OGLALA SIOUX TRIBE

2021 Tribal Transportation Safety Plan

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PREPARED BY:

KLJ

ENGINEERING, REIMAGINED

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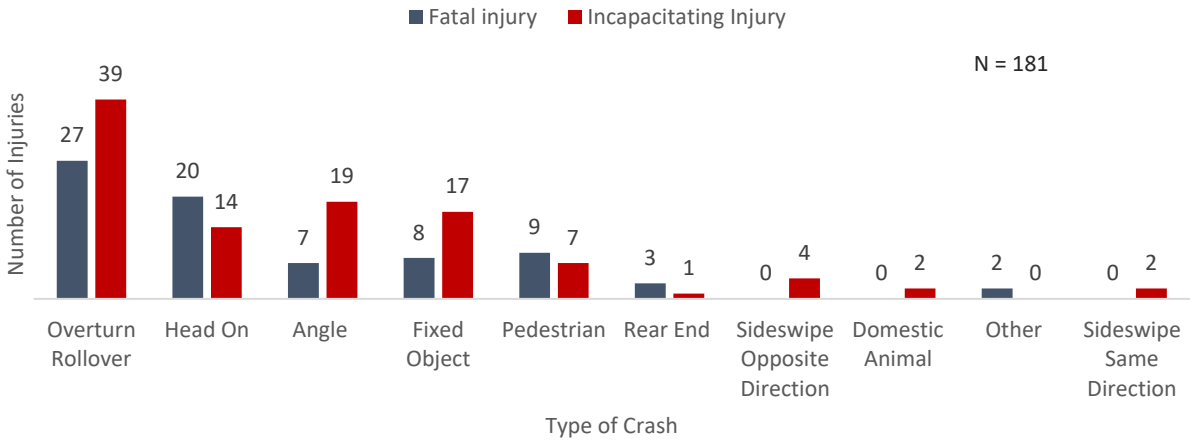
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EXECUTIVE SUMMARY

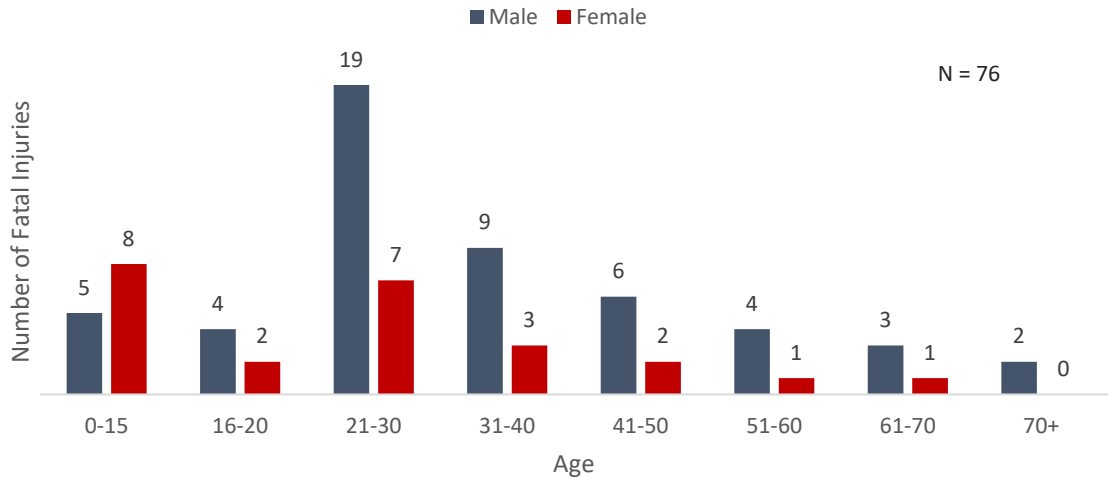
From 2013 to 2021, there were 838 reported crashes occurring in Bennett, Jackson, and Oglala Lakota Counties. Of the reported 838 crashes, approximately 36% of the crashes occurred in Oglala Lakota County. These 838 reported crashes involved 1,342 occupants, resulting in 76 fatal injuries and 105 incapacitating injuries. The leading crash type resulting in fatal and incapacitating injuries occurred from overturn rollover crashes, accounting for approximately 36% of all fatal and incapacitating injuries. Below summarizes the top crash types resulting in fatal and incapacitating injures.

Figure 1: Fatal and Incapacitating Injuries (2013-2020)



The causes of these severe crashes are varied but can be tied to a number of significant factors, including a high rate of impairment, low seat belt use and a significant number of younger drivers. Of the reported 76 fatal injuries occurring within the study area, approximately 59% of the occupants are under the age of 30 with approximately 25% being under the age of 20. The figure below summarizes the age range for number of fatal injuries occurring within the study area.

Figure 2: Fatal Injuries by Age and Gender (2013-2020)



In 2021 the Oglala Sioux Tribe undertook efforts to develop a Tribal Transportation Safety Plan that would identify existing safety efforts, transportation safety issues and then identify strategies for implementation that would address these issues. As part of the safety plan development, Tribal, and interested parties came together to review existing data, ongoing safety efforts and to identify new or continuing strategies to improve transportation safety in tribal communities. The strategies were prioritized around the 4Es (Education, Enforcement, Emergency response and Engineering) of safety. The 4Es are outlined below. Note that enforcement and emergency response have been combined and safety planning/other strategy have been included.

Education

- Develop a Reservation-Wide Transportation Education Program

Enforcement/EMS

- Provide Safety Enforcement or Tribal Highway Safety Officers
- Update Electronic Crash Records System Hardware
- Develop a Livestock Ordinance
- Develop an Advanced 911 System
- Provide for Improved Communications Equipment
- Establish a Motor Carrier Safety Program

Engineering

- Install School Zone Signing with Flashing Beacons
- Participate in Safety Projects for Signing, Striping, and Rumble Strips
- Perform Road Safety Audits on BIA, Tribal and County Roadway
- Develop Multi-Use Paths and Pathway Lighting Projects
- Provide Remote Weather Monitoring Stations
- Culvert Replacement
- Mile Reference Markers Along Routes
- Install Snow fencing Due to Drifting Snow

Safety Planning/Other

- Develop a Social Media Page for Safety Reporting

BACKGROUND

The Oglala Sioux Reservation encompasses over 2 million acres (3,469 square miles) in the entirety of Oglala Lakota County, the southern half of Jackson County, and the northwest portion of Bennett County in southwest South Dakota. The northern and western boundary is along the Oglala Lakota county border. The northern border is also defined by the White River in Jackson County. The southern boundary is the South Dakota/Nebraska state border. While most of the eastern border is not defined by natural land features, a portion of it follows the Jackson/Mellette county boundary.

Figure 3: Pine Ridge Reservation[1]



The land's main uses are for agriculture and ranching. Revenue from tourism and the Prairie Wind Casino generate funds for the Tribes. The major employers include the tribe itself, Oglala Lakota College, Indian Health Services, Bureau of Indian Affairs, and the Prairie Wind Casino. The Oglala Sioux Tribal Department of Transportation is responsible for maintaining nearly 520 miles of BIA roadways and over 1450 miles of Tribal roadways within the Pine Ridge Indian Reservation.

Available data has indicated that injury and fatality crash rates on reservations are higher than the rest of the United States. Federal programs are available to help resolve traffic related crashes and provide safer reservation transportation routes for Tribal members and the traveling public. The Federal Highway Administration (FHWA) created the Tribal Transportation Program Safety Funds (TTPSF) aimed at addressing safety issues and needs of Tribal governments for transportation and access on reservations. Each year, two percent of the total available Tribal Transportation Program (TTP) funds are awarded for safety improvements through a competitive application program.

FHWA has emphasized the development of a Tribal TSMP as a first step in implementing a comprehensive safety program. This is clearly seen in the funding emphasis on safety planning and the ranking criteria that requires any safety project application be linked to a transportation safety plan.

A Tribal TSMP is a community based, multi-disciplinary approach to identify transportation safety issues and potential implementation strategies with the goal of improving transportation safety on Tribal Lands. The FHWA describes them as:

> *"Tribal Transportation Safety Plans are a tool used to identify and address transportation risk factors that have a potential of leading to serious injury or death. Safety Plans also organize the efforts of a variety of entities to more effectively reduce risk and can cover multiple transportation modes (roads, maritime, trails,*

[1] https://sdtribalrelations.sd.gov/images/ost.jpg

air travel, and others). Safety plans may lead to implementation of a project or program, renewed efforts in an existing program, or further study of a roadway section (using an engineering study or Road Safety Audit).

A Tribal Safety Plan should not be developed with a focus on any one funding source. Instead, a Tribal Safety Plan should demonstrate the safety concerns in a community and the strategies that will be explored to implement the plan. To the greatest extent possible, the concerns demonstrated by a safety plan should be selected based on incident history (data). Data allows funding entities to understand the needs and may even compel the funding of the community's needs. Safety Plans can provide a forum for utilizing data sets that are not otherwise considered by funding agencies such as public testimony when formal crash data does not exist".

Benefits of developing safety plans have been well documented and include the opportunity to leverage resources, work toward a common goal and consider all road users resulting in reduced deaths and injuries in Tribal and other communities.

HISTORICAL CRASH DATA

Historical crash data for crashes occurring on the Pine Ridge Reservation was provided by the South Dakota Department of Public Safety (SDDPS) for an eight-year time interval covering January 1, 2013 through December 31, 2020[2]. Crash data is submitted to the SDDPS by law enforcement using the South Dakota Accident Record System (SDARS) or Traffic and Criminal Software (TraCS), a data collection and reporting tool for the public safety community. Oglala Sioux Tribal police have implemented and have been using the TraCS system since the early 2010's and have been the leading Tribal police department in the nation of sharing crash record data with other government agencies.

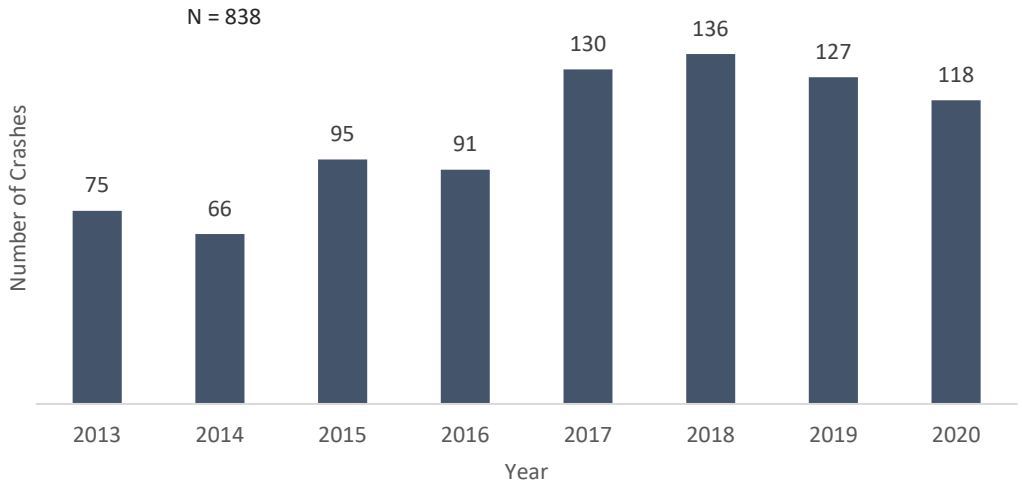
One of the important factors in the development of a Tribal Safety Management Plan is the available crash data analyzed and utilized in the identification of issues and development of strategies. Adequate crash information plays a crucial role for the Tribe as this information can be used to assist in applying and securing federal and state funding and TTPSF funds for safety improvements on roadways throughout the Reservation, as many request data to support the grant application. Available crash data shown in this plan was analyzed to reflect contributing factors to traffic-related deaths and injuries on the Reservation. The crash data that was collected were crashes occurring in Bennett County, Jackson County and Oglala Lakota County. Crashes that occurred on Interstate-90 in Jackson County were excluded from the analysis. This allowed to filter out crashes that occur on higher traffic roadway such as jackknife crashes by semi-tractor trailers.

Location of Crash

During the studied eight-year time interval between 2013-2020, there were a reported 838 crashes or approximately 105 crashes per year within the three-county area. Of the reported 838 crashes, 303 crashes occurred in Oglala Lakota County, 280 crashes occurred in Jackson County and 255 crashes occurred in Bennett County. The number of reported crashes has increased per-year over the eight-year time interval, approximately doubling since 2014. Typically, this type of increase in the number of crashes would be alarming, however the data is showing that adequate crash data is being reported since the Oglala Sioux Tribal police began implementing the TraCS system and sharing data with other government agencies. The Oglala Sioux Trible police responded to 374 crashes or approximately 45% of the reported crashes within the eight-year study period. The number of crashes reported since 2018 has been on a downward trend as shown in **Figure 4**.

