Appendix B

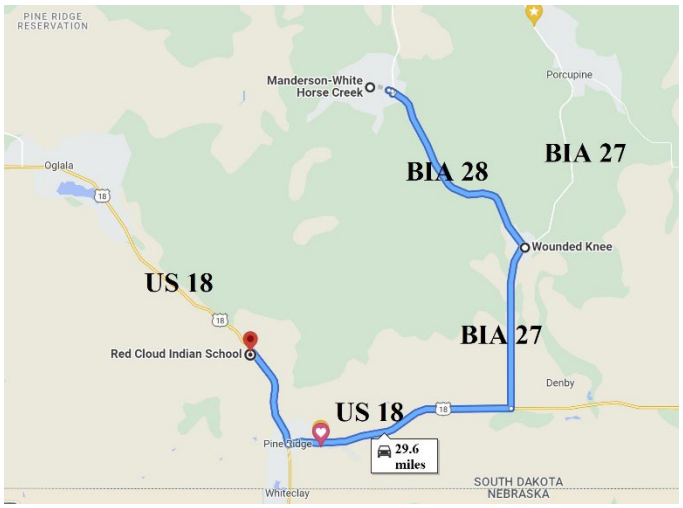
Raw Data for BCA
Project Costs: Project costs are in 2023 dollars

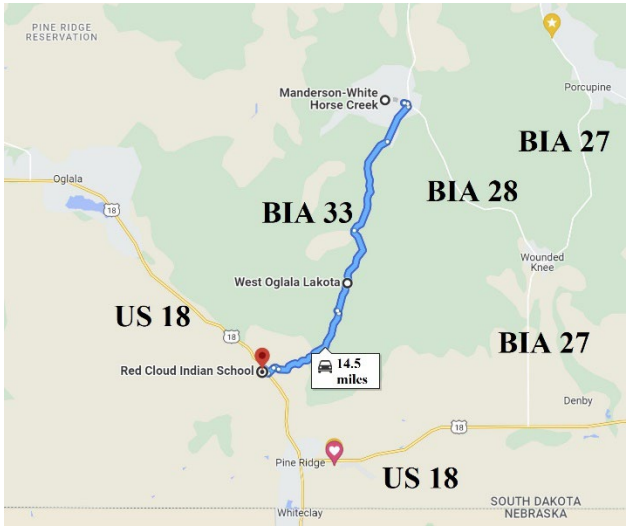
Year	North		South		Total
2024	$ 150,000	Planning	$ 150,000	Planning	$ 300,000
2025	$ 550,000	Planning	$ 550,000	Planning	$ 1,100,000
2026	$ 700,000	Planning			$ 700,000
2027	$ 7,000,000	Construction	$ 750,000	Planning	$ 7,750,000
2028	$ 21,200,000	Construction	$ 750,000	Planning	$ 21,950,000
2029			$ 7,000,000	Construction	$ 7,000,000
2030			$ 21,200,000	Construction	$ 21,200,000
Total	$ 29,600,000		$ 30,400,000		$ 60,000,000

First full year of operation of project will be 2029 for North Section and 2031 for South Section

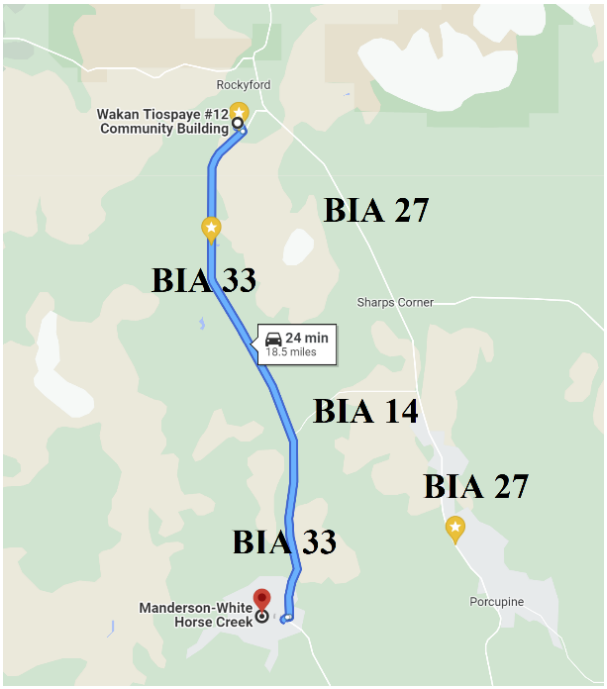
Prior incurred improvement and repair costs can be found in Appendix A and at www. . This does not include annual maintenance costs.

