with Construction Activities, and the EPA 2017 Construction General Permit.

The DANR General Permit for Storm Water Discharges Associated with Construction Activities is required for construction activity disturbing one or more acres of earth and work in a waterway. The SDDOT has this permit and will submit the Notice of Intent (NOI) to DANR 15 days prior to project start in order to obtain coverage under the General Permit. Work can begin once the DANR letter of approval is received.

The Contractor must adhere to the "Special Provision Regarding Storm Water Discharges to Waters of the State." The Contractor will complete the DANR Contractor Certification Form prior to the

pre-construction meeting. The form certifies under penalty of law that the Contractor understands and will comply with the terms and conditions of the permit for the Project. Work may not begin on the Project until this form is signed and submitted to DANR.

The EPA 2017 Construction General Permit is required for the Project. The SDDOT has this permit and will submit the NOI to EPA 15 days prior to project start in order to obtain coverage. Work can begin after authorization is received from the EPA. This permit provides coverage for construction and dewatering activities for the Project. The Contractor must adhere to the "Special Provision Regarding Storm Water Discharge to Waters of the United States within Indian Reservations."

The Storm Water Pollution Prevention Plan (SWPPP) will be developed prior to the submittal of the NOI and will be implemented for all construction activities for compliance with the permit. The SWPPP must be kept on-site and updated as site conditions change. Erosion control measures and best management practices will be implemented in accordance with the SWPPP. The Storm Water, Erosion, and Sediment Control Inspection Report Form DOT 298 will be used for site inspections and to document changes to the SWPPP. A copy of the completed inspection form will be filed with the SWPPP documents and retained for a minimum of three years.

The inspection will include disturbed areas of the construction site that have not been finally stabilized, areas used for storage materials, structural control measures, and locations where vehicles enter or exit the site. These areas will be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP will be observed to ensure that they are operating correctly, and sediment is not tracked off of the site.

State and Local Approvals

SDDOT anticipates receiving all required project approvals well in advance of construction. All project phases have been programmed into the STIP.

A public meeting was held for the Project on June 20, 2019. The purpose of the meeting was to involve the public in the planning and design process, provide a project overview, and gather input, comments, and concerns from the public. Additionally, property owner meetings were conducted on January 28, 2020. Notes from these meetings as well as a copy of the PowerPoint presentation can be found in the appendices.

Federal Transportation Requirements Affecting State and Local Planning

As noted above, the Project has been programmed into the STIP as required.

Assessment of Project Risks and Mitigation Strategies

The US 12 project recognizes the possibility of unexpected delays due to funding, environmental review findings, permitting, real estate acquisition, and weather-related events. Due to the rural

location of the project, increased bid costs in hauling material (asphalt, concrete, gravel, steel), is also another potential factor to consider.

Statutory Project Requirements

As stated earlier, SDDOT is submitting this application for a small project under both the INFRA and Rural grant schemes. Each grant has separate statutory requirements.

INFRA Requirements

A small INFRA candidate must be selected with consideration to its cost-effectiveness, effect on regional mobility, and effect on freight corridor safety. The Project rates highly on cost-effectiveness, has benefits to mobility as described earlier, and would promote safety on a freight corridor with frequent high winds and frequent wildlife crossings, as indicated by the six animal collision crashes in the Project area between 2014 and 2018.

Rural Requirements

Rural projects have the following five requirements:

Requirement #1

The project will generate national, or regional economic, mobility, or safety benefits.

As discussed in detail in the preceding sections, the project will have significant benefits to regional economics, to personal and freight mobility, and to safety.

Requirement #2

The project will be cost-effective.

The results of the BCA show a very favorable ratio of 2.6, clearly indicating that the project will be cost effective.

Requirement #3

The project will contribute to 1 or more of the national goals described under Section 150.

The Project will contribute to the following goals:

Goal	Project Outcome
(1) Safety	The Project will contribute to the national safety goal.
(2) Infrastructure Condition	The Project will restore this stretch of US 12 to new condition, reducing the associated maintenance costs, and extending its viable life.
(5) Freight Movement and Economic Vitality	US 12 is on the National Highway System and, as detailed earlier, is important to regional economic vitality, in particular for Standing Rock Reservation and the agricultural producers of North and South Dakota.
(6) Environmental Sustainability	As detailed earlier, the Project will avoid greenhouse gas emissions that result from detouring for unanticipated closures, and it will support a community that is committed to initiatives for environmental sustainability.

Requirement #4

The project is based on the results of preliminary engineering.

As described earlier, the preliminary engineering and environmental work is well underway and will be completed prior to construction. The Project is programmed into the STIP.

Requirement #5

The project is reasonably expected to begin not later than 18 months after the date of obligation of funds for the project.

The Project is expected to be ready for bid letting by spring 2023 – February 15 for component 05U5, and April 15 for component 05HW. As shown in Figure 12, construction of both components will be completed by the end of 2024. As this is the case, there will be no difficulty in obligating the grant funds by the required deadline of September 30, 2025.

Supporting Documents

Links to supporting documents are included throughout this narrative. All supporting documents and the MPDG grant application narrative are available to view at the following webpage:

https://www.srfconsulting.com/sddot-us-12-mpdg