[2] https://safesd.gov/raw-data.html

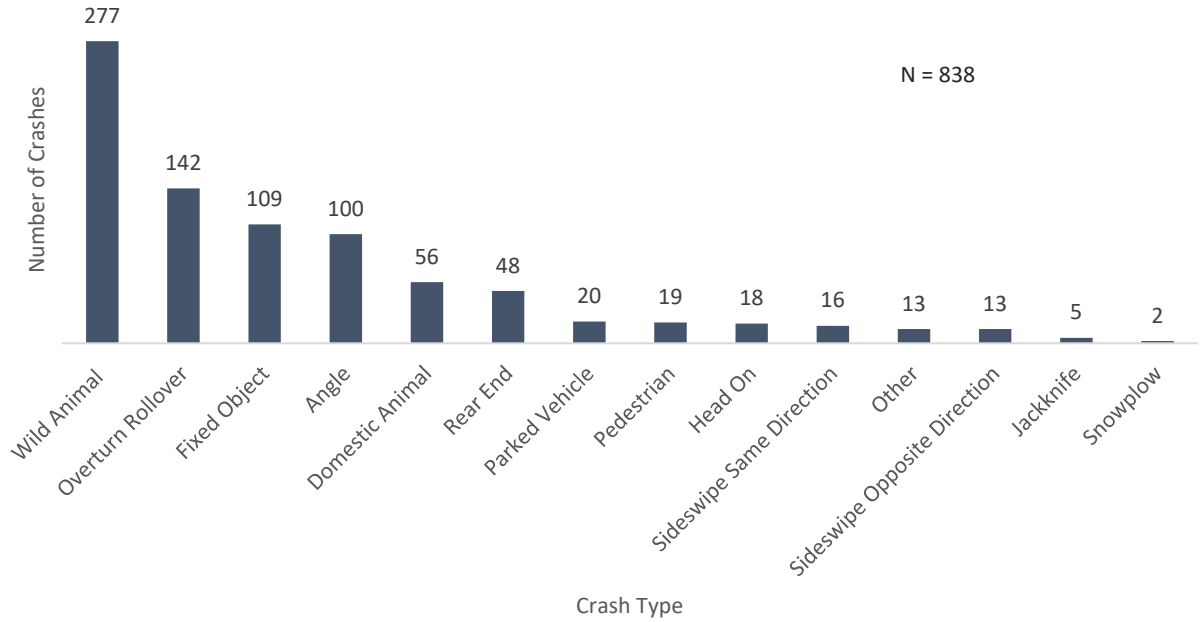
Figure 4: Number of Crashes Reported Per Year (2013-2020)



Crash Types

Wild Animal crashes were the most common reoccurring event throughout the eight-year time interval, accounting for 277 of the 838 crashes or 33.1% of all reported crashes. The other three top leading crash types observed are Overturn Rollover crashes accounting for 142 crashes or 16.9% of all reported crashes, Fixed Object crashes accounting for 109 crashes or 13.0% of all reported crashes and Angle crashes accounting for 100 crashes or 11.9% of all reported crashes. These top crash trends are consistent when comparing them to the leading crash types from the 2016 Tribal Transportation Safety Plan. **Figure 5** shows the different crash types that occurred within the three-counties from 2013-2020.

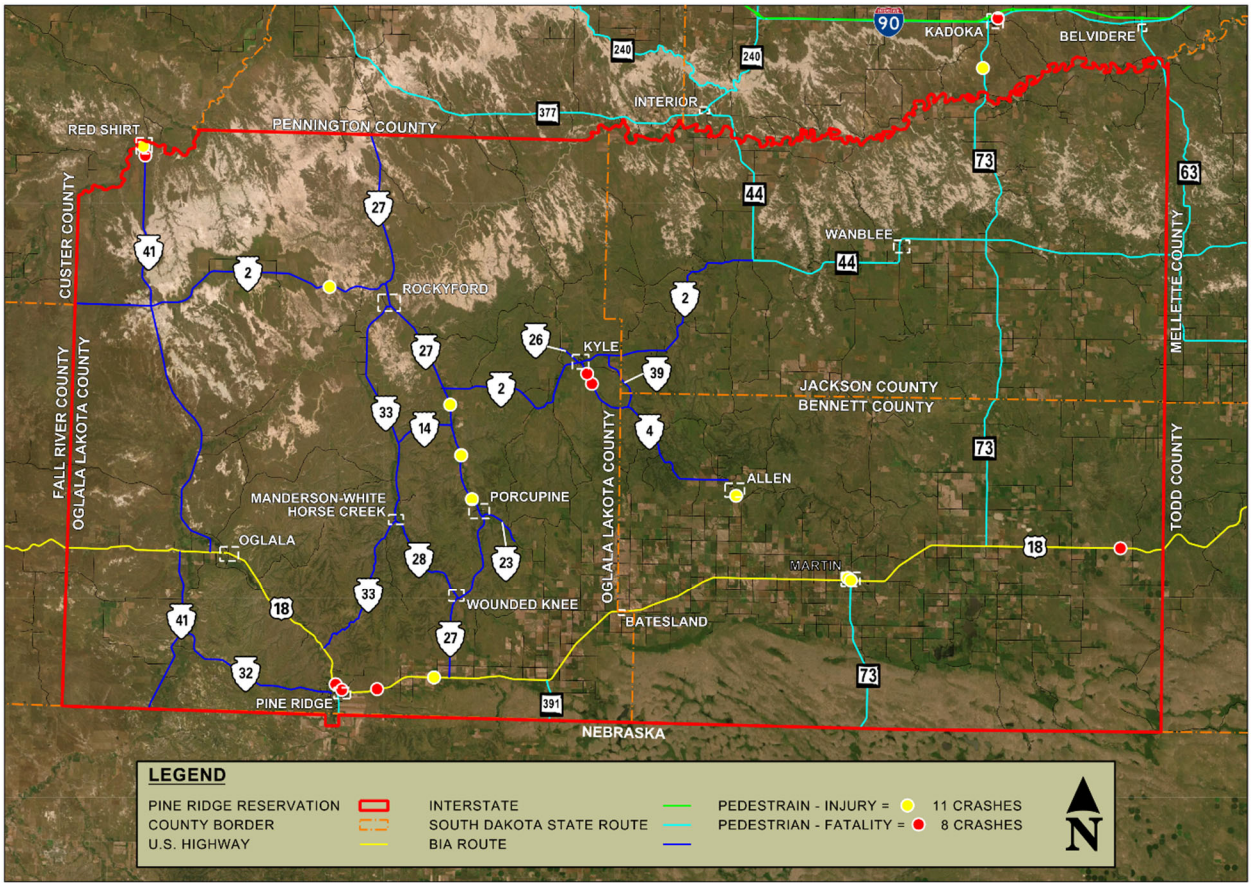
Figure 5: Crash Types (2013-2020)



Pedestrian Crashes

Although Pedestrian crash type only accounts for 19 of the 838 crashes or 2.3% of all reported crashes, being the eighth top crash type of all the reported crash types reported, it is the fifth top crash type when relating it to the number and fatal or incapacitating injury. Pedestrian crashes have a significant impact to the tribal communities due to the severity of the types of injuries. Pedestrian crashes resulted in eight fatal crashes and 11 injury crashes. Analyzing the location of pedestrian crashes, a large number of the crashes are occurring near the communities of Kyle, Pine Ridge and Red Shirt. One safety countermeasure to help reduce these types of crashes are separated shared-use pathways. **Figure 6** shows the location and injury type for each of the reported Pedestrian crash.

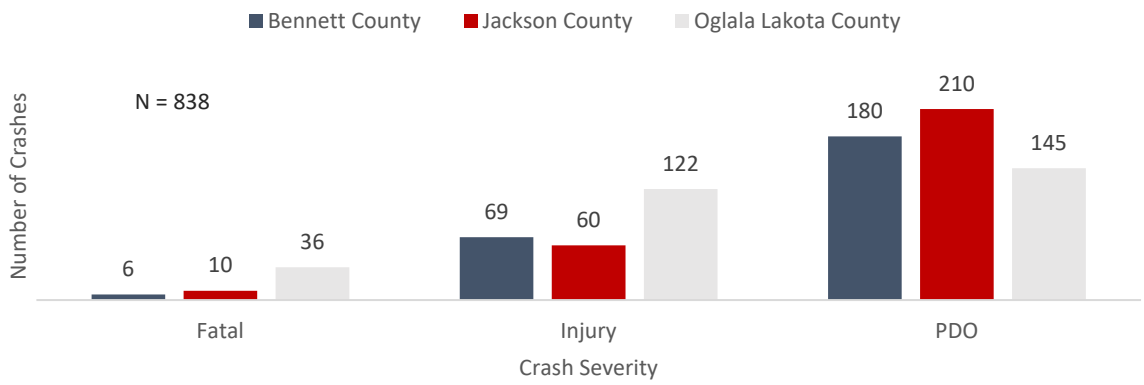
Figure 6: Pedestrian Crash Location and Injury Severity (2013-2020)



Crash Injury Severity

During the studied eight-year time interval, there were 52 fatal accidents, 251 injury accidents and 535 property damage only accidents for a total of 838 accidents within the three-county area. A total of 36 of the 52 fatal accidents or approximately 69% of fatal accidents occurred in Oglala Lakota County. The high number of fatalities in Oglala Lakota County identify geographic area to target for safety countermeasures. **Figure 7** shows the crash severity for each county.

Figure 7: Crash Severity per County (2013-2020)



The 838 accidents reported involved 1,342 occupants. The SDDPS[3] further analyzes crash injury severity into five different categories. These categories are:

- Fatal Injury – An injury results in death. An injury caused death that occurs within 30 days of an accident
- Incapacitating Injury – Any injury, other than a fatal injury, which prevents the injured person from walking, driving, or normally continuing the activities the person was capable of performing before the injury occurred
- Non-Incapacitating Injury – Any injury, other than a fatal injury or an incapacitating injury, which is evident to observers at the accident scene
- Possible Injury – Any injury reported or claimed which is not a fatal injury, incapacitating injury, or non-incapacitating injury
- No Injury

Of the 1,342 occupants involved in crashes, 76 resulted in a Fatal Injury and 105 resulted in an Incapacitating Injury. **Table 1** summarizes the different crash injury severities for each occupant involved in a crash within the three-county area.

Crash Injury Severity	Number of Injuries	Percentage
Fatal injury	76	5.7%
Incapacitating Injury	105	7.8%
No injury	507	37.8%
Non-incapacitating Injury	129	9.6%
Not applicable	1	0.1%
Possible Injury	272	20.3%
*Not Reported	252	18.8%
Total	**1,342**	**100.0%**

* - Not Reported, Injuries Listed as Wild Animal Crashes

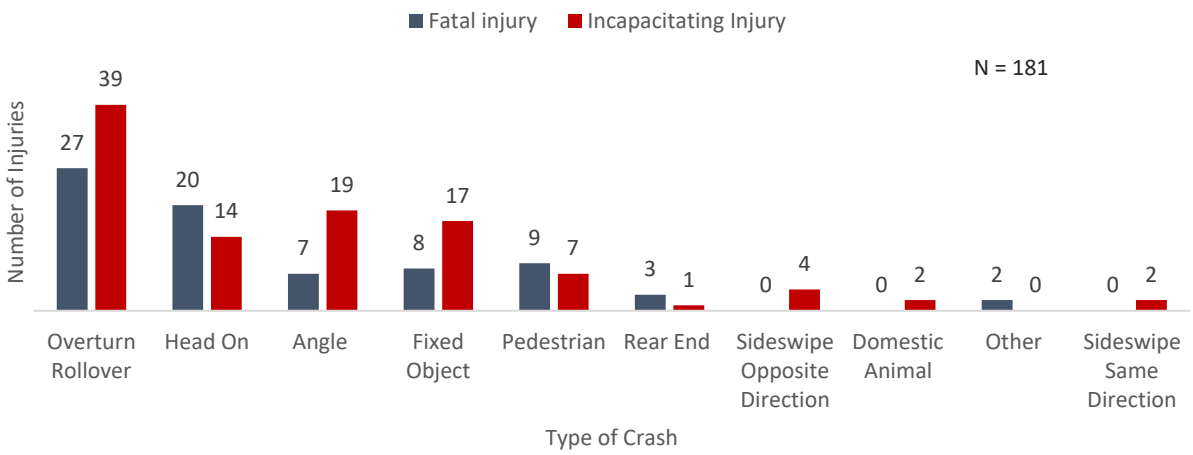
Table 1: Crash Injury Severity Per Number of Occupants (2013-2020)

Fatal and Incapacity injury crashes stand out due to their impact on lives. Of the 76 fatal injuries, 14 were from the result of Overturn Rollover crashes, six were Head On crashes, five were Pedestrian crashes, 4 were Angle crashes, three Rear End crashes, two Fixed Object and one was listed as other. Of the 105 incapacitating injuries, 28 were

[3] https://safety.fhwa.dot.gov/hsip/spm/conversion_tbl/pdfs/kabco_ctable_by_state.pdf

from the result of Overturn Rollover crashes, 12 each from Head On and Angle crashes, seven from Fixed Object crashes, 6 were Pedestrian crashes, three from Sideswipe Opposite Direction crashes, two from Domestic Animal crashes and one each from Rear End and Sideswipe Same Direction crashes. **Figure 8** summarizes the different crash types for Fatal and Incapacitating Injures.

Figure 8: Fatal and Incapacitating Injuries (2013-2020)



Safety Restraint Use

The use of proper safety restraints in a moving vehicle helps reduce the severity of injuries for occupants in the event of a crash. Approximately 42% of occupants within the three-county areas used a proper safety restraint. This percentage may be higher as the type of safety restraint used information for Wild Animal crashes was not reported and account for approximately 20% of the total reported safety restraint use. This data could be used to support increased education and seat belt initiatives. **Table 2** summarizes the frequency of safety restraints being used in the three-county area.