Direct route in miles – an additional 15.1 miles daily each way
29.6 currently from Manderson to Red Cloud Community via BIA 28/BIA 27/US 18
14.5 miles from Manderson to Red Cloud Community via BIA 33 S





Detour route in miles – an additional 5.8 miles daily each way
18.5 from Manderson to Rockyford via BIA 33 N
24.3 from Manderson to Rockyford via BIA 33/BIA 14/BIA 27





AADT - North Section 300 average daily, with18% trucks

AADT - South Section 430 average daily. The adjacent BIA 28 route is 1,800. Assumption is that after reconstruction it is estimated half would use BIA 33 instead of BIA 28 increasing the ADT by 900. The South Section is currently not usable for truck traffic, after construction there is potential of 11% of the traffic being truck traffic that will pass through Manderson

Annual estimated increase in traffic is 1% for population growth

No build scenario –
Estimated annual cost of maintaining the direct route North Section:
Assessing damages from storm of 2019, and anticipation of disaster storms recurring every 5 years, it can be estimated that every 5 years emergency repairs will cost approx. $760,000

Mill and overlay will be needed on the North Section of BIA 33 if it is not reconstructed, this will cost approximately $7 million, assuming there is not additional emergency storm damage across the reservation, this could be constructed in 2026/2027. This does not include any maintenance or repairs until the mill and overlay can be programmed from TTP funds.

Continued annual maintenance will include:
Stripping done yearly at $1800 per mile, $22,860/yr for North Section
Crack and chip seal to be completed 7 years following the mill and overlay, $40,000 per mile, $508,000 for North Section (begin 2034)

The current maintenance costs for South Section cannot be determined at this time for the no build scenario. After storm events, OSTDOT staff will blade the current roadway to try and dry out the road and fix the scours. OSTDOT cannot maintain the road in its current condition.

Estimated days of closure for flooding and overtopping – 1 day, approx. 5 days a year. Due to current pavement conditions, erosion, and climate change it is anticipated closures may occur more frequently.

Estimated days of closure when road closed due to culvert failure - 30-60 days, historically 1 time every 10 years. Due to current culvert conditions, erosion, and climate change it is anticipated culvert failures will occur more frequently.

Cost to repair the North Section to make it passable due to current closure from the culvert failure on July 30, 2023, is approximately $150,000 for a temporary fix until a permanent fix can be funded. The permanent fix is estimated at $800,000, with anticipated construction in 2024.

Build scenario - Estimated annual maintenance cost for the direct route when the project is completed:

Crack and Chip Seal is estimated at $40,000 per mile every 7 years N - $508,000 (begin 2035)
S - $548,000 (begin 2037)

Stripping is estimated $1800 per mile every year – N - $22,860/yr, S- $24,460/yr

The following table lists project assumptions to be used to calculate a BCA for this project.