Type of Safety Equipment Used	Number of Occupants	Percentage
Child/Youth restraint system used properly	12	0.9%
Child/Youth restraint system used, not properly	2	0.1%
Eye protection only	11	0.8%
Helmet and eye protection	19	1.4%
Helmet only	2	0.1%
Lap belt and shoulder harness used	537	40.0%
Lap belt only used	17	1.3%
None used	328	24.4%
Not applicable	35	2.6%
Shoulder harness only used	5	0.4%
Unknown	107	8.0%
*Not Reported	267	19.9%
Total	**1342**	**100.0%**

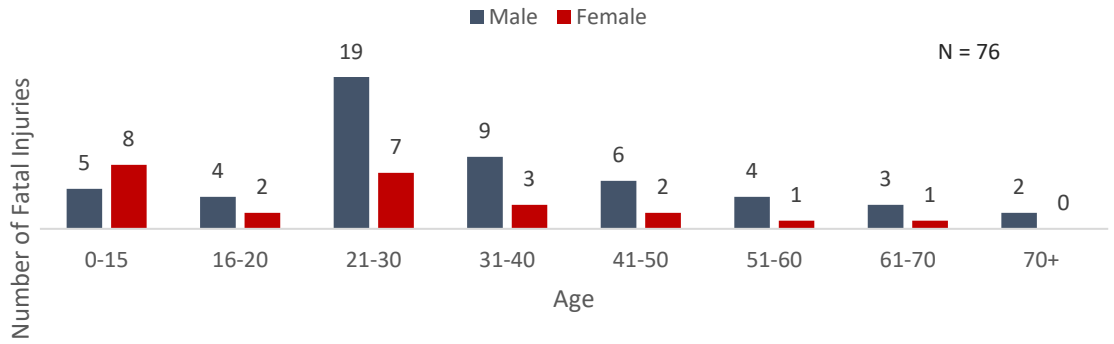
* - Not Reported, Injuries Listed as Wild Animal Crashes

Table 2: Safety Restraint Used for Crashes per Occupants (2013-2020)

Age and Gender of Occupants

Young drivers are consistently overrepresented in fatal crashes in all states and tribal communities in the region. This is also true for the Pine Ride Indian Reservation, 59.2% of all fatalities within the three-county area were under the age of 30. What is significant is that the data for the area shows that approximately 25% are under the age of 20. This high rate of young inexperience drivers, education, enforcement, and outreach programs may be needed. Additionally, many tribal communities have identified the lack of drivers education programs as an issue. **Figure 9** summarizes fatal injures by age group and gender.

Figure 9: Fatal Injuries by Age and Gender (2013-2020)

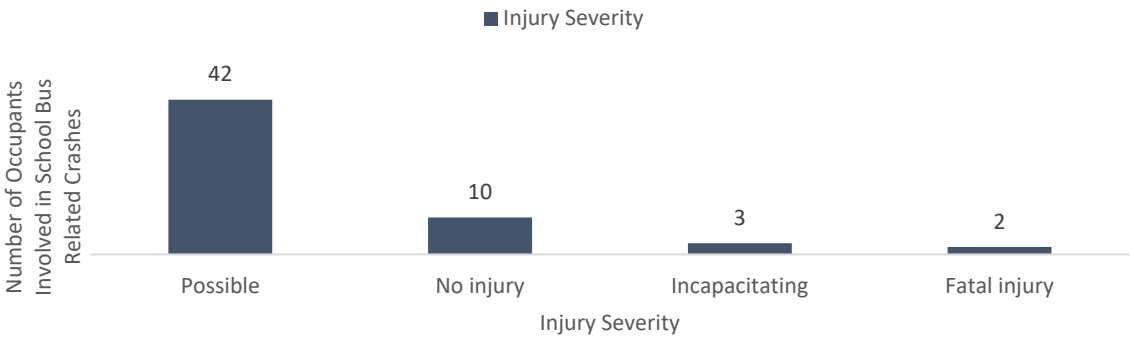


School Buses

School buses play an important role in providing a safe mode of transportation for children to and from school. In the eight-year study period, there were a reported seven crashes or approximately 0.8% of reported crashes involving a school bus. This number may seem low but when comparing it to the state average over the same eight-year study period, crashes involving a school bus is approximately 2.5 times higher in the study area compared to 0.3% of reported crashes in South Dakota involving a school bus.

All reported school bus crashes occurred in Oglala Lakota County and were reported by the Oglala Tribal Police. Of the reported seven crashes involving school buses, one crash resulted in a fatal cash, two resulted in an injury crash and the remaining four crashes resulted in property damage only. A total of 57 occupants were involved in the seven crashes involving school buses. Occupant severity injures from these crashes resulted in two fatal injuries, three incapacitating injuries, 42 possible injuries and ten no injuries. Safety measures such as increase drivers education regarding laws for school buses, identifying safe school routes, increase visual identifiers such as flashing light on school buses and establishing school zone area may be beneficial to assist in increase safety. **Figure 10** summarized the different injury severities involving the number of occupants involved in school bus related crashes.

Figure 10: Injuries Severity for School Bus Related Crashes (2013-2020)



2021 TRIBAL TRANSPORTATION SAFETY MANAGEMENT PLAN

This 2021 plan was developed using available data and the personal knowledge and expertise of the planning meeting participants. The group included Tribal safety representatives from engineering, education, public safety, motor fuels and the OST Tribal Council representatives. A list of participants is included in the appendices.

The planning group reviewed the available crash data to develop a list of issues that are currently affecting transportation safety on the reservation. The group then identified the existing programs on the reservation and identified additional strategies that need to be implemented to address safety issues. The following sections document these discussions and the outcomes.

Issues Causing Crashes on The Pine Ridge Reservation

The crash data analysis, identify several transportation safety issues that are causing crashes, increasing crash severity, or restricting complete data analysis. Those that are supported by the data included:

- Wild and domestic animal crashes
- Crashes with fixed objects
- Overturn Rollover crashes
- Alcohol impaired driving
- Lack of seat belt use
- Young drivers
- Pedestrian fatalities
- Intersection crashes

The group identified several other transportation safety issues based upon personal experience that are causing crashes, increasing crash severity, or are otherwise creating transportation safety concerns in the local communities. These include:

- School Zone signage and signs with flashing beacons.
- Snow and ice removal due to drifting snow
- Distracted driving
- Need for intersection improvements (sight distance, lighting, adv warnings)
- Speeding
- ATV use
- Lack of funding for child car seats
- No mile reference markers along routes

EXISTING SAFETY PROGRAMS

The Tribe has implemented or is working on a number of safety projects and programs to address transportation safety issues on the Reservation. The list is not all inclusive, but documents and programs that the group participating in the development of the safety plan were aware of.

- The Tribe has constructed separated pathways to decrease vehicle/pedestrian interaction.
- The Tribe has received safety grants.
- Highway signing on the reservation has been updated.
- The Tribal police are using TraCS (Traffic and Criminal Software)
- Completed rumble strip projects on all paved BIA roads
- The Tribe has performed seat belt education and provided child seats.

- Safety announcements and information have been featured on the local radio.
- Speed monitoring trailers are being used.
- The Tribe currently has traffic safety officers.
- Stricter penalties have been implemented for DUI's.
- The Tribe has a primary seat belt law.

IMPLEMENTATION STRATEGIES

The plan's main goal is to use a multi-disciplinary approach to identify safety strategies for implementation that can address the transportation safety issues on the Pine Ridge Indian Reservation. The strategies are intended to be implemented over the next several years and each have a Strategy Champion and Funding Opportunities identified. The strategies were developed as a comprehensive approach to safety, including engineering, enforcement, education, and emergency management opportunities.

Education Strategies

Develop a Reservation-Wide Transportation Safety Education Program

The Oglala Sioux Tribe does not currently have a Safety Coordinator, however, various Tribal Programs, law enforcement and other interested parties on the reservation provide education on transportation safety. One area that was particularly identified in the data analysis was education for younger drivers on behavioral issues such as seat belt use and impaired driving. With the high rate of crashes involving young drivers on the reservation, this will be a critical program in helping to reduce crashes.

Figure 11: Buckle Up Its Our Primary Law Sign[4]



This effort would use and build on national safety campaign themes on impaired driving, seat belt use, texting and driving and other transportation safety issues, by using local leaders or other notable Tribal Community members/leaders to promote safety themes. Many safety campaigns across the country have shown a greater rate of success when they are made culturally relevant to the Tribal audience and utilize local talent to deliver the safety message. The Safety Program has received past funding, but it was not sufficient for larger cost-items such as PSAs, Arrive Alive Programs, billboards using local artistry, banners, videos, Tribal safety posters and other safety education materials that would be used in education programs, during Pow Wows and at other community events.

Strategy Champion: OST DOT.

Funding Opportunity: BIA Indian Highway Safety Program Funding.

[4] https://ostdps.org/highway-safety

Enforcement Strategies

Provide Increased Safety Enforcement or Tribal Highway Safety Officers

Currently the Tribe have dedicated highway safety officers providing traffic enforcement services and was identified the need to expand their presence. While regular officers assist with traffic enforcement, there continues to be a large number of fatalities and severe crashes on the reservation.

Figure 12: Oglala Sioux Police Vehicle[5]



To assist in education and enforcement within the reservation, it was felt that additional officers were needed, particularly during events. With inadequate staffing during events, and the demands on time that criminal activities require, highway safety enforcement by necessity becomes a lower priority. To elevate the level of highway safety enforcement during events and to elevate normal traffic enforcement, the Tribe should pursue obtaining at least one or possibly two additional highway safety enforcement officers. If it is determined by law enforcement that the highest need is only during the summer months and if part time assistance is available, these could be seasonal positions.

Strategy Champion: OST Department of Public Safety.

Funding Opportunity: BIA Indian Highway Safety Program Funding.

Update Electronic Crash Records System Hardware

As discussed in the historical crash data, the Oglala Sioux Tribal police have implemented and have been using the TraCS system since the early 2010's and have been the leading Tribal police department in the nation of sharing crash record data with other government agencies. The Oglala Sioux Trible police responded to 374 crashes or approximately 45% of the reported crashes within the eight-year study period. With the advancements in technology, computer software and hardware becomes outdated and regularly needs to be updated. It was identified that the majority of the Toughbook computers used by the tribal safety department are nearing the end of their life cycle and are in need of being updated. By updating these Toughbook computers, it will allow the department to continue to provide crash data to other agencies and assist the Tribe by providing important safety data when applying for safety grants. In addition to updating the equipment, it is desired to expand the TraCS system and necessary hardware with the remaining police department and the Department of Transportation for access to crash records.

Strategy Champion: OST Police Department

Funding Opportunity: BIA IHSP Funding and SDDPS Funding

[5] https://ostdps.org/police

Develop a Livestock Ordinance

With the rural nature of much of the land on the Oglala Sioux Reservation and the large amount of open range, crashes with domestic livestock are in the top five leading causes of crashes. Many of the animals, including horses and cattle that get loose, wander along the roadway corridors grazing or moving from field to field. Other tribes have had similar issues and have implemented tribal ordinances that allow the tribal government to remove the animals and hold them until the proper owner comes to retrieve them. Animals not claimed are then auctioned off by the tribe. It is recommended that the Tribe develop a comprehensive approach including such an ordinance, an aggressive removal program and a roadway fencing program that collectively could be utilized to address the issue.

Strategy Champion: OST DOT, Law Enforcement and Tribal Council.

Funding Opportunity: TTP or TTPSF for fencing

Develop an Enhanced 911 System

Currently the Tribe does not have an enhanced 911 system, which means that when a call is received by a 911 operator, location information is unavailable within the systems. This requires the operator to get more detailed location information prior to being able to dispatch an emergency vehicle. This is also further complicated in that many roads may be known by a local or nickname that is not easily identifiable by either the dispatcher or responder. To remedy this situation, the system within the reservation should be upgraded to include location information for quicker response times. The BIA Inventory includes strip maps that may be able to be utilized as part of this effort.

Strategy Champion: OST DPS, OST DOT and EMS Agencies.

Funding Opportunity: BIA Indian Highway Safety Program Funding.

Provide Improved Communications Equipment

The Pine Ridge Indian Reservation encompasses over two million acres with various types of terrain, including rugged areas along the Badlands National Park. With the large land area, variety of enforcement and EMS agencies and terrain challenges, effective communication is critical during emergencies and daily activities. There currently is limited communication coverage on portions of the reservation and a need to upgrade repeaters, radios and other hardware to ensure adequate communications during crashes, emergencies or weather-related events. Initially, this task may include development of a communications plan that specifically identifies all the needs.

Strategy Champion: OST DOT, OST DPS and EMS Agencies.

Funding Opportunity: BIA Indian Highway Safety Program.

Establish a Motor Carrier Safety (MCS) Program

With the presence of US 18 running through the Pine Ridge Reservation, there is a substantial presence of large commercial vehicles. Currently there are no weigh stations within the reservation, there are concerns with overweight and/or unsafe vehicles operating on the roadways. The tribe recently passed a code and implemented it, however inadequate staffing has made it difficult to enforce regulating trucking activities and use portable scales to check vehicle weights. The Oglala Sioux do not currently have a need for an extensive program, but as a functioning Department of Transportation, the tribe should start taking steps to develop a MCS program. This program could start modestly with implementing funding for an MCS Officer and acquisition of portable scales that could be used on the reservation. If portable scales are purchased, consideration should be given to getting similar equipment to what the State of South Dakota uses to assist with training and calibration. Other tribes have received grants to assist in developing programs such as this.

Strategy Champion: OST DOT, OST DPS and SDDOT.

Funding Opportunity: TTP Safety Funding and BIA Indian Highway Safety Program.

Engineering Strategies

Install School Zone Signing with Flashing Beacons

One area where there was an identified need was for the installation or upgrading of school zone signing and adding flashing beacons, crosswalks and other traffic control.

Figure 13: School Zone Signing Example



The Oglala Department of Public Safety does utilize the speed monitoring trailers at times in school zones, but they are only used there for short durations. With the large number of young driver crashes on the reservation and with 11% of the fatal crashes that have been reported being pedestrian crashes, the upgrading of these systems could help to reduce serious crashes.

Strategy Champion: OST DOT.

Funding Opportunity: TTP Safety Funding, TTP Funding or SDDOT Funds.

Participate in Safety Projects for Signing, Striping, and Rumble Strips

The South Dakota Department of Transportation has initiated a statewide program to replace and upgrade signing on county, tribal and other rural roadways within the state. They are currently working on paved roadways and will be working on a county by county bases to improve and replace signing on gravel roadways. To ensure that BIA and Tribal Routes are included in the upgrades, the Tribe should coordinate with Bennett, Jackson and Oglala Lakota Counties. The SDDOT also has a statewide effort to assist in the installation of rumble strips where sufficient width and structure exist for their installation. While no state funding is available for striping of BIA or Tribal roadways, TTP funds are available for this use. With the large percentage of run off the road crashes, all of these counter measures would be important tools in reducing crashes.

Strategy Champion: OST DOT, Counties and SDDOT.

Funding Opportunity: SDDOT, TTP Safety Funding and TTP Funding.

Perform Road Safety Audits on BIA, Tribal and County Roadways

Road Safety Audits (RSAs) have been an important tool for many Tribes and one that the Oglala Sioux Transportation Department could utilize. RSAs provide an opportunity to bring traffic and safety expertise to assess safety concerns of routes where there are high numbers of crashes or where they have specific concerns. The goal of these RSAs is to identify safety issues and then develop specific transportation safety improvements that may include signing, lighting, striping, pathways, intersection improvement and other activities to rectify shortcomings.

The Oglala Sioux Transportation Department performed an RSA on BIA 2 in 2018. This RSA was limited to the segment between Sharps Corner and South Dakota State Highway 44. The RSA recommended the following safety improvement along BIA 2:

- Urban Section
    - Install Separated Shared Use Pathway
    - Install Sidewalks
    - Install Signed, Marked Crosswalks
    - Install Pedestrian Rectangular Rapid Flashing Beacons
    - Install Two-Way Left Turn Lanes
    - Install All-Way Control at Intersection
- Rural Section
    - Install Guardrail
    - Install Shoulder Rumble Strips
    - Install Delineators
    - Install Retroreflective Signs
    - Install Horizontal Alignments Signs
    - Improve Horizontal Alignment
    - Add Shoulders and Flatten Side Slopes
    - Flatten Crest Vertical Curve
    - Remove Fixed Objects from Clear Zone

To continue to build on the safety improvement and the use of RSAs, the Tribe should pursue funding to accomplish RSAs on additional BIA, Tribal and county roadways within the Reservation.

Strategy Champion: OST DOT.

Funding Opportunity: TTP Safety Funding.

Develop Multi-Use Pathways and Pathway Lighting Projects

There are locations within the Pine Ridge Reservation where there is pedestrian/bike traffic and the Tribe has identified specific need for pathways. The locations included Kyle, SD Hwy 407 and Tribal 129, Wanblee, and Allen. SDDPS crash data identifies pedestrian or bike as a major crash cause, being in the top 10 of crash types occurring and accounting for approximately 9% of all serious and fatal injuries between 2013-2020. Multi-use pathways should be considered to separate pedestrians from vehicle traffic. The need for these pathways has been present for some time and has increased as new Tribal housing has been developed and there is a need for access to Tribal communities and schools.

Figure 14: Separated Pathway with Pedestrian Lighting



Lighting should be considered along urban or other pathways as appropriate to increase pedestrian visibility, provide for traffic calming and potentially increase security. Solar powered and/or LED lighting could be used to reduce the cost for providing power and the need for continual power usage. An example of a solar powered lighting system is shown, and several companies produce such systems.

Figure 15: Solar Pedestrian Lighting Example[6]



BIA 4 Pathway in Kyle

The town of Kyle is located along BIA 2 and BIA 4 intersects it connecting at Little Wound School. There are currently no pedestrian facilities along BIA 4 and the tribe has identified this area as a high pedestrian area between the movie theatre and going north to the intersection of BIA 2 and BIA 4 near Little Wound School. This area also intersects many housing developments. This project would develop a separated multi-use pathway creating pedestrian connectivity along BIA 4 between the movie theatre and school.

[6] https://www.sepco-solarlighting.com/solar-pathway-landscape-lighting

Figure 16: BIA 4 Pathway in Kyle



This pathway would be approximately 0.5-miles and could include pedestrian lighting depending on the available funding or broken into two different phases to accommodate both the multi-use pathway and pedestrian lighting. The approximate project construction cost for the multi-use pathway and lighting are shown below:

- Separated Multi-Use Pathway: $677,000.00
- Pedestrian Lighting: $160,000.00
- Total Construction Cost: $837,000.00

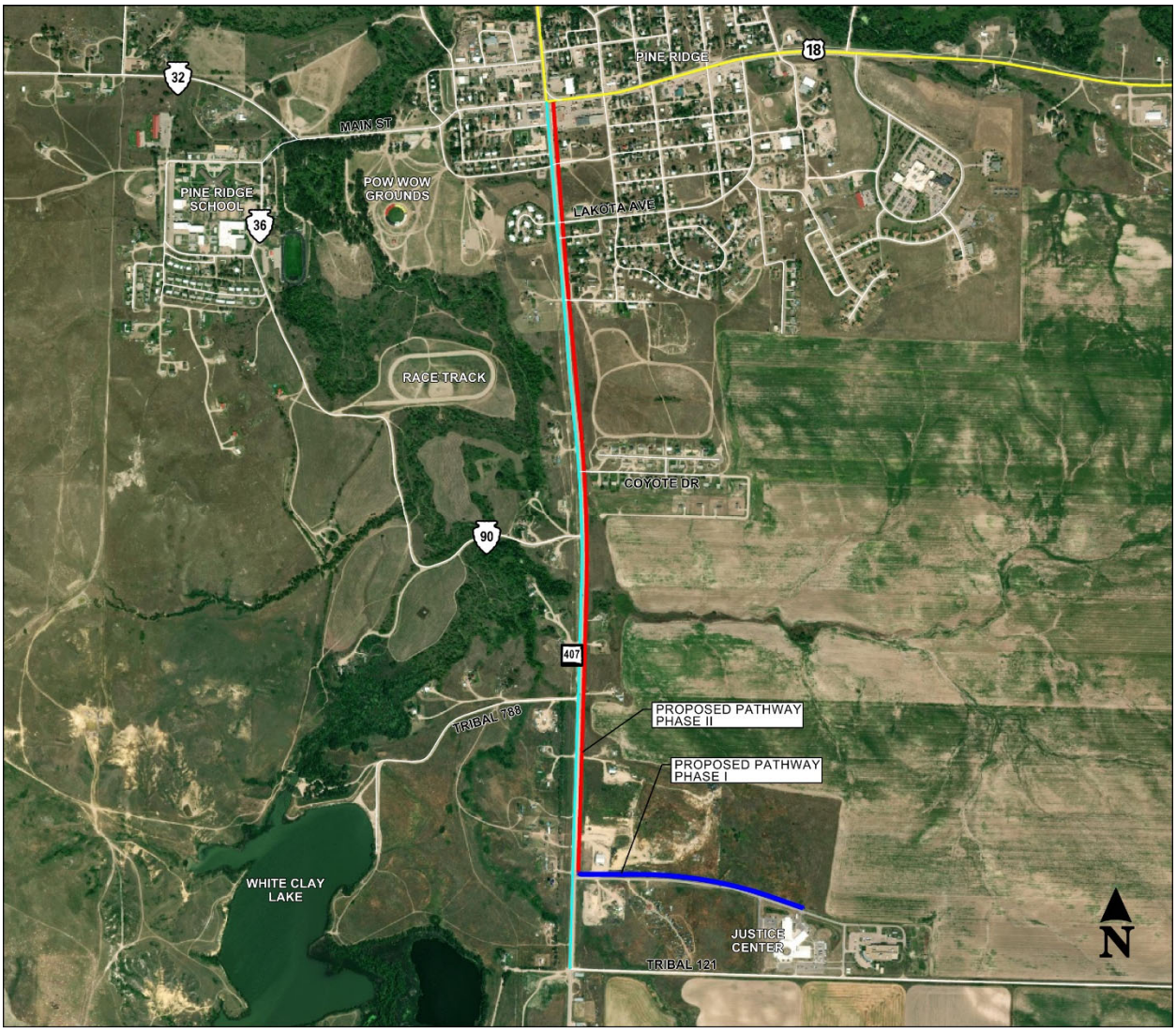
Strategy Champion: OST DOT

Funding Opportunity: TTP Safety Funding, TTP Funding or SDDOT Transportation Alternatives Funding

Justice Center to Pine Ridge Pathway

A number of pedestrian facilities have been improved in recent years in Pine Ridge, particularly along US 18. However, there are no facilities extending south of town along South Dakota State Highway 407. This has been identified as a need to connect housing and tribal facilities south of town with the services in the downtown area, and also allow for connection to the pedestrian facilities in that area. Additionally, the Justice Center is located south of town and includes the corrections facility. When individuals are released, many of them walk back to town, adding to pedestrian use of the roadway.

Figure 17: Justice Center to Pine Ridge Pathway



The project would be approximately 2.1-miles long and could include pedestrian lighting depending on the available funding or broken into multiple phases to accommodate both overall length multi-use pathway and pedestrian lighting. The approximate project construction cost for the multi-use pathway and lighting are shown below:

Phase I (0.5-miles)

- Separated Multi-Use Pathway: $677,000.00
- Pedestrian Lighting: $147,000.00
- Total Construction Cost: $824,000.00

Phase II (1.6-miles)

- Separated Multi-Use Pathway: $1,968,000.00
- Pedestrian Lighting: $476,000.00
- Total Construction Cost: $2,444,000.00

Strategy Champion: OST DOT

Funding Opportunity: TTP Safety Funding, TTP Funding or SDDOT Transportation Alternatives Funding

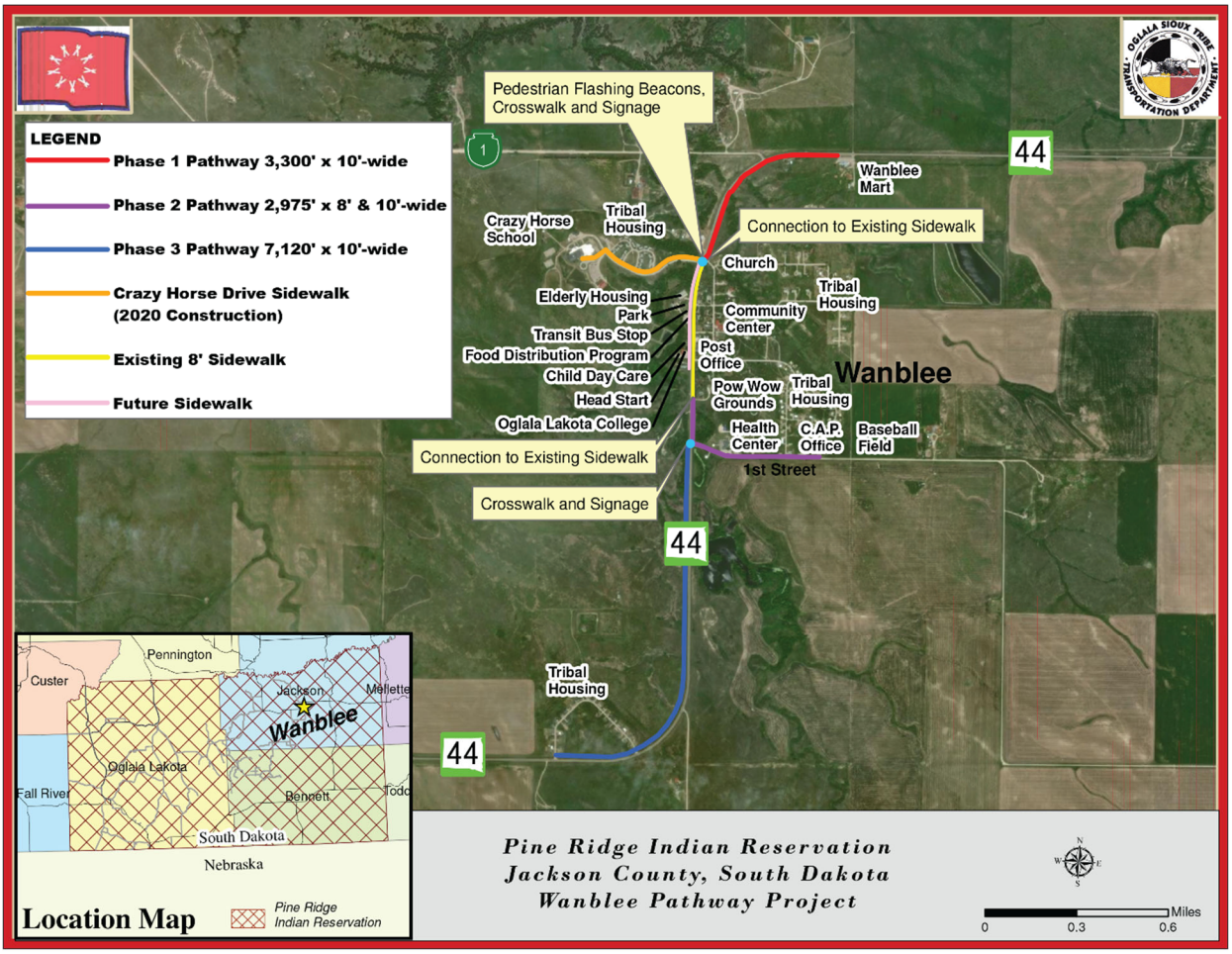
Wanblee Pathway

The community of Wanblee is located along South Dakota State Highway 44 on the Pine Ridge Indian Reservation. As with many other tribal communities there is a lot of pedestrian traffic in the area and little or no facilities for them

to use. This project would develop a separated pathway and with cross walks and pedestrian lighting that would run through town to connect tribal housing to the south and head north through town ending at Wanblee Mart.

With a population at 940, over 80% below the poverty level, and a high percentage of residents that walk or bike, a safe, separated, ADA compliant pathway is needed for Wanblee residents to access pow-wow grounds, health center, police department, CAP (Community Action Program) office, post office, two churches, community center, Crazy Horse School, and Wanblee Mart.