Description of Work	**Resulting State of Good Repair**
BIA 33 pavement reconstruction	Use of geotextiles along with base course and asphalt concrete will extend life span and provide stronger and more resilient pavement structure
BIA 33 pavement reconstruction	Reduces temporary repair costs and deferred maintenance to OSTDOT
BIA 33 pavement reconstruction	Paving the top of the roadway will protect road from erosion and increase resiliency
BIA 33 concrete culverts	Use of concrete for culverts will increase the life span from 50 to 100 years
BIA 33 culvert ends armored	Use of gabions, riprap, and turf reinforcement mats to prevent erosion will protect culvert and road embankment from scour leading to road failure
BIA 33 increasing the size and number of culverts	Increasing size will have 100-year life span and increase road resiliency with better flood and scour control
BIA 33 graded road geometry	100-year life span
BIA 33 regrading to widen ditches and incorporate green scaping	Promotes flood and snow storage and reduces water on roadway and snow drifting across the roadway surface
BIA 33 raising road sections to a higher profile	Raising road sections will prevent overtopping
Description of Work	**Resulting Economic Growth**
BIA 33 improved vehicle access	Better access to tourists, residents, businesses and trucking
BIA 33 wider road top, shoulders, improved intersections	Support growth of trucking for industrial, commercial, mining and agricultural industries
BIA 33 improvements support continued use of Tribal gravel pit	The Tribal gravel pit will be used for Reservation wide projects reducing costs, hauling, and fuel consumption for years to come
BIA 33 improvements support increased consumer spending	Reduce damage to personal and commercial vehicles, reduce consumer spending on vehicle repairs and allow residents to spend on essential needs or personal items
BIA 33 grading and paving	Job creation in the grading and paving construction phases of the project will have significant short-term and probable long-term economic impact

Description of Work	**Resulting Environmental Sustainability**
BIA 33 South improvements transform BIA 33 to alternative collector route it is intended for	Travelers currently avoiding BIA 33 South and driving on longer alternate routes will use BIA 33, thereby reducing travel time, mileage and resulting fuel consumption
BIA 33 North improvements to decrease repeated road closures	Reducing travel time, mileage and resulting fuel consumption
Recycle existing asphalt for up to 20% of aggregate in new asphalt concrete pavement	Recycling existing asphalt reduces landfills, reduces aggregate quantity mined, reduces fuel used to deliver aggregate to project site, and reduces project cost
Recycle existing base course for a portion of new base course	Recycling existing base course reduces aggregate quantity mined, reduces delivery fuel consumption, and reduces project cost
Recycle remaining existing base course and asphalt for approaches and temp surfacing	Using the remaining recycled asphalt and base course in lieu of gravel surfacing will reduce mining, fossil fuel consumption from mining and hauling, and project cost
Wetland preservation sites	Protection of existing wetlands and creating wetlands near culverts and adjacent ditches
Description of Work	**Resulting Quality of Life Improvement**
BIA 33 improvements from Rockyford to BIA 14	Safer and more efficient travel and time savings
BIA 33 improvements from Rockyford to BIA 14	Improve safety by providing a safer route for emergency services and shoulders for emergency service parking
BIA 33 improvements from Manderson to US 18 and Red Cloud	Improve safety by providing a shorter, safer route for emergency services and shoulders for emergency service parking
BIA 33 improvements from Manderson to US 18 and Red Cloud	Safer and more efficient travel and time savings, residents' access to Tribal transit, schools, grocery, healthcare, financial institutions, businesses, other housing areas, and people with disabilities have more access to goods & services
BIA 33 pavement surfacing	Decrease potential for crashes from road condition and added safety updates
BIA 33 pavement surfacing Manderson to US 18	Reduce impacts to local residents, who are currently stranded when it rains or snows
BIA 33 Culvert replacements to withstand 100-year flood	Improved drainage, removal of ponding areas causing muddy silted conditions
BIA 33 with safer & higher design speed	Emergency response time decreased
BIA 33 increased sight distance, shoulders, and snow storage	Ease for road maintenance crews to plow snow, safer, shoulders to plow snow onto, less snow drifting due to larger ditches

BIA 33 improved surface	Vehicle maintenance cost reduction for residents, schools, agriculture, mining, and transit
BIA 33 flattened side slopes	Reduced damage road maintenance mowers
BIA 33 better access for gravel and ranching businesses	Tribe and local businesses grow and increase jobs for Tribal members
BIA 33 grading and paving	Job creation in the grading and paving construction phases of the project will have significant short-term and probable long-term economic impact