Figure 18: Wanblee Pathway



The project would be approximately 2.5-miles long and could include pedestrian lighting depending on the available funding or broken into different phases to accommodate both the multi-use pathway and pedestrian lighting. The approximate project construction cost for the multi-use pathway and lighting are shown below:

- Phase 1 Separated Multi-Use Pathway: $807,600.00
- Phase 1 Pedestrian Lighting: $190,000.00
- Phase 2 Multi-Use Pathway: $728,000.00
- Phase 2 Pedestrian Lighting: $171,000.00
- Phase 3 Separated Multi-Use Pathway: $1,750,000.00
- Phase 3 Pedestrian Lighting: $409,500.00
- Total Construction Cost: $4,056,100.00

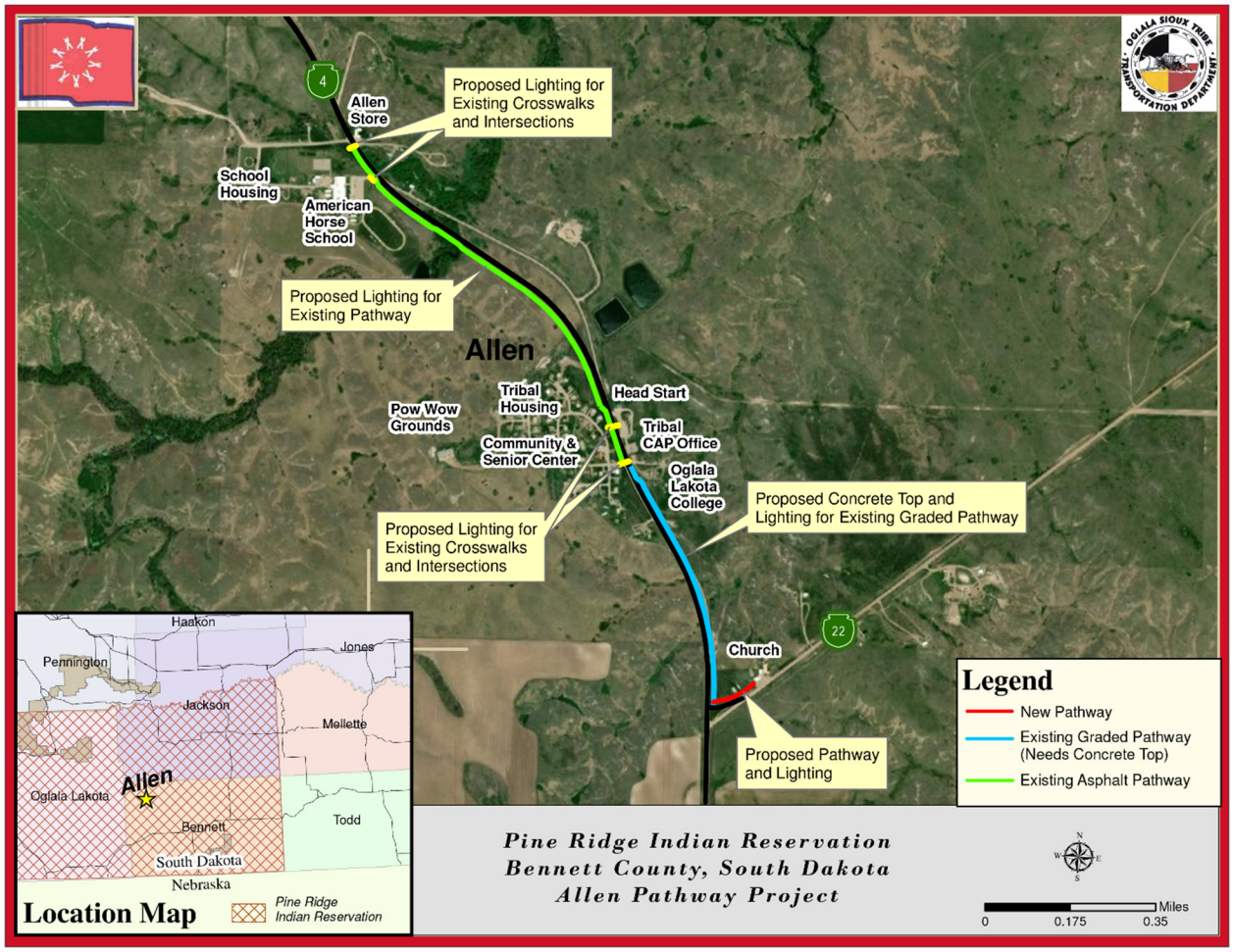
Strategy Champion: OST DOT

Funding Opportunity: TTP Safety Funding, TTP Funding or SDDOT Transportation Alternatives Funding

Allen Pathway

The community of Allen is along BIA 4 in Bennett County, located in the southeast portion of the Pine Ridge Indian Reservation. The roadway was recently reconstructed from 2-miles north of Allen to 1-mile south of Allen. Parallel to the new roadway, a pedestrian shared use pathway was constructed. Even though the pathway was constructed, there was not enough funding available to install pathway lighting and a section of the pathway between Allen and the intersection of BIA 4 and BIA 22, only a graded pathway was constructed with no surfacing. This project would provide the critical lighting along the pathway and at crosswalks in the community of Allen as well as at the American Horse School and crosswalk to the Allen Store. In addition to the lighting for the pathway, surface section for approximately 0.7-miles is proposed for the graded pathway and 0.1-miles of new pathway with lighting between the church along BIA 22 and the graded pathway is proposed. The pathway connects tribal and school housing to the Oglala Lakota College center, Head Start, CAP office, Post office, American Horse School and Allen Store.

Figure 19: Allen Pathway



The project would be approximately 0.70-miles long for the surfacing section, 0.1-miles for new pathway and 1.6-miles for the pathway lighting. The approximate project construction cost for the multi-use pathway and lighting are shown below:

- New Separated Multi-Use Pathway: $129,200.00
- Surfacing Section for Graded Pathway: $275,000.00
- Pedestrian Lighting: $485,900.00
- Total Construction Cost: $890,100.00

Strategy Champion: OST DOT

Funding Opportunity: TTP Safety Funding, TTP Funding or SDDOT Transportation Alternatives Funding

Culvert Replacements

Rapidly aging culverts are located across the Pine Ridge Indian Reservation, many of which are too short to provide road embankment which has a recoverable zone. In the last 10 years, two culverts have catastrophically failed resulting in the road caving in nearly 30 feet.

There are approximately 30 large culverts across the Reservation which are not long enough to provide adequate embankment which would have a recoverable side slope. These culverts were installed prior to the current safety standards which include shoulders and recoverable side slopes and are also rapidly aging and when they fail it is catastrophic.

Figure 20: Culvert Failure Along BIA 2



Many of the culverts are located on BIA Route 2 between Sharps Corner and SD Highway 44, BIA Route 32, and BIA Route 33.

A badly damaged culvert is located along BIA Route 33, 5.5-miles south of Rockyford, and approximately 10-miles south of Badlands National Park, South Unit. BIA 33 is a narrow road with no shoulders. The culvert at this location is about 12 inches below the roadway and is short in length (spanning approximately 10 feet) leaving a drop from the roadway of 15 feet on one side and 20 feet on the other side. The culvert is failing and due to embankment erosion, the road is sagging over the pipe creating voids in the surrounding material and significant risk for roadway departure crashes.

Figure 21: Existing Culvert on BIA 33



The project proposes replacement of the existing culvert with a longer concrete box culvert and related reinforcements that will eliminate the road sagging and related voids in the piping, establishing recoverable side slopes and establishing a safe clear zone along this section of roadway.

BIA Route 2, from Kyle to 19.7 miles east where it connects to SD Highway 44 is a roadway which was constructed more than 50 years ago, and the culverts may be as old as 80 years. The existing culverts are metal, do not have end sections, and are too short to provide support for embankment wide enough for an adequate recoverable clear zone. The in slope over many of the culverts under BIA Route 2 is approximately 2:1. Proposed improvements include replacing culverts with longer culverts, adding end sections, permanent erosion controls, and rebuilding the road over the culvert.

Figure 22: Typical Steep Embankments along Culverts



The reconstructed road will have 12-foot lanes, 4-foot shoulders, tapered asphalt edge, and recoverable in slope within the clear zone. The end sections and permanent erosion controls will prevent erosion around the culvert ends.

Strategy Champion: OST DOT.

Funding Opportunity: TTP Safety Funding, TTP Funding.

Provide Remote Weather Monitoring Stations

Many transportation agencies utilize remote weather information systems (RWIS) sites to provide information to both the roadway user and to the department of transportation.

Figure 23: Remote Weather Information Systems Example[7]



These sites can monitor weather conditions, roadway conditions, site specific forecasts and provide video imagery at the location. With the large land area, rural nature and at times hazardous driving conditions, RWIS sites could be utilized at strategic locations to improve roadway safety by providing images and current data to roadway users and data to improve services by the OST Department of Transportation.

Strategy Champion: OST DOT.

Funding Opportunity: TTP Safety Funding, TTP Funding.

Mileage Reference Markers Along Routes

Currently within the reservation all the routes that are paved, no mileage reference markers (MRM) are present. MRM's assist motorist in letting them know how far they have traveled on a particular route, let them know the distance to their destination and most importantly in the event of an accident or roadside emergency it will allow them to give a more precise location to first responders. It is recommended that MRM's be installed on paved BIA routes within the reservation.

Strategy Champion: OST DOT.

Funding Opportunity: TTP Safety Funding, TTP Funding.

Install Snow Due to Drifting Snow

With the heavy snows and high winds that occur on the reservation, blowing and drifting snow are often areas of concern due to the high number of crashes that occur during the winter months. Snow fences have been found to be an effective countermeasure for some locations if designed and located properly. Another alternative is the use

[7] https://www.campbellsci.com/news-colorado-flood-rwis

of living snow fences that incorporate trees and other native vegetation to catch blowing snow. While these have the advantage of not needing to have the fencing material repaired or replaced, they may take a number of years to get established.

Figure 24: Example of Snow Fencing[8]



The OST Transportation Program, with the assistance of Road Maintenance, should develop a plan on locations where drifting is often a problem. Snow fencing or living snow fences should then be designed and installed, using the appropriate design guides associated with each.

Strategy Champion: OST DOT

Funding Opportunity: TTP or TTPSF

Safety Planning and Other Strategies

Develop a Social Media Page for Safety Reporting

Social Media is an area that has been underutilized in the Oglala Sioux community in the transportation area. The Tribe would like to develop a platform that would allow for the sharing of important information such as road closures, road construction, emergency notifications, RWIS, maps, and other data to users in the area. It is intended that their social media page would also be set up to allow users to send in safety concerns such as crashes, missing or damaged signs, roadway concerns and other desired feed back to the transportation and safety programs. While the platforms for outreach exist, assistance with development of a professional, user friendly and reliable system is needed.

Strategy Champion: OST DOT and OST DPS.

Funding Opportunity: BIA Indian Highway Safety Program and SD DPS.

[8] https://centennialwoods.com/reclaimed-wood-ideas/snow-fence/#group-1

APPENDIX A: MEETING AGENDA

Oglala Sioux Tribal Safety Plan 2021 Update

Agenda

July 27, 2021

OST Transportation Building

10:00 a.m.	Welcome and Introductions
10:15 a.m.	Background and Overview
	Review of Previous Safety Plan
	Crash and Safety Data Update
	Review Road Safety Audits Completed
	Questions and Discussion of Data
11:00 a.m.	Development of Activities for updated Oglala Tribal Transportation Safety Plan:
	Identification/Discussion of new safety issues and concerns
	Identify Safety Strategies completed
	Identify New Strategies to Include.
12:00	Lunch (provided)
1:00 p.m.	Finalize Development of Safety Activities to include in Plan
	Sort by 4E's
	Identification of Implementation Steps
	Identification of Champions for Specific Elements
	Identification of Potential Funding Sources
	Identify Grant Opportunities
2:00 p.m.	Break
2:15 p.m.	Questions/Discussion of Process or other Items
3:00 p.m.	Adjourn

APPENDIX B: MEETING PARTICIPANTS

Oglala Sioux Tribal Transportation Safety Plan			
Attendance List			
Name:	Organization:	Phone:	Email:
Courtney Tow Lance	OST C & F	605-867-1265	ost_credit@yahoo.com
David Kelly	OST DOT	605-867-5376	ostroads@gmail.com
Kevin Rascher	OST DPS Highway Safety	605-454-7082	krascher@ostdps.org
Darrell Hernandez	OST Presidents Office	605-391-4536	darrell.hernandez@oglala.org
Craig Genzlinger	KLJ	406-461-2222	craig.genzlinger@kljeng.com
Tonya Huber	KLJ	605-721-5553	tonya.huber@kljeng.com
Chad Fischer	KLJ	406-441-5786	chad.fischer@kljeng.com

APPENDIX C: 2021 TRIBAL TRANSPORTATION SAFETY PLAN PRESENTATION

Oglala Sioux Tribe

Tribal Transportation Safety Plan

July 2021

1

Benefits of Safety Planning

- Opportunity for coordinated efforts & shared resources within a community toward common goal
- Establish communication & form partnerships with local, State, and Federal
- Tool to leverage funding and resources
- Action Plan

2

Goal of Safety Planning

- Reduce the frequency of fatal and serious injury transportation incidents through coordination of efforts by:
  - Elected officials / Council
  - Public
  - Administrators
  - Educators
  - Enforcement
  - Engineers
  - Emergency Medical Responders
  - And others…

3

Safety Plan Focus

- Not focused on any one funding source or program
  - Funding Available from Tribal Transportation Safety Funds.
- Focused on the modes that are most significant to the Community

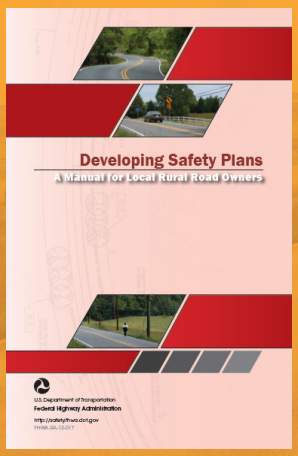
Its your plan!

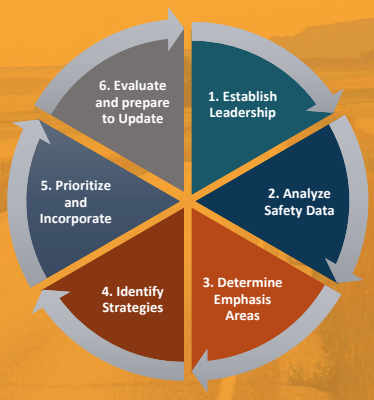
  - Roads
  - Trails
  - Winter Trails
  - Air
  - ATV



4

Safety Planning Process





5

Crash Data

- Data Based Plan
  - SD DPS Data (2013-2020)
    - Bennett County
    - *Jackson County
    - Oglala Lakota County
  - Tribal Enforcement
- Personal Knowledge

* - Crash Data obtained for Jackson County exclude crashes occurring on I-90

6

Previous SDDPS Data

- 2015 Tribal Transportation Safety Plan
  - Amended October 2018
    - 1,266 Reported Crashes (2006-2013)
    - Top Three Crash Types
      - Wild Animal (367 crashes or 29.0%)
      - Overturn Rollover (288 crashes or 22.7%)
      - Fixed Object (228 crashes or 18.0%)
    - Fatal Crashes (109 crashes)
      - Bennett County (10 crashes or 9.2%)
      - Jackson County (22 crashes or 20.2%)
      - Oglala Lakota (77 crashes or 70.6%)

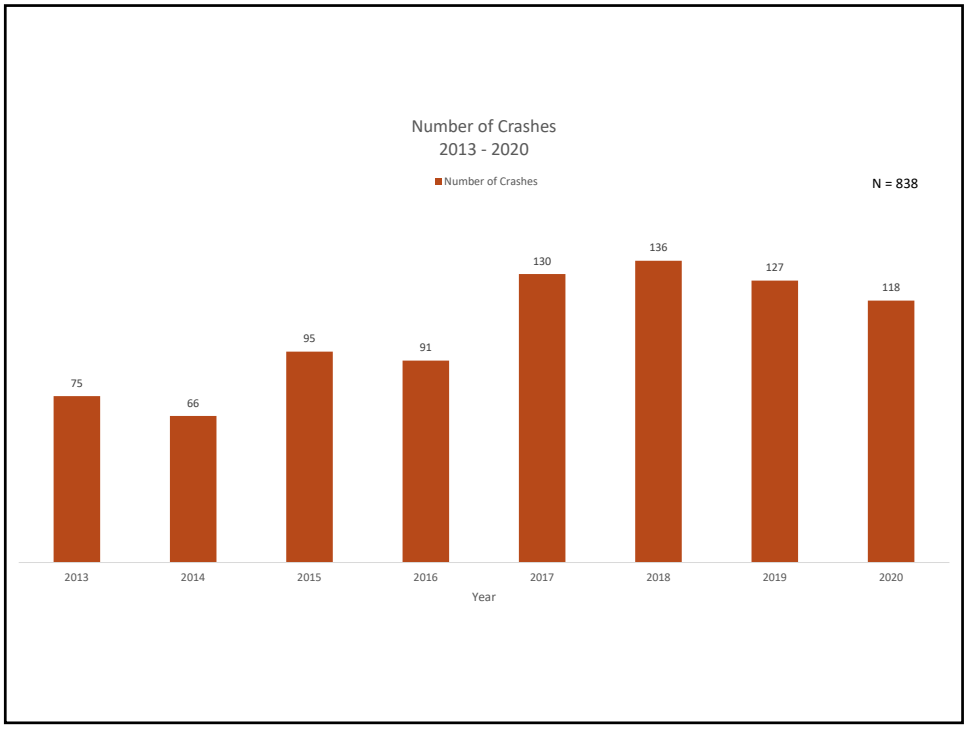
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Updated SDDPS Data

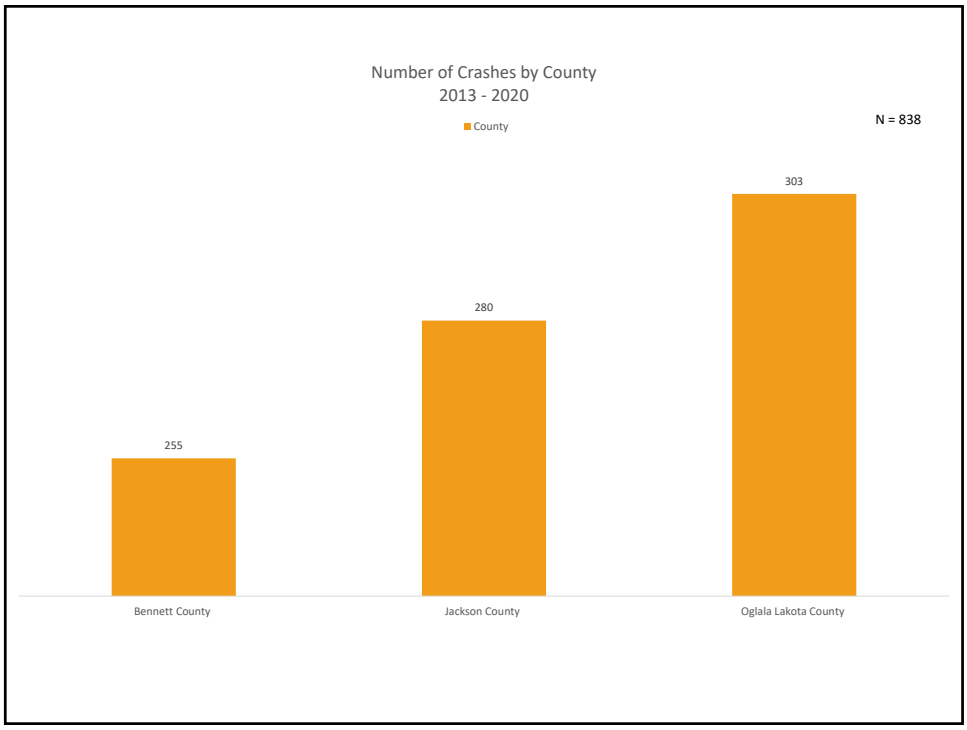
- SD DPS Data (2013-2020)
  - Bennett County
  - *Jackson County
  - Oglala Lakota County

* - Crash Data obtained for Jackson County exclude crashes occurring on I-90

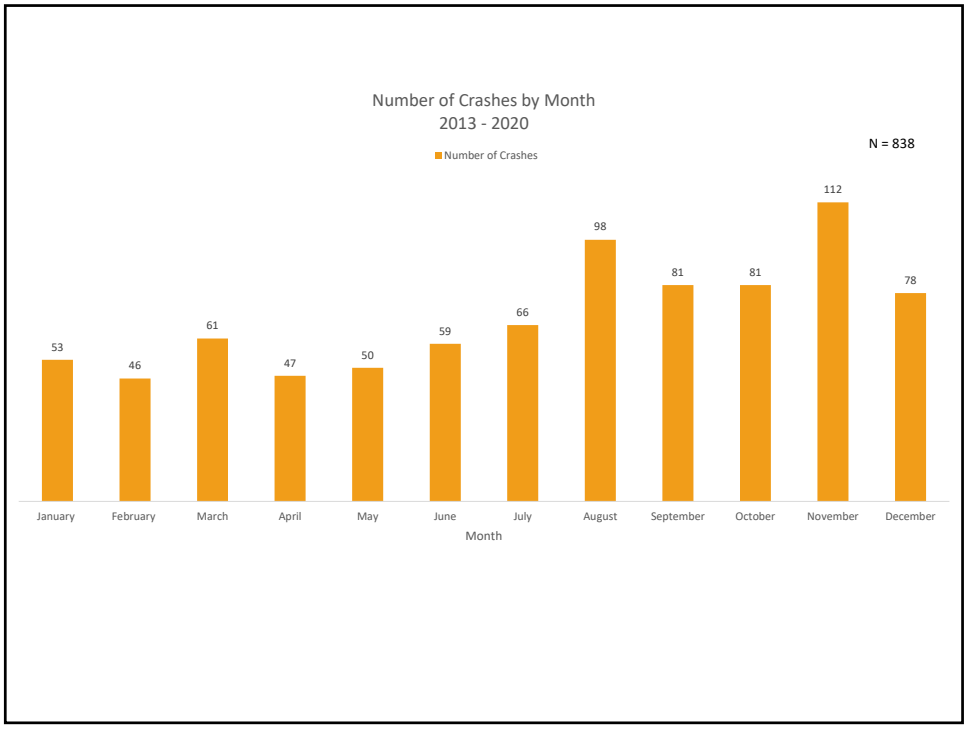
8


Number of Crashes
2013 - 2020
Number of Crashes
N = 838
75
66
95
91
130
136
127
118
2013
2014
2015
2016
2017
2018
2019
2020
Year

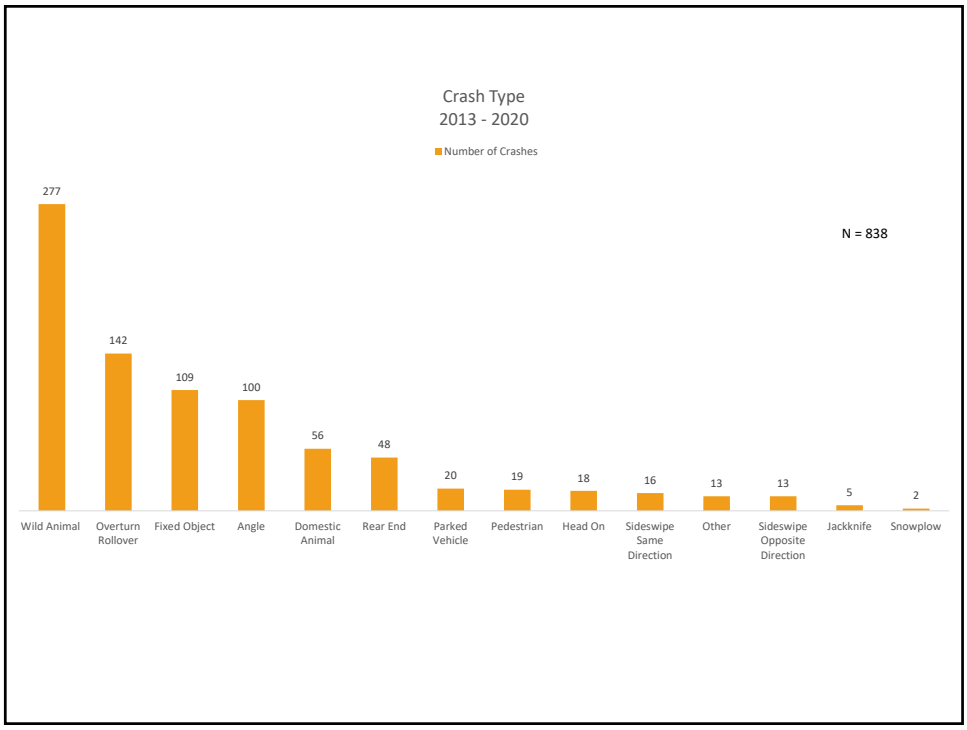
9


Number of Crashes by County
2013 - 2020
County
N = 838
255
280
303
Bennett County
Jackson County
Oglala Lakota County

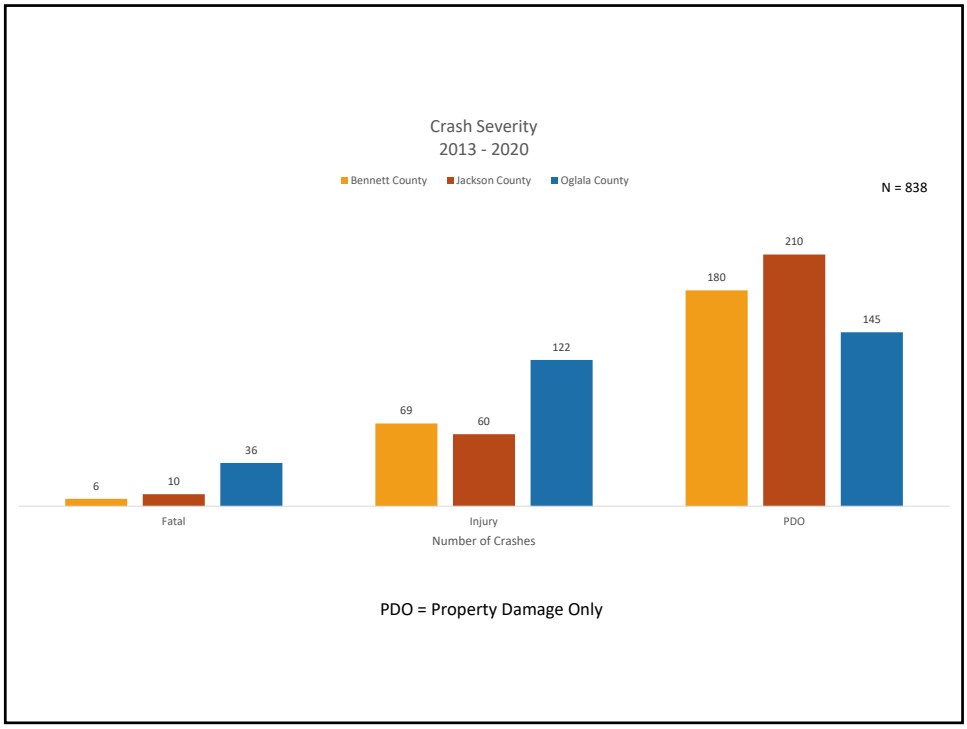
10


Number of Crashes by Month
2013 - 2020
Number of Crashes
N = 838
53
46
61
47
50
59
66
98
81
81
112
78
January
February
March
April
May
June
July
August
September
October
November
December
Month

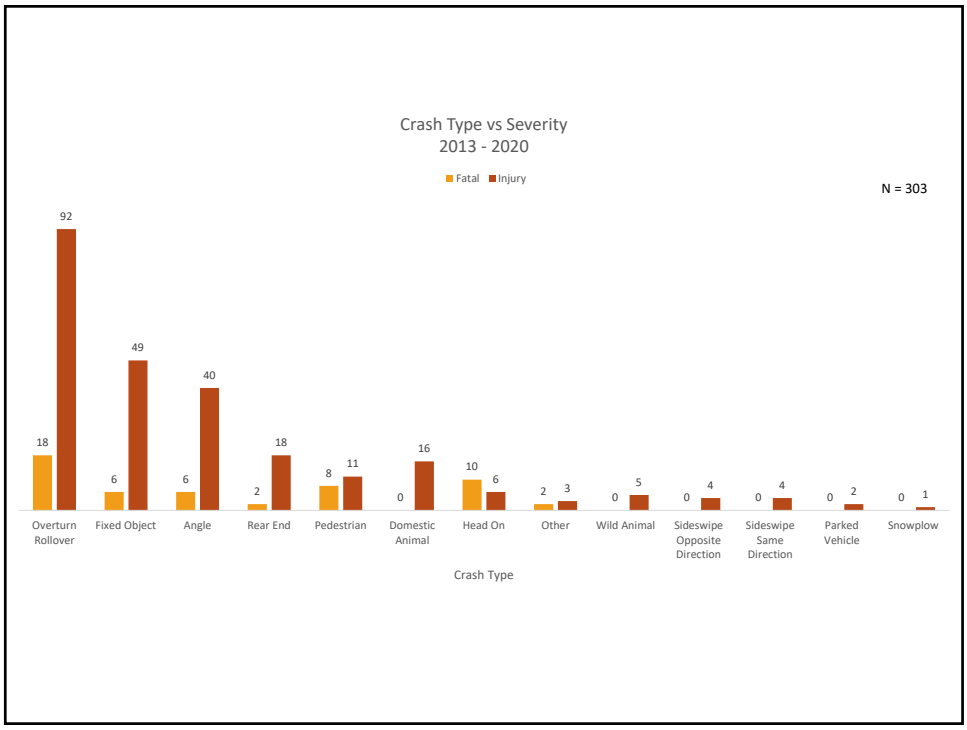
11


Crash Type
2013 - 2020
Number of Crashes
N = 838
277
142
109
100
56
48
20
19
18
16
13
13
5
2
Wild Animal
Overturn Rollover
Fixed Object
Angle
Domestic Animal
Rear End
Parked Vehicle
Pedestrian
Head On
Sideswipe Same Direction
Other
Sideswipe Opposite Direction
Jackknife
Snowplow

12


Crash Severity
2013 - 2020
Bennett County
Jackson County
Oglala County
N = 838
6
10
36
69
60
122
180
210
145
Fatal
Injury
PDO
Number of Crashes
PDO = Property Damage Only

13


Crash Type vs Severity
2013 - 2020
Fatal
Injury
N = 303
18
92
6
49
6
40
2
18
8
11
0
16
10
6
2
3
0
5
0
4
0
4
0
2
0
1
Overturn Rollover
Fixed Object
Angle
Rear End
Pedestrian
Domestic Animal
Head On
Other
Wild Animal
Sideswipe Opposite Direction
Sideswipe Same Direction
Parked Vehicle
Snowplow
Crash Type

14

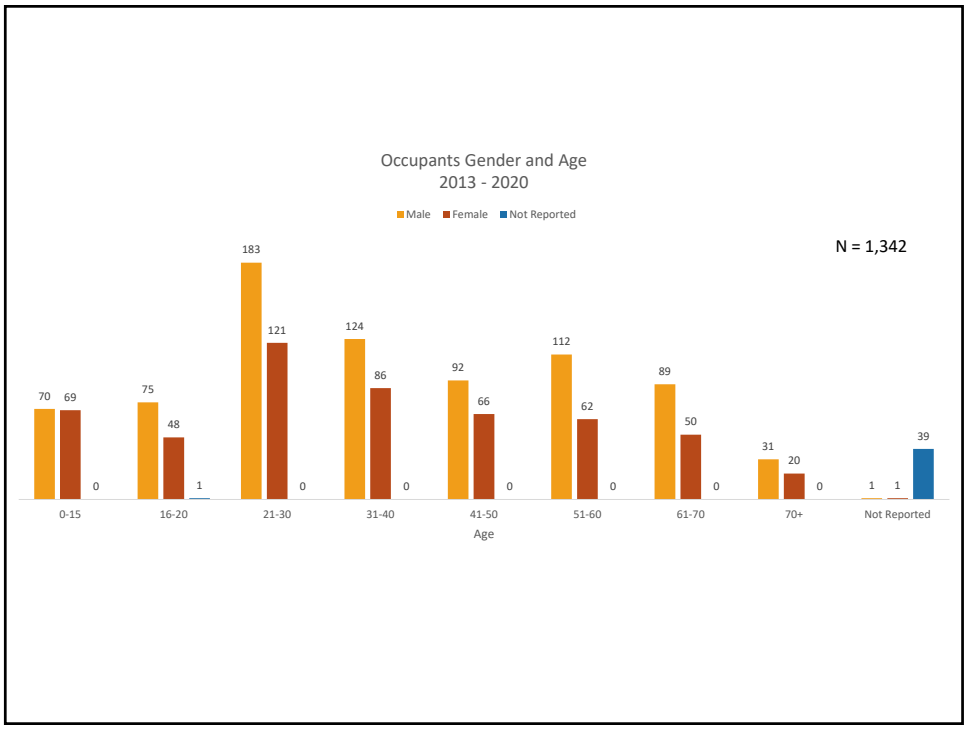
Crash Injury Severity	Number of Injuries	Percentage
Fatal injury	76	5.7%
Incapacitating	105	7.8%
No injury	507	37.8%
Non-incapacitating	129	9.6%
Not applicable	1	0.1%
Possible	272	20.3%
*Not Reported	252	18.8%
Total	**1342**	**100.0%**

* - Not Reported, Injuries Listed as Wild Animal Crashes

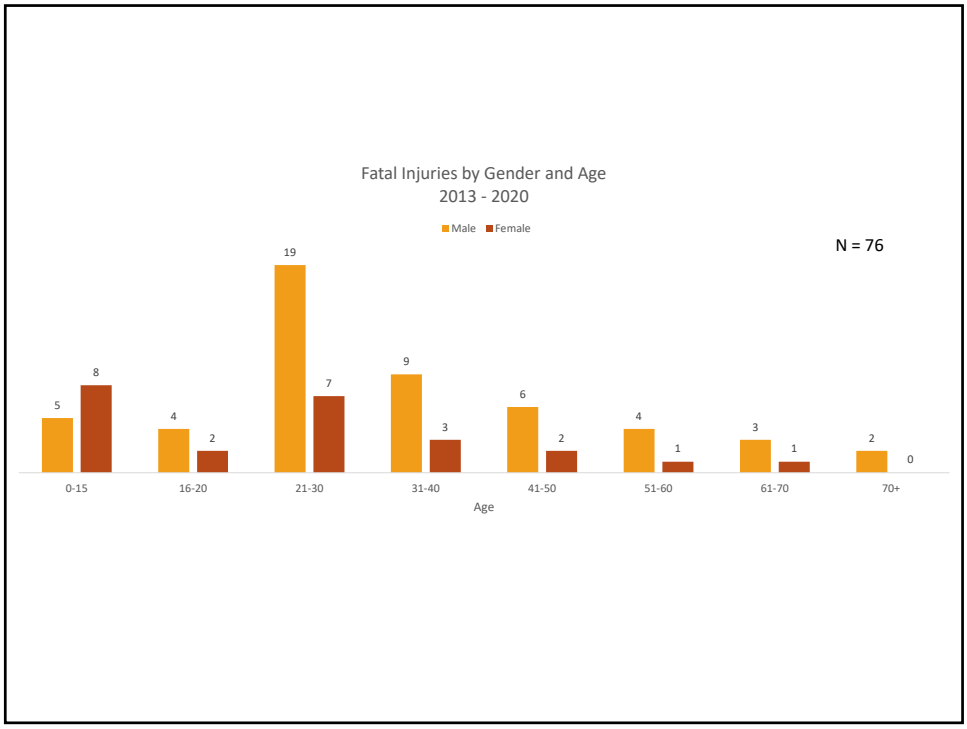
Type of Safety Equipment Used	Number of Occupants	Percentage
Child/Youth restraint system used properly	12	0.9%
Child/Youth restraint system used, not properly	2	0.1%
Eye protection only	11	0.8%
Helmet and eye protection	19	1.4%
Helmet only	2	0.1%
Lap belt and shoulder harness used	537	40.0%
Lap belt only used	17	1.3%
None used	328	24.4%
Not applicable	35	2.6%
Shoulder harness only used	5	0.4%
Unknown	107	8.0%
*Not Reported	267	19.9%
Total	**1342**	**100.0%**

* - Not Reported, Injuries Listed as Wild Animal Crashes

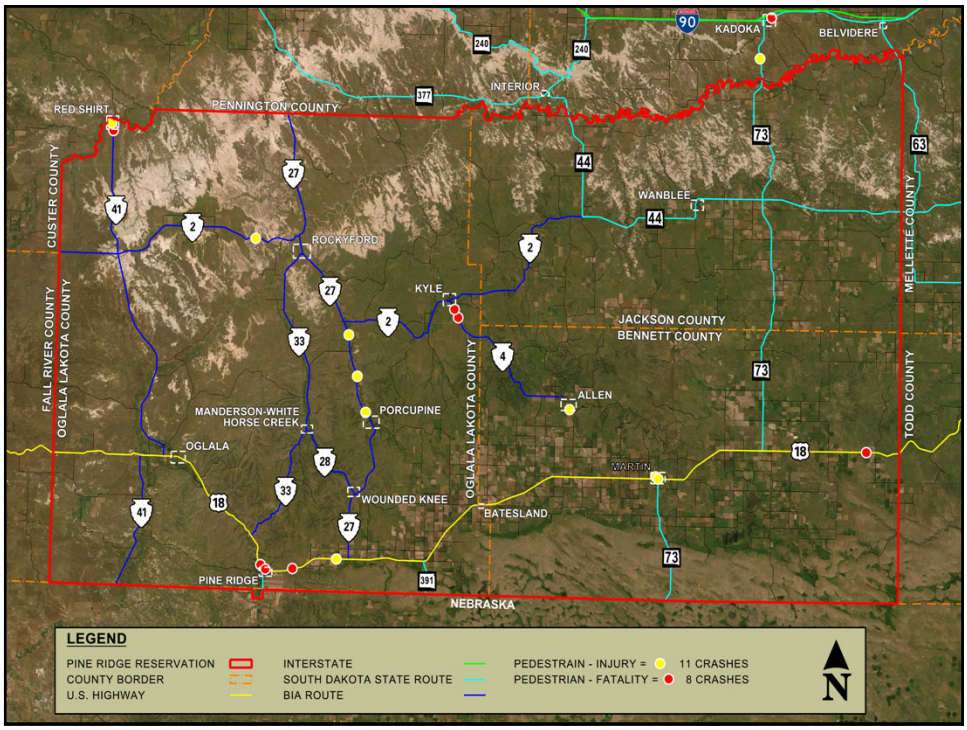
15



16


Fatal Injuries by Gender and Age
2013 - 2020
Male
Female
N = 76
5
8
4
2
19
7
9
3
6
2
4
1
3
1
2
0
0-15
16-20
21-30
31-40
41-50
51-60
61-70
70+
Age

17


RED SHIRT
PENNINGTON COUNTY
INTERIOR
KADOKA
BELVIDERE
WANBLEE
ROCKYFORD
KYLE
JACKSON COUNTY
BENNETT COUNTY
ALLEN
PORCUPINE
MANDERSON-WHITE HORSE CREEK
OGLALA
WOUNDED KNEE
BATESLAND
MARTIN
PINE RIDGE
NEBRASKA
CUSTER COUNTY
FALL RIVER COUNTY
OGLALA LAKOTA COUNTY
MELLETTE COUNTY
TODD COUNTY
LEGEND
PINE RIDGE RESERVATION
COUNTY BORDER
U.S. HIGHWAY
INTERSTATE
SOUTH DAKOTA STATE ROUTE
BIA ROUTE
PEDESTRAIN - INJURY = 11 CRASHES
PEDESTRIAN - FATALITY = 8 CRASHES
N

18

Existing Safety Programs

Existing Safety Programs from 2015 Safety Plan

- Constructed Separated Shared-Used Pathways
- Received Safety Grants
- Highway Signing has been Updated
- Tribal Police using TraCS
- Rumble Strips installed on BIA 27 and BIA 41
- Reconstruction of US Highway 18
- Seat Belt Education and Provided Child Seats
- Safety Information and Announcements featured on Local Radio
- Use of Speed Monitoring Trailers
- Traffic Safety Officers
- Stricter penalties for DUI's
- Primary Seat Belt Law implemented

19

2016 Implementation Strategies

Education Strategies

- Develop a Reservation-Wide Transportation Safety Education Program

Enforcement/EMS Strategies

- Provide Increase Safety Enforcement or Tribal Highway Safety Officers
- Develop a Livestock Ordinance and Enforcement Team for Livestock Roundup
- Develop an Enhanced 911 System
- Provide Improved Communications Equipment
- Establish a Motor Carrier Safety Program

20

2016 Implementation Strategies Continued

Engineering Strategies

- Install School Zone Signing with Flashing Beacons
- Participate in Safety Projects for Signing, Striping and Rumble Strips
- Conduct Road Safety Audit on BIA, Tribal and County Roadways
- Develop Multi-Use Pathways and Pathway Lighting Projects
  - Kyle Pathway
  - Manderson Pathway
  - BIA 407 Pathway
  - Wanblee Pathway
  - Allen Pathway
  - Porcupine Pathway
- Provide Remote Weather Monitoring Stations

Safety Planning and Other Strategies

- Develop Social Media Page for Safety Reporting

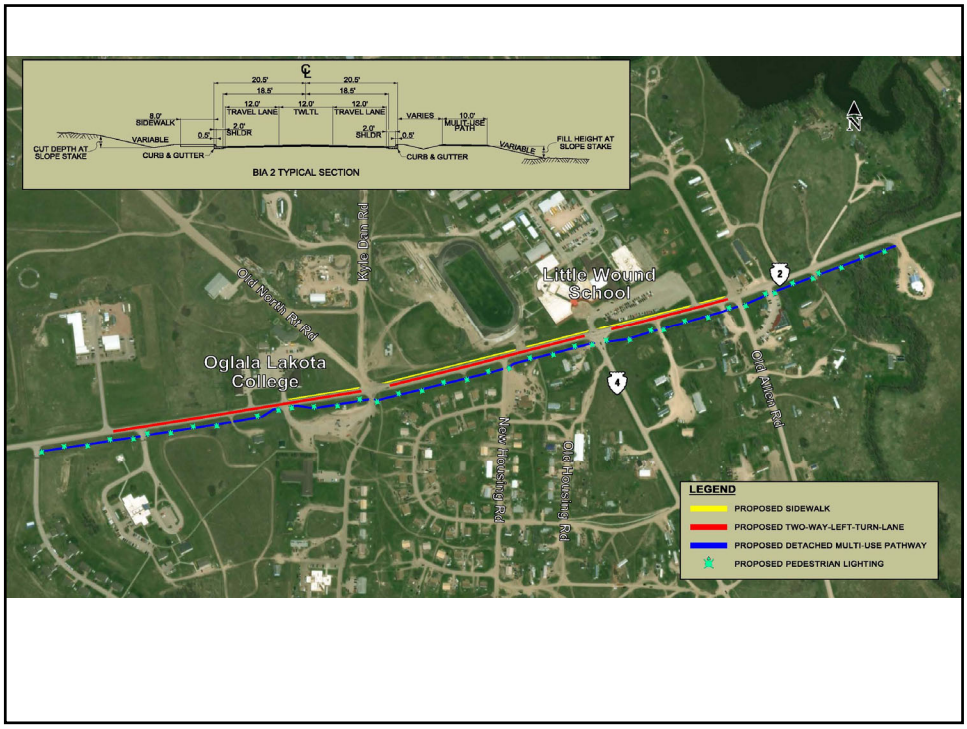
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2018 Road Safety Audit

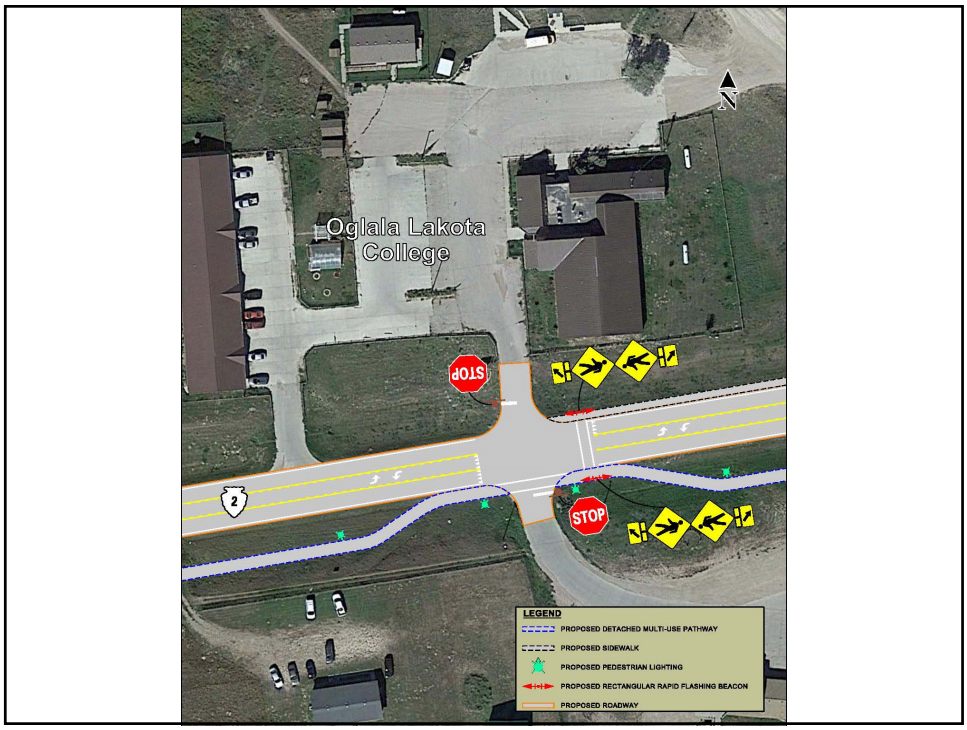
Road Safety Audit was Limited from Sharps Corner to South Dakota State Highway 44

- Recommended Safety Improvements
  - Urban Section
    - Install Separated Shared Use Pathway
    - Install Sidewalks
    - Install Signed, Marked Crosswalks
    - Install Pedestrian Rectangular Rapid Flashing Beacons
    - Install Two-Way Left Turn Lanes
    - Install All-Way Control at Intersection
  - Rural Section
    - Install Guardrail
    - Install Shoulder Rumble Strips
    - Install Delineators
    - Install Retroreflective Signs
    - Install Horizontal Alignments Signs
    - Improve Horizontal Alignment
    - Add Shoulders and Flatten Side Slopes
    - Flatten Crest Vertical Curve
    - Remove Fixed Objects from Clear Zone

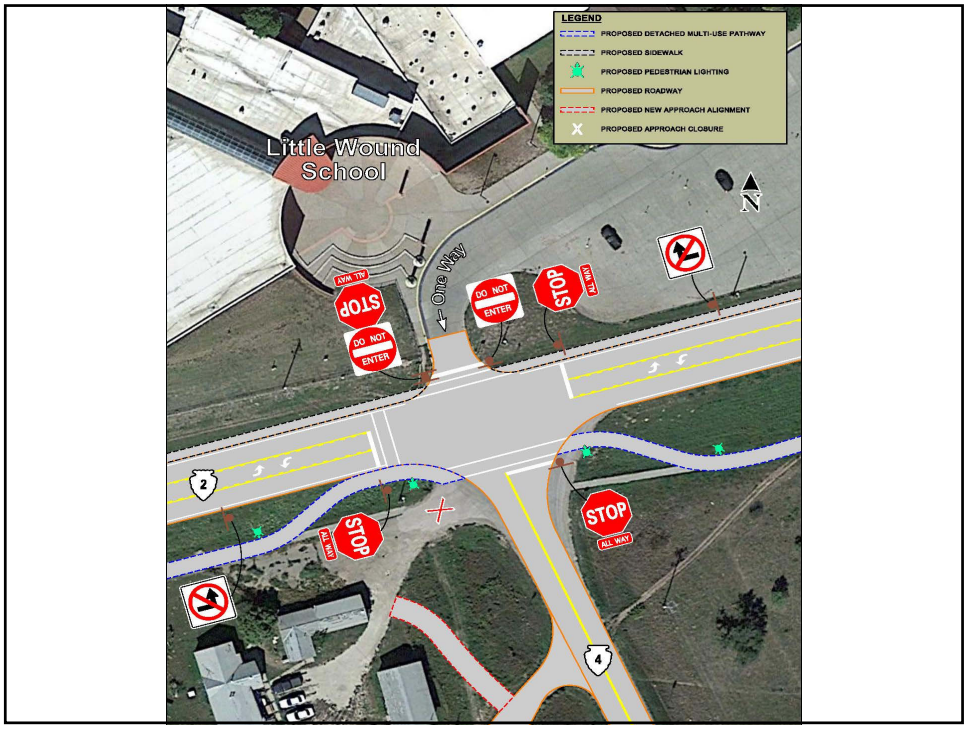
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BIA 2 TYPICAL SECTION
Little Wound School
Oglala Lakota College
Old Airport Rd
Kyle Loop Rd
New Housing Rd
Old Housing Rd
LEGEND
PROPOSED SIDEWALK
PROPOSED TWO-WAY-LEFT-TURN-LANE
PROPOSED DETACHED MULTI-USE PATHWAY
PROPOSED PEDESTRIAN LIGHTING

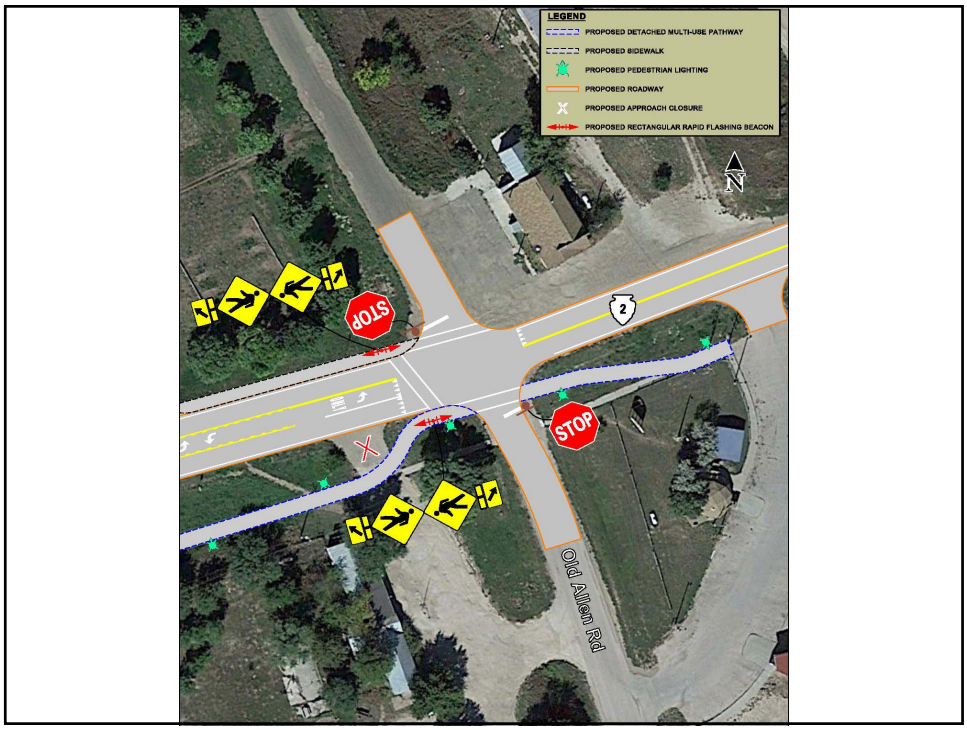
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Oglala Lakota College
STOP
STOP
LEGEND
PROPOSED DETACHED MULTI-USE PATHWAY
PROPOSED SIDEWALK
PROPOSED PEDESTRIAN LIGHTING
PROPOSED RECTANGULAR RAPID FLASHING BEACON
PROPOSED ROADWAY

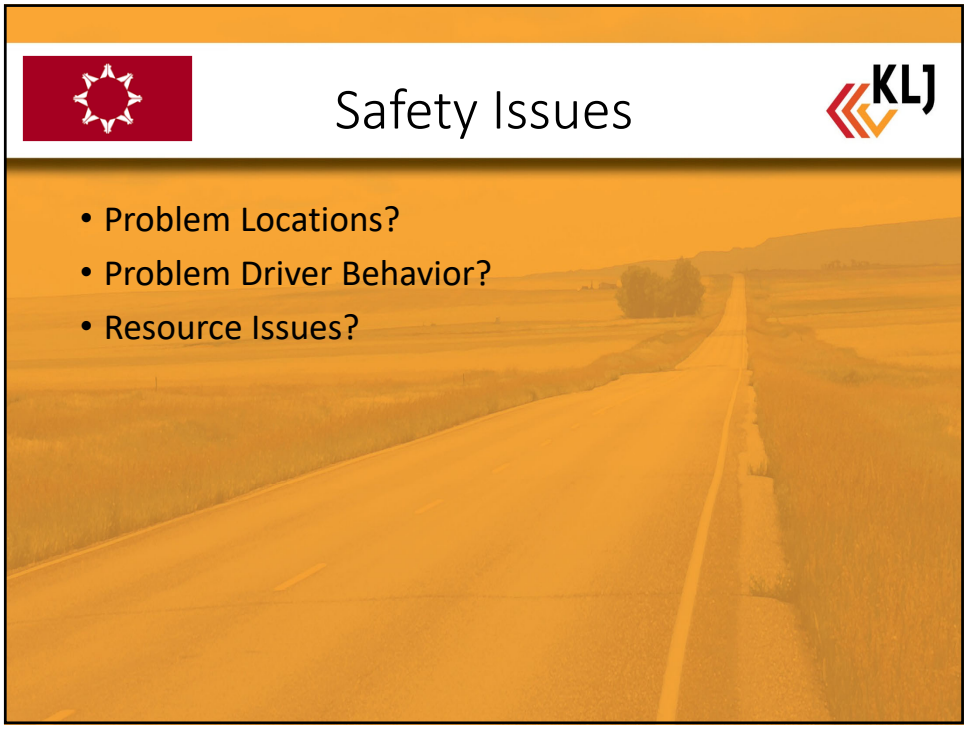
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LEGEND
PROPOSED DETACHED MULTI-USE PATHWAY
PROPOSED SIDEWALK
PROPOSED PEDESTRIAN LIGHTING
PROPOSED ROADWAY
PROPOSED NEW APPROACH ALIGNMENT
PROPOSED APPROACH CLOSURE
Little Wound School
One Way
STOP
ALL WAY
DO NOT ENTER
N
2
4

25


LEGEND
PROPOSED DETACHED MULTI-USE PATHWAY
PROPOSED SIDEWALK
PROPOSED PEDESTRIAN LIGHTING
PROPOSED ROADWAY
PROPOSED APPROACH CLOSURE
PROPOSED RECTANGULAR RAPID FLASHING BEACON
STOP
N
2
Old Alien Rd

26


Safety Issues
KLJ
• Problem Locations?
• Problem Driver Behavior?
• Resource Issues?

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Safety Countermeasures
KLJ
• Strategies to Improve Safety

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Questions and Discussion
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